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IN COLLABORATION WITH

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Tengku Adil Tengku Izhar
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PREFACE


The conference continues to bring together experts, academics, researchers, professionals, and students from the discipline of library and information science as well as other information related field in order to push forward the boundaries of research, academic and practitioner in the era of digital data and age. We hope this conference be the milestone to motivate further collaboration not only among the Asia-Pacific region but also across the world, to enhance the LIS education and best practice through knowledge sharing among the professionals.

This year, we accept over 40 research papers from different countries in the parallel sessions and inclusion in this Conference Proceedings. We also receive posters presented in this conference.

The editors would like to express their sincere gratitude to all participants which include authors, program committee and volunteers. Without those support the conference and proceedings would not reach such quality and this conference will not have been materialized.

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The Status of Documents and Related Concepts in Translation and in Library Science*

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Abstract. This paper examines how language expressions are dealt with in translation and in library science. In doing so, we consolidate what we may call the *documentational* perspective toward language expressions and confirm that translation and library science take this perspective in contrast with the *linguistic* perspective. We introduce a terminology that helps us talk about language expressions and related concepts from these two different perspectives. We argue that properly understanding the documentational perspective is essential for maintaining the area of learned use of languages in the face of the rapid technical development of language processing.

Keywords: Document, Language, Language Processing.

Introduction

Library science and translation currently face a common issue1, which originates from the fact that documents have become available in electronic form and become the objects of automatic processing by the computational approach.

Library science has traditionally dealt with what we may call documents2 (books, articles, etc.)3 as the smallest basic unit and developed means to properly and effectively manage them. As documents have increasingly been distributed in electronic form, it has become possible to manipulate units smaller than documents. Not only documents, but pages, passages and other information units are handled and consumed as basic units on the Internet. Automatic processing of these units has been developed greatly and it is widely held that the computer science-oriented approach and the library and information science-oriented approach will converge in the form of information retrieval (IR) or natural language processing (NLP). But is it the case, empirically? And should it be the case, theoretically? For instance, are the “passages” or “paragraphs” identified in library science the same as those dealt with in more

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1 While fully acknowledging that the juxtaposition of “library science” and “translation” involves a little categorical twist, we use these terms as it makes the discussion of the units and other issues easier and more consistent.

2 While this use of “documents” here is not precise in view of the standard use of this term in library science, we use it this way in this paper to make the contrast with “texts” clearer in later discussion.

3 We use such words as “books” etc. loosely, as we are here concerned with clarifying the points of view towards documents and not with rigidly examining the well-established types of documents.
computer science-oriented IR or NLP? While existing work on documents in library and information science has attempted to consolidate the denotational range of documents, it has not explicitly dealt with the issue addressed in this study [4,5,25,26].

In translation, the basic unit is also a document, although it is not the smallest unit that translation deals with. Neural machine translation (NMT) has greatly improved the fluency of target language (TL), to the extent that some claim that NMT will soon outperform human translation. But can the current language processing approach to machine translation (MT) theoretically reach the level of human translation? Is translation a language processing task in the first place, as most MT researchers and developers assume?

Should the answer to these questions be negative, how can we characterise the status of documents and related concepts as perceived and dealt with in translation and library science as distinct from corresponding, seemingly similar or common concepts in IR, NLP or related computer science-oriented information processing approaches? This paper addresses this question. We examine translation and library science together because they share the same problematique in the era of data-driven language and document processing and also because examining issues of translation helps to shed light on issues in library science and vice versa. This paper is a follow-up to a paper published in A-LIEP ten years ago [21], taking into account the recent development of NLP technologies and from the points of view of translation and library science rather than from the technological point of view.

The rest of the paper is organised as follows. In chapter 2, we examine and clarify the status of translation in contrast with machine translation, behind which lies views on language expressions commonly adopted in NLP and in linguistics. Through this examination, we consolidate the status of documents and related concepts as perceived in translation, contrasting them with related concepts used in NLP and linguistics. In chapter 3, we examine the status of documents and related concepts in library science and show that it is close to the status of these concepts in translation. In chapter 4, we consolidate the theoretical nature of the units dealt with in translation and library science, and argue that they are the basic units that the learned use of language in general is concerned with. Chapter 5 concludes the paper.

Translation and the Status of Documents

Much has been said about the difference between human translation and machine translation, with some carrying out empirical comparisons and some examining viewpoints of comparison; some focusing on specific items and some talking about general performance [1,7,14,24,33]. Rather than examining general differences between human and machine translations, here we pick up some typical examples that help us understand the essential difference between human translation and machine translation, and enable us to consolidate the status of documents and related concepts in human and machine translations.

Where MTs Fail

Let us start by considering translating the following passage into, for instance, Japanese [20]:
States Parties shall assure to everyone within their jurisdiction effective protection and remedies, through the competent national tribunals and other State institutions, against any acts of racial discrimination which violate his human rights and fundamental freedoms contrary to this Convention, as well as the right to seek from such tribunals just and adequate reparation or satisfaction for any damage suffered as a result of such discrimination.

As this is Article 6 of the International Convention on the Elimination of All Forms of Racial Discrimination, which has been ratified by Japan (with a reservation to Article 4), its official Japanese version exists. Therefore, unless otherwise specified (e.g. if the TL document is targeted to primary school children), the correct translation is to use the Article 6 of the official Japanese version.

Trying to create a Japanese text that has “the same” meaning as the meaning given by the SL text falls desperately short of translation in its proper sense. MT systems, including Google NMT, nevertheless do this⁴. MT systems, be they rule-based, example-based, statistical or neural, cannot properly translate this passage, because they regard “translation” as a linguistic process. While current MT research recently goes beyond sentence-to-sentence translation and developing methods to take into account contextual information [28,37], “context” remains merely linguistic, and cannot, both *ipso facto* and *ipso jure*, properly deal with the case above.

The above example is not an isolated one. Proper names also defy the criteria of semantic equivalence. “東京工業大学” (Tokyo Kougyo Daigaku), for instance, should be translated as “Tokyo Institute of Technology”; we cannot translate it as “Tokyo University of Technology,” “Tokyo Institute of Engineering,” etc., although semantically they both can be regarded as maintaining equivalence, because Kougyo means Engineering or Technology, and Daigaku means University. In the same manner, “ICC ローマ規程,” “ICC 規程,” and “ローマ規程” should be “ICC Rome Statute,” “ICC Statute,” and “Rome Statute,” respectively in English. Similarly, “ジェノサイド犯罪” in legal documents should be “the Crime of Genocide” in English. Table 1 shows how they are translated into English by Google Translate⁵. Only two English expressions are correct, and that only two were correct means that Google Translate does not satisfy the criteria required for professional translation.

<table>
<thead>
<tr>
<th>Japanese</th>
<th>English</th>
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<tbody>
<tr>
<td>ICC ローマ規程</td>
<td>ICC Rome Statute</td>
</tr>
<tr>
<td>ICC 規程</td>
<td>ICC Regulations</td>
</tr>
<tr>
<td>ローマ規程</td>
<td>Roman Code</td>
</tr>
<tr>
<td>ICC 規程はジェノサイド犯罪も定めている。</td>
<td>The ICC Code also defines genocide crimes.</td>
</tr>
<tr>
<td>ICC 規程はジェノサイド犯罪も定義している。</td>
<td>The ICC Statute also defines genocide crimes.</td>
</tr>
</tbody>
</table>

⁴Indeed, those who are not trained with translation practice tend to do the same, according to the author’s experience in translation seminars and workshops.

⁵https://translate.google.com. The data were obtained on 10 July, 2019.
“ICC Statute” etc. can be regarded not only as a proper name but also as a technical term. Technical terms also require similar treatment in translation. For technical terms, consistently using the same TL terms that correspond to the SL terms is *sine qua non* in proper translation; using expressions that have equivalent meaning within a given context does not make sense. While technical terms linguistically consist of single or multiple words [6], they require different treatment from ordinary words or multiword expressions [34]. This is because terms are functional classes of lexical items [36]; they are socially – not linguistically – consolidated because terms are identified as terms within the activities of the specialized domain [35]. Analogically speaking, they are more like pets than dogs or cats; the concept of “pet” is social, while “dog” and “cat” represent species. It is a logical consequence of the fact that MT systems deal with texts as *linguistic* entities that they cannot deal with technical terms properly.

**Language Expressions/Texts and Statements/Documents**

We have so far used some of the key terms rather informally, resorting to the general understanding of the concepts referred to by these terms. Here we clarify these terms and, in so doing, make clearer the status of documents and related concepts in translation and machine translation.

Let us start from borrowing the words of Michel Foucault [11]:

> The question that the analysis of *langue* raises, in the face of a certain fact of discourse, is always: from what kind of rules was this *statement* constructed, and, consequently, from what kind of rules can other *statements*, which resemble this one be constructed? The description of discourse raises a completely different question: how is it that this *statement*, and nothing else in its place, appeared? *" (the author’s translation)*

We can observe two different points of view here.

The first is the analysis of language, which targets, in the face of a given language expression, the range of “well-formed” expressions to which the given expressions belong. The most typical research representing this point of view is the research of syntax, which aims to establish a finite number of syntactic rules with a lexicon containing a finite number of lexical items to describe an infinite number of well-formed sentences [8,27]. Let us call this point of view *linguistic*, the object of study *language*, and the expressions perceived from this point of view *language data*. The research fields of *linguistics* and *natural language processing* or *computational linguistics* are based on this point of view⁶. Research from this point of view has extended its target well beyond sentences and now addresses a wider range of units both in terms of size (e.g. text linguistics or discourse studies) and/or in terms of relevant factors (e.g. socio-linguistics). We use *texts* to express some units larger than sentences, and *corpus* to refer to the collection of texts as perceived within the linguistic point of view. We

⁶ “La question que pose l’analyse de la langue, ‘a propos d’un fait de discours quelconque, est toujours : selon quelles règles tel ‘énoncé’ a-t-il ‘été construit, et par conséquent selon quelles règles d’autres ‘énoncés semblables pourraient-ils ‘être construits? La description du discours pose une toute autre question : comment se fait-il que tel ‘énoncé soit apparu et nul autre ‘a sa place?’”

⁷ Note here that existing MT systems accept any “well-formed” SL sentences as “translation.”
also use *discourse* and *linguistic context* to refer to what are normally referred to by the terms discourse and context.

The second is what Foucault called “la description du discours,” which addresses, in the face of a given language expression, the question: how did the given expressions and nothing else actually appear. This is the point of view adopted in translation; translators are concerned with a given document as a unique entity. Language expressions here are dealt with as expressions engraved with a particular time and space in which they are uttered and possibly with the name of the utterer. Let us call this point of view *documentational*, the target of study *language expressions*, and the expressions perceived from this point of view statements. The specialized activity of *translation* and the research field of *library science* are based on this point of view. Interestingly, while we can naturally say “translating a book” or “translation of a book,” such expressions as “linguistic analysis of a book” cause a mismatch of categories and are not normally used in English. We use *documents* to express a coherent textual unit dealt with in translation and library science, and *archive* to refer to the collection of documents as recognized from this point of view. We also use *discours* (borrowed from French) and *documentational context* to refer to the discourse in its concrete sense and the concrete units that surround some expressions and make them meaningful.

Table 2 lists the terminology we adopted above to contrast linguistic and documentational points of view. This clarifies the reason why MTs failed in the translation tasks; these cases are related to elements that have to be treated as something unique or fixed socially and/or historically. Equivalence of meaning as defined in linguistics falls short of dealing with unique passages from a document that attains a unique legal status in the world, unique elements that represent social organisations or individuals, or technical terms established and accepted in research communities that exist in reality [19].

Table 2. Contrast of terms in linguistic and documentational approach.

<table>
<thead>
<tr>
<th>Viewpoint</th>
<th>linguistic</th>
<th>documentational</th>
</tr>
</thead>
<tbody>
<tr>
<td>Target</td>
<td>language</td>
<td>language expressions</td>
</tr>
<tr>
<td>General expressions</td>
<td>language data</td>
<td>statements</td>
</tr>
<tr>
<td>Basic coherent unit of expressions</td>
<td>texts</td>
<td>documents</td>
</tr>
<tr>
<td>Collection of coherent units</td>
<td>corpus</td>
<td>Archive</td>
</tr>
<tr>
<td>Meaningful sequence of expressions</td>
<td>discourse</td>
<td>discours</td>
</tr>
<tr>
<td>Environment of focal expressions</td>
<td>linguistic context</td>
<td>documentational context</td>
</tr>
</tbody>
</table>

Translation consists of processing documents rather than texts, and requires a documentational approach rather than a linguistic one. Note that this is what we normally do in our learned use of language in general. No researcher, for instance, writes a paper based on a random sampling from a collection of papers contained in a “bal-

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8We have the established term “philological,” but this obscures the current problematique that translation and library science have. We thus did not adopt this term.

9We will keep using this word in a dual sense, one in a general sense and the other in a narrow sense established here. Which is meant will be easily identified in each context.
anced” corpus, or regards related work as something that could have been different from what s/he has now. No translator, to the extent that s/he deserves the title, resorts to randomly chosen texts to validate their expressions in translation or to check information related to expressions occurring in an SL document. The domain of translation shows that this point of view is not only (perhaps unconsciously) adopted in subject-oriented activities such as scientific research, but is also observed in our learned use of language in general. We can understand translators and library scientists as specialists who deal with our learned use of languages.

Incidentally, it is interesting to observe that a macroscopic shift of translation competences discussed in translation studies has happened in the past decades, i.e. the description of competences has extended from language competences [38] to competences that go beyond language processing [13]. European Master’s in Translation Competence Framework 2017 states that “a high level of language competence in at least two working languages ... should be a prerequisite” (the author’s emphasis) before starting the graduate level study for translation [10]. By using the terminology, we adopted in this paper, this shift can be described as a shift from the linguistic point of view to the documentational point of view in translation competences. This nicely emphasizes what translators do. What translators translate is individual documents. Only deploying general language knowledge is utterly insufficient in dealing with individual documents. This holds not only for literary works but also for technical documents that need to be translated in a similar manner to other, related technical documents, because how a document should be translated is decided for each document. In other words, a translator’s competence is more to do with what NLP researchers name “overfitting,” which is indeed essential in the translation.

Language Expressions and Library Science

Through the examination of the characteristics of translation, we consolidated two separate streams of concepts that correspond to two contrastive points of view one can take in the face of language expressions, as summarised in Table 2. We also saw that both translation and library science take the documentational point of view rather than or in addition to the linguistic point of view. For library science, it is a matter of course; the basic units in a library are books and other documents. What, then, is required in dealing with units smaller than books or articles in the library science approach?

System of Books and System of Expressions

We can take as a point of departure an op-ed in Forbes written by Panos Mourdoukoutas, published on 21 July 2018 and immediately deleted [29], which “call[ed] for all public libraries replaced by Amazon bookstores” [32], and criticisms of this article. While most criticisms rightly identified the importance of public libraries as a social infrastructure and claimed that they cannot be replaced by private services, in the context of the present discussion, the following point raised by a critique is relevant [2]:

A good public library offers a balanced collection across many topics, and it is absolutely fine if some materials rarely check out. The “Amazon library”
would quickly narrow down to just a handful of popular titles, leaving the community at large bereft of any variety and almost all culture.

Books and documents in libraries make a system and a unified whole. This point is most relevant to our immediate discussion on the status of documents in library science and what distinguishes libraries from bookstores or the Internet. The concept of a system is crucial for us to nurture knowledge which blocks us from getting into the world of filter bubble with biases [31], without even noticing that we are biased. The old but still important concept of ASK (anomalous state of knowledge) can be regarded as introducing this important concept in library science to IR, which may otherwise be regarded as a straightforward application of computer science technologies [3]. That a library collection constitutes a system of documents can also be observed from the fact that, for instance, in the process of doing master’s research, a supervisor would not accept a student’s claim that there is no related work in the past on the topic that the student picked up should the student search documents only on the web by using search engines. S/he is asked to do searches of the library catalogue and due databases accessible in the library. Even if a library may not provide a comprehensive list of all documents in the world, it provides a point at which you can stop searching documents, precisely because libraries maintain a system of documents and thus of knowledge. This enables users to evaluate not only what they found but also what they might have missed – an essential trait of knowledge. A proper IR system takes into account the concept of a system in library science. Incidentally, there is a report that traditional encyclopaediae are more systematic than Wikipedia [40]

By extrapolating this observation to units consisting of language expressions smaller than documents, we can state that library science has to process and manage language expressions within a system constituted by the expressions of the same level. Indeed, dictionaries deal with words in a manner analogous to libraries dealing with books [18]. Though research in dictionaries constitutes an independent field of lexicography [9], the fact that library science deals with reference tools and reference books, of which dictionaries constitute one category, shows the affinity between libraries and library science on the one hand and dictionaries and lexicography on the other.

In lexicography, corpus-based methods are widely used. Interestingly, however, the late Adam Kilgarriff, one of the most prominent corpus-based lexicographers, defined a so-called “apple,” “orange” and “banana” problem in corpus-based lexicography, which shows the contrast between a system of words in dictionaries and textual corpora that are regarded as language data. The problem can be stated as follows. Suppose you compiled a corpus of 10,000 word tokens, extracted a set of names of fruits, and obtained “apple” and “orange.” From the point of view of headword entries in a dictionary, if you include “apple” and “orange,” it is preferable to have “banana” as an entry in the dictionary as well. This is because the entries in a dictionary should constitute a system. Extending the corpus size does not provide a solution to this issue. If you extend the corpus size, you would be able to obtain “banana” successfully, but you would also obtain “mango” and “kiwi.” Then of course you need “papaya,” which is not in the extended corpus. The textual corpus does not reflect the system of words. Kilgarriff and his collaborators defined, in a corpus-based project of developing monolingual and multilingual word lists for language learners, a set of conceptual

Interestingly, individuals learn their first language as a system and as a unified whole [15], though this does not mean that the expressions they generate make a system.
domains and populated the domains with words independently for each language, without depending too much on the corpus [22]. We observe here that the system of words and meanings cannot be fully captured through corpus analysis.

That there are two points of view in the face of a set of language expressions and the essence of our language practice in the real world is more on the side of the documentational point of view is currently being recognized also by some cutting-edge NLP researchers, though informally. For instance, Taku Kudo, a Google NLP engineer who was involved in developing Google NMT, stated [23]:

> What makes NLP different from most other machine learning applications is that NLP tasks contain problems to solve in which knowledge is essential, as distinct from those tasks which data-oriented learning can do. Translating and transliterating proper names is one such task. ...

What is called knowledge here, or its representational forms, are what library science and lexicography deal with. By definition, knowledge is not something that could have been something different. Knowledge is systematic and constitutes in its own sphere as distinct from the textual sphere, and thus cannot be learned from textual corpora. In the language practice, it is this systematicity that enables us to evaluate what we obtained and what we did not. Makoto Nagao, one of the pioneers of natural language processing, tried to incorporate the library science point of view toward NLP [30], to transform the task of NLP from dealing with whatever is formally allowed to dealing with the learned use of languages.

**Dynamics in Library and Library Science**

Library practice may be regarded as passive and static. Library practice is sometimes regarded as little more than providing books, documents or information upon request by library users. After all, as each book is perceived as a unique entity in history, is it not the case that library practice is something like the task that natural historians were doing in the past, the whole task of which is to collect and categorise the items? This is the misunderstanding that underlies the Forbes article we saw above. Translation, in contrast, is generally regarded as a generative and dynamic process, even though it also takes a documentational point of view in the face of language expressions. There seems to be two reasons for this contrast. One is that translation is perceived as a linguistic process rather than a documentational process. The other is that what translators generate is what readers directly read, while what librarians generate is the environment that enables library users to choose what they read.

Within the field of library science, though, it is well established and understood that library practice is dynamic and generative. The most relevant aspect within the context of this article is concerned with maintaining the system of books. In library science, this is covered in collection development, which is one of the core tasks of library practice [16]. While libraries in the world together aim for, at least as a regulatory ideal, is to collect all the documents that ever existed in the world exhaustively, the basic operating unit is individual libraries. In each library, librarians make decisions about which books are to be added and which are not, in order to construct and maintain the system of books. In making these decisions, librarians in a library exam-
ine not only books that clients would find in the library but also those that clients would not, because they are not accepted as a part of the collection.

We can now observe the parallelism between translators’ task and librarians’ task again here. They involve decision making [16,39], and in the process they take into account possible alternatives that are not chosen and thus do not become visible after the decisions have been made. Upon this understanding, we can contrast the concept of dynamics in translation and library science with that in linguistics and natural language processing. On the one hand, the dynamics dealt with in translation and library science always lead to, in each synchronic state, a concrete existence, be it a translated book or a library collection. As such, the dynamics of language expressions from a documentational point of view are always concerned with the realistic possibility of existence [17]. This process is often not visible to end users. On the other hand, the dynamics dealt with in linguistics and natural language processing is concerned with mechanisms that are related to possible expressions, be it something materialized as concrete existence in history, an ephemeral utterance, some imaginary existence, or something that remains a theoretical possibility. We can call this “formal possibility.” It seems that we can more easily conceive of the latter type of dynamics.

The Sphere of Language Practice

Documentational point of view and learned use of language

We have recognized the parallelism between translation and library science. We have not yet, however, examined how the concept of systematicity, introduced in previous section in the process of examining the nature of library science, can be relevant to translation. In the process of producing TL documents in translation, translators examine multiple possibilities before choosing the expression actually used in the TL document. Generally speaking, the quality of translation depends on how systematically these possibilities have been examined. As the possible alternatives examined in the translation process do not appear anywhere in the TL document, the requirement that translators should systematically examine possible alternatives for a TL expression remains invisible. The concept of systematicity in library science is, in contrast, palpable in the form of a library collection.

As we observed in previous section, the generative and dynamic aspect can be more easily recognized with regard to translation, because people can imagine the translation as a process even though what they have is a completed translation of a book or document. The corresponding generative process in library activities as most typically represented by collection development is carried out behind the door by librarians, and is not normally visible to clients with average knowledge of libraries. The visibility of systematicity is different. In libraries, whether collection development has been carried out systematically or not is reflected in the collection, and visible to clients, at least partially. In translation, whether the TL documents are made after possible alternatives have been systematically examined or not is not directly reflected in the TL documents. It is only indirectly reflected in their quality.

While we have so far focused on translation and library science, many – or as a matter of fact, most – of our learned activities related to language or documents are not (just) linguistic but documentational, and essentially so. An author examines more than one expression at each part of her/his writing; s/he examines different arrange-
ments of textual parts and organizations of documents; s/he may try to publish what s/he wrote on different platforms. A good reader does not only read what is written but also what could have been written. Teachers score essays by trying to reconstruct possible worlds within which what is actually written makes better sense. We can easily see that these hold for oral discussion as well. At the level of books or documents, when we buy books, we do not choose books in isolation (“choose” books “in isolation” is already an oxymoron). Our activities as regards language expressions are inherently documentational; linguistic level is a prerequisite, to borrow a phrase from [10].

The theoretical unit

We approximated language expressions seen from the documentational point of view as “expressions engraved with a particular time and space in which they are uttered and possibly the utterer.” Now that we have seen that our language or document activities consist not only of what became visible but also of the process and functions that enabled what is visible to be created, it is necessary to adjust the theoretical characterisation of the language expressions as seen from the documentational point of view.

The theoretical unit operating in our learned use of language and documents in the documentational point of view is what we called “statements” (in Table 2), which is the English equivalent of what Michel Foucault called “´enonc´e” [12]. Foucault took great pain in consolidating the concept of “´enonc´e,” which is passively characterised. He states:

The statement, then, must not be treated as an event that occurred in a particular time and place, and that the most one can do is recall it – and celebrate it from afar off – in an act of memory. But neither is it an ideal form that can be actualised in any body, at any time, in any circumstances, and in any material conditions. Too repeatable to be entirely identifiable with the spatio-temporal coordinates of its birth (it is more than the place and date of its appearance), too bound up with what surrounds it and supports it to be as free as a pure form (it is more than a law of construction governing a group of elements), it is endowed with a certain modifiable heaviness, a weight relative to the field in which it is placed, a constancy that allows of various uses, a temporal permanence that does not have the inertia of a mere trace or mark, and which does not sleep on its own past11.

Unlike Foucault, who tried to grasp this unit theoretically, translation and library science – and the learned use of language in general for that matter – deals with it

11Translated by A. M. Sheridan Smith. The archaeology of knowledge and the discourse on language. Pantheon, New York (1971). “On voit que l’´enonc´e ne doit pas ˆetre trait´e comme un ´ev´enement qui se serait produit en un temps et en un lieu d´etermin´es, et qu’il serait tout juste possible de rappeler – et de c´el´ebrer de loin – dans un acte de m´emoire. Mais on voit qu’il n’est pas non plus une forme id´ee qui ne peut toujours actualiser dans un corps quelconque, dans un ensemble indiff´erent et sous des conditions mat´erielle qui n’importent pas. Trop r´ep´etable pour ˆetre enti´erement solidaire des coordonn´ees spatiales-temporelles de sa naissance (il est autre chose que la date et le lieu de son apparition), trop lourd pour que l’on puisse toujours actualiser dans un corps quelconque, dans un ensemble indiff´erent et sous des conditions mat´erielle qui n’importent pas. Trop lourd pour y dormir, une sorte de permanence temporelle qui n’a pas l’inertie d’une simple trace, et qui ne sommeille pas sur son propre passe.”
practically. It is always operating when we are using language in a learned way. A specific character of the statement, however, makes it difficult to perceive this fact and the nature of the statement [12]:

> Although the statement is not hidden, it is not visible either; it is not presented to the perception as the manifest bearer of its boarders and characteristics. It requires a certain change of viewpoint and attitude to be recognised and examined in itself. Perhaps it is like the overfamiliar that constantly eludes one; those familiar transparencies, which, although they conceal nothing in their density, are nevertheless not entirely clear. The statement level (only) emerges in its very proximity.”

This is the reason why, not infrequently, translators and library scientists cannot explicitly verbalise exactly what they are dealing with, or cannot explicitly differentiate their activities and agendas from more computer science-oriented approaches that deal with seemingly similar tasks.

**Conclusions and Outlook**

Starting from the observation of the points where MTs fail, we consolidated the sphere of activities concerned with language expressions, which may be characterised as *documentational*, and argued that both translation and library science are concerned with the documentational sphere in the face of language expressions. As a first approximation, this sphere can be regarded as consisting of language expressions unique in time and space. We then examined the status of the two concepts, i.e. dynamics and systematicity, in translation and library science. We finally clarified the nature of the basic units in this sphere.

In doing so, we proposed a terminology that can distinguish the linguistic view to language expressions and the documentational view to language expressions. While this terminology, listed in Table 2, should be useful for differentiating the documentational approach from the linguistic approach, it may still be difficult to make this sphere understood properly, as this basic unit is not visible due to its sheer proximity to our perception but at the same time it only manifests itself as is in its proximity. It is up to us to consolidate and verbalise this sphere in such a way that it can be shared by computer scientists. The task is of utmost importance for maintaining the sphere of the learned use of language in the era of data-oriented machine learning approach to natural *language* processing.

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12The author’s emphasis; Translated by A. M. Sheridan Smith with some modifications. “Or l’enonc’ e a beau n’être pas caché, il n’est pas pour autant visible; il ne s’offre pas à la perception, comme le porteur manifeste de ses limites et de ses caract’ères. Il faut une certaine conversion du regard et de l’attitude pour pouvoir le reconnaître et l’envisager en lui-même. Peut-être est-il le trop connu qui se d’érone sans cesse; peut-être est-il comme ces transparencies familières qui, pour ne rien receler dans leur épaisseur, ne sont pas pour autant données en toute clarté. Le niveau ‘énonciatif’ s’esquisse dans sa proximité.”
References


An Exploratory Study on the Information Avoidance Behavior of the Bachelor of Library and Information Science Students of the University of the Philippines Diliman in the Context of Academic Goal Progress

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Abstract. Much of the literature on information behavior explore information seeking. Active acquisition of information is attributed to knowledge and certainty, whereas avoidance has always been perceived as counter to the norm of information seeking. However, there are various motivations for which avoidance could be considered as a rational behavior. It is in this regard that this research explored avoidance behavior in the context of academic goal progress. The study employed self-administered survey to 44 Bachelor of Library and Information Science (BLIS) students in the University of the Philippines (UP) Diliman. The research tool used was adapted from Addison in 2017 and Dr. Freund’s Affect and Avoidance study design that examined avoidance in the context of personal health concerns. A pretest was conducted in order to determine monitoring behaviors practiced by students. These behaviors were used in the modification of the questionnaire. Further adjustments were made by the researchers based on their knowledge and observations on academic goal progress monitoring. Through qualitative analysis, it was found that avoidance of academic goal progress information is not very prevalent among UP BLIS students. Most students seek information on progress and know their status with respect to their academic goals. When they do avoid, it is to prevent distressing emotions. However, many students are also willing to accept inconvenient truths about their performance. Avoidance behavior is manifested when students procrastinate and when they actively delay obtaining available reports on academic progress from professors.

Keywords: Information Avoidance Behavior, Information Seeking, Academic Goal Progress.

Introduction

Information avoidance attempts to explain why people decide to remain unwelcoming of crucial information, regardless of their motives. With academic responsibilities and concerns taking up most part of the day of students every day, they deal with the choice whether to know or not know reports and updates on their progress. This would then determine their next course of action and would eventually have considerable consequences in school performance, as well as in mentality and attitude towards study.
According to Webb et al. [15], promoting lasting changes in behavior is an extremely significant challenge confronting science and society. In this fast-paced generation, most people are predisposed to finding quick solutions to alter their behavior in order to get fast, evident results. Since tracking progress religiously is a process and thereby takes time, its value is not realized by many. This could be a reason why “progress monitoring… has received relatively little attention to date” [1]. [Intentional ignorance of information] is part of popular culture and counters current scientific perspectives that suggest people will actively monitor and seek information on their progress [15]. On such grounds, this particular field of inquiry in information-seeking behavior is worth looking into.

As students of the University of the Philippines are often described as critical thinkers, it is interesting to investigate their avoidance behavior concerning academics – the area in which they highly excel. This research determines the extent avoidance behavior exists among UP BLIS students with regards to their academic progress; identify the students’ reason/s for avoiding information regarding their academic progress, and; identify the ways students avoid information regarding their academic progress.

Narayan [13] explains, “understanding why people choose to seek certain types of information and avoid others, and the specific factors involved in individuals’ information choice will help us design better information environments and information systems for both public and private life” (p. 1).

**Literature Review**

There is a myriad of scenarios in which information is valued and pursued. Individuals take in information so they can make rational decisions. This assumption, however, has been established to be not always true. According to Russell Golman [8], “people sometimes avoid information strategically - for example, a defense attorney might not want to know whether his client is actually guilty so he can put forth the best possible defense without being bound by the truth” (para. 7).

In Bernstein’s article in 2017, Dr. James Shepperd says people avoid stressful information because they might not have the financial, or as in the case of this research, psychological resources to deal with that information. “We want to think of ourselves as healthy and smart, people who make good decisions, so we resist information that challenges these beliefs,” (para. 5) he adds. People also avoid information if they do not trust it, perceive it as insignificant or would not help them, think it might force them into action they do not want to take, or if they see it posing anticipated regret [14].

Sweeny et al. [14] defined information avoidance as “any behavior intended to prevent or delay the acquisition of available but potentially unwanted information” (p. 341). Sometimes, people engage in this behavior by simply covering their ears, looking away, or physically leaving a situation to avert learning information [14]. In other instances, people go to greater lengths to avoid information, such as, never returning to the doctor for an update on the findings of a medical test, or perhaps forgoing even free and easy screenings entirely. Sweeny et al. also states that “information avoidance can be active (e.g., by asking someone not to reveal information) or passive (e.g., by failing to ask someone a question that would reveal the information)” (p. 341). In both cases, information is entirely not obtained. Sweeny et al. noted this as a defining characteristic of information avoidance.
This study explores avoidance within the confines of academic goal progress monitoring. According to Benn [2], “information on progress may be sought independently through self-monitoring or provided to people in the form of feedback”. In the higher education environment, feedback is obtained through the process of advising. Advocates are “central to retention and to student development” [6]. However, it is equally important that the students engage in advising and that they work to excel in their academic career.

Progress monitoring helps people gauge efforts needed for them to achieve their desired state, thus promoting goal attainment [9]. Harkin et al. [9] maintains that “monitoring goal progress… helps to ensure goals are translated into action” (p. 198). It is especially important for college students to self-monitor over the course of the semester, because they sometimes receive little feedback from their instructors, in the form of written assignments and tests. Cohen in 2015, maintains that students at the postsecondary level need to self-initiate tasks, monitor and evaluate their progress, and seek out help and enact the appropriate repair strategies when needed.

Webb et al. [15] claims “… there is an ostrich problem such that, in many instances, people have a tendency to ‘bury their heads in the sand’ and intentionally avoid or reject information that would help them to monitor their goal progress” (p. 794). The Ostrich Problem takes place when people prefer not to know how they are doing [15]. Jarrett [11] wrote, “…if [people are] comfortable with [their] current modus operandi, it can be very tempting to delude [themselves] that there is no need to change and avoiding progress monitoring is one way to do that” (para. 4). According to Webb et al. [15], when the Ostrich Effect takes place, people “intentionally fail to evaluate the implications of [relevant] information for their goal progress – in other words, they (in a functional sense) reject the information” (p. 795).

Too often, students have an obscure idea of their progress status in various requirements such as papers, reviewing for exams, and meeting deadlines, among others. An article by the American Psychological Association in 2015 claims the more often one monitors his/her progress, the greater the likelihood he/she will succeed. For this reason, the widespread tendency of people to not seek or pay attention to essential information about their goal progress when they could, even if achieving the goal is valuable to them, is considerably alarming and worth looking into.

Research Methods

A qualitative method of evaluating the information avoidance behavior of UP BLIS students was used. Descriptive analysis was employed to make deductions about the extent of such behavior among subjects.

A print survey questionnaire was utilized containing structured and open-ended questions. This instrument was extensively adapted from Addison [1] and Dr. Freund’s Affect and Avoidance study design that was used in Addison’s dissertation, *The Issue of Avoidance: Information Avoidance in the Context of Personal Health Concerns*. As Addison’s tool measured the phenomenon of information avoidance in terms of health concerns, modification of questions was necessary to tailor the research instrument to the intent of the present study.

In Addison’s questionnaire, basic information about the participants such as age and gender were gathered. This was no longer employed in the modified research tool as it is irrelevant to the study’s aim. Instead, the researchers performed a pre-test that determined the progress monitoring strategies commonly practiced by LIS students. This pre-test was conducted online via sending a Word document to several LIS stu-
The researchers asked them to share the ways by which they obtain information on their academic progress. Upon determining common practices, these habits were used to build the information-seeking demographics section of the questionnaire. Participants were asked to select all the strategies that apply to them. As for the scenarios, the researchers created five unpleasant situations concerning academics. These scenarios, which are characterized by inadequate performance, might have already been experienced by LIS students one way or another. Participants were asked how they would respond. The responses involve distressing emotions, depending on the behavior chosen. This section of the questionnaire was necessary to determine how most LIS students would likely behave in situations wherein avoidance is a viable but unwise option. There are six options to choose from in each scenario, ranging from active avoidance to active seeking of information. Three behaviors account for avoidance while the other three account for seeking.

Out of a total of 158 undergraduates of the BLIS program of UP Diliman for the Second Semester of Academic Year 2017-2018, forty-four individuals successfully participated in the survey. The said respondents who engaged in the survey were obtained using convenience sampling. The sole intervention done by the researchers in selecting respondents was merely being present in the physical area of study to give out questionnaires. She handed these to SLIS students who were in close proximity, regardless of level of acquaintance. Furthermore, the researchers were able to conveniently obtain respondents from the classes of some faculty members.

**Discussion and Results**

**Academic Progress Monitoring Strategies**

*Approaching the Professor for Firsthand Information*

Out of 44 respondents, only 26 (59%) consult with the professor for insights and comments on their work. With this finding, it can be surmised that a significant number of students do not approach the instructor for progress feedback. Those who forego advising regularly perhaps would want to believe that they are performing satisfactorily. They could also be avoiding professors because they would not want to hear about their lapses and inadequate efforts. It is also possible that they perceive instructor's assessment and advice as not very helpful or necessary. Those students who regularly have themselves advised have the advantage of producing a more quality output because they are able to integrate valuable thoughts and comments of the professor to their work. They are also likely to make intelligent decisions in their studies as they are guided by the instructor.
Only 20 respondents (46%) consult with the professor for updates on class standing. A possible explanation for this is that most of those who do not consult know that consulting would just reinforce what they suspect—that they have not been doing well academically. They do not want to be confronted with this situation, hence, the existence of the Ostrich Effect. One respondent answered tellingly, “Some [students do not avoid knowing their progress] because their academic standing is fairly on the right track. In my opinion, avoidant behavior [on progress] is highly related to the state of the student’s academic goal progress and the psychological effect it has on them.” Olgado in 2018 observed that sometimes, those who need to improve their grades forgo class standing updates while those who have good academic performance are actually the ones who willingly monitor their standing.

With 40 respondents (91%) who ask professors for instructions and other details on requirements, it can be inferred that such practice is not avoided. Students are aware of the importance in obtaining firsthand information from instructors, as they are expected to do so. Note that this practice is not to be confused with advising or seeking insights and comments on one’s work.

**Promptly Opening Email from the Professor.** Thirty-eight participants (87%) immediately open emails from professors. With this result, it can be assumed that UP BLIS students generally do not avoid opening emails and that they recognize the urgency of correspondence with their instructors. Such behavior is indicative of progress monitoring.

**Self-recording Grades**

From the results, it can be construed that not very many students religiously keep track of their grades. However, non-employment of this behavior does not necessarily translate to avoidance. Though avoidance may exist, it could also be that some simply do not practice self-recording. Non-seeking does not necessarily mean avoidance. Those who keep track of grades are able to objectively determine whether they have made progress or not. Those who monitor also have the advantage of knowing areas of weakness and of using strategies to improve upon their learning. Compared to
those who rely on memory alone, students who record have a clearer picture of progress, which allows them to reflect on achievements.

![Fig. 2. Bar graph of results for the strategy of recording grades.](image)

It is worth noting that a possible reason behind the small statistic (13 respondents or 30%) of those who self-compute their class standing is most LIS professors update students of their standing. There is a particular time during the semester when they would have class standings available and would have a brief one-on-one consultation with each student to provide them this information.

**Checking the Course Syllabus.** With thirty-four respondents (78%) using the syllabus to keep themselves aware of class requirements and activities, progress monitoring behavior is fairly significant.

**Seeking Information Online.** Seeking information online is observed by 32 respondents (73%). Consulting the internet may be an information seeking behavior; however, according to Manheim [12], it could also be a catalyst for avoidance when students consult electronic sources instead of those in physical form. It is likely that they miss out important information found in books. This could also breed avoidance in situations wherein students do not listen attentively to the professor because they think they could look up the topic in the internet anyway. Given the statistics, the researchers presume that consulting the internet is a prevalent practice among students, but not exploited.

**Approaching Classmates for Updates and Other Information.** Among all strategies, seeking important updates and information from classmates is the most observed. This is employed by 42 respondents (96%). Questions typically asked are the following: “Do we have homework?”, “When is our exam?”, “When is the deadline of [a particular requirement]?” The above approach is very straightforward - a plausible
reason for its high response rate. Acquiring information from classmates is a common practice among students. However, such information is not reliable at all times. Also, arrangements with professors sometimes vary for different students. Seeking instruction directly from professors remains a more justified progress monitoring behavior than consulting peers.

**Benchmarking with Classmates.** Only 16 respondents (37%) employ this behavior. Most students do not compare their work to another’s work; they do not think this is necessary. One respondent said that what is important is to focus on one’s work in order for him to be able to achieve personal best. However, poor performance could also be a plausible reason. Knowing that one has done poorly compared to others is painful to accept.

**Responding to critical academic scenarios**

**Scenario 1**

![Fig. 3. Bar graph of responses to the scenario of completing requirements at the last minute.](image)

Among the 6 options, the highest-rated answer is the most aggressive information-seeking strategy, accounting for 59% (26 respondents) of the sample. A significant number of respondents would take advantage of the consideration of the professor of late submission and the opportunity to improve their grade. Options 1 and 2 (avoidance behaviors) each gathered 1 response—a mere 3% of the sample. From these results, it can be inferred that students would make a conscious effort to submit homework, thus the prevalence of progress monitoring.

**Scenario 2**

![Fig. 4. Bar graph of responses to the scenario of inquiring from classmates.](image)
Only 4 respondents (9%) opted for the highest level of seeking. The most chosen option is still indicative of information-seeking nonetheless and accounts for a prominent 57% of the sample. These respondents are aware of the possibility of reinforcing that they are behind schedule upon learning what their peers have already done. Despite the risk of discomfort, they still choose to know.

**Scenario 3**

![Bar graph](image1)

**Fig. 5.** Bar graph of responses to the scenario of knowing the impact of a failed exam.

The results for Scenario 3 do not vary as greatly as the first two scenarios. Nevertheless, the highest-rated answer, accounting for 30% of the sample, is still indicative of progress monitoring behavior. These respondents would want to know whether the particular exam they failed significantly affected their overall grade and they would not mind computing this themselves. The second most selected strategy involves seeking help from the professor to compute grades. This shows that students rely on data from instructors and value their insight. As they would not hesitate to approach them, this is a manifestation of a willing and constructive attitude towards opportunities for improvement.

**Scenario 4**

The highest-rated answers for Scenario 4 are comprised of both seeking and avoiding. Option 3, which involves seeking information rated highest at 46% among all the strategies by a significant value. Respondents would still opt to monitor their progress despite the risk of being upset.

![Bar graph](image2)

**Fig. 6.** Bar graph of responses to the scenario of being unconfident in an exam.
Scenario 5

Fig. 7. Bar graph of responses to the scenario of consulting with the adviser when needed.

The highest-rated option for Scenario 5 is characterized by information-seeking. Many students realize the value of the adviser’s input. They believe that the rational response to not being able to carry out an expected task is consulting with the adviser and not the easy way out, which is intentionally overlooking the fact that there is a problem or putting off addressing it. They recognize that failing to do the task implies a more pressing need for the adviser’s help. Constructive criticism from the adviser may be considered in students’ decision to consult. Only 3 respondents (7%) would not want to consult with the adviser.

Results for Scenarios 2-5 indicate that students will seek information on their progress even if this entails them being upset when they already know. It is important to understand why students avoid obtaining information on progress. One highly plausible reason for this is they do not want to face the reality that drastic changes must be done. Realizing that they have much to do causes anxiety. Also, it could be possible that students do not want to have their relaxed mind set interrupted. Moreover, sometimes, they are complacent with their current behavior towards academic work. It could be that they are satisfied with their present efforts; thus, they do not feel the need to work harder or further monitor their progress.

One particular truth about students avoiding academic responsibilities is that they are not motivated. They do not feel like working yet or they are waiting for the “perfect” time to be motivated. It is more likely that they would not take the initiative to monitor their progress if, in the first place, they do not want to work. As one respondent simply put, “[W]hen students avoid information on progress, most of the time, it is because they feel lazy.”

A notable description of avoidance by students is procrastination. The researchers supposed that when students are given a task, they might be thinking that they would be able to finish their work the last minute. Perhaps they have done this before already, and they think it would work again for them. According to one student, “[P]rogress information avoidance is] mildly aggressive. I try to avoid [submitting a requirement] until I’m close to the deadline.”

Conclusions and Recommendations

Qualitative analysis and statistic results establish that avoidance of academic goal progress information is not very prevalent among UP BLIS students. When students avoid information on goal progress however, it is mainly to prevent unpleasant or distressing feelings – primarily fear, anxiety, and disappointment. They also some-
times refuse to know if they think the information would obligate them to take action that is difficult, inconvenient, or against will.

BLIS students avoid knowing about their goal progress by intentionally delaying obtaining updates on performance, thus, willfully lacking knowledge on academic progress. Moreover, it is worth noting that avoidance is also generally attributed to procrastination.

With the observations that have been made, this study provides insights into how researchers could approach information avoidance among BLIS students, should they decide to investigate it further. Information-seeking behaviors displayed by participants were known; hence, avoidance could be more accurately measured by determining the extent students do not observe such strategies. The researchers strongly suggest that these salient behaviors be used to construct an improved questionnaire. Along with this revised tool, future researchers can also employ appropriate statistical analysis methods to quantify and come up with more precise deductions about the prevalence of avoidance.

The findings of the present study indicate that information avoidance is not very prevalent in the UP SLIS. The student population of SLIS is significantly smaller compared to that of other colleges within the university. This might have also contributed to BLIS students’ relatively minimal degree of avoidance of information on progress. If so, it is relevant to ask whether such avoidance is consistent with other colleges – particularly, bigger institutions.

References


Appendix

Questionnaire for Affect and Avoidance Study

Information-seeking demographics
1. The following are practices/strategies on monitoring academic progress. Please check all those that apply to you.
   ___ I consult with the professor for insights and comments on my work.
   ___ I consult with the professor for updates on class standing.
   ___ I consult with the professor to clarify instructions on/confirm deadlines of requirements.
   ___ I promptly open e-mails from a professor upon receiving them.
   ___ I take note of my grades in requirements such as homework, quizzes, reports, projects, exams, etc.
   ___ I compare scores on previous requirements with current/latest scores.
   ___ I take note of requirements I was able to submit and those I forewent submitting (if there were any), keeping in mind their corresponding weight (percentage) on the final grade.
   ___ I gather scores of completed requirements and calculate my standing (compute a pre-final grade) using the grading system provided by the professor to gauge the grade I need to obtain a passing or desired final grade.
   ___ I consult the course syllabus every so often to know whether I am able to keep up with requirements.
   ___ I look up information online to learn more about the class topic/lesson.
   ___ I seek updates and other information on requirements/class activities from classmates.
   ___ I compare requirements I have done with those of classmates.

Responding to Critical Academic Scenarios
2. Please read the following scenarios and check the behavior that is most characteristic of you when you respond to such a situation.
2.1. Your professor gives homework weekly. The homeworks are very analytical and takes time to answer that you forewent submitting 5 out of 12 homeworks. Of the 4 long exams, you only passed 2. To make matters worse, you are unsure of your performance on the fifth exam. The professor accepts late submission of homework.

___ I will forego submitting 5 homeworks despite them being an important part of my grade.
___ I would think 5 homeworks would not impact my grade much – I will forego submitting the homeworks completely.
___ I will make an effort to submit at least 3 of the 5 homeworks I did not do initially.
___ I will ask some of my classmates whether they were able to submit all homeworks, and decide from there whether to pass the homeworks or not.
___ Whether or not 5 homeworks would impact my grade significantly, I will still pass them.
___ It is important that I pass the 5 homeworks even at the last minute – it is a vital grade component.

2.2. You were given 2 weeks to write a 30-page paper. It’s 4 days until deadline and you haven’t started on anything yet. Will you ask your classmates about what they’ve done so far?

___ I would rather not ask my classmates whether they’ve done anything so far.
___ I would avoid learning whether my classmates have done anything so far.
___ Even if it might just reinforce the fact that I am writing way behind schedule, I would want to ask my classmates what they have accomplished so far.
___ I want to know what my classmates have accomplished so far.
___ It is important to know what my classmates have accomplished so far.
___ I want to know immediately what my classmates have accomplished so far.

2.3. Based on your estimates, you can say that you have been performing well in class. However, there was one exam that you failed.

___ I would rather not check whether the exam affected my grades significantly.
___ I would avoid checking whether the exam affected my grades significantly.
___ Even if it might upset me, I want to know whether the exam affected my grades significantly. I will compute my grades myself.
___ I want to know the impact of the failed exam on my grades. I will compute my grades myself.
___ It is important to know the impact of the failed exam on my grades. I will ask help from the professor to compute my grades.
___ I want to know immediately the impact of the failed exam on my grades. I will ask help from the professor to compute my grades.

2.4. You are not sure with several of your answers in a major exam.

___ I don’t bother checking my notes – I couldn’t care less about whether my answers are right or wrong.
___ I deliberately do not check my notes – checking them won’t change anything anyway.
___ Even if it might upset me, I will consult my notes. I want to know whether I answered right or wrong.
___ I want to know whether I answered right or wrong, therefore, I will check my notes.
___ It is important to know whether I answered right or wrong, therefore, I will check my notes.
___ I actively consult my notes to know immediately whether I answered right or wrong.

2.5. Your thesis adviser told you to consult with him/her and submit an output for your thesis by the end of the week. Unfortunately, you weren’t able to fulfill the expected output. Will you still consult with your adviser?
___ I will actively not consult with my thesis adviser.
___ I will avoid consulting with my thesis adviser.
___ Even though I dread consulting/do not want to consult with my thesis adviser empty-handed (lacking/no deliverables), I will still talk with him/her.
___ I will consult with my thesis adviser.
___ It is important to consult with my thesis adviser. I will talk with him/her.
___ I will consult immediately. I was not able to fulfill the expected task, thus, there is a more pressing need to consult and update the professor about the situation.

- End of survey -
Development of Data Science Program for Working Women

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Abstract. In recent years, data science has been paid attention in Japan, and data science education has begun to be implemented for working people. It can be said that with the progress of the knowledge-based society, the need for the ability to understand and analyze data is increasing in the modern society. On the other hand, the decrease in the population of working age in Japan is caused to activation of women. As these two factors cross each other, we believe that there is a strong demand for data science education for women working in companies that have just finished a family leave. This study aims to develop a data science program for working women who finish a family leave aiming to identify some issues. The data science program was conducted four one and a half hour training classes in February 2019 developed by the University of Tsukuba, targeting employees of IBM Japan. Two types of questionnaire survey were conducted to measure the effectiveness of the program. Many participants felt the pace was appropriate, while the differences among them could be seen depending on their level of understanding of statistics. As for understanding of the contents, they could understand in essence. Regarding of usefulness, they chose to be useful. It can be said that this program succeeded in motivating their learning of data science. Furthermore, the fact that many requests for practical training and exercises can be said to indicate that extending the one and a half hour training time to two hours can lead to the acquisition of useful skills for work.

Keywords: Data Science, Working Women, Education Program

Introduction

Japan’s Declining Birthrate and Aging Population

Japan, as one of the world's leading low birth rates and aging population, is facing problem with the declining population of the working-age from 15 to 64. While Japan's total population is decreasing, elderly population aged 65 and over is increasing, and working-age population is rapidly decreasing. Against this background of demographic changes, Japan has high expectations for the use of elderly people and women for the maintenance and development of its society. Let us look at the current working situation of women in Japan.

The number of employed people in Japan in 2018 is 29.5 million women and 37.2 million men. The employment rate in the working-age population is 69.6% of women
and 83.9% of men. Both of the number of employed women and its rate is lower than the ones of men [2].

Above all, it has been pointed out that the labor force participation rates of women in Japan by age group figures an “M-shaped curve” due to the burdens in the labor force participation of women around their thirties [2]. It means that the existence of women who resign due to life events such as marriage and childbirth, and return to work after finishing a family leave. In recent years, people who support life stages in Japan “married, have children but continue working” is 43.0%, while those who support life stages “married and have children, but once quitted for the opportunity of marriage or childbirth, work again after parenting” is 36.0% [5]. Therefore, the period corresponding to the M-shaped valley is shortened and the bottom age class is increased (See Fig. 1).

![Fig. 1 Women’s Labor Force Participation Rate by Age Group in Japan](image)


However, of the 2.37 million Japanese women who wish to work, the largest number for non-job-seeker reason is still “for childbirth/childcare” (32.6%) (Statistics Bureau of Japan, 2018, p.11). The “M-shaped curve” employment patterns have not been completely wiped out compared to European countries [2].

So where do they acquire the knowledge and skills needed for work when they face a balance between home and work? According to a survey by the Cabinet Office in 2018, 80.3% of women are “(I have) done while working” [5], but in another survey, the largest number of training at work companies is “joining in the training at the time of employment” (67.4%), and the “training on career development for the future” is only 16.1% [6].

With the changing demographics of Japanese population and the aim of utilizing women in our society, especially in companies, now a need for training to contribute to women’s career development is required while achieving a balance between home and work.

Additionally, from around 2010, data science has been paid attention in Japan. In recent years, not only in school education but also for working people, data science education has begun to be implemented. It can be said that with the progress of the
knowledge-based society, the need for the ability to understand and analyze data is increasing in the modern society.

As these two factors cross each other, we have a need for data science education for women working in companies that returned from a family leave.

Why Data Science?

We need to consider what skills are useful for women workers who returned from a family leave. In some companies related to computers and software such as IBM Japan, most of them are college graduates, have general knowledge and skills, and are used to intellectual work. Then, we chose data science for this purpose.

There is no clear definition in data science. This article uses "data science" as a general methodology for effectively using data collected by using computer systems as an extension of the Internet, IT, and IoT concepts. The purpose of data science is to increase productivity and enrich society based on collected data. Although this purpose has been insisted, it could not have been achieved. Since big data, artificial intelligence, and machine learning have become very familiar recently, data science has also become very important again.

However, in Japanese universities, application fields such as data science have not been taught enough. The urgent need of society is for people with data science skills, and organizations that produce human resources with such skills. Roughly speaking, the concept of data science consists of the concepts of data analysis, database technology, and knowledge of application areas. It is necessary to improve data analysis and database technology skills. Knowledge of application area is also important, but it is not easy to improve its skill in a general sense. Each area has different characteristics.

Computer and software companies such as IBM Japan, particularly women workers who returned from a family leave, have several advantages in dealing with data science.

1) There is no need to learn basic computer operations.
2) It is necessary to learn basic concepts of data analysis and database.
3) It is possible to learn continuously at home without time limit
4) No need for physical labor or commuting

This means they can improve their data science skills regardless of time and place. Acquiring these skills may not be easy, but is achievable. These skills are valuable and will not be useless in the future.

Literature Review

“Efficient analyzing and utilizing of those data may bring abundant living”.

It is said that it is necessary to train data scientists who can find problems from various data and have the capacity to use analysis results to solve problems [4].

In order to provide much people with data science knowledge, online courses are effective and currently various courses are provided. The Statistics Bureau of Japan offers introductory course on data science for working people [6]. The Ministry owns and publishes a wide range of data related to people's lives. If it is possible to interpret data from various viewpoints using knowledge obtained from the course through these open data, it can be expected that ideas for using more data will be born.
In 2017, the Faculty of Data Science was established at Shiga University, Japan [9]. In addition to techniques for analyzing data, fieldwork is also conducted to learn examples of data utilization in the business domain. The curriculum is designed to acquire problem solving skills. The University of Tokyo Extension has also set up a data science course, and provides an opportunity for working people in various fields to learn data science [10].

In this way, data science learning opportunities are beginning to be provided to various layers.

Purpose and Method of Research

Research Purpose

This study aims to develop a data science training program for working people. This time, we developed a pilot program for women who return from a family leave aiming to identify some issues.

Research Method

This pilot program was conducted four times in February 2019 for the data science program developed by the University of Tsukuba, targeting employees of IBM Japan Ltd. (IBM Japan) (See Table 1). The lecturers were member of the faculty of the Library Information and Media Science, University of Tsukuba.

Since this is a program for reinstated women employees, the opening time was set under company lunch break (from 12:00 to 13:30), held in IBM Hakozaki Office meeting room. Attendance was optional. 20 participants were recruited through public invitations by intranet and direct e-mail to employees who participated in the past year’s parenting support seminar hosted by Diversity Division.

The affiliation of the participants was as follows:

Human Resources: 7, Finance: 6, Marketing:6, Engineering: 1

Among the participants, 13 have taken a family leave within the past 5 years. All participants had experiences to use Microsoft Excel, but there was a considerable difference in work experience.

In this program, two types of questionnaire were conducted to measure the effectiveness of the program. The first one was a questionnaire survey on information utilization which was conducted before and after the training. This questionnaire items were selected and modified the survey of the “Creating a scale of practical use of information and examining its reliability and validity” [8]. The second one was conducted after each class in order to extract improvement points in the content.

Table 1. Pilot Program Outline

<table>
<thead>
<tr>
<th>Date</th>
<th>Contents</th>
<th>No. of Attendee</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st class</td>
<td>2019/02/12</td>
<td>What is data science</td>
</tr>
<tr>
<td>2nd class</td>
<td>2019/02/15</td>
<td>Understand data-1 (Analyze data)</td>
</tr>
<tr>
<td>3rd class</td>
<td>2019/02/19</td>
<td>Understand data-2 (Case study)</td>
</tr>
<tr>
<td>4th class</td>
<td>2019/02/26</td>
<td>Understand data-3 (Visualize results)</td>
</tr>
</tbody>
</table>

The syllabus of this program is on the following website: http://www.slis.tsukuba.ac.jp/~tokii.maki.ga/DataScience/
Outline of Program

We aimed to provide an opportunity for each participant to consider “relationship between own field and data science”. We considered the program contents to achieve this purpose by introducing cases of various fields in the flow of "Collection", "Storage" and "Utilization" of data.

This program consisted of four classes and each class had 60-minute lecture and 30-minute exercise. By utilizing more familiar data, we devised to be able to acquire the analysis skill necessary for data science.

The goals for the four classes are as follows:

1st class: To know what data science is. Review of basic statistics
2nd class: To know the flow from data collection to utilization
3rd class: To know what you need to interpret the analyzed results
4th class: To know the flow visualizing analyzed results

a) 1st class (lecture)

First, in order to consider "what could be done" by analyzing data, the lecture aimed to realize the necessity of recognizing the analysis result from various directions. The class provided explanation of the meaning of the numerical value which could be obtained from statistics widely. By showing concrete analysis examples from basic keywords of statistics, we got to know which part the participants did not understand from their reaction.

b) 1st class (exercise)

The lecturer put data in a table, made a scattergram, and performed an exercise to calculate basic statistics using Excel. It may be difficult to see how the statistics can be obtained by calculation and how the statistics be changed by the numerical value changes. Therefore, at first, analysis methods and analyzed results using several data were shown, and then data for analysis was increased to about 50. The consumption of food in each city published by the Statistics Bureau of Japan was used. As this data is open to public, the participants themselves acquired the same open data and they would have an additional learning opportunity by performing analysis other than the food shown as a sample.

Finally, for data in the next class, we conducted a questionnaire asking anonymous questions about food preferences with 5-point scale.

a) 2nd class (lecture)

The lecture started with the review element of statistics. Focusing on the fact that one statistics alone cannot see trends in the data, we have presented concrete examples from the mean and variance of the data. By increasing the number of items, we presented the keywords of the “t-test”, and lectured that it was possible to find various trends based on basic statistics.

In this lecture, we introduced cases using various data from data acquisition to analysis and utilization.

First, we showed how to create a questionnaire on the web site that was conducted to the participants at the 1st exercise. It was shown that we could share the acquired data with all the participants, quantify the questionnaire results and visualize the trends.
Next, as a concrete example, the results of the questionnaire survey on sports by the Statistics Bureau of Japan were shown, and the analyzing method with many items was introduced. These data were used to indicate the need to look at data from various perspectives, by items, year of data acquisition, age group, and even by geographical area. As for the data indicating the geographical area, we presented a method to visualize the data on a map. It was able to lead to the introduction of the field of GIS (Geographic Information System).

b) 2nd class (exercise)
Using the food preference data generated by the participants in the 1st class (exercise), the steps of "summarize in table", "quantify" and "determine basic statistics" were shown. We aimed to let the participants feel data science more familiar than the ever.

a) 3rd class (lecture)
A 90-minute lecture on research was given on the subject of sensibility and data science. In order to analyze what people feel interesting, it was indicated which action of the person should be quantified and characteristic value to be used for analysis was narrowed down from the obtained numerical value showed that. It was shown that narrowing down the obtained feature quantity makes the result easier to interpret. By introducing research that deals with large-scale data, we aimed to convey the importance of preprocessing data.

b) 3rd class (exercise)
No additional exercises

a) 4th class (lecture)
We introduced methods such as Principal Component Analysis and clustering with the theme of distance as to how to look at the data. By these methods, we showed that cases where the data presented in the previous exercises could be analyzed from another perspective.

First, we asked the participants, "Can you analyze that people who like A tend to like B as well?". We introduced a part of the analysis to see the co-occurrence relationship in Excel, then introduced the analysis software R that could be useful for the large-scale data, and tried to create opportunities for using specialized analysis software.

Finally, we described the process of putting together the obtained results and talked the necessity of selecting items to show in information visualization. By introducing information visualization technology, we aimed to have the participants reaffirm the importance of communicating in the workplace.

b) 4th class (exercise)
For calculation of basic statistics to t-test, we provided a file that each participant could modify data on spreadsheet software for practice. A total review of the lectures was performed.
Result by Questionnaires

Results of Questionnaire Conducted Each Class

In this pilot program, we conducted a questionnaire each class. The purpose of this questionnaire is to review the class contents of the next round and to utilize it for future program composition by knowing the understanding of the participants. The five 5-point scale items, one 3-point scale item and a free description were used. As Table 2 shows, in Q1 and Q3, answer “3” means that the progress of the class is appropriate. In Q2, Q4 and Q6 with 5-point scale, “5” is selected when satisfaction is very high. Q5 is 3-point scale and “3” is selected when satisfaction is high.

Table 2. Questionnaire Items Conducted Each Class

<table>
<thead>
<tr>
<th>Question No.</th>
<th>Contents of question</th>
<th>5-point scale</th>
<th>3-point scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1</td>
<td>How was the class of the training by the instructor?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q2</td>
<td>Was the content easy to understand?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q3</td>
<td>Was the length of time appropriate?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q4</td>
<td>Was this training helpful to you in the future?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q5</td>
<td>Would you recommend this training to your colleagues?</td>
<td>3-point scale</td>
<td></td>
</tr>
<tr>
<td>Q6</td>
<td>Please tell us about your overall satisfaction.</td>
<td></td>
<td>5-point scale</td>
</tr>
</tbody>
</table>

The mean and standard deviation (SD) are shown in Table 3.

Table 3 Questionnaire Results

<table>
<thead>
<tr>
<th>Question No.</th>
<th>1st class (n=11)</th>
<th>2nd class (n=7)</th>
<th>3rd class (n=18)</th>
<th>4th class (n=11)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1 (Speed)</td>
<td>Mean 3.45</td>
<td>SD 0.78</td>
<td>Mean 3.14</td>
<td>SD 0.35</td>
</tr>
<tr>
<td>Q3 (Length)</td>
<td>Mean 3.00</td>
<td>SD 0.43</td>
<td>Mean 3.00</td>
<td>SD 0.00</td>
</tr>
<tr>
<td>Q2 (Understanding)</td>
<td>Mean 3.45</td>
<td>SD 0.78</td>
<td>Mean 4.00</td>
<td>SD 0.76</td>
</tr>
<tr>
<td>Q4 (Usefulness)</td>
<td>Mean 4.27</td>
<td>SD 0.75</td>
<td>Mean 4.71</td>
<td>SD 0.45</td>
</tr>
<tr>
<td>Q6 (Overall Satisfaction)</td>
<td>Mean 4.18</td>
<td>SD 0.57</td>
<td>Mean 4.43</td>
<td>SD 0.49</td>
</tr>
<tr>
<td>Q5 (Recommendation)</td>
<td>Mean 2.27</td>
<td>SD 0.62</td>
<td>Mean 2.71</td>
<td>SD 0.45</td>
</tr>
</tbody>
</table>

Table 3 shows that the mean of the “Speed” of the class (Q1) was from 3.06 to 3.55. It can be said that many participants felt that the pace was appropriate. In the 1st class, since the standard deviation was larger, differences among participants could be seen depending on the participants' level of understanding.

About the “Length” of the class (Q3), it can be understood that many participants felt the length of class was moderate (Mean was from 2.78 to 3.18). As for “Understanding” of the contents (Q2), many participants could understand almost (every means was over 3.45). And regarding of “Usefulness” (Q4), many participants chose to be useful since every means was over 3.89. Q6’s “Overall Satisfaction” was rela-
tively high (every means was over 4.00). The second and fourth classes, when familiar examples were introduced, were much satisfying.

Regarding “Recommendation” with 3-point scale (Q5), many participants would like to recommend to others, since every means was over 2.12.

Results of Pre-post Comparison Questionnaire Survey

“A Scale for the skills of practical use of Information” by Takahira et al. [8] was modified and conducted for this survey. The same questionnaire was used twice pre and post attending.

Two or three questions were selected for each of the six skills shown in the previous research. In this study, a total of 13 were used as question items. Since it was a questionnaire for school students in Takahira’s research, some question items were changed to questions related to workers. The questions and results are shown in Table 4.

In this study, since the 4-point scale was used, an item showing three or larger values are an item selected as “applicable”.

20 people answered pre-attending, and ten answered post attending. In Table 4, the mean and standard deviation (SD) were shown, and the mean value indicating a value of 3 or more and the standard deviation indicating a value of 1 or more are underlined.

Table 4 Pre-post Comparison Results of Information Utilization

<table>
<thead>
<tr>
<th>Question item</th>
<th>Pre-attending (n=20)</th>
<th>Post-attending (n=10)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td><strong>① Collection skill</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q11: I am a type of person who reads a talked about book/journal.</td>
<td>2.40</td>
<td>0.92</td>
</tr>
<tr>
<td>Q12: I am a type of person who does not read a newspaper and TV news.</td>
<td>2.30</td>
<td>0.84</td>
</tr>
<tr>
<td><strong>② Judgment</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q13: I am a type of person who believes a press/TV reporting.</td>
<td>2.35</td>
<td>0.73</td>
</tr>
<tr>
<td>Q14: I am paying attention to whether work-related data is old.</td>
<td>3.30</td>
<td>0.64</td>
</tr>
<tr>
<td><strong>③ Expression</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q15: I have rewritten a figure/table by myself to understand the writing.</td>
<td>3.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Q16: I am a type of person who classifies data by contents when many of them are collected.</td>
<td>3.50</td>
<td>0.50</td>
</tr>
<tr>
<td><strong>④ Processing skill</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q17: I can summarize data well, even it is various.</td>
<td>2.45</td>
<td>0.74</td>
</tr>
<tr>
<td>Q18: I am not good at understanding what the author/speaker wants to say.</td>
<td>2.55</td>
<td>0.80</td>
</tr>
<tr>
<td>Q19: I am good at drawing similarities among a plenty of data.</td>
<td>2.40</td>
<td>0.58</td>
</tr>
</tbody>
</table>
Imagination

Q20: I am a type of person who considers from a different point of view.  
2.65  0.65  2.80  0.75
Q21: I am not good at creating a new/different thing.  
2.85  0.79  2.80  0.75

Outgoing ability

Q22: I am good at making the easy-understanding documents/materials.  
2.45  0.86  2.60  0.66
Q23: I am not good at explaining my idea/thought to others.  
2.70  0.78  2.80  0.75

As Table 4 shows, it was understood that many participants selected “applicable” (Q14, Q15 and Q16). The value of the standard deviation pre-attending showed that there was a difference between the participants (Q11, Q15, and Q22). In the data science of Q15 and Q22, it is considered to be close to the item that asks the ability concerning visualization of data.

Looking at the values of Q14 and Q15 shown in Table 4, 0.1 point is down. Therefore, we divided it into a group who answered both questionnaires and a group who answered only one questionnaire. The mean is as follows:

Q14: Pre-attending 3.30 (2.89, 3.64), Post attending 3.00(2.88, 4.00)
Q16: Pre-attending 3.50 (3.33, 3.64), Post attending 3.40(3.33, 4.00)

Value in parentheses: (Answered both questionnaires, Answered pre-questionnaire only)

The value of the group answering both questionnaires shows little change. It shows that those who answered both questionnaires have lower self-assessment than those who answered the pre-attending only. People who felt the need for data knowledge tended to participate actively in this program. However, it is said that skill improvement has not been realized in the four classes. To meet the needs of the participants, it is necessary to evaluate their skill improvement and understanding of the program contents for each class, and to analyze the results.

Furthermore, Table 5 showed the results of nine people who answered both questionnaires.

Underlining was applied to items whose mean value has risen by 0.2 or more.

Table 5. Pre-post Comparison Results of Information Utilization of Both Attending (n=9)

<table>
<thead>
<tr>
<th>Question No</th>
<th>Pre</th>
<th>Post</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>Q11</td>
<td>2.56</td>
<td>0.83</td>
</tr>
<tr>
<td>Q12</td>
<td>2.22</td>
<td>1.03</td>
</tr>
<tr>
<td>Q13</td>
<td>2.33</td>
<td>0.67</td>
</tr>
<tr>
<td>Q14</td>
<td>2.89</td>
<td>0.57</td>
</tr>
<tr>
<td>Q15</td>
<td>3.22</td>
<td>0.79</td>
</tr>
<tr>
<td>Q16</td>
<td>3.33</td>
<td>0.47</td>
</tr>
<tr>
<td>Q17</td>
<td>2.44</td>
<td>0.68</td>
</tr>
<tr>
<td>Q18</td>
<td>2.44</td>
<td>0.50</td>
</tr>
</tbody>
</table>
It is difficult, on the one hand, to see changes in the practical skills of information utilization due to a short period of time, but small changes were seen in processing skill (Q17 and Q19). There were also small changes in the imagination (Q20).

On the other hand, the means of Q18 and Q22 were decreasing. We supposed this might have been influenced by the contents of the 4th lecture. In this lecture, the previous lectures were summarized and the various analysis methods were introduced. A participant said “I wanted to hear more slowly.” So, the participants might assess their understanding skill as low. In the 4th lecture, we also introduced infographics. Since many participants have thought the importance of information in the workplace, they were interested in infographics. After learning the techniques to make clear expressions, however, they might lose their confidence of making documents/materials.

### Consideration

Based on the above results and free description of the questionnaire conducted after each class, we considered construction of future programs.

#### Handling Various Level of Participants' Understanding

The understanding level of the participants was varying. Since the mean of the speed of the class was from 3.06 to 3.55, many participants felt that the speed was appropriate. However, in the 1st class, since the standard deviation was larger, differences among them could be seen depending on the participants’ level of understanding of statistics. And, for example, a participant said “I wanted to confirm the understanding level on the way”. This program was widely introduced from basic knowledge of statistics to utilized cases of data science. After the second class, we responded as needed to supplement the items that appear to have differences in the level of understanding based on the content of the questions and requests from the participants. Because the participants were working in various fields, the scope of interest was wide and it was difficult to explain everything in the lecture. Therefore, we established a web page for the class and introduced reference books and web pages as needed.

Many participants were using Excel in their work. The participant said that learning data analysis methods using Excel anew was a hint for solving business problems. So, it can be said that using Excel as an exercise is appropriate in an entry tool of data science education.

#### Providing the Familiar Data

Using open data and showing concrete examples of analysis, there was an opinion “I could get an opportunity to consider that data science would use the cases related to my duty.” The overall satisfaction of the second and forth class was relatively high. Since we introduced the familiar examples in these classes, we supposed that the fa-
familiar examples made the participants be satisfied. By using familiar and easily accessible data, we can provide the participants to improve the motivation for learning about data science and create opportunities for learning.

**Showing the Leading-edge Research Activities**

By showing the research of the quantification of sensibility, we succeeded in getting the possibility of data science felt by quantifying a variety of information. Some participants wanted to know more detailed analysis methods, and some were interested in the analysis process as well as the results. We thought it was a good opportunity to consider what could be done with data science. In addition, some participants considered the possibility of data science to be able to add value to data by showing academic research. We can successfully provide a learning opportunity to the participants who think about data science from various perspectives from business side and daily life.

**Increasing Practice Time**

Many participants showed more interest than expected in the area of infographics used to analyze and interpret data and communicate the results. In the future, we will consider to provide a visualization class that introduces visualizing results in various areas at first, then introduces analysis methods. This will make it easier to create an opportunity to think in conjunction with the work.

By showing the process from data collection to analysis and expression, some participants linked with their works, considered what could be done with data science, and asked questions. While many participants felt the length of class was moderate, there were many opinions to increase practice time using specific data. It was difficult to increase length due to time restriction. In the future class, we should provide some resources that the participants can be able to analyze them at home as a kind of homework.

**Conclusion**

From around 2010, data science has been paid attention in Japan. In recent years, not only in college students but also for working people, data science education has begun to be implemented. It can be said that with the progress of the knowledge-based society, the need for the ability to understand and analyze data is increasing in the modern society.

At the same time, considering the Japanese society, the decrease in the population of working age is caused to activation of women. As these two factors cross each other, we believe that the skill up in data science is the best for women working companies that have returned from a family leave, because it can be improved regardless of time and place. These skills are valuable and will not be useless in the future. The purpose of this project is to introduce the basic concepts of data science and to invite them to more advanced concepts for women working in companies that have returned from a family leave.

Needless to say again, in the four-time series of programs, it was not possible to reach the stage of examining the educational effect of the program. However, according to the results of questionnaire, as indicated by the free description, such as "it became a hint to solve business problems by learning how to analyze data", they showed strong interest in the concepts of data science. So, it can be said that this
program succeeded in motivating their learning. Furthermore, the fact that many requests for practical training and exercises can be said to indicate that extending the a half hour exercise time to one hour can lead to the acquisition of useful skills for work or require self-training such as home work.

Based on the results of this pilot program, we would like to advance the development of more practical programs in data science that are much useful to working women in the future.

References

Turn 1 into A Million: Empowering Book Drives In Collection Development

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Abstract. Gifts and donations play a significant part in collection development initiatives of the library. Not only it enriches the collection, but it also helps in filling the gaps in the collection, add rare and great finds, replace missing issues of serials, and augmenting the reduced funds in the library. This paper seeks to determine the effectiveness of the Turn 1 into a Million Project of the De La Salle University (DLSU) Libraries. Also, it aims to empower book drives initiatives in the libraries to overcome some library shortcomings with regards to collection building. Furthermore, the number of donations received, donors participated in this initiative as well as the utilization of these donations for almost eight years was also highlighted in this undertaking.

Keywords: Book Drives, Donations, Collection Development.

Introduction

The library is the heart of the university. Moreover, in any university, it is essential that the library should be able to provide a well-balanced collection in support of the curriculum, research, and informational needs of its academic community. The collection, coupled with competent staff, efficient library service, effective library programs, and suitable space, will always be one of the assets of any library. Having this in mind, it is imperative that a library house a wide range collection responsive to the various need of its clientele.

Collection development is the process of building a useful and balanced collection of library materials over some time. Through a series of collection assessments, the library identifies which subject areas should be prioritized in order to fill the gaps in the collection. Building the library collection is usually done through different ways such as purchase, gifts and donations, and thru loaning of collection. For some, tied with quality of the collection, having a large number of library materials can also be considered a great asset in the library, whatever the kind is. Indeed, the size of the library collection matters.

With the ever-increasing amount of information and resources available nowadays, not to mention the surge of prices to purchase these resources, collection development is usually affected by budgetary limitations. Thus, libraries were not able to fully supplement all materials requested by their clientele. To augment the gaps in the collection, libraries welcome all the help they need. Gifts and donations were solicited or unsolicited library materials that were usually evaluated in agreement with the criteria stipulated in the collection development policy (CDP) which can either be added to the collection or be disposed of. These materials help enrich the library collection [6].
They also represent a significant part in the collection development activities in the library [1].

Book donations or book drives projects are campaigns, usually of pre-determined length conducted by a library, school, or organizations to solicit donations of books to expand existing collection or to generate funds to benefit the institution using a book sale. Since the library collection was usually impacted with budgetary constraints and to keep a more updated and well-balanced collection, more libraries are now engaged in book drives and donation activities. Book drives help them fill the gaps in the collection such as replacing or adding rare, out-of-print titles, and missing volumes of serials; and augmenting reduced library funds [5]. Also, those books which were not selected due to some factors (e.g., unmet criteria in CDP, not in good physical condition) were given to other donees or subject for disposal.

Programs such as book drives, gifts-in-kind donations, and solicitations were organized and implemented to help the libraries gather materials that can be useful to their clientele. Library clientele, including the members of the academe, students, and even friends of the library, were being tapped to donate books and other library materials that would benefit the entire academic community. The library becomes a repository of the various and wide range of materials that can be of use to the library patrons they serve. While it is true that gifts and donations form a significant part in collection building, this also requires a substantial amount of librarian’s time and effort especially in evaluating these materials [6,7,8].

The De La Salle University (DLSU) Libraries’ Turn 1 Into a Million Book Project

It is imperative for the De La Salle University as a research institution to continuously improve its services for the benefit of its increasing patrons. Known as one of the best academic libraries in the country, the University welcomes the challenge of increasing its book collections into a million to better serve its patrons. To date, the Libraries has more than 400,000 collections of a wide variety of reading materials from print to non-print, online and special collections and more.

As such, DLSU libraries has embarked into another challenging project which will make the number of its collections more powerful than ever - the launching of Turn 1 into Million book drive. Tracing its humble beginnings during its soft opening on 1 April 2011 and its formal launching on 26 August 2011, this book solicitation project aims to raise a million books from donations, solicitations, and gifts in response to the library’s vision of promoting lifelong learning through reading (DLSU Libraries, 2011). The project hopes to get at least a book from a patron every day, and it is expected to reach 1 million in volumes in the coming years [3]. The project will not only challenge the academic librarians to double their effort in augmenting their collections but will also provide the patrons a wide variety of reading materials that suit their interests, needs, and purpose. To date, the book drive was able to gather 65,211 volumes of donations from almost 972 donors in eight years.

With the aim of raising a million books from donations and gifts as a response to library’s vision to lifelong learning, this study seeks to determine the effectiveness of the Turn 1 into a Million book drive project in terms of collection building. Also, an analysis of the number of donations acquired from August 2011 to present as well as its usage were also presented to provide a more compelling result of the study. Moreover, this assessment will also posit if the project is worth pursuing or not.
Method

The study employs the descriptive analysis approach to determine the effectiveness of the Turn 1 into a Million book drive project of the DLSU Libraries in terms of collection building. Only the print books acquired thru the book drive from August 2011 to April 2019 were the focus of the study. These include the special collections received, the donations received thru the donation boxes or chutes, as well as the donations which were sent directly to the library. Also, an analysis of the number of donations acquired from August 2011 to present as well as its usage were also presented to provide a more compelling result of the study.

As for the usage statistics of the donation, the study made use of the methodology adopted by Thomas and Shouse [7] in agreement with the concepts of Diodato and Diodato’s study in 1983 entitled The Use of Gifts in a Medium-Sized Academic Library which posits that “use can be a measure in the effectiveness of the gifts program”. The researchers analyzed the usage statistics of the donations received from August 2011 to April 2019, which were culled from Sierra, the integrated library system (ILS) used by the DLSU Libraries.

To further evaluate the program, the researcher made use of the post-program evaluation checklist based on Flett et al. [4] Strategic Evaluation of Programs Toolkit for Public Libraries. The toolkit provides practical advice and methods in evaluating library programs whatever the kind is [4]. The elements included in the checklist are: (1) purpose/objectives/audience; (2) links with strategic vision; (3) partners/stakeholders; (4) budget; (5) resources; (6) marketing and promotion; (7) data; (8) participant satisfaction; (9) other benefits to the library service; and (10) continuous improvement and recommendation.

Results and Discussions

Purpose / Objectives / Audience. The project was limit to only 1 million print books since it was estimated that the new library building could only house 1 million print books. Given the objective of the Turn 1 into a Million book drive which is to “raise one million books and be the first private university in the country to ever hit the mark”, based on the last recorded accession number, the program has not yet met its objective in the span of eight years since it was launched in August 2011. To date, the total collection of the DLSU Libraries is around 475,000 volumes, wherein the donations received is 59,288 volumes. Since every donation received is being evaluated, only those materials that passed the evaluation will be included in the collection.

Links with Strategic Vision. In line with the University’s key result areas (KRAs) (DLSU, 2015) specifically education that is excellence-driven and learner-centered; and research that is rigorous, meaningful and responsive; the library remains to be responsive to the research, informational, curricular and outreach needs of the entire academic community by providing organized, relevant and fast delivery of information resources and materials in various formats. Also, the library envisions as a leading academic library in the ASEAN community that is a knowledge hub for scholarly engagement, teaching and learning, providing an innovative, inclusive, and creative learning environment. It also advances the learning and research thrusts of the University by providing quality information resources, learner-centered services, and programs through strategic partnership [3].
Partners / Stakeholder. The entire academic community, as well as friends of the library, were considered active partners and stakeholders in the program. The Libraries were able to gather some of the note-worthy donations and collections from different stakeholders here and around the globe. There were around 972 donors and benefactors who have generously donated their collections to the DLSU Libraries. The donors were notable alumni, students, faculty members, members of the DLSU administrations, institutes and partners schools, organizations, and centers such as Bienvenido Santos Center for Creative Writing, SHORE Institute, US Embassy among others.

Budget. There was indeed an allocated budget in the processing of these materials. The transportation cost to be able to pick up these donations estimated at a minimum amount of Php 3,500.00 per month is indeed sufficient. These include outsourcing of vehicle for the pick-up of donations such as thru Transportify, Grab, or vehicle rental. As for the materials processing cost, which is priced at Php 300.00 per book, it is also enough to cover supplies such as tattle tapes, barcode stickers, donor plates, and others. There was indeed a return of investment (ROI) for the project in which the donations and gifts were added to the collection. Thus, there was no need for the library to purchase some of these donations. It is indeed recommended that further cost-benefit analysis of the program should be conducted.

Resources. The Collection Development Librarian is the focal person tasked to assess the donations received thru the program. The evaluation of the donations was by the criteria stipulated in the collection development policy (CDP) of the DLSU Libraries. Only those materials that met the criteria will be included in the collection. If the donation is considered a special collection, a designated room will be housing this donation. If the donation is not a special collection, it will be part of the general circulation collection. Included in personnel resources were the library staff who were tasked to pick-up the donations from designated locations. In addition, transportation of the materials from pick-up points to the library as well as the processing supplies such as tattle tapes, barcode stickers among others were used to process these materials and make it available to clienteles.

Marketing and Promotion. Marketing and promotion of the program were strong during the early years. Posters, announcements, including social media posts, were used during its infancy years. From 2011-2015, the Libraries were able to gather almost 50,000 donations. However, as time goes by since some members of the community have known the existence of the program, donations and gifts were sent directly to the library or thru the donation book chutes. Hence, the donations from 2016 to date were only around 15,000 volumes. Despite the small number of donations received, the Libraries continues to make all the efforts to promote its collection through exhibits of collections, dialogue series with donors, and even relaunching of collections and renovations of spaces. These simple ways helped the Libraries promote their collection, thus, encourage more donations to the Libraries.

Data

Books Received Thru the Turn 1 into a Million Book Drive. Based on the monitoring of donations acquired thru Turn 1 into a Million Book Project from August 2011 to April 2019, the Libraries were able to gather a total of 65,211 volumes. Out of 65,211 volumes, 59,288 volumes (90.92 %) were included in the collection, as shown in Ta-
Table 1. Donations Received thru Turn 1 into a Million Book Drive.

<table>
<thead>
<tr>
<th>Donations Received (August 2011 – April 2019)</th>
<th>Donations Included in the Collection</th>
<th>Donations Excluded in the Collection</th>
<th>Number of Donors</th>
</tr>
</thead>
<tbody>
<tr>
<td>65,211 volumes</td>
<td>59,288 volumes (90.92%)</td>
<td>5,923 volumes (9.08%)</td>
<td>972</td>
</tr>
</tbody>
</table>

**Distribution of Donated Materials Per LC Classification Number.** Table 2 below shows the distribution of donated materials per LC classification. Majority of the donated materials were under Social Science (H) which was around 14,156 volumes followed by Law (K) with 7,885 volumes. The least donations received was under Naval Science (V) with 31 volumes only.

<table>
<thead>
<tr>
<th>Library of Congress (LC) Classification</th>
<th>Number of Volumes Per LC Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>A (General Works)</td>
<td>449</td>
</tr>
<tr>
<td>B (Philosophy, Psychology, Religion)</td>
<td>4,513</td>
</tr>
<tr>
<td>C (Auxiliary Sciences of History)</td>
<td>105</td>
</tr>
<tr>
<td>D (History)</td>
<td>3,385</td>
</tr>
<tr>
<td>E-F (History of the Americas)</td>
<td>146</td>
</tr>
<tr>
<td>G (Geography, Anthropology &amp; Recreation)</td>
<td>976</td>
</tr>
<tr>
<td>H (Social Science)</td>
<td>14,156</td>
</tr>
<tr>
<td>I (Political Science)</td>
<td>3,198</td>
</tr>
<tr>
<td>K (Law)</td>
<td>7,885</td>
</tr>
<tr>
<td>L (Education)</td>
<td>6,756</td>
</tr>
<tr>
<td>M (Music)</td>
<td>186</td>
</tr>
<tr>
<td>N (Fine Arts)</td>
<td>674</td>
</tr>
<tr>
<td>P (Language and Literature)</td>
<td>7,575</td>
</tr>
<tr>
<td>Q (Science)</td>
<td>5,288</td>
</tr>
<tr>
<td>R (Medicine)</td>
<td>3,399</td>
</tr>
<tr>
<td>S (Agriculture)</td>
<td>168</td>
</tr>
<tr>
<td>T (Technology)</td>
<td>1,948</td>
</tr>
<tr>
<td>U (Military Science)</td>
<td>139</td>
</tr>
<tr>
<td>V (Naval Science)</td>
<td>31</td>
</tr>
<tr>
<td>Z (Bibliography, Library Science)</td>
<td>311</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>59,288</strong></td>
</tr>
</tbody>
</table>

**Distribution of Donated Materials by Acquisition Year.** Donated materials were also profiled by the year it was acquired. Figure 1 shows the distribution of donated materials per acquisition year from August 2011 to March 2019. It was noted that 16,789 volumes were donated in the year 2011 with a peak of 12,710 volumes in 2017.
volumes were received in 2014, marking the year with the highest donations of materials received.

![Distribution of Donated Materials By Acquisition Year](image)

**Fig. 1. Distribution of Donated Materials by Acquisition Year**

*Distribution of Donated Materials by Publication Date.* Table 3 presented the distribution of donated materials by publication date. The data below shows that most of the materials donated were copyrighted in 1959 and below with 26,281 volumes. Only 2,376 volumes copyrighted 2011-2018 were received through donations. These were because most of the materials donated were special personal collections of notable alumni and benefactors that they have used and accumulated over a period of time.

<table>
<thead>
<tr>
<th>Publication Date</th>
<th>Number of Volumes</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011-2018</td>
<td>2,376</td>
</tr>
<tr>
<td>2000-2010</td>
<td>4,790</td>
</tr>
<tr>
<td>1990-1999</td>
<td>8,382</td>
</tr>
<tr>
<td>1980-1989</td>
<td>7,186</td>
</tr>
<tr>
<td>1970-1979</td>
<td>5,483</td>
</tr>
<tr>
<td>1960-1969</td>
<td>4,790</td>
</tr>
<tr>
<td>1959 and below</td>
<td>26,281</td>
</tr>
<tr>
<td>Total</td>
<td>59,288</td>
</tr>
</tbody>
</table>

*Usage Statistics of the Donations Received.* In agreement with the concepts of Diodato and Diodato’s in 1983 which posits that “use can be a measure of the effectiveness of the gifts program” which was also adopted by Thomas and Shouse [7], of the 59,288 volumes of donations included in the library holdings, only 10,979 volumes
have recorded circulation usage. It further signifies that 48,309 volumes (81.48%) had zero usage since inclusion to the collection, as shown in Table 4 below.

Table 4. Usage Statistics of Donations Received

<table>
<thead>
<tr>
<th>Donations Included in the Collection</th>
<th>Donations with Recorded Usage</th>
<th>Donations with Zero-Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>59,288 volumes (100%)</td>
<td>10,979 volumes (18.52%)</td>
<td>48,309 volumes (81.48%)</td>
</tr>
</tbody>
</table>

Given the data above, the top 10 most circulated donated books were also determined in Table 5 below:

Table 5. Top 10 Most Circulated Donated Books

<table>
<thead>
<tr>
<th>Rank</th>
<th>Title of the Book</th>
<th>Author</th>
<th>Year</th>
<th>Donor / Collection</th>
<th>Number of Circulation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Exploring the philosophical terrain</td>
<td>Apolega, Dennis</td>
<td>2013</td>
<td>Anonymous</td>
<td>223</td>
</tr>
<tr>
<td>2</td>
<td>Statistical literacy for lifelong learning</td>
<td>Arcilla, Rechel Guino</td>
<td>2013</td>
<td>Lou Krainz Collection</td>
<td>103</td>
</tr>
<tr>
<td>3</td>
<td>The Holy Bible ESV: English Standard Version: containing the Old and New Testaments</td>
<td></td>
<td></td>
<td>Eric Siy</td>
<td>96</td>
</tr>
<tr>
<td>4</td>
<td>Rules of court with code of professional responsibility</td>
<td></td>
<td></td>
<td>Rex Book Store</td>
<td>87</td>
</tr>
<tr>
<td>5</td>
<td>Diary of a wimpy kid: cabin fever</td>
<td>Kinney, Jeff.</td>
<td></td>
<td>Anonymous</td>
<td>69</td>
</tr>
<tr>
<td>6</td>
<td>The Holy Bible: New International Version</td>
<td></td>
<td>1984</td>
<td>Discipline Office</td>
<td>63</td>
</tr>
<tr>
<td>7</td>
<td>The Calculus 7</td>
<td>Leithold, Louis</td>
<td>2002</td>
<td>Natividad Galang-Fajardo.</td>
<td>63</td>
</tr>
<tr>
<td>8</td>
<td>Civil code of the Philippines with: the Family code of the Philippines</td>
<td></td>
<td></td>
<td>Ng, Tiffany</td>
<td>63</td>
</tr>
<tr>
<td>9</td>
<td>The Holy Bible: New International Version</td>
<td></td>
<td>2002</td>
<td>Discipline Office</td>
<td>57</td>
</tr>
<tr>
<td>10</td>
<td>Harry Potter and the sorcerer's stone</td>
<td>J. K. Rowling</td>
<td>1999</td>
<td>Discipline Office</td>
<td>57</td>
</tr>
<tr>
<td></td>
<td>Mga Piling babasahin para sa J.P. Rizal</td>
<td></td>
<td>1988</td>
<td>Lee, Romnick T.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Developmental psychology: childhood and adolescence</td>
<td>Shaffer, David R.</td>
<td>2007</td>
<td>Natividad Galang-Fajardo</td>
<td>55</td>
</tr>
<tr>
<td>10</td>
<td>The law on obligations and contracts</td>
<td>De Leon, Hector S.</td>
<td>2008</td>
<td>Rex Book Store</td>
<td>52</td>
</tr>
</tbody>
</table>
Other benefits to the Library Service. Donations and gifts form a significant part of the collection building activities of the Libraries. It also enriches the Libraries’ collection by filling in the gaps in the collection development of the library. The Libraries continue to receive donations despite the absence of intensified promotion and marketing.

Continuous Improvement and Recommendations. Despite the unquestionable part of donations and gifts in the collection building of the DLSU Libraries, it is indeed recommended that only materials that will surely be useful to the academic community will be included in the collection, making sure that there is a return of investment (ROI) for these materials or the project as a whole. A rigorous selection procedure of the donations and gifts is very much needed to get only those acceptable and useful gifts and donations.

Conclusion

Gifts and donations play a significant part in building the collection of the library. Book drives and gifts-in-kind projects were implemented to augment the gaps in the collection, especially during reduced library funds. Based on the findings of the study, the Turn 1 into a Million book drive of the DLSU Libraries was found to be effective in collection development of the Libraries as signified by the number of donations received and the donor who has been taking part in this initiative. However, in terms of utilization, the majority of the donations has zero-usage or were not circulated at all. It is recommended that a rigorous evaluation procedure should be implemented to get only those acceptable and useful gifts and donations. Also, a strong promotion of the project should still be done to encourage more gifts and donations for the library.

References

Utilization of Centralized e-Library System in the Schools Division Office of Tayabas City

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Abstract. The study aimed to provide centralized e-library system for the Schools Division Office of Tayabas City that gave access to developed instructional materials which were cost effective and support skill development of teachers. The research used descriptive-evaluation research method to gauge its efficacy, effectiveness and accuracy using ISO 9126. Rapid Application Development (RAD) was also used to describe a method of software development which heavily emphasizes rapid prototyping and iterative delivery. This creates an avenue for teachers to have a community of sharing valuable inputs beneficial in the teaching-learning process. The system increased efficacy of learning resource management in the delivery of their services. Based from the four (4) system characteristics that were assessed, result shows that functionality and usability obtained the highest rating. The developed system was acceptable based on the result of system testing with the weighted mean of 4.91 and 4.89 in terms of functionality and usability respectively. It can be seen from the results that the ultimate outcomes of the developed system were its user friendliness, ease in navigating/searching available instructional materials and network accessibility. Therefore, elementary and secondary school teachers shall register on the division centralized e-library system to access learning resources beneficial in the teaching learning process. Development of more localized and indigenized instructional materials from among all grade levels were encouraged to increase community of sharing that will be stored in the portal.

Keywords: Contextualized e-library, Indigenized, RAD

Introduction

Various important wide-ranging systems including knowledge bases and accepted electronic resources based from concept knowledge were promoted from among libraries. Partnering together in wide-ranging environments help guide a conclusive shift in the area of school libraries record management.

Integrated Library Systems (ILS) receives by far the most attention among the many technological decisions and implementations in libraries. Generally, ILS received the most usage of any library system because unlike most library technology, almost every single library employee interacts with it on a regular basis. Indeed truly, many library employees spend the majority of their work day using the ILS [15].

On the other hand, Library Management System (LMS) provide solution which is developed on latest technology focused towards automating the vital activities of the
Library [4]. It can be integrated with Barcode for easy access and retrieval of any item from the Library. An online public access catalogue facility can be provided for speedy retrieval of any kind of document. This solution can be linked with self-service for quick search and online requisition. Different libraries of organization or institution use the software that is designed according to their demand.

Thus, the development of web based application of Centralized e-Library System provide an easy management of library using intranet specially in school setting. The development of this system help manages works efficiently and effectively among library personnel and accessibility of instructional materials for teachers. It is used to manage the record of various transactions like issue of books, return of books, addition of new books, uploading of developed instructional materials, and inventory of the books which are workable offline.

The system application provides cost effective methods of distributing learning materials to teachers as well as students and help them learn digital communications. Instructional materials can be downloaded at any time for free.

**Literature Review**

Library System gave the detailed information about students, staffs and books. A Library Management System is a tool that helps libraries which are still using the old way to manage their library transactions. The old way like searching for a book using manual work is hassle, fast report generation is not possible, information about issue/return of the books are not properly maintained, no central database can be created as information is not available in database.

Barve and Dahibhate [4] point out overview of various library related open source software such as library management systems, digital library software, content management systems, knowledge management software, citation management software, journal management systems, next generation OPACs, etc [4].

Palmer and Choi [15] claimed that most of the significant areas of research are digital repository software, OPAC and integrated library systems. Thus, employing descriptive literature review can assess the state of open source software research in the library context [15].

**Open Source Library Management System**

Introduction of Open Source Software (OSS) for their libraries is the new trend using Integrated library Management System (ILMS). However, migrating from existing system to another system posted many issues among users when they compare with the features provided in new system.


Ukachi, Nwachukwu, and Onuoha (2014) affirmed the relevance of library automation, the characteristic of open source software and issues to be considered in selection of library automation software. They also indicate Koha, Evergreen, ABCD, WinISIS, NewGenLib, Emilda, PMB, WEBlIS [24].

**Evaluation / Comparison of Open Source Library Management System**

communities, support were presented and gave general suggestion for selecting ILS software [11].

Reddy [20] claimed that NewGenLib has more enhanced features compared to functional features of Koha, NewGenLib and eGranthalaya [20].

Macan and Stojanovski [14] tested two open source integrated library systems, the ABCD (Ver.1.1 beta 1) and Koha (Ver. 3.4.4) and evaluated modules like OPAC, acquisition, cataloging, serials, circulation and patron management, reports and statistics, administration and security. However, OPAC was given more emphasis [14].

Pruett and Choi [17] differentiated two classes of Integrated Library Systems (ILS): proprietary and open source. The former source includes: Evergreen and Koha while the latter includes: SirsiDynix’s Symphony and Ex Libris’ Voyager. Four areas such as functions, adoption and technical support, usability, and economics were examined as its bases. It was concluded that usability of both categories of software has no significant difference [17].

Randhawa [18] provided the lists of features and information on selection of library management systems, advantages and limitations such as Koha, NewGenLib, Evergreen, Senayan, ABCD, and BiblioteQ [18].

Breeding, M. (2014) reported evaluative ratings submitted by individuals representing over three thousand libraries from 53 countries, describing experiences with 136 different automation products, including both proprietary and open source systems [5].

Next Generation Library Management System

In 2013, Babu and Krishnamurthy presented the conclusive scenario of resource discovery and analyze paradigm shift in the library operations. They, then explains how library evolves over time with the integration of technology in the efficient management of records and transactions.

Balnaves [3] proposed common software such as DSpace, Vufind and Koha model that serve as operating system in library. These hybrid combinations of system designs function well resulting to highest satisfaction of its operational capabilities among school librarians [3].


Fu and Fitzgerald [9] distinguished how the traditional integrated library systems and the next-generation ILSs impact on technical staffing models at academic libraries. Redesigning staffing model to meet challenges and opportunities imposed by the next generation systems was explained thoroughly [9].

Yang, C. [26] pointed out high-end features of newly introduced library systems such as electronic resource management, knowledge base, role based login, user driven acquisition, unified workflow, trial database management, license management, and interoperability. There are other functions such as integration with other system, support for different record formats, direct clientless, chat with vendor, ILL, RDA compatibility, and cloud based. Further, he expounded and compared upcoming development of library system including Worldshare, Kuali OLE, Intota [25].
Young [25] introduced new alternative to Integrated Library Systems such as open source solutions, library services program, and hybrid publicly available library policy platform [26].

**Open Source Learning Management System: Implementation, Migration and Integration**

Albee and Chen [1] identified library staff satisfaction and attitudes towards an open source library automation systems in the state of Indiana using survey method. The benefits, difficulties, and improvements using Evergreen were also discussed [1].

Breeding [5] presented library discovery products and their evolution, scope, functionality, major technologies and concepts involved. Data collection from libraries using discovery product on issues like, product satisfaction, resource coverage, perceived effectiveness for library users, objectivity in producing search result, relevancy ranking, ease of administration, integration capabilities with ILS were explored. The discovery of products such as EBSCO discovery service, Vufind, BiblioCore, Summon, WorldCat Local, AquaBrowser Library, Enterprise, Primo, Arena, Encore, Iguana embodied in his study [5].

Kari and Baro [13] conducted survey to find use of library automation software in Nigerian university libraries and their challenges, experience with the automation projects. The researches indicated that major problems such as lack of fund, lack of skilled manpower, and absence of modern systems. They found out that KOHA, SLAM, VIRTUA systems were widely used [13].

Singh [22] shared publicly available software that provides experiential learning among librarians on the use of hybrid system. This includes the clustering data on subsisting operations and mediums of practical support, supposition of librarian for hands on support and means of librarian with hands on support, the survey and interview method used and product related website expedients [22].

**Method**

Descriptive-evaluation research design was used in the study in order to gather information regarding the evaluation of the developed centralized e-library system. Assessment was done which will be used by the Schools Division Office and eventually analyzed through determinative evaluation. It allows the institution and other respondents to determine the efficiency, effectiveness and accuracy of the developed system based on the ISO 9126.

Rapid Application Development was adopted to describe a method of software development which heavily emphasizes rapid prototyping and iterative delivery. The designers and developers of system utilize knowledge and discoveries obtained during the development process [23].

The project is designed and coded in HTML, PHP, CSS, JAVASCRIPT and database management was handled by MYSQL. Data flow diagrams were created for the facilitation and managing various transactions in the library.
Fig. 1 shows the iterative model for the developed centralized e-library system for the Schools Division Office of Tayabas City. Iterative design is employed in the improvement of prototype design or product concept [23]. This approach of product development improves its design through prototype testing, frequent testing, materials testing, focus groups, client feedback, design development and evaluation until final output was refined. The researchers adopted this iterative model to test the system functionality, usability, reliability and portability.
Fig. 2 shows the Use Case Diagram which illustrates how the librarian and the end-user interact with the system. It presents the different activities which the former can be manipulated so as the latter using the developed centralized e-library system. The data flow clearly depicts the things user and the librarian can be done in the said system.

Every user is required to have a unique login name and password to be used in searching and downloading instructional materials such as localized and indigenized resources useful in the teaching-learning process. Books not belongs to downloadable materials can be borrowed upon approval of the librarian and keep update as regards to when it should be returned. On the other hand, the librarian has the right to validate the users thereat. Only registered users can accessed to the materials and shall not be other than Department of Education teachers and students. He/she has also log in name and password maintained all throughout the work assignment. All issued books and those at hand are in control of the librarian.

**Project Development**

The centralized e-library system is a conceptual/prototype model used in project management that describes the stages involved in an information system development project from an initial feasibility study through maintenance of the completed application. Mostly, several models are combined into some sort of hybrid methodology. Documentation is pivotal regardless of the type of model chosen or devised for any application, and is usually done in parallel with the development process. Some methods work better for specific types of projects, but in the final analysis, the most important factor for the success of a project may be how closely particular plan was followed.

Fig. 3. Phases of System Development

Fig. 3 indicates the system development is a gradual transformation of a sequence of models, which are output of the different system development phases. It can be divided into three main activities or processes; this includes analysis, construction and testing. Customer requirements collected in a requirement specification are placed in the input of system development. Whilst program code constitutes final executable model of the system produced which is most common output. Application-oriented specification is developed to show what the system offers to its users is found in the analysis. Design and implementation were established in the construction activities. In addition, the results of the analysis are formalized in terms of the implementation environment on the design activities. Lastly, separate programs are identified and then coded in the implementation model.
System Testing

The aim of the system testing process is to determine and resolve all defects. The program was subject to a set of test and observation of the Learning Resource personnel in the division Office of Tayabas City.

All modules and functionalities of centralized e-library system will be test providing the actual inputs from the Librarian. The primary objective is to test the module interfaces in order to ensure that no errors are occurring in the system. Based on this observations it will be decided whether the program meets the expectation or not.

Results

The combinations of all the characteristics of system application leading to the development of centralized e-Library system were strongly accepted. The uploaded localized and indigenized instructional materials connected through the Division Area Network found to have useful application among teachers from different public elementary and secondary schools. The adoption of several user friendly coding helps increased efficacy of system functionality, usability, reliability and portability.

The system was designed to store all the information about borrowers, localized and indigenized materials, e-books and processes which lessen human effort and encourage efficient record keeping and facilitation of resources. This creates an avenue for teachers to have a community of sharing valuable inputs beneficial in the teaching-learning process.

Fig. 4. Summary Characteristics of e-Library System

Fig. 4 shows the summary characteristics of the e-library system. It can be seen from the figure that among the four characteristics being tested, functionality got the highest rate of 4.91. This means that the system provides software items with substantial reusability both within the system and between different types of systems. Usability, portability and reliability of the system were also given a high rating by the respondents which reveal that they strongly accept the system.
Fig. 5 shows the functionality of the developed e-library system. The respondents have high acceptance rating as to user friendliness with 4.94 mean rates. Network accessibility using intranet and internet and advanced search interface were also obtained strong acceptance from the respondents. Further, interaction of the developed system with other systems and appropriateness of specifications as to end user requirements received highly positive rating. This provides some assurance that the implemented design will satisfy system requirements.

Fig. 6 reveals the portability of the e-library system design. Downloading localized and indigenized instructional materials got the highest mean rate of 4.90. Items such as easy use-design and fastest installation received the same adjectival rating of
strongly accepted. The statements have the ability to change new specifications when run in another platforms and installation of system without assistance of the developer also obtained a highly positive ratings. This entails agreement and acceptance of end-user as to the ability of the system to be used for a different purpose or on a different system.

Fig. 7. Usability of e-Library System

Fig. 7 reveals the usability of the e-library system design. Easy browsing on the log file and process understanding got the highest mean rates of 4.93 and 4.92 respectively. Statements on the operational management of the system in the absence of an expert and system manual have high acceptability rates from the respondents. In addition, appropriate Meta data was used to deliver fastest services among end-users.

Fig. 8 shows the reliability of the e-library system. The respondents gave high acceptability rating on the easy navigation and searching of developed instructional materials displayed in the system design. Storage of large amount of information, accessibility, ability to restore components, low error rate and error recovery can be fixed easily received the same acceptability level from the respondents. This means that the system design helps them manage efficient retrieval and downloading of resources needed in the teaching learning processes.
Conclusions

1. The implementation of centralized e-library system has high rate of acceptability which will benefit the teachers and the library personnel of Schools Division Office of Tayabas City. It makes the entire process in the library efficient and manageable.

2. The characteristics of the e-library system for Schools Division Office of Tayabas City obtained high result on its functionality, usability, portability and reliability which proved the acceptability of the developed application and performed its intended purpose. The respondents find the system to be user-friendly and advanced search and retrieval.

3. Said system application makes it easier for the library personnel and teachers to upload and download instructional materials from the portal since the system interface design was friendly user and navigable.

References


Capturing Changing User Goals in the Information-Seeking Process Using the Information Behavioral Grammar Model

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Abstract. Problem-solving support services have progressed considerably in Japan’s public libraries, with a focus on business support, health and medical information, legal information, and administrative support. However, little research has been conducted to identify the information needs of local citizens. Using the information behavioral grammar model as a theoretical framework, this paper reports on the information needs of entrepreneurs and cancer patients who used public libraries to achieve their goals. Existing interview data from entrepreneurs and cancer patients were analyzed using the constant comparative method based on a grounded theory approach. The results identified how problem-solving goals and information needs of entrepreneurs and cancer patients were modified through progress in their information-seeking processes. It is suggested that the information behavioral grammar model is useful for understanding the change in distal goals and information needs in the information search process for problem solving, together with the affective states of users and their underlying causes. The practical implications for problem-solving support services offered in Japanese public libraries are highlighted: entrepreneurs and cancer patients make use of a variety of external services before and after using the problem-solving support services of public libraries; collaboration with external specialized organizations and professionals is essential; and the possibilities of offering training in library use, Web search, and specialized database retrieval should be explored.

Keywords: Goal Model, Starting a Small Business, Cancer Cure, Information Behavioral Grammar Model, Public Libraries

Introduction

Even though increasing numbers of public libraries in Japan offer problem-solving support services, few user surveys have been conducted. Therefore, the present study aimed to identify potential users’ information needs and their problem-solving goals using existing data sets. We identified how the information needs of business support service users and health and medical information service users changed, and at what stages public library services were used. We use Bandura’s goal model [1] and the information behavioral grammar model as a framework for data analysis.
Background

This section introduces the recent developments in problem-solving support services deployed in Japanese public libraries. The support service has been defined as follows.

Kinds of [public library] service which intends to help solving local clients’ problems concerning their everyday-life and work, as well as to support activities for solving local issues, based on clients’ requests and local situations [2].

This service is mainly offered under four genres: business support, health and medical information, legal information, and administrative support. Fig. 1 shows how these four genres have developed over time and indicates the years when names were assigned to the genres of the problem-solving support service by public libraries. The business support service was started earlier in 1990s and increased in the 2000s. Legal information service and administrative support service are started in late 1990s. Meanwhile, health and medical information service was started in 2003, a little bit later, and still expanding.

![Fig. 1. Years when names were assigned to each genre of the problem-solving support service](image)

Business support services have been developed in conjunction with the policy of supporting entrepreneurs from industry. The health and medical information service is based on national and regional policies reflecting the declining birth rate and the increasingly aging population in Japan, and provides public library users with not only reading opportunities for entertainment but also assistance in solving the problems of local people. That is, the problem-solving support service is expanding the role of the public library from a place providing reading opportunities for pleasure to one that is useful for citizens.
Even though the problem-solving support service has been expanding in public libraries, no studies have been conducted on the needs of library users or market research on the support service itself. We believe that service design and operation should be evidence based. Thus, we should analyze the information needs of service users in relation to their information-seeking processes. Our goal was to capture users’ information needs of the problem-solving support service that are embedded in their information-seeking processes. It is important to understand user goals and how the library problem-solving service can help achieve these goals by fulfilling their information needs at the different stages of their information-seeking process.

This paper focuses on the information behavior of those who intend to start a small business (i.e., users of business support information) and of cancer patients (potential users of the health and medical information service). The data analysis is guided by the following research questions.

RQ1: How useful is the information behavioral grammar model for analyzing the changes in user goals in their information-seeking process for problem solving?
RQ2: How do users’ problem-solving goals (distal goals) and information needs (proximal subgoals) change throughout their information-seeking processes?

What kinds of activities or services are offered by public libraries under the rubric “problem-solving support”? Table 1 lists the service elements, in descending order, provided by public libraries that have implemented the service [3].

<table>
<thead>
<tr>
<th>Table 1. Components of the problem-solving support service</th>
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<tr>
<td>Actively collecting related materials in the target genre</td>
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<tr>
<td>Opening a special corner in the library</td>
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<tr>
<td>Providing lists of materials, pathfinders, and links to relevant external collections</td>
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<tr>
<td>Providing free access to online databases relevant to the genre</td>
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<tr>
<td>Holding online database training sessions</td>
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<tr>
<td>Holding seminars and symposia on relevant topics</td>
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<tr>
<td>Providing guidance on the use of partner organizations and event information</td>
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<tr>
<td>Holding consultations jointly with partner organizations</td>
</tr>
<tr>
<td>Opening a reference window dedicated to the target genres</td>
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Once public libraries start offering a problem-solving support service, they actively collect materials relating to the target genre; they set up a corner to exhibit the relevant library materials, prepare lists of relevant materials held in the library, create pathfinders on relevant topics, and edit the links of relevant websites. Public libraries contract to use online databases in related domains, and provide free access to library users and hold user training sessions. Some libraries work with other related organizations to hold seminars and symposia on relevant topics to provide guidance on the use of partner organizations and to introduce their events to library users; personnel from related organizations may be invited to hold individualized consultations. Some libraries open a reference service window dedicated to the target genres.

Table 1 reflects the importance of collaboration with outside organizations. This is because the selection of materials and answers to reference questions in the target genres, such as business, law, government, and health, require specialized knowledge.
Collaboration with external organizations specialized in the target genre is indispensable in providing reliable problem-solving support.

Three issues have been identified as crucial to the successful provision of problem-solving support: (1) cooperation with external relevant organizations; (2) specialized knowledge of the genre; and (3) selection of materials [3]. These issues may be resolved if public libraries adopt an evidence-based service design grounded in user studies and market research. However, as no such studies exist, the motivation for the present research was to fill this gap.

**Theoretical Framework**

This section explains the theoretical framework applied for data analysis. We used the information behavioral grammar model derived from the goal model, which is a component of Bandura’s social cognitive theory.

**The Origin of the Information Behavioral Grammar Model**

Bandura’s goal model in his social cognitive theory distinguishes between “distal goals” and “proximal subgoals” in which the former “serve as general directive function” and the latter “determine people’s immediate choice of activities” [1, p. 473–474]. When applied to information-seeking behavior, the goal model suggests that information needs are considered as a proximal subgoal, and what users intend to accomplish through meeting their information needs is considered as a distal goal.

**Characteristics of the Information Behavioral Grammar Model**

The information behavioral grammar model has the following characteristics, which make it suitable for analyzing information-seeking processes in context [4] (Fig. 2).

1. Multiple levels of goals: the model distinguishes between distal (long-term or primary) and proximal goals. A distal goal is a problem-solving goal such as starting a business, while an proximal goal is an information-seeking goal such as getting information on procedures for starting a business. Both types of goals are only representative of the multiplicity of goals, relative to each other, and change over the course of time.

2. Shifts in affective states: affective states and their changes over time are an important dimension for studying information-seeking behavior.

3. Relationships of self-efficacy, use experience, and evaluation: evaluation of the effects of a library service will be influenced by multiple factors, including past use experience and self-efficacy.
These characteristics of the information behavioral grammar model make it suitable for use as a lens for analyzing information-seeking behavior motivated by distal goals.

Methodology

This section explains the data sources we analyzed and the methods applied to the data. We analyzed two sets of existing interview data. One set relates to the information-seeking process of starting a small business. Using the critical incident technique with semistructured interviews [5] and a timeline interview approach [6], this data set was gathered from those who used the business information services at several public libraries. The other data set concerns the information-seeking processes of cancer patients, whose data were gathered using surveys and timeline interviews.

Capturing the Information-Seeking Process for Starting a Small Business

We interviewed 18 heavy users of the business information service, who used the service several times along the course of attaining a goal, at four public libraries between May and December 2006. Participants signed an agreement form, which guaranteed the confidentiality of each interviewee’s personal information, and we provided a book token equivalent to their travel expenses. The interview data were audio-recorded, transcribed, and analyzed. The interviews sought the following information:

(1) the last use of the public library business information service
(2) the goal of the use of the business information service
(3) the process leading to the generation of the goal
use of other sources to achieve the goal
(5) a detailed description of the use of the business information service to achieve the goal
(6) evaluation of the service.

The content of transcribed interviews was analyzed using the constant comparative method based on the grounded theory technique [7]. Details of the methodology and the results of the study are reported elsewhere [8]. Nine of the 18 interviewees were looking for information for a business start-up, and it is their interview data that we analyze in the current paper. Transcribed interview data were analyzed using the framework of the information behavioral grammar model and concepts related to the modification of goals were extracted. The results are presented in section 5.1.

Capturing the Information-Seeking Process of Cancer Patients

We conducted a survey of 100 Japanese citizen panel members (cancer patients and their family members) from the Center for Cancer Control and Information Services at the National Cancer Center on their use of public libraries for searching medical information for cancer treatment; we received 24 effective responses. One of the survey questions asked whether respondents were willing to participate in a face-to-face or telephone interview for additional information; 19 of the 24 survey respondents agreed to participate in an interview and these were conducted between December 2014 and February 2015 using a semi-structured interview with a timeline technique. The interviews sought the following information:
(1) the timeline for their cancer diagnosis and their course of treatment
(2) their knowledge of cancer before the diagnosis
(3) their information needs related and the sources used to fulfill those needs
(4) their collaboration with others during the information-seeking process
(5) changes in their knowledge of cancer during the information-seeking process
(6) the criteria used to evaluate the information and sources
(7) their expectations of the public library health and medical information service
(8) their suggestions on information-seeking strategies for new cancer patients.

We sent an email to each of the 19 respondents outlining the interview questions, interview method (face-to-face or telephone), and available dates and times. For face-to-face interviews, we also specified a location. We conducted face-to-face interviews with six respondents between December 6 and 19, 2014, and telephone interviews with 13 respondents between January 16 and February 14, 2015. Face-to-face respondents signed an agreement form, which guaranteed the confidentiality of each interviewee’s personal information, and we provided a book token equivalent to their travel expenses. Telephone respondents gave verbal consent. All interviews were audio-recorded.

We transcribed all interviews except one, which had very poor sound quality, leaving 18 respondents. The content of transcribed interviews was analyzed using the constant comparative method based on the grounded theory technique. The aim of the research was to identify the goals of cancer patients with respect to their use of the health and medical information service in public libraries. Details of the data, methodology, and results are reported elsewhere [9].

We report the findings related to respondents’ use of public libraries embedded in their information-seeking experiences regarding cancer treatment. We analyzed the
data to capture changes in problem-solving goals (distal goals) and information needs (proximal subgoals) over time. The results are presented in section 5.2.

Results

Modification of Goals in the Information-Seeking Process for Starting a Small Business

Fig. 3 shows the relationship between goals and associated factors identified in the information-seeking process of searching for information for starting a small business, using the information behavioral grammar model as the analytical framework.

Information needs (proximal subgoals) change with the progress of the start-up process. In the early stages, interviewees attempted to clarify the image of their new business by referring to materials in bookstores and libraries about trends in the business area. In the “entrepreneurship seminar” offered by the local library, interviewees listened to successful entrepreneurs and acquired general tips on starting a new business. The seminar also functions as a place to meet people who can help each other in starting a new business, which reduces the sense of anxiety associated with entrepreneurship.

At the individual meeting with a business consultant at the public library, a consultation is offered on topics such as the creation of a business plan according to the field and purpose of the company, securing opening funds, and obtaining permissions and approval procedures.

While the regular reference service tends to help fulfill information needs, which is the immediate goal, entrepreneurship support is a service that supports starting a new
business, which is a distal goal. The user is seeking more than just information, as their needs include business planning, fund acquisition, store acquisition, permission application, and other information and advice; however, it is impossible for public libraries alone to satisfy these needs. Therefore, cooperation with related organizations such as the Industrial Promotion Division or local chambers of commerce that can respond to such consultations is essential. Thus, librarians are expected to introduce external agencies and experts related to entrepreneurship.

At the initial stages of considering entrepreneurship, people hesitate to visit the Industrial Promotion Division and local chambers of commerce with a high psychological threshold. In contrast, because public libraries can be used freely by anyone, people feel easy to visit it. In addition, public libraries are open on weekends and nights, so it is an environment that is convenient to use for working people. For local governments considering regional promotion, it can be seen that a public library with this kind of a low psychological threshold is very useful as a place to encourage entrepreneurs to start planning a business start-up through activities such as seminars. If a win–win relationship is established between libraries and local government, the collaboration will be successful and ongoing.

Modification of Goals in the Information-Seeking Process of Cancer Patients

Fig. 4 shows the relationship between goals and associated factors identified in the information-seeking process of cancer patients. How do the cancer patient’s information needs or the immediate subgoals change along with the treatment stages?

Clearly, many cancer patients do not have subjective symptoms but are diagnosed with cancer following medical examinations. However, some people have uneasy feelings about their physical health and start to investigate the underlying reasons for this; they might search for which hospital to go to, or check out websites and bookstores, which are used more often at this stage than public libraries.

Immediately after being diagnosed with cancer, it is often the case that interviewees cannot think clearly about anything because of shock. Some of them cannot understand the terminology used by the doctor relating to their diagnosis; they try to look up terms on the Internet or go to the public library to read books on their particular cancer to check if the doctor’s diagnosis is appropriate. If the doctor’s diagnosis is not convincing, some seek further information, for example, a second opinion, or they look for a specialist. At this stage, the websites of medical institutions are used and acquaintances are consulted.

Recovering from the impact of a diagnosis will lead cancer patients to try to inform themselves about their illness and treatment. They tend to exhibit the information-seeking behavior of searching through all kinds of information sources, such as the Internet, public libraries, and acquaintances. Above all, it is very common for cancer patients to check the “five-year survival rate” of their disease. Some patients even start to prepare their own funerals because the published five-year survival rate of their particular cancer is poor.

At this stage, it is likely that many interviewees visit patient meetings and blogs to seek dialogue with other patients who are experiencing the same illness. Thus, they expect to obtain information both unilaterally as well as seeking two-way information exchange.
In the case of cancer, patients may need to choose a particular treatment from several alternative treatments. Informed consent requires the patient to be fully informed about the treatment before starting it. Treatment is generally conducted according to medical practice guidelines; however, cancer patients are looking for information such as which treatment can help them live longer. For this reason, some of the large public libraries that provide health and medical information services have medical treatment guidelines in place.

When hospitalized and undergoing surgery or anticancer treatment, some patients, especially mothers with small children, also look for information on municipal services on childcare during hospitalization. Some young cancer patients investigate whether they will be able to conceive children in the future.

Information seeking continues even after receiving treatment. One interviewee commented: “I’m looking for information on posttreatment responses, such as whether I can get medical assistance.” Another said: “what kind of diet should I have as somebody with gastrointestinal cancer?”

Patients who are used to searching for information at work or as a pastime are able to search efficiently for information they want using the Internet or libraries. However, for patients who are not familiar with this practice, they have to learn how to search for information on the Web or at the public library. One interviewee said: “I’ve had a lot of trouble finding books in the library.” Some people rely on family and friends for information.

As noted, cancer patients do not just seek information, but, depending on the stage of their cancer, they need to understand the meaning of the technical terms used by the doctor and the kinds of treatment indicated for their disease. This implies under-
standing the diagnosis, selecting a treatment, receiving medical support, and obtaining health and medical advice as required for survival. Because it is impossible for public libraries alone to provide these needs, cooperation with related organizations such as medical institutions are essential.

Implications

This section discusses the theoretical implications of using the information behavioral grammar model to analyze goal-oriented information-seeking processes, and the practical implications for problem-solving support services offered by public libraries in Japan.

Theoretical Implications

The information behavioral grammar model, used here for content analysis of interview data, was found to be useful for identifying the changing pattern of goals and the associated affective, cognitive, and behavioral states of information-seeking processes. In the context of starting a small business, the model captured how actors’ distal goals gradually changed from being ambiguous to becoming concrete, while their immediate subgoals of information needs changed in accordance with the progress in starting the business. The model could capture the anxiety commonly associated with entrepreneurship, and it identified how this anxiety was reduced through the mutual help of attendees of the entrepreneurship seminar.

For cancer patients, the model identified the depression commonly felt immediately after diagnosis due to shock and how patients recovered from negative feelings to challenge the disease. The distal goal of patients was to overcome cancer, but their immediate subgoals changed from understanding their disease to concerns such as selecting hospitals and doctors, seeking second opinions, selecting treatment from among alternatives, preparing for hospitalization, and dealing with medical expenses, medical insurance.

Practical Implications

The results of content analysis of the interview data illustrated that the information-seeking processes of entrepreneurs and cancer patients reflect goal-oriented information behavior, and the immediate goals of actors change in accordance with the progress of stages toward their distal goals. These findings imply that the problem-solving support services of public libraries should be designed to support the attainment of users’ distal goals. That is, users are expected to look for different information depending on the stage of their search process. During this process, library users will make use of various external services before and after using the library. Thus, librarians are expected not only to help users navigate the internal resources of the library system, but also to guide them toward external information sources, including materials, organizations, and professionals that are relevant to the search stage of the clients. Collaboration with external organizations that are relevant to the genre of the problem-solving support is essential for libraries to guide users to the appropriate institutions and their personnel.
Local government agencies, chambers of commerce, and medical institutions are expected to hold lectures and conferences to educate residents. However, participation in these meetings held at local government offices or hospitals implies a high psychological threshold for local residents; for example, it is difficult to attend a business seminar held by the local chamber of commerce or the city hall when a person is unsure whether to start a business. Likewise, people hesitate to go to the hospital, unless they or their family are sick. So they are unlikely to attend health and medical seminars held in hospitals or medical institutions. In contrast, if entrepreneurship support seminars and medical seminars are held at the local public library that everyone can use, even people only vaguely considering a business venture, or healthy people who are simply interested in medical care can freely participate. Thus, collaboration between public libraries and local organizations is also of great benefit to local government and organizations including chambers of commerce and medical institutions.

Cancer patients who used the public library for the first time after being diagnosed with cancer had difficulty locating books. In addition, patients who were not used to searching the Internet had difficulty finding information about their illness. By teaching users how to navigate the resources of the library and by showing inexperienced users how to conduct searches and use specialized databases, public libraries will be able to reduce the number of inexperienced users in the local population who need to search for information. Thus, provision of information literacy training may be effective in improving information literacy, digital literacy, and health literacy.

Conclusion

We analyzed the information-seeking processes of entrepreneurs and cancer patients who are considered as potential users of the problem-solving support services offered by libraries in Japan. The provision of such support services has progressed considerably. Using existing interview data, we focused in this article on the business support service and health and medical information service to identify the information needs of local citizens. We used the information behavioral grammar model, derived from Bandura’s goal model, which distinguishes between distal goals and proximal subgoals and posits that the former generate the latter.

We identified how problem-solving goals and the information needs of entrepreneurs and cancer patients were modified along with the progress of their information-seeking processes. It is suggested that the information behavioral grammar model is useful for elucidating the changes in the distal goals and information needs in the information-search process for problem solving together with the affective states of the actors and their underlying causes.

The practical implications for problem-solving support services offered in Japanese public libraries are highlighted: entrepreneurs and cancer patients make use of a variety of external services before and after using the problem-solving support services of public libraries; collaboration with external specialized organizations and professionals is essential; and the possibilities of offering training in library use, Web search, and specialized database retrieval should be explored.
References

Advancement of bibliographic identification using a crowdsourcing system

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Abstract. The bibliographic data comprising the identification information for each book are sometimes not unified across libraries in Japan. In order to improve this situation, we investigate the current bibliographic confusion in Japan and to manually identify similar books using crowdsourcing versus automatic identification. Sets of books which were previously difficult to judge can now be processed via bibliographic identification through crowdsourcing. In particular, it is noteworthy that the crowdsourcing method was correct when the sets of comprised nouns with high specificity or low frequency of use. Among the sets with divided results, 14 were caused by formatting differences between the two books. It would be possible to raise the rate of decision accuracy further by adding information about size that was not displayed on the screen in this investigation. However, as there are many differences in terms of attention and knowledge among people who participate in crowdsourcing, it is necessary to use large numbers of participants in order to more successfully identify sets of books.

Keywords: Bibliographic data, Crowdsourcing, Japanese libraries

The need for bibliographic identification

Bibliographic data in Japan

The number of books published in Japan reached 75,412 in 2017, up from 13,009 in 1950. About 2.8 million books have been published since the end of World War II [1, 2]. However, the bibliographic data comprising the identification information for each book are not unified across libraries in Japan. This is because the methods used to prepare bibliographic data differ depending on the person overseeing the process and depending on the level of input error.

Generally, such bibliographic data are unified using a MARC (from MAchine Readable Catalog) system. However, in Japan, there is JAPAN/MARC created by the National Diet Library (NDL) but also other various MARCs created by private companies that are used by many public libraries. In addition, many individual libraries input bibliographic data for some items, such as donated books or local history records without using a MARC. Also, bibliographic data may require changes over time.
As a result, a fluctuation of bibliographic data may occur in the notation of the title, author name, and other items.

**Trial of identification process for books**

Many attempts have been made to automate the identification of bibliographic records corresponding to such materials and resolve duplications.

For example, Sitas et al. [3] pointed out the importance of bibliographic identification and proposed an algorithm for duplicate detection of bibliographic data. Cousin [4] developed duplicate detection and consolidation procedures for bibliographic records in COPAC, a union catalog of some of the large academic libraries in the United Kingdom and Ireland (COPAC has been replaced by Library Hub Discover). Borel et al. [5] proposed a flexible, open-source, multiplatform software tool supporting the implementation of multiple strategies for record comparisons. Beall et al. [6] discussed the causes of duplication of metadata records by type for monographs, serials, and journal articles.

Kleek et al. [7] and Zavalina et al. [8] discussed the temporal variation of bibliographic data in MARCs. For example, Zavalina et al. traced the evolution of a sample of OCLC WorldCat metadata records created in MARC format according to a new RDA standard of information representation.

Additional work on the identification of bibliographic records also occurs due to system changes in libraries. The reports of Lee [9] and Bamman et al. [10] provide examples of this. Furthermore, there have been identification attempts for large-scale bibliographic databases, such as Library Hub Discover [11] in the UK and Libraries Australia [12] by the National Library of Australia. The National Diet Library Search [13] by the NDL also identified bibliographic records in the collection of the NDL, prefectural libraries, and designated city libraries. In addition, OCLC’s WorldCat [14] have also devised optimization methods based on the format and quantity of the target record, presence/absence of the source (author name or unified title) record, application rate, and other differences.

In Japan, Taniguchi [15][16] has been conducting a series of studies on detection and bibliographic identification of duplicate bibliographic records. Ikegawa et al. [17] also carries out bibliographic identification for MANGA.

In recent years, the transformation and identification of bibliographic records with new cataloging concepts, such as FRBR (Functional Requirements for Bibliographic Records) and IFLA LRM (IFLA Library Reference Model), have been studied. The work of Aelberg et al. [18] and Drcorsel et al. [19] are examples. Bibliographic identification can be regarded as a very similar issue to the identification of the same physical form in IFLA LRM.

However, most of these studies have aimed at the examination of items necessary for bibliographic identification and its contribution to automation and assume that all items in the data catalog have been correctly input. In other words, they do not have been conducted on incomplete inventory data.

A judgment by human eyes seems to be necessary even if the automatic identification is carried out, because there are both identification leakage and misidentification problems in bibliography identification. Identification leakage is a case in which multiple data for the same book are not correctly identified in one data, and misidentification is a case in which data on different books are erroneously judged as referring to
the same book. In general, misidentification is a bigger problem in that it makes it difficult to find books.

However, since identification leakage and misidentification are mutually opposed, certain identification leakage must be allowed when misidentification is suppressed. If misidentification is small, identification leakage increase, resulting in a large loss in the accessibility of retrieval results.

Manual judgment is considered to be effective for such a delicate problem. In general, it is difficult to make a manual decision on a large amount of data such as library materials. However, if the problem can be simplified so that unskilled people can work, then the crowdsourcing approach, in which many volunteers identify, can be used.

We investigated the current bibliographic confusion in Japan and started the L-Crowd project[20] to identify misleading books, such as those that have similar titles (or may actually be the same). The L-Crowd project is the first large-scale library crowdsourcing initiative in Japan. It aims to create accurate data that is needed by libraries and can be created only through manual labor. This project was started by library and information science and computer science researchers with the title “Internet Library Volunteers” in August 2012.

In this paper, we analyze the identification results of crowdsourced books in the L-Crowd project and try to clarify the effectiveness and problems of the crowdsourcing method. And, features of the material in which this technique is effective and future development to AI are also discussed.

**Bibliographic identification using crowdsourcing**

**Crowdsourcing**

Crowdsourcing generally is an outsourcing technique that employs freelance, volunteer and paid human resources to complete a particular task. Crowdsourced labor often works remotely. Crowdsourcing works when a business or individual, also known as crowdsourcer, advertises a problem or project on a related website and invites subject matter experts and the general public, known as the crowd, to propose a solution or participate in finishing the task. The participating members are paid remunerations or are complemented with recognition once the problem is solved or the task is completed [21].

Crowdsourcing has become a popular approach to addressing problems in many domains such as machine learning, natural disaster response, and digital libraries. In general, crowdsourcing is effective in the following scenarios: 1) there is a large number of tasks that an artificial intelligence (AI) system finds difficult but that are easy for human workers (e.g., entity identification); 2) the problem could be solved if the appropriate AI or information technology (IT) solutions could be developed, but there are not enough resources to do so; and 3) there is not a dedicated staff to solve the problem.

There are many types of crowdsourcing that are defined in terms of the size of tasks, the incentives, the way the tasks should be distributed, etc. One of the most popular types of crowdsourcing is microtask crowdsourcing—here, tasks can be completed in a short period of time, and the instruction is self-contained so that workers
do not need to communicate with requesters. We apply this microtask crowdsourcing approach to the current dilemma addressed here.

**Crowdsourcing for bibliographic identification**

In order to calculate the similarity of each book pair, there are methods such as the vectorization of sentences by the number of words (TF-IDF: Term Frequency - Inverse Document Frequency, Okapi BM25, LSI : Latent Semantic Indexing, etc.), the method using the distributed expression of words (Word2Vec/CBoW : Continuous Bag of words, WMD : Word Mover’s Distance, LC-RWMD : Linear-Complexity Relaxed Word Mover’s Distance, etc.), and the method using the distributed expression of sentences (Dec2Vec, Sent2Vec, etc.). In this study, we decided to use BM25 to ensure that words used to compute only bibliographic items, but not the text of books, are expected to be concentrated to some extent, and that computation speed is ensured.

We calculated the similarity of each book pair using the Okapi BM25 (BM25) algorithm. We applied it to a total of 5.53 million books: 2.3 million books in public libraries in Kyoto Prefecture that do not have ISBNs, and 3.2 million books in the national bibliographies of the National Diet Library in Japan.

BM25 was originally used as a ranking function in search engines to rank matching documents according to their relevance to a given search query. It is based on the probabilistic retrieval framework developed in the 1970s and 1980s by Robertson et al.[22]. BM25 ranks sets of documents based on the frequency of the occurrence of the query words in a document, not on the interrelation of the query words in a document. However, since BM25 calculates the score based on the frequency of occurrence of title words, the score may be too small to accurately measure frequently occurring words. Furthermore, BM25 is not considered for correlation between words, word length, and the importance of fields etc.. However, these elements are crucial importance in the bibliographic identification. For example, even if the score for books with different titles is larger than the score for books with different volumes, the former is not always suitable. Because there are many books with similar title, but there are very few books with multiple volumes.

Therefore, we examined the importance of each bibliographic fields (for example, title, publisher’s name, volumes, and the author’s name etc.), and improved the algorithm to change the weight according to these fields of bibliographic data.

In addition, The extremely large score of BM 25 is not always suitable and small score may not mean useless for crowdsourcing. For example, when the score of BM25 is sufficiently large, it is possible to automatic judge the two books to be the same book without requiring a human to evaluate this. In contrast, when the score is small, a machine will consider it to be a completely different book. The case that we need to judge is when the score are intermediate. If two books have scores that place them in a middle, a human being may judge whether or not they are the same, but it is difficult for a machine to empirically judge this.

In this study, As a range in which the automatic decision by computer was difficult, 8,604 set of books in which the score of BM 25 is 80% or less of the same book (the score of BM25 is maximum when books are the same) and the score of BM 25 is more than 20 are extracted and used.

The microtask crowdsourcing screen is shown in Fig. 1. For both books, the author’s name, the publisher, the year of publication, and the title are displayed. We
asked crowds to judge whether the books were the same or different. All the crowds involved in this project are volunteers.

<table>
<thead>
<tr>
<th>タイトル</th>
<th>著者</th>
<th>著者名</th>
<th>出版者名</th>
<th>出版年</th>
</tr>
</thead>
<tbody>
<tr>
<td>算数学教室：検定試験受験者教科用</td>
<td>上</td>
<td>[田村貞義]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>経営者検定試験用テスト</td>
<td></td>
<td>経営者検定試験委員会</td>
<td>日本法令</td>
<td>2008</td>
</tr>
</tbody>
</table>

Note. A screenshot of the task. The first line is the instruction "Do the two rows in the table refer to the same book?" The columns are title, volume and number, authors, publishers, and year. The two buttons are "the same" and "different." The task also has a "Skip" button.

Fig. 1. Crowdsourcing judgment screen displaying both books' information

As volunteers who were not trained in bibliographical technique conducted the crowdsourcing, they could make incorrect decisions about what were actually the same books. However, the identification of books is not difficult because users usually do it in bookstores. Also we expected that the error of judgment effect would be minimized if several people evaluated the same combination. From a technical viewpoint, the “tacit knowledge” that was accumulated in the library until now was now “algorithmized.” Feeding the results of the crowdsourcing back into the identification algorithm allows it to learn, improving not only the data judged by humans but also the algorithm’s ability to automatically process the same material.

Causes of bibliographical problems and misidentification

Analysis target

We designed the crowdsourcing interface to randomly display 8,604 sets of books. Many anonymous volunteers and 81 registered volunteers performed judgments with a total of 85,936 tasks performed in 60 days. On average, a set of books was identified 9.99 times. In several cases, people belonging to organizations, such as university students, worked more intensively than those who were unaffiliated. Therefore, for reporting from a single computer located within an organization, we fixed the crowdsourcing so that bibliographic pairings were not displayed continuously repetition. As a result of this, several of the books in the study have a smaller number of judgments. The number of display times or the smallest number of judgments was one, and the largest number was 16. Among these, 6,231 sets were judged more than eight times. Table 1 shows the results of the crowdsourcing determination performed on the 6,231 sets.
As shown in Table 1, from the 6,231 sets of books, 935 sets (15.0%) were determined to be the “same book” by the majority; 5,254 sets (84.3%) were determined to be “different books.” There were 44 sets (0.7%) that could not be determined.

In 4,001 sets (64.2%), all the participants were in agreement; in 1,157 (18.6%), 90–99% were in agreement. Of the 5,158 combinations in which 90% or more of the determination results coincided, there were 4,528 sets (87.8%) where the two books were different, and 629 sets (12.2%) where they were judged to be the same book.

In contrast, the judgments were varied for 176 sets (2.8%), and the majority judgment was made by less than 60% of the participants. For 20 of the 176 sets, the same and different decisions were equal. Also, on 22 sets, many participants carried out the skip operation without making a decision, and for one set, all members selected skip.

In order to investigate whether the crowdsourcing decisions were truly accurate, we looked at 400 out of the 4,528 sets that 90% or more of the participants judged as a “combination of different books” and 200 of the 4,528 sets that 90% or more of the participants judged as the “same book.” Furthermore, we looked at a grouping of 180 sets that contained 176 sets in which the judgment was split and four sets in which the majority judgment was skipped. This group was named Undecided. A total of 400 sets were surveyed. However, there were eight sets for which the Kyoto Prefectural Library and the National Diet Library could not check the actual information of any of the books due to their physical unavailability, such as being on loan. As a result, the actual investigation objects were 197 sets of Same, 396 sets of Different, and 179 sets of Undecided (772 sets in total).

We confirmed the actual items by checking the title pages and the imprint of books. If they were all identical, we judged them to be same book and if there were differences, we judged them to be different books. We judged a revision to be another book, but we judged a reprint to be the same book. We do not used the book covers for collation purposes, because the National Diet Library discards the original book covers, and Kyoto Prefecture libraries glue the book cover on so that it cannot be removed.

Table 1. Crowdsourcing results

<table>
<thead>
<tr>
<th></th>
<th>Same</th>
<th>Different</th>
<th>Skip</th>
<th>Split</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>0–59%</td>
<td>57</td>
<td>81</td>
<td>18</td>
<td>20</td>
<td>176   (2.8%)</td>
</tr>
<tr>
<td>60–69%</td>
<td>43</td>
<td>92</td>
<td>3</td>
<td>-</td>
<td>138   (2.2%)</td>
</tr>
<tr>
<td>70–79%</td>
<td>68</td>
<td>156</td>
<td>0</td>
<td>-</td>
<td>224   (3.6%)</td>
</tr>
<tr>
<td>80–89%</td>
<td>138</td>
<td>397</td>
<td>0</td>
<td>-</td>
<td>535   (8.6%)</td>
</tr>
<tr>
<td>90–99%</td>
<td>210</td>
<td>947</td>
<td>0</td>
<td>-</td>
<td>1,157 (18.6%)</td>
</tr>
<tr>
<td>100%</td>
<td>419</td>
<td>3,581</td>
<td>1</td>
<td>-</td>
<td>4,001 (64.2%)</td>
</tr>
<tr>
<td>Total</td>
<td>935</td>
<td>5,254</td>
<td>22</td>
<td>20</td>
<td>6,231</td>
</tr>
</tbody>
</table>

Note. Majority decision results were marked with the following terms: “Different,” “Same,” “Skip,” and “Split” the number of “Different” and “Same” outcomes were equal.)
Crowdsourcing and identification results

The comparison of the crowdsourcing and the bibliographic identification results are shown in Table 2.

Table 2. Results of crowdsourcing and bibliographic identification

<table>
<thead>
<tr>
<th></th>
<th>Same</th>
<th>Different</th>
<th>Undecided</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Same</td>
<td>183 (92.9%)</td>
<td>4 (1.0%)</td>
<td>49 (27.4%)</td>
<td>287</td>
</tr>
<tr>
<td>Different</td>
<td>14 (7.1%)</td>
<td>392 (99.0%)</td>
<td>130 (72.6%)</td>
<td>485</td>
</tr>
<tr>
<td>Total</td>
<td>197</td>
<td>396</td>
<td>179</td>
<td>772</td>
</tr>
</tbody>
</table>

Note. The rows are the result of bibliographic identification and the columns are the result of crowdsourcing.

As shown in Table 2, for the 197 sets judged to be the same through crowdsourcing, 183 (92.9%) were indeed the same book. Moreover, 392 (99.0%) of the 396 sets judged to be different books were actually different. In our opinion, these are very high accuracy rates, and we assert that it is very likely that the actual book set judgment was correct if the judgments were the same for 90% of the participants.

In contrast, 49 (27.4%) were judged the same and 130 (72.6%) were judged different of the 179 Undecided sets. As shown in Table 1, 15.0% of the book pairs were judged to be the same and 84.3% were judged to be different. Therefore, in the case of the Undecided, there seemed to be difficulty in judging whether the bibliographic identification was right or not.

Cause of the erroneous judgment results of the crowdsourcing

We examined the causes of the 179 combinations in which the results of the bibliographic identification judgment were divided (in terms of the majority) as well as the causes of the combinations in which the judgment results were incorrect. Both had commonalities and could thus be divided into the 3 types, respectively.

Factors attributable to bibliographic record

Lack of data in the bibliographic record. Unfortunately, the bibliographic data used by Japanese libraries contains some missing items. As described in Chapter 1, the reason may be errors in input in the book acceptance, conversion errors in system replacement and so on.

However, among the cases that could not be judged by looking at the actual data, there were extremely few cases where the judgment could not be made, or when the erroneous judgment occurred when the title, the author’s name, and the publisher’s name were missing or incorrect. In this study, there was only one case where the title was incorrect. The main types of information that could not be judged or that caused incorrect judgments included the year of publication (35 sets), volume number (22 sets), or version (10 sets) (in some cases, multiple items were missing). Among these, the year of publication was misjudged in both the bibliographic data are common, and only 4 pairs were missing at least one volume.
Of the 772 pairs analyzed, 212 sets did not include the year of publication in the bibliographic data of the book; however, this does not mean that it could not be determined simply because one of the publication years was missing. In particular, when the volume number or version number were the same, or when both the author name and the publisher name were the same, participants tended to make a judgment even when the year of publication was missing. Even when the titles were sentences, such as “I’ll cure your myopia”; a relatively specific noun combination, such as “A Bibliographical Discussion of Edo’s Board Book” or “Piano and Cello Science”; titles whose meaning was unclear, such as “Tensarabara”; and titles composed of nouns that were infrequently used, such as “Raw Garbage Compost,” many of the books were correctly identified.

In contrast, books with few bibliographical items that were only composed of nouns, such as “High Blood Pressure,” “Volcanic Island,” and “Jinshin War,” were often incorrectly identified.

If one of the books in the sets had information displayed, such as “Volume 1” or “Upper Volume,” and the other was blank, participants often determined them to be the same book. There was a strong tendency to skip judgment when one of the books contained words such as “Volume 2” or “Lower Volume.”

In addition, although a book with a long title was considered to be highly specific, there was no significant correlation between the ease of identification and the length of the title.

Notation fluctuation of bibliographic data. The second case is the notation fluctuation of the bibliographic data. For example, if the title is displayed as “Yomihon” which means “Reading book” in small size behind “Shogyo” which means “Commerce” in the title, or if the reading kana(small size description) is displayed with main title "!". In addition, there are differences between old and new kanji character such as "歌行燈" and "歌行灯".

In addition, there are cases in which the subtitle is described and not described in the bibliographic data. Authors with different roles, such as person who write the text and who drew the picture in the picture book, and the description for original author and translator are the similar case.

In some cases, the name of the publisher is omitted. For example, "Shinko Publishing Co., Ltd. Keirinkan" and "Keirinkan" are the same publisher, but both are entered in the bibliographic data. When the judging person is not an expert, the judgment which requires such expert knowledge becomes difficult. There are 28 errors caused by such fluctuation of bibliographic data as the number of erroneous judgments. Though it cannot be said that the number is small enough to be disregarded, it seems to be possible to solve these parts by constructing the database which recorded the special knowledge.

Among the problems of fluctuation of bibliographic data, only the case in which the year of publication is wrong is a big problem to induce the error of the judge. As a cause of the error in the publication year, simple input error can be considered, but there are some publishers who change only the printed content without changing the version even if the content is drastically changed. Such business practices are also considered to have an impact.

Factors stemming from the published book itself
Difference of book form. Books with the same contents are often published more than once. For example, when a book is made into a DVD, a translation book or a book originally published as a single book is published as a paperback book or a new book. Especially in Japan, there are many cases where a novel is published as a paperback within a short period of time. Many of these groups are judged by the fact that they were published in different years, but in many cases, they were published as paperbacks or new books in the year following the publication of the book, and in some cases, books in different forms were published in the same year. This often causes confusion.

In some cases, bibliographic data is created as a separate library material. In the microtask used in this research, only "Title", "Author name", "Publisher" and "Year of publication" are displayed in the first screen to judge the identity due to the restriction of the display screen size. As for other bibliographic items, it was possible to confirm the size and form by following the link, but in the microtask, there were very few cases to carry out the work to that extent. Therefore, it is considered that misjudgment on these combinations occurred. Since the size of a book is different from that of a paperback book or a new book, and it is easy to judge other materials from bibliographic data, automatic judgment seems to be possible when the size is input.

Another book that is easy to make mistakes. As a case where a person judges another book to be the same book, there are "Zenon Kayokyoku Zenshu" and "Zenon Kayokyoku Daizenshu", "Journal of Japanese Literature" and "Essays in Japan". As described above, it was often difficult to judge the combination of books whose contents were semantically similar and whose notations were similar. In the meantime, though the editing distance of the character string is generally used on the similarity decision, in the decision of the human, the large relation with the difficulty in the decision was not observed for the difference of the editing distance.

As a combination of books which are easy to be mistaken, in addition to such difference in title, there are some examples in which the volume differs in series. In particular, when the same numbers were included, such as "The First Volume" and "Nihon Hen Vol. 1", the tendency of misidentification was remarkable.

In addition, although there was only one set in this survey, there were some cases in which the cover, cover and title paper of books were different, even though the contents were identical. In such cases, it is very difficult to judge from only bibliographic data.

Factors attributable to judgment

We paid particular attention to combinations that eight or more participants evaluated. As described above, when many judges were involved, there were no erroneous judgments. However, there were some sets of books that many judges skipped. A book whose title contained rare words, such as "時慶卿記" is a typical example. Participants also skipped books containing only capital letters.

There were a few cases in which we could not understand why the judgments were not in the same location, even though eight or more participants had judged it. For example, even if the bibliographic items were almost the same or almost different from each other, the judgment results were separated. It is possible that the partici-
pants’ attention was insufficient or split. One way to solve this would be to increase
the number of judges involved in a project.

**Conclusion and further research**

This study makes several unique contributions. As described in the previous chapter,
sets of books that were previously difficult to judge can now be processed via bibliog-
graphic identification through crowdsourcing. In particular, it is noteworthy that the
crowdsourcing method was correct when the sets comprised nouns with high specific-
ity or low frequency of use. Conventional automatic methods could not be applied to
sets with missing bibliographic data and fluctuating bibliographic data.

Furthermore, many identified bibliographic data by crowdsourcing have errors or
omissions. We expect to contribute to the work of correcting errors and omissions in
bibliographic data in Japanese libraries using this results.

Among the sets with divided results, 14 were caused by formatting differences be-
tween the two books. It would be possible to raise the rate of decision accuracy fur-
ther by adding information about size that was included bibliographic data but not
displayed on the screen in this investigation.

On the other hand, there are some problems. In this study, we used 8,604 sets of
books based on the score of BM 25 (the score is less than 80% of the maximum and
more than 20). Further examination is desired on whether the criteria is appropriate
and which sets of books should be judged by crowdsourcing.

Furthermore, it is also necessary to consider how to continue the project. In par-
ticular, recruiting volunteers who participate in the microtask is very important. In our
study, reliable results were often obtained when more than eight people judged. It also
shows that many volunteers are needed as there are many differences in terms of at-
tention and knowledge among people who participate in crowdsourcing. As the num-
ber of volunteers were gradually decreasing during the study, how to give incentives
to volunteers is a big problem.

In the future, the results of crowdsourcing will be analyzed in more detail. Another
interesting issue is to apply AI techniques to our problem. We have already
crowdsourced the development of AI agents (which we call "AI workers") through
our crowdsourcing platform [20], who perform the same tasks as those for human
workers. Our preliminary evaluation showed that the AI workers can output reasona-
able results. Effective ways to aggregate the results from human and AI workers for
reducing the amount of human labor will be examined.

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Using Signal processing to Investigate User Web Search Behaviour on Topics of Interest with Multiple Periodicities

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Abstract. A Web user searches for multiple topics of interest on the Web on a regular basis. The topics may be searched periodically at a particular time or at different times, creating temporal patterns with different periodicities in the search history. To improve a user’s Web search experience, the multiple periodicities of the topics of interest of a user can be exploited. This study proposes to find multiple periodicities of a user’s topic of interest through signal processing. It is found that Fast Fourier Transform can be used to find multiple periodicities of a topic as well as to predict the temporal pattern of the topics with accuracy and error depending on the training data size.

Keywords: Web search, Temporal patterns, FFT, Multiple periodicities.

Introduction

The Web is extensively searched for various topics. Most of the topics searched by the Web users are time-sensitive and are searched regularly [1–3]. But, different people have different topics and times preferences. For example, people who watch sports may issue more queries on Saturdays than on weekdays. Students are likely to issue more school-oriented questions in the evenings on weekdays when they are completing their homework. Accountants may issue queries on tax law that they will only submit during work hours from Monday to Friday. Users also have different interests at different times: the accountant could also watch sport. Thus to better model the user, we need to know their topics of interest and their periodic behaviour for each topic. Periodic behaviour can be complex, as it can be a simple pattern (every morning) or a combination of patterns (every morning on weekdays and all day on weekends).

Providing the search results for a query while ignoring the time of search, may not prove useful every time. The intent of a user associated with a query depends on the time of the search. This intent is referred to as the temporal intent. Understanding the temporal intent of a user can be utilized to provide relevant results [4].

Searching for specific topics at particular times makes the user’s search history a temporal dataset with topics searched having different temporal patterns. For instance, a topic in a user’s search history may have a single periodicity pattern or a multiple periodicity pattern. A temporal pattern is a single periodicity pattern if it has one period which means that the topic is searched at a particular time regularly. A topic has a multiple periodicity pattern if it has multiple periods. For example, a topic which is searched at different times on weekdays and weekends has multiple periods. In general, to find the temporal patterns in a temporal dataset, a single periodicity is defined and all the patterns with a required threshold periodicity occurring after a particular period are considered as temporal patterns. Thus, a temporal pattern is easy to retrieve
and predict if it has a single periodicity. But, in the case of Web search history, there may be temporal patterns with multiple periodicities.

Fig. 1 shows a temporal pattern with multiple periodicities. The pattern repeats after a regular hourly period on alternate days. So, on the day, when it occurs, the subsequent occurrences are a few hours apart except for the case of its last occurrence, where the next occurrence is a day apart.

This study has proposed the use of Fast Fourier Transform (FFT) to find the multiple periods of a temporal pattern. As search logs from commercial Web search engines don’t have open access, synthetic data has been created for the purpose of this study. The temporal pattern of a topic is treated as a signal and analysed using Fast Fourier Transform.

![Fig. 1. A signal representing a user's topic of interest with multiple periodicities](image)

**Related Works**

The main aim of this work is to study the use of Fast Fourier Transform (FFT) in finding the multiple periods of topics searched by a user and to analyse the accuracy of prediction to ultimately improve the Web search experience. This section is divided into two sub-sections. The first subsection briefly shows the other related works that have been done to provide personalized and relevant search results. The second subsection discusses signal processing and its benefits studied in different areas.

**Improving Web Search Experience**

User Web search history has been studied widely to understand user search behaviour [5]. To predict the nature of the information need of a user, it is essential to study the past browsing behaviour of the user [6, 7]. The location has also been studied as a feature to identify the user intent associated with a query [8]. It is found that using
location as a feature is not equally beneficial to all kinds of queries. Time has also been studied as an influential factor for personalization in various aspects. A study by Liu et al. [9] proposed a model to identify the temporal information of a user’s Web search using dwell and click sequence on search results. Item-level dwell time has also been capitalized as a measure of item relevance to a user [10]. According to a study by Halvey et al. [11], users have specific needs at different times of the day and the week. They predicted user’s mobile web navigation pattern using Markov models based on the automated method they developed to segment log data by time periods. Metzler et al. [12] exploited the implicit temporal intent associated with search queries to provide relevant results. Vu et al. [13] also modelled time in re-ranking the search results to deliver more relevant search results. According to this study, recent documents may be of more relevance to the user. Song and Guo have considered the time of search in their work to improve recommendation quality [3]. They generated query level, task-level and user-level features to capture the characteristics of task repetition and used neural networks to recommend better results. Like this work, the aim of our research is also to improve the user search experience by providing better search results using the time of the search. It is not always necessary that a user searches for a topic at a specific hour every day. It may be on alternate days or only on specific days. Our work also addresses the issue of multiple periodicities in a temporal pattern using signal processing. A signal or a pattern with multiple periodicities can be thought of a combination of different sub-signals or sub-patterns that have their own periodicities. For instance, a signal which shows that a topic is searched every morning at 8 am on weekdays and at 2 pm on weekends.

**Fast Fourier Transform**

Signal processing is extensively used in different areas like Electronics and communication, Biology, Astronomy, Time-series analysis and so on. FFT has found use in studying the quasi-periodic signals [14, 15] in radiation. To study the climate data in the frequency domain, the work by [16] used FFT. To predict seizures, a model has been proposed based on classifiers like Random Forest and SVM (Support Vector Machine) with FFT [17]. The study [18] proposed a model based on FFT with machine learning to advise if a patient needs a body check-up on the basis of past medical data of the patient. To reduce the computation and storage complexity of Deep Neural Networks (DNN), FFT has found significant use [19]. Multivariate time series classification has also been done with FFT [20]. Alexey et al. [21] used FFT and spectrum analysis to find the periodicity patterns of user’s engagement with search engines and to evaluate search quality. All of these results predict user behaviour based on periodic patterns.
Fig. 2. Comparing the original pure signal with the processed signal

Fig. 3. Comparing the original mixed signal with the processed signal
Methodology

The experimental methodology consists of creating the sample signals, applying Fast Fourier Transform (FFT) and Inverse Fast Fourier Transform (IFFT), preparing a model for extrapolation, followed by comparing the results.

Creating signals

Fifteen main synthetic signals were created for the purpose of this study. They are composed of different periodicities. Each signal represents a sinusoidal wave. The length of each signal is 192 hours (8 days). Some of the signals are regarded as pure signals. For convenience, they are named as S1, S2, S3, S4, S5, and S6. In Signal S1, the pattern repeats after a regular interval of five hours on alternate days, while in Signal S2, the pattern repeats at each alternate hour on alternate days. Signal S3 represents a pattern that repeats at every hour on alternate days. Signal S4 shows a weekend pattern where a topic is searched only on Saturdays and Sundays. Signal S5 represents a signal where a topic is searched after 5 hours every day while Signal S6 shows that a search is made at alternate hours every day. Some signals are created by mixing some of the pure signals. Signals S12, S13, S23, S123, S35, S36, S45 and S46 are regarded as “mixed signals” as they are created by combining the “pure signals”. These signals show the combination of different periodicities of their component pure signals. Thus, these signals represent multiple periodicities. For example, Signal S13 as shown in Fig. 1 is a combination of Signal S1 and Signal S3. It becomes clear from Figure1 that this signal is a combination of two waves or signals with different amplitudes and frequencies. The component signals of various frequencies can be filtered out using FFT.

Signal S0 also has a pattern but is burst with some random noise. It represents a topic that is often searched periodically but may be due to some other activities or engagements, the topic is not searched for a few regular periods. For example, a user searches about political news every morning but, when he goes for holidays, he doesn’t search about them. Thus, noise is created in the periodic signal.

Applying FFT and IFFT

Fast Fourier Transform (FFT) is an algorithm to efficiently convert the Time-domain data to the Frequency-domain. In this study, FFT is applied to the signals to analyse the periodicities of a signal, as shown in Fig. 1. The FFT values are then converted back to the time-domain by applying the Inverse Fast Fourier Transform (IFFT). This allows for extrapolation to future time periods. IFFT produces the same values in Time-domain. It is observed that after applying IFFT to the frequency domain values, the original time-domain signal is reproduced. Thus, FFT and IFFT can potentially be used to predict or extrapolate the original signal. The graphs in Fig. 2 and Fig. 3 are showing the comparison of the original signal and the processed signal, after applying IFFT to FFT values of Signal S3 and Signal S23. As it is apparent from these figures that both the original and the processed signals are overlapping. This means that using IFFT, the same original signal irrespective of the number of inherent periodicities, can be recreated. All these conversions and analysis are done in Python 3.6 using Numpy and Scipy libraries along with other required libraries for data processing and visualization.
Fig. 4. A pure signal with its respective extrapolated signal with Time batch 0-96

Fig. 5. A mixed-signal with its respective extrapolated signal with Time batch 0-96
Extrapolation and Comparison

Each of the original signals is divided into Time batches, ranging from 0-24 hours to 0-192 hours, producing 8 segments of the original signal. A prediction model is trained on a segment and then extrapolated for the rest of the length of the original signal. For example, if the prediction model is trained on a segment of Time batch 0-48 hours, it will predict the signal from 49 hours to 192 hours.

The following steps explain the process of extrapolation:

1. Different segments of the original signal are created for different Time batches.
2. Size of Prediction signal is calculated by taking the difference between a segment of the original signal and the original signal.
3. The segment is cleaned of any constant trend. De-trending a signal means the removal of any linear trends in the signal to allow the identification of potential cyclic patterns in the signal.
4. The de-trended segment of the signal is converted to Frequency domain by applying FFT on it.
5. The magnitude is calculated by taking the absolute value of FFT values.
6. The phase is calculated by taking the angle of FFT values.
7. The magnitude and the phase values are processed to construct the signal back in the time domain for the length of the original signal. This produces an extrapolated signal.

Fig. 4, Fig. 5, and Fig. 6 show the extrapolated signal trained with a segment of a signal of Time batch 0-96 hours. Fig. 4 represents the extrapolated signal of the original signal Signal S1, Fig. 5 shows the extrapolated signal of the original signal Signal S36, and Fig. 6 represents the extrapolated signal of the original signal Signal S0. To find the percentage accuracy and error of the extrapolated signals, the difference be-
tween rounded and absolute values of the extrapolated signal with each corresponding value of the original signal is calculated. Fig. 8, Fig. 9, Fig. 10, and Fig. 11 show the percentage of the accuracy and the error values of Signals S0, S1, S12, and S123 respectively with different Time batches.

**Results and Discussion**

It is observed that FFT is able to find multiple periods in a single signal. It can be used efficiently to filter the individual signals of a single period from a mixed signal. In other words, FFT is able to find the different periods in the temporal pattern of a topic. The IFFT can produce the signal from the frequency domain to the time domain, similar to the original signal. In the case of extrapolation, with respect to different training Time batches, it is seen that more training data corresponds to more accuracy for all the different kinds of signals. As shown in Fig. 8, Fig. 9, Fig. 10, and Fig. 11 in general, the accuracy is increasing with an increase in the training data, except at some points. For Signal S1, the percentage of accuracy is higher than that of the error with most of the training Time batches. Similar is the case with Signal S12. Surprisingly, the Signal S0 that has noise incorporated within a regular pattern, shows high accuracy with every training Time batch. Signal S123 which is a combination of three signals of different periodicities, gives poor accuracy in extrapolation.

It has been found that the number of periods in a signal is related to the training Time batch size and the accuracy of prediction. Fig. 7 show the percentage accuracy of all the signals with all the 8 training Time batches. Most of the pure as well as the mixed signals which are a combination of 2 signals, show accuracy higher than 50 percent after 2 Time batches, that is, after Time batch 0-24 and Time batch 0-48.

Signal S5 and Signal S6 are showing 100 percent accuracy after 2 and 1 time-batches respectively as their periodicity is small as compared to the other signals. In Signals S5 and S6, the patterns are repeating after 5 hours and 2 hours respectively. Although this is not the case for Signal S123 which is a mixed-signal of 3 signals. The accuracy is more than 50 percent after 5 time-batches.

Thus, it is clear that prediction accuracy is affected by the number of the periods and length of the period in the training data as well as the complexity of periodic patterns, while low error rates in periodic data can be overcome.
Fig. 7. Accuracy for all the signals with different Time batches

Fig. 8. Percentage accuracy and percentage error in extrapolation with different Time batches for Signal S0
Fig. 9. Percentage accuracy and percentage error in extrapolation with different Time batches for Signal S1

Fig. 10. Percentage accuracy and percentage error in extrapolation with different Time batches for Signal S12
Conclusion and Future work

This study sought to determine periodic patterns of behaviour in Web queries using signal processing. A typical user may exhibit complex periodic behaviour which, if understood, could be used to personalize and provide more relevant results to the user. FFT was proposed to determine the strength and nature of periodic patterns for a user who may have such behavioural patterns. This can then be used as a generator to reproduce the periodic behaviour pattern in future. For example, a user who searches for sport every Saturday can have results personalized for sport on Saturdays. The aim of this study was to determine how well this FFT approach can detect different kinds of patterns, using carefully controlled data, and the results indicate that it works reasonably well. The amount and variability of data clearly affect the outcome, but reasonably high prediction accuracies can be obtained with only the equivalent of a single week’s data. Other time forecasting methods (from machine learning) will be contrasted with this technique in future, and the approach will be tested with real world data. Ultimately, this pattern detection will be used as part of a broader goal to personalise the search results for users.

References


LGBT Book Collections in Japanese Public Libraries

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Abstract. It is important for public libraries to provide services for LGBT (lesbian, gay, bisexual, and transgender) people. However, few studies have examined the library services for LGBT people in Japan. In this study, we investigated 3,085 public libraries and 433 LGBT books in order to clarify library services for LGBT people with a focus on book collection. The purpose of this study is to clarify the current states of library services for LGBT people and investigate the elements that can improve such library services. According to the results, it was found that 97.8% of Japanese public libraries were holding at least one LGBT book. It was also found that the presence of the LGBT books was mostly not influenced by the published year, price, and popularity. On the other hand, it was shown that LGBT literature—especially Japanese novels, English novels, and children’s books—tended to be held by public libraries more than the other types of LGBT books. It was also shown that the libraries whose municipality had introduced ‘partnership certificates’ for same-sex couples and the libraries that had introduced outsourcing systems tended to hold LGBT books more than the other libraries.

Keywords: LGBT Books, Collection Analysis, Japanese Public Libraries.

Introduction

In recent years, human rights for LGBT (lesbian, gay, bisexual and transgender) people have been attracting attention. Because of this increasing awareness, new legislation for LGBT people has been established in Japan. Since 2015, over 20 municipalities have passed an ordinance which issues ‘partnership certificates’ to same-sex couples. These certificates give them the same rights as married heterosexual couples. In 2018, the Tokyo Metropolitan Government passed a regulation that prohibits discrimination on the basis of sexual orientation and gender identity. Furthermore, in July 2019, an openly gay person was elected as a member of the House of Councillors of the National Diet.

A public library is a library that provides services to all visitors, which of course includes LGBT people. It is important for the public library to provide services for LGBT people and this awareness has been increasing along with the above-mentioned political changes in Japan. Nevertheless, few studies have examined the library services for LGBT people in Japan.

Within this context, we clarified library services for LGBT people with a focus on book collection. More specifically, we tried to establish how many libraries hold LGBT books; what kind of LGBT books tend to be held by Japanese public libraries; and what kind of libraries tend to hold LGBT books. The purpose of this study is to
clarify the current states of library services for LGBT people and investigate the elements that can improve such library services.

In order to clarify what kind of LGBT books tend to be held, we considered the following five typical characteristics of books: (1) Nippon Decimal Classification (NDC) categories, (2) C-Code, (3) published year, (4) price, and (5) popularity. In order to clarify what kinds of libraries tend to hold LGBT books, we considered the following four types of characteristics of libraries: (i) whether the library is in the municipality that introduced the partnership certificates for same-sex couples, (ii) whether the library is managed by an outsourcing system called the ‘designated administrator system’ (henceforth ‘outsourcing library’), (iii) whether the library is a main one or an annex, and (iv) the type of municipality served.

We chose 433 LGBT books as our sample. The 3,085 public libraries that were holding them were investigated using the application programming interface (API) from Calil (https://calil.jp). Calil is a free web service that can perform cross-library searches in Japan. Using this program, we investigated the current status of public library services for LGBT people in Japan.

Related Studies

Other researchers have conducted library services studies in regard to LGBT people. For example, Hart and Mfazo [1] used a questionnaire for librarians in Cape Town, South Africa, to investigate collection practices, behaviours, and services which libraries render towards the gay community. Boon and Howard [2] investigated nine Canadian public libraries’ that contained 35 young adult fiction works with LGBT content. They discovered that these libraries had significantly fewer copies of LGBT titles than control titles (i.e., not LGBT titles). They concluded that certain libraries were much more likely to purchase the control titles than the LGBT titles. Chapman [3] also conducted a holding analysis of 203 LGBT-related fictional works for children and young people in English public libraries. She concluded that the provision of LGBT-related fiction for children and young people was generally limited by the participating authorities. However, concerning libraries in Japan, some case studies were conducted but little is known about what is actually happening in the entire country.

Meanwhile, some research was conducted on controversial books in Japan. For example, Ohba et al. [4] investigated the numbers of collections of books on the subject of ‘the right to collective defence’ in 5,003 Japanese libraries. This was done in order to examine whether controversial books were fairly held. For the same purpose, Ohba [5] also investigated the numbers of collections of books on ‘postal service privatisation’ and ‘Yasukunijinja’ (The Imperial Shrine of Yasukuni), which commemorates those who died in the service of Japan.

Methods

In this section, we explain our method of selecting sample libraries and sample books along with the methods of our analysis.
Sample Libraries

We used 3,085 public libraries as our sample libraries where Calil could be implemented to retrieve their collections. For each library, we obtained data concerning each characteristic. As previously mentioned, the characteristics we considered were as follows: (i) whether the library is in the municipality that introduced the partnership certificates for same-sex couples, (ii) whether the library is an outsourcing library, (iii) whether the library is a main library or an annex, and (iv) the type of municipality it served.

We determined above-mentioned (i) by using the list provided by the ‘organization to demand for same-sex partnership system against municipalities.’ This list included 23 municipalities and one prefecture that introduced the partnership certificates for same-sex couples. It also included the eight municipalities that are planning to introduce these certificates. Then, we classified our sample libraries as (a) libraries in municipalities that had already introduced partnership certificates, (b) libraries in municipalities that were planning to introduce the certificates, and (c) others (libraries in municipalities that neither had introduced the system nor were planning to).

We also classified each sample library as either an outsourcing one or not an outsourcing one. In Japan, local governments have long managed public libraries. However, in 2003, organisations—including private enterprises—began to take over their management with the introduction of an outsourcing system called the designated administrator system. Many libraries have now introduced this system. However, some people in Japan argue that the outsourcing libraries may not provide unprofitable services, such as those for minorities. With this in mind, we considered whether the library is an outsourcing library and clarified the outsourcing libraries did not tend to hold LGBT books. We judged whether the library is an outsourcing library or not based on The Report on Public Libraries Managed by the Designated Administrator System in 2018 which was published by the Japan Library Association. This source includes a list of outsourcing libraries. Thus, we identified libraries listed in the report as outsourcing libraries and all others as not outsourcing libraries.

Furthermore, we classified the libraries as either main libraries or annexes, and according to the type of municipality served: (1) prefectural libraries, (2) ‘ordinance-designated’ city libraries, (3) Tokyo special ward libraries, (4) city other than ordinance-designated ones (henceforth ‘general city libraries’), and (5) town and village libraries. Japan is divided into 47 prefectures, and these are the first level of region classifications, one of which is ‘Tokyo-to’. The second level of region classifications are the ordinance-designated cities, Tokyo special wards, general cities, towns, and villages. In Japan, an ordinance-designated city is defined as a city with a population greater than 500,000 such as ‘Yokohama-shi’. The Tokyo special wards are 23 municipalities with the highest population densities in Japan such as ‘Shinjuku-ku’. A general city is defined as a municipality with a population of more than 50,000 people such as ‘Hakodate-shi’. Towns and villages such as ‘Yakushima-cho’ are smaller than those already mentioned. The classification was based on Statistics on Libraries in Japan which was published by the Japan Library Association.

Table 1 shows the number of our sample libraries in each category. We excluded the libraries whose names were not in the Statistics on Libraries in Japan from our sample concerning the type-wise analysis of main libraries or annexes and the types of municipalities served. Because of this, the total numbers of samples shown in Table 1 were slightly different depending on the analysis.
Sample LGBT Books

We used 433 LGBT books as our sample. Our selection process involved these three sources: (1) Japanese National Bibliography provided by the National Diet Library; (2) an LGBT book guide, Rainbow-Colored Book Shelf; and (3) Google Web Search. We first used the Japanese National Bibliography and downloaded the book data whose Nippon Decimal Classification (NDC) categories were homosexuality (i.e., 367.97). We next used Rainbow-Colored Book Shelf, which gave 164 LGBT books. Third, we utilized Google and searched with keywords such as ‘LGBT book list’ or ‘sexual-minority book list’, and obtained book lists from its top 20 pages. After that, we obtained ISBN data of each LGBT book from the National Diet Library’s online search API (https://ndlonline.ndl.go.jp), because Calil only allows us to search books by ISBN. Finally, we obtained 433 ISBNs and used them as our sample LGBT books.

Concerning those 433 books, in June 2019, we investigated which ones were held using Calil. In addition, we obtained data of characteristics concerning our sample books. As previously mentioned, the characteristics we considered were as follows: (1) NDC categories, (2) C-Code, (3) published year, (4) price, and (5) popularity. The data concerning NDC categories, published year, and price were obtained from the National Diet Library API. The data concerning C-Code were obtained from Kinokuniya’s online web store (https://www.kinokuniya.co.jp). We used the number of hit counts of Bing search (https://www.bing.com) in order to measure the popularity in the same way as a previous study conducted by Ohba et al. [4]. We used Bing Web Search API for each ISBN to obtain data concerning popularity. Table 2 shows the characteristics of LGBT books analysed. This table also shows the channel of acquisition and all data that was obtained on July 6th, 2019.

In the following, we explain about NDC and C-Code. NDC is the most popular library classification system in Japan. This classification code consists of three digits.

Table 1. The number of our sample libraries in each category

<table>
<thead>
<tr>
<th>Category</th>
<th>Number of Libraries</th>
</tr>
</thead>
<tbody>
<tr>
<td>i) Whether the library is in the municipality that introduced the partnership certificates</td>
<td></td>
</tr>
<tr>
<td>Already Introduced</td>
<td>249</td>
</tr>
<tr>
<td>Planning to Introduce</td>
<td>72</td>
</tr>
<tr>
<td>The Others (Not Introduced, and Planning to)</td>
<td>2,764</td>
</tr>
<tr>
<td>Total</td>
<td>3,085</td>
</tr>
<tr>
<td>ii) Whether the library is an outsourcing one</td>
<td></td>
</tr>
<tr>
<td>Outsourcing Libraries</td>
<td>470</td>
</tr>
<tr>
<td>Not Outsourcing Libraries</td>
<td>2,615</td>
</tr>
<tr>
<td>Total</td>
<td>3,085</td>
</tr>
<tr>
<td>iii) Whether the library is a main library or an annex</td>
<td></td>
</tr>
<tr>
<td>Main Libraries</td>
<td>1,255</td>
</tr>
<tr>
<td>Annexes</td>
<td>1,748</td>
</tr>
<tr>
<td>Total</td>
<td>3,003</td>
</tr>
<tr>
<td>iv) The type of municipality served</td>
<td></td>
</tr>
<tr>
<td>Prefectural Libraries</td>
<td>56</td>
</tr>
<tr>
<td>Ordinance-Designated City Libraries</td>
<td>267</td>
</tr>
<tr>
<td>Tokyo Special Ward Libraries</td>
<td>222</td>
</tr>
<tr>
<td>General City Libraries</td>
<td>1,960</td>
</tr>
<tr>
<td>Town and Village Libraries</td>
<td>498</td>
</tr>
<tr>
<td>Total</td>
<td>3,003</td>
</tr>
</tbody>
</table>
We used first-level (i.e., first digit), second-level (i.e., first and second digits), and third-level (i.e., first, second, and third digits) classification codes as book characteristics. For example, if ‘159’ was assigned to a book as an NDC category, we used ‘1’, ‘15’, and ‘159’. Incidentally, these three codes represent ‘Philosophy’, ‘Ethics. Morals’, and ‘Practical ethics’, respectively.

C-Code is a classification code assigned by the Japanese publishers for bookstores. It consists of four numbers: the first digit represents target readers (such as ‘5: Books for women’), the second digit represents the forms of books (such as ‘5: Dictionaries’), and the third and fourth digits represent subjects of books (such as ‘10: Philosophy’).

### Table 2. Characteristics of LGBT books analysed

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Values</th>
<th>Channel of acquisition</th>
<th>The number of acquisition data</th>
</tr>
</thead>
<tbody>
<tr>
<td>NDC Categories</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1st-level</td>
<td>0, 1, ..., 9</td>
<td>National Diet Library API</td>
<td>414</td>
</tr>
<tr>
<td>2nd-level</td>
<td>00, 01, ..., 99</td>
<td>Kinokuniya online bookstore (<a href="https://www.kinokuniya.co.jp">https://www.kinokuniya.co.jp</a>)</td>
<td>425</td>
</tr>
<tr>
<td>3rd-level</td>
<td>000, 001, ..., 999</td>
<td>National Diet Library API</td>
<td>433</td>
</tr>
<tr>
<td>C-Code</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1st digit (target readers)</td>
<td>0, 1, ..., 8, 9</td>
<td>Kinokuniya online bookstore (<a href="https://www.kinokuniya.co.jp">https://www.kinokuniya.co.jp</a>)</td>
<td>425</td>
</tr>
<tr>
<td>2nd digit (forms)</td>
<td>0, 1, ..., 8, 9</td>
<td>National Diet Library API</td>
<td>433</td>
</tr>
<tr>
<td>3rd and 4th digit (subjects)</td>
<td>00, 01, ..., 99</td>
<td>National Diet Library API</td>
<td>433</td>
</tr>
<tr>
<td>Published year</td>
<td>1985~2019</td>
<td>National Diet Library API</td>
<td>433</td>
</tr>
<tr>
<td>Price (Yen)</td>
<td>360~18,000</td>
<td>National Diet Library API</td>
<td>429</td>
</tr>
<tr>
<td>Popularity</td>
<td>0~2,000</td>
<td>National Diet Library API</td>
<td>433</td>
</tr>
</tbody>
</table>

In order to clarify what kind of LGBT books tend to be held by public libraries, we first show the top 10 LGBT books in these institutions. Additionally, we analysed these holdings with a focus on the five characteristics shown in Table 2. Concerning price and popularity, we calculated correlation coefficients between the value (i.e., prices or Bing hit counts) and the number of sample LGBT books held. Concerning NDC, C-Code, and published year, we calculated the mean (average) and median of the number of sample LGBT books held for each value.

However, to clarify what kind of libraries tend to hold LGBT books, we calculated each library’s \( R_{LGBT} \) (the number of LGBT books held per the number of books held by the library) for each category shown in Table 1. The \( R_{LGBT} \) is defined as follows:

\[
R_{LGBT} = \frac{N_{LGBT}}{N_{all}}
\]

where \( N_{all} \) is the number of books held by the library and \( N_{LGBT} \) is the number of our sample LGBT books held by the library. We calculated the mean and median of the number of the holdings of LGBT books for each category and compared them with the mean and median figures of the other libraries. For example, if a library holds 30 sample LGBT books and the library holds 8,000 books, the library’s \( R_{LGBT} \) becomes 0.00375 (=30/8,000). In this way, we calculated every \( R_{LGBT} \) and then calculated the mean and median of \( R_{LGBT} \) for each category. For example, we determined the mean and median of \( R_{LGBT} \) among the libraries that were in the municipality that introduced
the partnership certificates and the libraries that were in the municipality that did not introduce the partnership certificates and then compared them. \( N_{all} \) is obtained from *Statistics on Libraries in Japan*, and we excluded the libraries whose names were not shown in *Statistics on Libraries in Japan* and libraries whose \( N_{all} \) was zero. The number of such libraries was 193 and accordingly the number of our sample libraries for this analysis became 2,892 (=3,085-193).

**Results and Discussion**

In this section, we first show the results concerning how many libraries hold LGBT books. Then, we discuss the results concerning what kind of LGBT books tend to be held by Japanese public libraries and what kinds of libraries tend to hold LGBT books.

**Results Concerning How Many Libraries Hold LGBT Books**

Table 3 shows the results of the number of LGBT books held by for our sample libraries. It also shows the mean and median of the number of LGBT books held per library. The mean and median of LGBT books held by libraries were 42.6 and 32, respectively. It is also shown that a library held 318 titles of our sample LGBT books, which accounted for 73.4% of our sample of LGBT books. It is also suggested there were some libraries that did not have our sample LGBT books at all. Such libraries amounted to a total of 69. This suggests that 3,016 (=3,085-69) public libraries held at least one LGBT book, which amounted to 97.8% of our sample libraries. In other words, 97.8% of Japanese public library were providing some kind of LGBT book.

<table>
<thead>
<tr>
<th>Value</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>42.6</td>
</tr>
<tr>
<td>Median</td>
<td>32</td>
</tr>
<tr>
<td>Maximum</td>
<td>318</td>
</tr>
<tr>
<td>Minimum</td>
<td>0</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>38.1</td>
</tr>
</tbody>
</table>

Table 4 shows the number of libraries that were holding LGBT books as well as the mean and median of the number of libraries per book. The mean and median of the number of libraries were 303.5 and 136, respectively. A book is held by 2,438 libraries, which is 79.0% of our sample libraries.

<table>
<thead>
<tr>
<th>Value</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>303.5</td>
</tr>
<tr>
<td>Median</td>
<td>136</td>
</tr>
<tr>
<td>Maximum</td>
<td>2,438</td>
</tr>
<tr>
<td>Minimum</td>
<td>0</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>385.4</td>
</tr>
</tbody>
</table>
Results concerning What Kind of LGBT Books Tend to be Held

In this subsection, we first present the top ten LGBT books held by our sample libraries. After that, we explain the results concerning NDC categories, C-Code, published year, price, and popularity in this order.

Top Ten LGBT Books Held by Public Libraries. Table 5 displays the top ten LGBT books held by our sample libraries. Here, ‘n’ represents the number of libraries that held the book. Target readers were judged from first digits of C-Code. *Blackie, the Crayon*, was held by 2,438 public libraries, and it was the highest among our sample LGBT books. It is a picture book for children published in 2001. Interestingly, in this table, it was found that six out of the top ten books were for children.

NDC Categories. Table 6 shows the NDC categories which were significantly higher or lower in their number of holdings than the other books. This conclusion was based on the Brunner-Munzel test. Here, ‘n’ represents the number of sample books of the NDC category. **‘** and ***’ represent a significantly higher number of holdings than the other sample books at the 0.05 and 0.01 levels, respectively. This was observed using the Brunner-Munzel test. †‘ and ††‘ represent a significantly lower number of holdings than the other sample books at the 0.05 and 0.01 levels, respectively. ‘All books’ is the results of all the books, and the mean and median are same as shown in Table 4. For example, it was found that the number of sample LGBT books categorized under ‘9: Literature’ were 85 and the median and mean of the number of libraries that hold the book were 602 and 508, respectively.

This is higher than that for the other books (i.e., the books except for the ones whose NDC category was ‘9: Literature’). Table 6 shows the NDC categories that were significantly higher than the other categories as follows: ‘General works’ (0), Literature (9), General works (00), ‘Japanese literature’ (91), ‘English literature’ (93), General works (000), ‘Civil Code’ (324), ‘Education. Educational thought’ (371), ‘Japanese literature: novel. Story’ (913), and ‘English literature: novel. Story’ (933).

In summary, LGBT books were categorized as follows: (1) General works, (2) Literature (especially Japanese and English novel and story), (3) Civil Code, (4) ‘Education. Educational thought,’ tend to be held by Japanese public libraries.

<table>
<thead>
<tr>
<th>Title</th>
<th>n</th>
<th>Author</th>
<th>Year</th>
<th>Price</th>
<th>Target Readers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1  Blackie, the Crayon</td>
<td>2,438</td>
<td>Miwa Nakaya</td>
<td>2001</td>
<td>1,200</td>
<td>Children</td>
</tr>
<tr>
<td>2  Our Real Situation</td>
<td>2,357</td>
<td>Circo Tomori, Makiko Sato (Illustrator)</td>
<td>2016</td>
<td>1,300</td>
<td>Children</td>
</tr>
<tr>
<td>3  The Rainbow Garden</td>
<td>2,063</td>
<td>Ito Ogawa</td>
<td>2014</td>
<td>1,400</td>
<td>General readers</td>
</tr>
<tr>
<td>4  Life As a Girl</td>
<td>1,808</td>
<td>Tsukasa Sakaki</td>
<td>2016</td>
<td>1,500</td>
<td>General readers</td>
</tr>
<tr>
<td>5  I Am a Red Cat</td>
<td>1,609</td>
<td>Satoshin, Toshio Nishimura (Illustrator)</td>
<td>2011</td>
<td>1,300</td>
<td>Children</td>
</tr>
</tbody>
</table>
### Table 6. NDC categories that were significantly higher or lower than the others

<table>
<thead>
<tr>
<th>NDC</th>
<th>n</th>
<th>Mean</th>
<th>Median</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 General works</td>
<td>19</td>
<td>453.0</td>
<td>339.0</td>
</tr>
<tr>
<td>7 The arts</td>
<td>55</td>
<td>129.7</td>
<td>35.0</td>
</tr>
<tr>
<td>9 Literature</td>
<td>85</td>
<td>602.0</td>
<td>508.0</td>
</tr>
<tr>
<td>Second</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>00 General works</td>
<td>19</td>
<td>453.0</td>
<td>339.0</td>
</tr>
<tr>
<td>72 Painting, Pictorial arts</td>
<td>50</td>
<td>138.1</td>
<td>33.0</td>
</tr>
<tr>
<td>77 Theatre</td>
<td>4</td>
<td>56.0</td>
<td>41.5</td>
</tr>
<tr>
<td>91 Japanese literature</td>
<td>45</td>
<td>596.6</td>
<td>203.0</td>
</tr>
<tr>
<td>93 English literature</td>
<td>32</td>
<td>702.8</td>
<td>801.0</td>
</tr>
<tr>
<td>Third</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>000 General works</td>
<td>19</td>
<td>453.0</td>
<td>339.0</td>
</tr>
<tr>
<td>324 Civil Code</td>
<td>4</td>
<td>420.8</td>
<td>431.0</td>
</tr>
<tr>
<td>371 Education. Educational thought</td>
<td>2</td>
<td>211.0</td>
<td>211.0</td>
</tr>
<tr>
<td>726 Comics. Artwork</td>
<td>50</td>
<td>138.1</td>
<td>33.0</td>
</tr>
<tr>
<td>913 Japanese literature: Novel. Story</td>
<td>44</td>
<td>607.3</td>
<td>355.5</td>
</tr>
<tr>
<td>923 Chinese literature: Novel. Story</td>
<td>4</td>
<td>39.3</td>
<td>40.0</td>
</tr>
<tr>
<td>933 English literature: Novel. Story</td>
<td>32</td>
<td>702.8</td>
<td>801.0</td>
</tr>
<tr>
<td>All books</td>
<td></td>
<td>303.5</td>
<td>136.0</td>
</tr>
</tbody>
</table>

**C-Code.** Table 7 shows the C-Code which were significantly higher or lower in their number of holdings than the other books based on the Brunner-Munzel test. Incidentally, the descriptions *bunko* and *shinsho* refer to formats that represent the sizes of the books. Both descriptions represent pocket-sized paperbacks and the difference between the two is *bunko* is smaller than *shinsho* (approximately 105×148 mm and 103 × 182 mm, respectively).

Concerning target readers, Table 7 suggests that practical LGBT books and LGBT books for children were significantly higher in number of holdings than the other LGBT books. Concerning formats, *shinsho*, collected works, and picture books were significantly higher in number than the other LGBT books. Concerning fields, Japanese literature (Fiction. Romance. Novel) and foreign literature were significantly higher in number than the other LGBT books. This result is similar to the results of NDC classification, which indicated that literature—especially Japanese and English novels and stories—tend to be held. It was also shown that LGBT books for children...
tended to be held, which was also shown in the results concerning the top ten LGBT books held by public libraries.

**Published Year.** Fig. 1 represents the median of the number of libraries that hold the book for each published year. We can say neither the newer nor the older books tend to be held.

<table>
<thead>
<tr>
<th>C-Code</th>
<th>n</th>
<th>Mean</th>
<th>Median</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st Digit</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 Books for General Readers</td>
<td>326</td>
<td>251.1</td>
<td>125.0††</td>
</tr>
<tr>
<td>2 Practical Books</td>
<td>2</td>
<td>194.5</td>
<td>194.5*</td>
</tr>
<tr>
<td>3 Professional and Technical Books</td>
<td>29</td>
<td>115.2</td>
<td>87.0††</td>
</tr>
<tr>
<td>8 Books for Children</td>
<td>53</td>
<td>823.0</td>
<td>788.0**</td>
</tr>
<tr>
<td>9 Magazines</td>
<td>14</td>
<td>17.0</td>
<td>4.0††</td>
</tr>
<tr>
<td>2nd Digit</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Bunko</td>
<td>46</td>
<td>141.0</td>
<td>68.5††</td>
</tr>
<tr>
<td>2 Shinsho</td>
<td>17</td>
<td>384.7</td>
<td>419.5**</td>
</tr>
<tr>
<td>3 Collected works</td>
<td>44</td>
<td>456.4</td>
<td>460.5**</td>
</tr>
<tr>
<td>7 Picture books</td>
<td>16</td>
<td>657.5</td>
<td></td>
</tr>
<tr>
<td>9 Comics</td>
<td>21</td>
<td>16.0</td>
<td>8.0††</td>
</tr>
<tr>
<td>0 General works</td>
<td>5</td>
<td>37.8</td>
<td>4.0†</td>
</tr>
<tr>
<td>3rd and 4th Digit</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>34 Managements</td>
<td>4</td>
<td>341.3</td>
<td>274.5*</td>
</tr>
<tr>
<td>73 Music</td>
<td>2</td>
<td>35.0</td>
<td>35.0††</td>
</tr>
<tr>
<td>79 Comics. Graphic novels</td>
<td>27</td>
<td>36.1</td>
<td>10.0††</td>
</tr>
<tr>
<td>93 Japanese literature: Fiction. Romance. Novel</td>
<td>55</td>
<td>628.0</td>
<td>371.0††</td>
</tr>
<tr>
<td>95 Japanese literature: Essays. Prose. Other literatures</td>
<td>75</td>
<td>170.3</td>
<td>91.0††</td>
</tr>
<tr>
<td>97 Foreign literature: Fiction. Romance. Novel</td>
<td>38</td>
<td>646.8</td>
<td>674.5**</td>
</tr>
<tr>
<td>98 Other foreign literatures</td>
<td>11</td>
<td>494.3</td>
<td>478.0**</td>
</tr>
</tbody>
</table>

All books | 303.5 | 136

Fig. 1. The median of the number of libraries holding the book for each published year
Price. The correlation coefficient between the number of libraries that hold the book and the price of the book was -0.05 and there was no significant difference at 0.05 level; therefore, there was little correlation between them.

Popularity. The correlation coefficient between the number of libraries that hold the book and the popularity (i.e., Bing hit counts) was -0.02 and there was no significant difference at 0.05 level; therefore, there was little correlation between them.

Results concerning What Kind of Libraries Tend to Hold LGBT Books.

In this subsection, we present the results concerning partnership certificates, and outsourcing libraries, whether the library is a main library or an annex, and the type of municipality served, in this order.

Partnership Certificates. Table 8 shows the $R_{LGBT}$ (the value that the number of sample LGBT books held divided by the number of books held by the library) concerning partnership certificates. The * and the † in the Median columns represent significant differences at the 0.05 level, and the ** and ‡‡ represent significant differences at the 0.01 level. This was observed using the Brunner-Munzel test. The * and the ** were significantly higher than the other libraries and † and ‡‡ were significantly lower than the other libraries. Table 8 shows the mean and median of the $R_{LGBT}$ of the libraries that have already introduced the partnership certificates. Both calculations were 0.000391, and significantly higher than the other libraries at the 0.01 level. Interestingly, not only the others (mean and median were 0.000360 and 0.000341, respectively) but also libraries that were planning to introduce the partnership certificates (mean and median were 0.000313 and 0.000323, respectively) were significantly lower than the other libraries. These results may suggest that libraries tend to add LGBT books to their collections after introducing the new system.

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>Mean</th>
<th>Median</th>
<th>Maximum</th>
<th>Minimum</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Already Introduced</td>
<td>233</td>
<td>0.000391</td>
<td>0.000391</td>
<td>**</td>
<td>0.001100</td>
<td>0.000165</td>
</tr>
<tr>
<td>Planning to Introduce</td>
<td>70</td>
<td>0.000313</td>
<td>0.000323</td>
<td>‡‡</td>
<td>0.000612</td>
<td>0.000113</td>
</tr>
<tr>
<td>The Others (Not Introduced, and Planning to)</td>
<td>2,589</td>
<td>0.000360</td>
<td>0.000342</td>
<td>†</td>
<td>0.001357</td>
<td>0.000166</td>
</tr>
</tbody>
</table>

Outsourcing Libraries. Table 9 shows the $R_{LGBT}$ concerning outsourcing libraries. It shows the mean and median of the $R_{LGBT}$ of the outsourcing libraries were 0.000391 and 0.000374, respectively, and significantly higher than not outsourcing libraries (0.000356 and 0.000341, respectively) at 0.01 level.
Table 9. The $R_{LGBT}$ concerning outsourcing libraries

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>Mean</th>
<th>Median</th>
<th>Maximum</th>
<th>Minimum</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outsourcing libraries</td>
<td>441</td>
<td>0.000391</td>
<td>0.000374 **</td>
<td>0.001203</td>
<td>0</td>
<td>0.000161</td>
</tr>
<tr>
<td>Not Outsourcing libraries</td>
<td>2,451</td>
<td>0.000356</td>
<td>0.000341 ††</td>
<td>0.001357</td>
<td>0</td>
<td>0.000166</td>
</tr>
</tbody>
</table>

**Main Library or Annex.** Table 10 shows the $R_{LGBT}$ concerning main libraries and annexes. It shows the mean and median of the $R_{LGBT}$ of the annexes were 0.000378 and 0.000360, respectively, and significantly higher than those of main libraries (0.000339 and 0.000321) at 0.01 level.

Table 10. The $R_{LGBT}$ concerning main libraries or annexes

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>Mean</th>
<th>Median</th>
<th>Maximum</th>
<th>Minimum</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main Libraries</td>
<td>1,254</td>
<td>0.000339</td>
<td>0.000321 ††</td>
<td>0.001291</td>
<td>0</td>
<td>0.000152</td>
</tr>
<tr>
<td>Annexes</td>
<td>1,638</td>
<td>0.000378</td>
<td>0.000360 **</td>
<td>0.001357</td>
<td>0</td>
<td>0.000173</td>
</tr>
</tbody>
</table>

**Type of Municipality Served.** Table 11 shows the $R_{LGBT}$ concerning type of municipality served. Table 11 shows the $R_{LGBT}$ concerning Tokyo special ward libraries and town and village libraries were significantly higher than those of the other libraries. On the other hand, $R_{LGBT}$ concerning prefectural libraries and general city libraries were significantly lower than those of the other libraries.

Table 11. The $R_{LGBT}$ concerning type of municipality served

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>Mean</th>
<th>Median</th>
<th>Maximum</th>
<th>Minimum</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prefectural Libraries</td>
<td>56</td>
<td>0.000163</td>
<td>0.000165 ††</td>
<td>0.000296</td>
<td>0.000004</td>
<td>0.000058</td>
</tr>
<tr>
<td>Ordinance-Designated City Libraries</td>
<td>263</td>
<td>0.000363</td>
<td>0.000358</td>
<td>0.000876</td>
<td>0</td>
<td>0.000149</td>
</tr>
<tr>
<td>Tokyo Special Ward Libraries</td>
<td>198</td>
<td>0.000413</td>
<td>0.000378 **</td>
<td>0.001203</td>
<td>0</td>
<td>0.000182</td>
</tr>
<tr>
<td>General City Libraries</td>
<td>1,887</td>
<td>0.000353</td>
<td>0.000335 ††</td>
<td>0.001357</td>
<td>0</td>
<td>0.000161</td>
</tr>
<tr>
<td>Town and village libraries</td>
<td>488</td>
<td>0.000394</td>
<td>0.000387 **</td>
<td>0.001291</td>
<td>0</td>
<td>0.000171</td>
</tr>
</tbody>
</table>
Conclusions

In this study, we tried to clarify library services for LGBT people with a focus on book collection. More specifically, we tried to clarify how many libraries hold LGBT books; what kind of LGBT books tend to be held by Japanese public libraries; and what kinds of libraries tend to hold LGBT books. We investigated 3,085 public libraries and 433 LGBT books, and it was shown that the holdings of the LGBT books were mostly not influenced by the published year, price, and popularity. Concerning their subject, both of the results of the NDC classification and C-Code studies indicated LGBT literature (especially Japanese and English novels and stories) tended to be held by Japanese public libraries. In addition, the results of top ten LGBT books held by public libraries and C-Code indicated that LGBT books for children tended to be held by Japanese public libraries. It is also shown that the libraries whose municipality had introduced partnership certificates for same-sex couples and the libraries that had introduced outsourcing systems tended to hold LGBT books more than the other libraries. In addition, it was shown that annex libraries, Tokyo special ward libraries, and town and village libraries tended to hold LGBT books more than the other libraries.

In the future, we would like to focus on duplications and usage in regard to how many books are borrowed. In addition, we aim to conduct additional interview librarians in order to clarify the reasons of the above-mentioned results. Furthermore, we intend to examine not only libraries’ book collections but also their other services for LGBT people. In this way, we would like to clarify the actual state of services for LGBT people in greater detail.

Acknowledgments

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References

Causal Effect of Introducing Outsourcing on the Usage of Japanese Public Libraries

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Abstract. For a long time, Japanese public libraries were managed by local governments. However, in 2003, other organizations, including private enterprises, superseded the management of libraries and introduced an outsourcing system called “designated administrator system.” The suitability of this outsourcing system for libraries is now being debated, with many people arguing that it is unfit. To provide basic data for this discussion, we conducted a causal analysis on the introduction of outsourcing to public libraries in Japan. We performed a matching analysis, difference-in-differences (DD) analysis, and DD analysis with matching on library usage in terms of three factors, namely, the gate count, number of loans, and number of reference transactions. In the matching analysis, the average gate count per capita of all outsourcing libraries was higher than that of all direct management libraries. In the DD analysis with and without matching, the average gate count per capita and number of loans per capita of all the outsourcing libraries were higher than those of all the direct management libraries. These differences were statistically significant at a 0.01 significance level. The results indicate that the introduction of the designated administrator system increases the gate count per capita. Considering the difference in characteristics of the matching and DD analyses, the number of loans per capita may also be increasing with the introduction of the system.

Keywords: Outsourcing, Designated Administrator System, Japanese Public Libraries, Causal Effect, Matching, Difference-in-Differences Analysis

Introduction

Before 2003, Japanese public libraries were managed by the local governments; however, in 2003, other organizations, including private enterprises, superseded library management with the introduction of an outsourcing system named the “designated administrator system.” Although the number of public libraries managed using this outsourcing system (henceforth, “outsourcing libraries”) is increasing, whether local governments should employ this system for managing public libraries is under discussion. Many people argue the unsuitability of the system for public libraries. Few studies have examined the causal effect of introducing outsourcing to library management.

In this study, we used almost all Japanese public libraries for data and conducted three types of causal analyses: (1) matching analysis, (2) difference-in-differences (DD) analysis, and (3) DD analysis with matching. The matching and DD analyses have been frequently used in econometrics to detect causal effects of certain events. We analyzed the causal effects of introducing outsourcing on the usage of libraries in
terms of the following factors: (i) gate count per capita, (ii) number of loans per capita, and (iii) number of reference transactions per capita. For the matching analysis, we analyzed the difference in the aforementioned three factors between outsourcing libraries and conventional libraries managed directly by local governments (henceforth, “direct management libraries”) that were similar in (a) the number of holdings, (b) number of acquisition, (c) size of floors, (d) number of staffs, and (e) service population. The number of outsourcing and direct management libraries in the sample were approximately 400 and 3000, respectively (the numbers slightly differ depending on the investigation). These data were obtained from Statistics on Libraries in Japan (2015) [1], which is published by the Japan Library Association. For (2) the DD analysis, we compared changes in the aforementioned three factors of direct management and outsourcing libraries before and after the introduction of outsourcing. The data were obtained from Statistics on Libraries in Japan (2003–2015) [1]. For (3) the DD analysis with matching, we first analyzed direct management and outsourcing libraries that were similar in terms of the aforementioned (a) to (e). The libraries were then compared in terms of (i) to (iii).

Related Studies

In Japan, some librarians working in outsourcing libraries reported these changes observed after introducing the outsourcing system [2, 3]. In addition, Maeda (2007) [4], the Japan Library Association in 2007 [5], Koyama and Nagata [6] conducted questionnaire surveys to investigate the quality of outsourcing libraries and changes observed after introducing the outsourcing system. These reports and surveys ascertained that library services, including opening hours and days and library usage, were increased with the introduction of the outsourcing system. However, these studies included relatively small samples. Mouri and Ohba [7] conducted a comparative study, with a focus on the certified directors in outsourcing and direct management libraries.

Mizunuma and Tsuji [8, 9, 10, 11] comprehensively examined the differences between outsourcing and direct management libraries. Mizunuma and Tsuji [8] examined the reference services and reported that direct management libraries generally answer users’ questions directly, whereas outsourcing libraries developed environments where users can find answers for themselves. Moreover, they reported that outsourcing libraries received more reference questions than direct management libraries. Mizunuma and Tsuji [9] examined the changes in library usage in terms of the gate count, number of loans, and number of reference transactions, before and after introducing outsourcing. They asserted that in general, these factors exhibited an increase after the introduction of outsourcing. Mizunuma and Tsuji [10] reported that (1) direct management libraries have more novels than outsourcing libraries, whereas outsourcing libraries have more reference books than direct management libraries, and (2) the rates of borrowing books in outsourcing libraries were higher than those in direct management libraries. Mizunuma and Tsuji [11] stated that (1) the number of opening days and percentage of certified directors in outsourcing libraries were higher than those in direct management libraries, whereas (2) library usage, number of opening days, and number of certified directors increased after introducing an outsourcing system.
The aforementioned studies by Mizunuma and Tsuji, particularly [9], are similar to the proposed study. However, these studies did not conduct a strict causal analysis.

Method

As mentioned in Section 1, we conducted three types of causal analyses, namely the matching analysis, DD analysis, and DD analysis with matching. In the following subsections, we will explain the theoretical background of the conducted analyses and their implementation.

Theoretical Background

The following explanations are based on Angrist and Pischke [13], Hoshino and Tanaka [14], and Meyer [15], with some modification.

Angrist and Pischke [13] first asked whether hospitals make people healthier. To discuss this problem precisely, they introduced some notations. First, a binary variable \( T_i = \{0, 1\} \) was used to describe whether person \( i \) received any treatment (in this case, hospitalized). The outcome of interest—a measure of health status—was denoted using \( Y_i \). The effect of hospital care on \( Y_i \) was in question. To address this concern, we considered the possible situations that might have occurred if they had not went to the hospital and vice versa. Therefore, for any individual, there were two potential health variables, namely \( Y_i(0) \) for \( T_i = 0 \) and \( Y_i(1) \) for \( T_i = 1 \), which indicate the health of person \( i \) when they were and were not hospitalized, respectively. \( Y_i - Y_i(0) \) was the causal effect of hospitalization on an individual. However, because observing both the potential outcomes for the same person (\( Y_i(1) \) and \( Y_i(0) \)) is impossible, we must understand the effects of hospitalization by comparing the average health of people who were and were not hospitalized. The two unobservable events \( Y_i(0) \) for \( T_i = 0 \) and \( Y_i(1) \) for \( T_i = 1 \) were counterfactual.

The comparison of average health conditional on hospitalization status is formally associated with the average causal effect based on the following equation:

\[
E[Y_i|T_i = 1] - E[Y_i|T_i = 0] = E[Y_i|T_i = 1] - E[Y_i(0)|T_i = 1] + E[Y_i(0)|T_i = 1] - E[Y_i(0)|T_i = 0] = E[Y_i(1) - Y_i(0)|T_i = 1] + E[Y_i(0)|T_i = 1] - E[Y_i(0)|T_i = 0]
\]

Here, \( E[Y_i|T_i = 1] - E[Y_i|T_i = 0] \) is the observed difference in the average health and thus can be calculated. \( E[Y_i - Y_i(0)|T_i = 1] \) is the average treatment effect on the treated (ATET or ATT) and is the primary measure of causal inference. This term provided the average difference between the health of the hospitalized group (i.e., \( E[Y_i(1)|T_i = 1] \)) and the potential outcomes if they had not been hospitalized (i.e., \( E[Y_i(0)|T_i = 1] \)). Because the potential outcome term was counterfactual, the ATET could not be directly calculated. The final term \( E[Y_i(0)|T_i = 1] - E[Y_i(0)|T_i = 0] \) is the selection bias, which is the difference in the average \( Y_i(0) \) between the hospitalized and non-hospitalized groups. Because the unwell people are more likely to seek treatment than the healthy people, the hospitalized people had worse \( Y_i(0) \), and thus, the selection

---

1 In general, there is likely to be a distribution of both \( Y_i(1) \) and \( Y_i(0) \) in the population, therefore, the treatment effect can be different for different people.
bias was negative in this example. A large selection bias (in the absolute value) could completely prevail over a positive ATET. Most studies on causal inference have aimed to yield a zero selection bias and thus obtain the ATET by using E[Y_i|T_i = 1] − E[Y_i|T_i = 0] (which can be calculated using the acquired data).

Random assignment of T_i to the sample population (so-called RCT (Randomized Controlled Trial)) solves the selection problem. Because random assignment makes T_i independent of potential outcomes, it makes selection bias zero (i.e. E[Y_0|T_i = 1] − E[Y_0|T_i = 0] = E[Y_0|T_i = 0] − E[Y_0|T_i = 0] = 0). However, the RCT is difficult to perform. In the hospitalization example, some unwell people are forced to not be hospitalized in order to implement RCT.

**Matching.** First, consider the causal effect of an on-the-job training (OJT) on employee wages in a company. Do employees have higher wages after the OJT because of elements, such as improved skills and knowledge? Because of the selection bias, we cannot compare the wages of employees who did and did not receive the OJT. For example, employees with less years of service in the company may receive the OJT, whereas those who already have high wages may be reluctant.

Here, X_{i1} and X_{i2} represent employee i’s (1) years of service in the company and (2) the wage before the OJT, respectively. Furthermore, we assumed the following:

\[ \{Y_{i1}, Y_{0i}\} \perp T_i | X_{i1}, X_{i2} \]

That is, treatment T was randomly assigned in the set of employees with identical X_1 and X_2. The RCT was performed for the set of employees with identical X_1 and X_2. This approach is termed conditional independence assumption (CIA). With the CIA,

\[ E[Y_0|T_i = 1, X_{i1}, X_{i2}] = E[Y_0|T_i = 0, X_{i1}, X_{i2}] \]

which indicates that conditional on covariates X_1 and X_2, the selection bias disappears. Therefore,

\[
\begin{align*}
E[Y_i|T_i = 1, X_{i1}, X_{i2}] - E[Y_i|T_i = 0, X_{i1}, X_{i2}] &= E[Y_{i1}|T_i = 1, X_{i1}, X_{i2}] - E[Y_{0i}|T_i = 0, X_{i1}, X_{i2}] \\
&= E[Y_{i1} - Y_{0i}|T_i = 1, X_{i1}, X_{i2}] + E[Y_{0i}|T_i = 1, X_{i1}, X_{i2}] - E[Y_{0i}|T_i = 0, X_{i1}, X_{i2}] \\
&= E[Y_{i1} - Y_{0i}|T_i = 1, X_{i1}, X_{i2}]
\end{align*}
\]

Here, using the law of iterated expectations,

\[ E[E[Y_i|T_i = 1, X_{i1}, X_{i2}]|T_i = 1] = E[Y_i|T_i = 1] \]

and

\[ E[E[Y_{i1} - Y_{0i}|T_i = 1, X_{i1}, X_{i2}]|T_i = 1] = E[Y_{i1} - Y_{0i}|T_i = 1] \]

(=ATET)

Therefore,

\[
\begin{align*}
\text{ATET} &= E[E[Y_{i1} - Y_{0i}|T_i = 1, X_{i1}, X_{i2}]|T_i = 1] \\
&= E[E[Y_i|T_i = 1, X_{i1}, X_{i2}] - E[Y_i|T_i = 0, X_{i1}, X_{i2}]|T_i = 1] \\
&= E[Y_i - E[Y_i|T_i = 0, X_{i1}, X_{i2}]|T_i = 1]
\end{align*}
\]
In strict matching, \( E[Y_i|T_i = 0, X_{1i}, X_{2i}] \) is calculated as the mean of \( Y_i \) of employee \( j \), who belongs to the control group and satisfies equations \( X_{1j} = X_{1i} \) and \( X_{2j} = X_{2i} \), with employee \( i \) from the treatment group. However, with the increasing number \( (N) \) of covariates \( X \), finding such employee \( j \) in the control group (i.e., employee \( j \) with \( X_{1j} = X_{1i}, X_{2j} = X_{2i}, ..., X_{Nj} = X_{Ni} \)) is increasingly difficult. We can use the standardized Euclidean distance between \( (X_{1j}, X_{2j}, ..., X_{Nj}) \) and \( (X_{1i}, X_{2i}, ..., X_{Ni}) \) and adopt employee \( j \) with the shortest distance from employee \( i \). However, an excessively large number of covariates \( N \) results in the curse of dimensionality. Therefore, propensity score matching is generally employed. In propensity score matching, \( E[Y_i|T_i = 0, X_{1i}, X_{2i}] \) is calculated as \( E[Y_i|T_i = 0, p(X_{1i}, X_{2i})] \), where \( p(X_i) \) is \( P(T_i = 1|X_i) \), which indicates the probability that employee \( i \) with covariate \( X_i \) is from the treatment group. Propensity score matching is supported by the following propensity score theorem.

*Suppose the CIA holds for \( Y_{1i} \) and \( Y_{0i} \). Then \( \{Y_{1i}, Y_{0i}\} \perp T_i| p(X_i) \).*

**DD Analysis.** Let us begin with the following equation:

\[
Y_{1t} = \alpha + \beta t d_t + \gamma d_t + \theta_t + \epsilon_{1t}^h
\]

In the aforementioned equation, \( Y_{1t}^h \) is the outcome of interest for unit \( i \) \((i = 1, ..., N_i)\) of group \( j \) \((j = 0, 1)\) in period \( t \) \((t = 0, 1)\). \( d_t = 1 \) for \( t = 1 \) and \( d_t = 0 \) otherwise, whereas \( d_t^j = 1 \) for \( j = 1 \) and \( d_t^j = 0 \) otherwise. \( d_t^j \) is a dummy variable representing people in the treatment group after receiving the treatment. \( \beta \) and \( \beta^0 \) summarize the ways that group \( j = 0 \) and group \( j = 1 \) are influenced by time, respectively. A time-invariant difference may be observed in the overall means between groups \( j = 0 \) and \( j = 1 \), which is represented by \( \gamma \). \( A \) and \( \epsilon_{1t}^h \) are the true causal effect of the treatment on the treatment group outcome (i.e., ATET) and an error term, respectively.

The key identifying assumption is that \( A \) is 0 in the absence of the treatment (i.e., \( E[\epsilon_{1t}^h|d_t^j] = 0 \)). In this case,

\[
\bar{Y}_t^1 = \alpha + \beta t + \gamma + A
\]

\[
\bar{Y}_t^0 = \alpha + \gamma
\]

\[
\bar{Y}_0^1 = \alpha + \beta^0
\]

\[
\bar{Y}_0^0 = \alpha
\]

where the bar, subscript, and superscript indicate the average over \( i \), time period, and group, respectively. The DD of the aforementioned four factors (i.e., \( \bar{Y}_t^1, \bar{Y}_t^0, \bar{Y}_0^1, \) and \( \bar{Y}_0^0 \)) can be represented as follows:

\[
(\bar{Y}_t^1 - \bar{Y}_0^1) - (\bar{Y}_0^1 - \bar{Y}_0^0) = A + \beta t - \beta^0
\]

This approach assumes that if \( \beta^1 \) and \( \beta^0 \) are identical, the ATET \( A \) can be obtained as follows: \( (\bar{Y}_t^1 - \bar{Y}_0^1) - (\bar{Y}_0^1 - \bar{Y}_0^0) \). This is called *parallel trend assumption.*

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Implementation

We conducted the matching analysis, DD analysis, and DD analysis with matching. In this study, treatment $T$ mentioned in the previous subsection is the introduction of the designated administrator system (outsourcing). Outcomes ($Y$ in the previous subsection) are library usage in terms of the following factors: (i) gate count per capita, (ii) number of loans per capita, and (iii) number of reference transactions per capita.

For the matching analysis, the sample included 3,253 public libraries listed in the Statistics on Libraries in Japan (2015). For the DD analysis, 3,811 public libraries listed in the Statistics on Libraries in Japan (2005–2015) were included in the sample because the 2005 edition includes the data on the first outsourcing library. We classified the libraries as outsourcing and direct management libraries based on The Report on Public Libraries Managed by the Designated Administrator System [15].

Matching. As discussed in Section 1, we compared (i) gate count per capita, (ii) number of loans per capita, and (iii) number of reference transactions per capita of outsourcing and direct management libraries. These were matched in terms of (a) the number of holdings, (b) number of acquisition, (c) size of the floors, (d) number of staffs, and (e) service population. In matching, the statistical computing software $R$ [16] was used. First, glm—a generalized linear model function—was used for calculating propensity scores. Then, match function in the Matching package was used [17].

Table 1 shows the numbers of sample libraries. In Table 1, OutSrc and DirectM represent the outsourcing and direct management libraries, respectively. The sample libraries were classified based on their serving municipalities, that is, prefectures, ordinance-designated cities, Tokyo special wards, other cities, and towns and villages. Furthermore, the libraries were divided into two types, namely main libraries and annexes. The results of the analysis were obtained for each type and for all libraries combined. These data were obtained from Statistics on Libraries in Japan (2015) [1] published by the Japan Library Association.

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>OutSrc</th>
<th>DirectM</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Libraries</td>
<td></td>
<td>431</td>
<td>2822</td>
</tr>
<tr>
<td>Prefectures</td>
<td></td>
<td>4</td>
<td>56</td>
</tr>
<tr>
<td>Main Libraries</td>
<td></td>
<td>4</td>
<td>43</td>
</tr>
<tr>
<td>Annexes</td>
<td></td>
<td>0</td>
<td>13</td>
</tr>
<tr>
<td>Ordinance-designated Cities</td>
<td></td>
<td>55</td>
<td>228</td>
</tr>
<tr>
<td>Main Libraries</td>
<td></td>
<td>1</td>
<td>19</td>
</tr>
<tr>
<td>Annexes</td>
<td></td>
<td>54</td>
<td>207</td>
</tr>
<tr>
<td>Tokyo Special Wards</td>
<td></td>
<td>99</td>
<td>124</td>
</tr>
<tr>
<td>Main Libraries</td>
<td></td>
<td>3</td>
<td>20</td>
</tr>
<tr>
<td>Annexes</td>
<td></td>
<td>96</td>
<td>104</td>
</tr>
<tr>
<td>Other Cities</td>
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<td>216</td>
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<td>Annexes</td>
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<td>122</td>
<td>1198</td>
</tr>
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<td>Towns and Villages</td>
<td></td>
<td>57</td>
<td>551</td>
</tr>
<tr>
<td>Main Libraries</td>
<td></td>
<td>52</td>
<td>462</td>
</tr>
<tr>
<td>Annexes</td>
<td></td>
<td>5</td>
<td>89</td>
</tr>
</tbody>
</table>
**DD Analysis.** Let \( M \) be the year when a certain outsourcing library introduced the designated administrator system. The difference in the gate count per capita is defined as (A) the difference between the mean of the gate count per capita in \( M + 2 \) and in \( M + 1 \) and the mean of the gate count per capita in \( M - 1 \) and in \( M - 2 \). For example, for a certain outsourcing library with \( M = 2010 \), its gate count in 2008, 2009, 2011, and 2012 were 0.85, 0.95, 1.02, and 1.07, respectively. The difference of the gate count per capita for the library was calculated as follows: \((1.02 + 1.07)/2 - (0.85 + 0.95)/2 = 0.15\). The difference in the number of loans per capita and in reference transactions per capita were defined similarly. As mentioned in Section 1, we obtained such data from the *Statistics on Libraries in Japan* (2003–2015). Therefore, \( M \) varied from 2005 to 2013. Table 2 presents the number of outsourcing libraries for this analysis. The sample size of the libraries differs based on the type of library usage because of the missing data in the aforementioned *Statistics on Libraries in Japan*, which resulted in the exclusion of some of the libraries from the sample.

For the direct management libraries, the difference in the gate count per capita is defined similarly. For example, in the year \( M \), the difference in the gate count per capita is defined as (B) the difference between the mean of the gate count per capita in \( M + 2 \) and in \( M + 1 \) and the mean of the gate count per capita in \( M - 1 \) and in \( M - 2 \). Contrary to outsourcing libraries, in direct management libraries, \( M \) has no particular meaning (e.g., a year when the designated administrator system was introduced). Table 2 shows the number of direct management libraries used for this analysis. The number of samples was higher than 10,000 because of numerous duplicates. For example, a library that was mentioned in the *Statistics on Libraries in Japan* from 2005 to 2015 appeared seven times in the data (\( M = 2007, 2008, ..., 2013 \)).

In the DD analysis, we examined the statistical difference between (A) for outsourcing libraries and (B) for direct management libraries by using the Welch’s t test.

<table>
<thead>
<tr>
<th>Library Type</th>
<th>Gate Count</th>
<th>Loans</th>
<th>Reference Transactions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OutSrc</td>
<td>DirectM</td>
<td>OutSrc</td>
</tr>
<tr>
<td>All Libraries</td>
<td>236</td>
<td>12,609</td>
<td>256</td>
</tr>
<tr>
<td>Prefectures</td>
<td>3</td>
<td>462</td>
<td>3</td>
</tr>
<tr>
<td>Main Libraries</td>
<td>3</td>
<td>358</td>
<td>3</td>
</tr>
<tr>
<td>Annexes</td>
<td>0</td>
<td>124</td>
<td>0</td>
</tr>
<tr>
<td>Ordinance-designated Cities</td>
<td>25</td>
<td>1,007</td>
<td>23</td>
</tr>
<tr>
<td>Main Libraries</td>
<td>1</td>
<td>107</td>
<td>1</td>
</tr>
<tr>
<td>Annexes</td>
<td>24</td>
<td>900</td>
<td>22</td>
</tr>
<tr>
<td>Tokyo Special Wards</td>
<td>63</td>
<td>496</td>
<td>69</td>
</tr>
<tr>
<td>Main Libraries</td>
<td>1</td>
<td>112</td>
<td>1</td>
</tr>
<tr>
<td>Annexes</td>
<td>62</td>
<td>384</td>
<td>68</td>
</tr>
<tr>
<td>Other Cities</td>
<td>114</td>
<td>7,616</td>
<td>125</td>
</tr>
<tr>
<td>Main Libraries</td>
<td>59</td>
<td>3,581</td>
<td>73</td>
</tr>
<tr>
<td>Annexes</td>
<td>55</td>
<td>4,035</td>
<td>52</td>
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<tr>
<td>Towns and Villages</td>
<td>31</td>
<td>3,008</td>
<td>36</td>
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<tr>
<td>Main Libraries</td>
<td>28</td>
<td>2,648</td>
<td>33</td>
</tr>
<tr>
<td>Annexes</td>
<td>3</td>
<td>360</td>
<td>3</td>
</tr>
</tbody>
</table>

**DD Analysis with Matching.** In the DD analysis, the similarity between outsourcing and direct management libraries was not considered. In the DD analysis with matching, we first found the direct management libraries that were similar to each outsourcing library and then calculated the difference between (A) and (B) mentioned.
in the previous subsection. As mentioned in matching subsection, `glm` was again used for calculating propensity scores and then `match` function was used to find similar libraries. The number of sample libraries are the same as those in Table 2.

Results and Discussion

Table 3 presents the results of the straightforward comparison of outsourcing libraries and direct management libraries (i.e., without using causal analysis). In Table 3, the left-most column represents the types of municipalities of the libraries and the top row represents library usage. The “***” and “*” in column “S” indicate that differences between the left-hand outsourcing and direct management libraries were statistically significant at 0.01 and 0.05 levels, respectively. For example, the average gate count per capita for all outsourcing and direct management libraries were 1.3557 and 0.9172, respectively, and their difference was statistically significant at a 0.05 level.

The straightforward comparison of the gate count per capita of all the outsourcing and direct management libraries did not exhibit statistical difference at a 0.01 level. By contrast, the gate count and number of loans of libraries in the “Other Cities” category exhibited statistical differences at a 0.01 level.

Matching

Table 4 shows the matching results. In Table 4, the left-most column and top row represent the types of libraries and library usage, respectively. The “***” and “*” in column “S” indicate that the left-hand ATETs were statistically significant at 0.01 and 0.05 levels, respectively. Table 4 shows that the average gate count per capita of all the outsourcing libraries was 1.3557, which was higher than that for all the direct management libraries by 0.4647. The difference was statistically significant at a 0.01 level.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>All Libraries</td>
<td>1.3557</td>
<td>0.9172</td>
<td>*</td>
<td>2.2095</td>
<td>2.1063</td>
<td>0.0161</td>
<td>0.0155</td>
<td></td>
<td></td>
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<tr>
<td>Prefectures</td>
<td>0.5092</td>
<td>0.1706</td>
<td></td>
<td>0.3850</td>
<td>0.1880</td>
<td>0.0282</td>
<td>0.0085</td>
<td></td>
<td></td>
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<tr>
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<td>0.5092</td>
<td>0.2070</td>
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<td>0.3850</td>
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<td>0.0282</td>
<td>0.0102</td>
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<td></td>
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<tr>
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<tr>
<td>Ordinance-designated Cities</td>
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<td>0.1817</td>
<td></td>
<td>0.2728</td>
<td>0.3454</td>
<td></td>
<td>0.0054</td>
<td>0.0054</td>
<td></td>
</tr>
<tr>
<td>Main Libraries</td>
<td>0.4141</td>
<td>0.5482</td>
<td></td>
<td>0.4078</td>
<td>1.2999</td>
<td></td>
<td>0.0744</td>
<td>0.0228</td>
<td></td>
</tr>
<tr>
<td>Annexes</td>
<td>0.1989</td>
<td>0.1481</td>
<td></td>
<td>0.2702</td>
<td>0.2577</td>
<td></td>
<td>0.0041</td>
<td>0.0038</td>
<td></td>
</tr>
<tr>
<td>Tokyo Special Wards</td>
<td>0.7029</td>
<td>0.6512</td>
<td></td>
<td>0.8832</td>
<td>1.0155</td>
<td></td>
<td>0.0085</td>
<td>0.0128</td>
<td></td>
</tr>
<tr>
<td>Main Libraries</td>
<td>4.5794</td>
<td>1.6883</td>
<td></td>
<td>3.1428</td>
<td>2.5604</td>
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<td>0.0697</td>
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<td>0.4556</td>
<td></td>
<td>0.8229</td>
<td>0.7184</td>
<td></td>
<td>0.0066</td>
<td>0.0084</td>
<td></td>
</tr>
<tr>
<td>Other Cities</td>
<td>1.2219</td>
<td>0.7227</td>
<td>**</td>
<td>2.3240</td>
<td>1.7782</td>
<td></td>
<td>0.0173</td>
<td>0.0144</td>
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<tr>
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<td>1.5744</td>
<td>*</td>
<td>4.0880</td>
<td>3.7354</td>
<td></td>
<td>0.0292</td>
<td>0.0287</td>
<td></td>
</tr>
<tr>
<td>Annexes</td>
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<td>0.2485</td>
<td>**</td>
<td>0.9649</td>
<td>0.6897</td>
<td></td>
<td>0.0081</td>
<td>0.0065</td>
<td></td>
</tr>
<tr>
<td>Towns and Villages</td>
<td>4.1861</td>
<td>2.0130</td>
<td>*</td>
<td>6.0585</td>
<td>4.3793</td>
<td>*</td>
<td>0.0343</td>
<td>0.0246</td>
<td></td>
</tr>
<tr>
<td>Main Libraries</td>
<td>4.4969</td>
<td>2.3212</td>
<td>*</td>
<td>6.4986</td>
<td>5.0220</td>
<td>*</td>
<td>0.0360</td>
<td>0.0278</td>
<td></td>
</tr>
<tr>
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<td>0.4131</td>
<td></td>
<td>1.5734</td>
<td>1.0432</td>
<td></td>
<td>0.0159</td>
<td>0.0081</td>
<td></td>
</tr>
</tbody>
</table>
level, which was inconsistent with the results obtained through the straightforward comparison. “Other Cities” libraries exhibited a statistical significance at a 0.01 level in terms of the gate count, which was inconsistent with the results obtained through the straightforward comparison.

Table 4 shows that almost all the ATETs are positive, which indicates that outsourcing libraries exhibited higher usage in terms of all factors than direct management libraries; however, the differences were not statistically significant.

Table 4. Matching results

<table>
<thead>
<tr>
<th></th>
<th>Gate Count</th>
<th>Loans</th>
<th>Reference Transactions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OurSrc</td>
<td>ATET</td>
<td>S</td>
</tr>
<tr>
<td>All Libraries</td>
<td>1.3557</td>
<td>0.4647**</td>
<td>2.2095</td>
</tr>
<tr>
<td>Prefectures</td>
<td>0.5092</td>
<td>0.2407</td>
<td>0.3850</td>
</tr>
<tr>
<td>Main Libraries</td>
<td>0.5092</td>
<td>0.2513</td>
<td>0.3850</td>
</tr>
<tr>
<td>Annexes</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Ordinance-designated Cities</td>
<td>0.2028</td>
<td>0.0399</td>
<td>0.2728</td>
</tr>
<tr>
<td>Main Libraries</td>
<td>0.4141</td>
<td>—</td>
<td>0.4078</td>
</tr>
<tr>
<td>Annexes</td>
<td>0.1989</td>
<td>0.0447</td>
<td>0.2702</td>
</tr>
<tr>
<td>Tokyo Special Wards</td>
<td>0.7029</td>
<td>0.1742</td>
<td>0.8932</td>
</tr>
<tr>
<td>Main Libraries</td>
<td>4.5794</td>
<td>2.7431</td>
<td>3.1428</td>
</tr>
<tr>
<td>Annexes</td>
<td>0.5817</td>
<td>0.1195</td>
<td>0.8229</td>
</tr>
<tr>
<td>Other Cities</td>
<td>1.2219</td>
<td>0.3288**</td>
<td>2.3240</td>
</tr>
<tr>
<td>Main Libraries</td>
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<td>Annexes</td>
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<td>0.7167*</td>
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<tr>
<td>Towns and Villages</td>
<td>4.1681</td>
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<tr>
<td>Main Libraries</td>
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<tr>
<td>Annexes</td>
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<td>0.5620**</td>
<td>1.5734</td>
</tr>
</tbody>
</table>

DD Analysis

Before performing the DD analysis, we examined the validity of the parallel trend assumption (mentioned in subsection 3.1) for the data. Figs. 1, 2, and 3 show the trend of usage of the three libraries.

Fig. 1. Trend of gate count per capita for outsourcing and direct management libraries
These figures indicate parallel trends. Furthermore, we conducted a regression analysis by setting (1) the year as an explanatory variable and (2) the difference in the library usage of outsourcing and direct management libraries as an explained variable. For all library usage in terms of the three factors, a hypothesis of zero regression coefficients was not rejected. These results indicate that the parallel trend assumption was valid for the data. Figs. 1–3 show that curves of “OutSrc Libraries when they were DirectM Libraries” were consistently lower than those of “DirectM Libraries.” It means that usage of libraries which introduced outsourcing were relatively lower before the introduction. We will discuss this point later.

Table 5 shows the results of the DD analysis. In Table 5, for example, the average gate count per capita of all libraries that introduced outsourcing increased 0.2261 after the introduction. This is (A) mentioned in subsection 3.2. By contrast, the average gate count per capita for all the direct management libraries increased ~0.0343 (or decreased 0.0343). This is (B) mentioned in subsection 3.2. The “DD” is the difference between (A) and (B), and for all libraries, this difference reached 0.2603. This difference between (A) and (B) was statistically significant at 0.01 level, which is shown in the “S” column.

Furthermore, significant differences were observed in the gate count per capita, with a 0.01 significance level for libraries in the ordinance-designated cities and other cities. Moreover, significant differences were observed in the number of loans, at a 0.01 significance level for all libraries, including those in ordinance-designated cities, Tokyo special wards, and other cities.

The following observations were made: (1) Tables 4 and 5 revealed significant differences in different types of library usage in different libraries. More significant
differences were observed in the DD analysis than in matching. (2) Although the DD analysis revealed the difference in the chronological changes of the two investigation targets, the matching analysis indicated the difference in the current status of the targets. (3) Furthermore, we found that the curves of “OutSrc Libraries when they were DirectM Libraries” (Figs. 1–3) were consistently lower than those of “DirectM Libraries.” The aforementioned observations indicated that (i) outsourcing is generally introduced to the libraries with relatively low usage, and (ii) outsourcing increases the usage significantly than the direct management libraries; (iii) however, the amounts of usage have not reached the level where significant differences (from direct management libraries) were observed. However, let us emphasize again that matching showed that the usage of outsourcing libraries was higher than direct management libraries in terms almost all factors, although this increase was not statistically significant.

<table>
<thead>
<tr>
<th>Table 5. Results of DD analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Gate Count</strong></td>
</tr>
<tr>
<td>Differences</td>
</tr>
<tr>
<td>-----------------</td>
</tr>
<tr>
<td>All Libraries</td>
</tr>
<tr>
<td>Prefectures</td>
</tr>
<tr>
<td>Main Libraries</td>
</tr>
<tr>
<td>Annexes</td>
</tr>
<tr>
<td>Ordinance-designated Cities</td>
</tr>
<tr>
<td>Main Libraries</td>
</tr>
<tr>
<td>Annexes</td>
</tr>
<tr>
<td>Tokyo Special Words</td>
</tr>
<tr>
<td>Main Libraries</td>
</tr>
<tr>
<td>Annexes</td>
</tr>
<tr>
<td>Other Cities</td>
</tr>
<tr>
<td>Main Libraries</td>
</tr>
<tr>
<td>Annexes</td>
</tr>
<tr>
<td>Towns and Villages</td>
</tr>
<tr>
<td>Main Libraries</td>
</tr>
<tr>
<td>Annexes</td>
</tr>
</tbody>
</table>

**DD Analysis with Matching**

Table 6 shows the results of the DD analysis with matching. In Table 6, the average gate count per capita for all libraries that introduced outsourcing increased 0.2261 after the introduction (consistent with the results in Table 5). This is (A) as mentioned in subsection 3.2. By contrast, the average gate count per capita of all direct management libraries (and judged as similar to outsourcing ones by matching) increased 0.0203. This is (B) as mentioned in subsection 3.2. The “DD” is the difference between (A) and (B), which reached 0.2058 for all libraries. This difference between (A) and (B) was statistically significant at a 0.01 level (the “S” column). Moreover, “—” in Table 6 indicates that the difference or ATET could not be calculated because of the small sample size.

Significant difference was observed in the gate count per capita, at a 0.01 significance level for libraries in the ordinance-designated cities. Significant differences were observed in the number of loans, at a 0.01 significance level for all libraries, including those in ordinance-designated cities, Tokyo special wards, and other cities.

Similar results are presented in Tables 5 and 6. However, Table 6 presents more reliable results than Table 5 because the compared direct management libraries are similar to outsourcing libraries in terms of the following factors: (a) the number of holdings, (b) number of acquisition, (c) size of the floors, (d) number of staffs, and (e) service population, as mentioned in subsection 3.2. The parallel trend assumption
(β₁ = β₀ in subsection 3.2) was more reliable in the DD analysis with matching than in the simple DD analysis².

### Table 6. Results of DD analysis with matching

<table>
<thead>
<tr>
<th>Gate Count</th>
<th>Loans</th>
<th>Reference Transactions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Differences</td>
<td>DD (ATET) S</td>
<td>Differences</td>
</tr>
<tr>
<td>A</td>
<td>1.1325 0.0918   2.2012 0.0520 0.0019 0.0032</td>
<td>B</td>
</tr>
</tbody>
</table>

### Results on Particular Designated Administrator

The aforementioned results could be attributed to a particular designated administrator (or a particular corporation and foundation). We identified the three highest ranking corporations and foundations administrating most libraries, which are denoted as A, B, and C. Tables 7 and 9 presents the results of matching and DD analyses of the libraries administrated by them. Tables 8 and 10 present the number of samples of these analyses. Tables 7 and 9 reveal that numerous ATETs of “Others” (i.e., outsourcing libraries administrated by other than A, B, and C) were statistically significant. This observation indicates that significant ATETs in the previous subsections were not obtained by only A, B, and C. Because of the length restrictions, the results of the DD analysis with matching, which indicated similar tendencies, were omitted.

### Table 7. Matching results on libraries administrated by A, B, and C

<table>
<thead>
<tr>
<th>Gate Count</th>
<th>Loans</th>
<th>Reference Transactions</th>
</tr>
</thead>
<tbody>
<tr>
<td>OurSrc</td>
<td>ATET</td>
<td>S</td>
</tr>
<tr>
<td>A</td>
<td>1.1325 0.0918 2.2012 0.0520 0.0019 0.0032</td>
<td>B</td>
</tr>
</tbody>
</table>

### Table 8. The number of sample libraries for matching regarding A, B, and C

<table>
<thead>
<tr>
<th>N</th>
<th>OutSrc</th>
<th>DirectM</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>104</td>
<td>2,822</td>
</tr>
<tr>
<td>B</td>
<td>17</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td>299</td>
<td></td>
</tr>
</tbody>
</table>

### Table 9. Results of DD analysis on libraries administrated by A, B, and C

<table>
<thead>
<tr>
<th>Gate Count</th>
<th>Loans</th>
<th>Reference Transactions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Differences</td>
<td>DD (ATET) S</td>
<td>Differences</td>
</tr>
<tr>
<td>A</td>
<td>0.1818 0.2158 0.2055 0.3266 0.0008 0.0016</td>
<td>B</td>
</tr>
</tbody>
</table>
Table 10. The number of sample libraries for DD analysis regarding A, B, and C

<table>
<thead>
<tr>
<th>N</th>
<th>Gate Count</th>
<th>Loans</th>
<th>Reference Transactions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OutSrc</td>
<td>DirectM</td>
<td>OutSrc</td>
</tr>
<tr>
<td>A</td>
<td>68</td>
<td>12,609</td>
<td>82</td>
</tr>
<tr>
<td>B</td>
<td>11</td>
<td>11</td>
<td>11</td>
</tr>
<tr>
<td>Others</td>
<td>146</td>
<td>150</td>
<td>93</td>
</tr>
</tbody>
</table>

Conclusions

In this study, we examined the causal effects of introducing outsourcing on the usage of Japanese public libraries. In matching, the average gate count per capita of all the outsourcing libraries was higher than that of all the direct management libraries. Similar results were observed for “Other Cities” libraries. In the DD analysis, the average gate count per capita and number of loans per capita of all the outsourcing libraries were higher than those of all the direct management libraries, and similar results were obtained for libraries in “Ordinance-designated Cities” and “Other Cities”. Furthermore, among libraries in “Tokyo Special Wards,” the average number of loans of outsourcing libraries was higher than that of direct management ones. All of these differences were statistically significant at 0.01 level. In DD analysis with matching, almost the same could be said. Most of these results were different from the straightforward comparison of outsourcing libraries and direct management ones (see Table 3). Furthermore, these results could not be attributed to the influence of particular designated administrators (Tables 7 and 9).

These results validate that introducing the designated administrator system increases the gate count per capita. Considering the difference in the characteristics of the matching and DD analyses (as mentioned in the last paragraph of subsection 4.2), it is highly probable that the same can be said for the number of loans per capita. If the ordinance-designated cities and other cities intend to increase the gate count and the number of loans of their libraries, introducing outsourcing will be beneficial.

We must consider whether outsourcing libraries are attracting people with “popular” books, such as novels. However, a study by Mizunuma and Tsuji [10] provides contrasting results. They reported that direct management libraries generally have more novels than outsourcing libraries, whereas outsourcing libraries generally have more reference books than direct management libraries.

In future, the condition of employment of librarians in outsourcing libraries, especially per-hour salaries, can be investigated. We must examine whether the aforementioned increase is achieved at the cost of outsourcing librarians overworking with low salaries.

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A Study on Implementation of Demand-Driven Acquisition (DDA) Model in Academic Libraries: A Literature Review

Muhammad Salihu Zubair
University Library, Bayero University, Kano

Abstract. Demand-Driven Acquisition (DDA) practice is a method adopted and implemented by academic libraries to facilitate access to, and use of information resources for users. The DDA model is regarded as a model, for acquiring information resources based on just-in-time inquiry. It is also considered as a change from the just-in-case model for acquiring information resources by library users to the Just-in-time model, known as Demand-Driven Acquisition. The implementation of this model is gaining ground from acquiring and providing access to information resources as demanded by either individual or collective library users. The objective of this study is to explore existing literature on implementation of DDA model in academic libraries. This study furthermore explores the justification for libraries transition from the traditional just-in-case model to the recent just-in-time model of acquisition for effective access to and usage of information resources. The paper concludes that the DDA model has greatly permitted great participation of library users to make input in collection development, based on use. It is suggested that libraries in Asian and African countries should also follow the DDA model trend and probably adopt it in this era of financial recession.

Keywords: Demand Driven Acquisition, Just-in-case model, Library budget, Just-in-time model, Library resources

Introduction

Like living organisms, library collections grow at varied levels and stages, which interpret, how library collections develop over time, based on scopes, sizes, shapes, forms, quantity and directions. Collections in various libraries usually began just like any other, with a smaller nucleus of materials, which continue to grow at varying rates and speed over the years [21]. Information explosion leads to information resources availability in varied formats. For example, digital or non-digital; housing diverse contents such as scholarly reference, research, fiction etc. This has created a number of implications for libraries to acquire relevant information resources.

Collection acquisition in academic libraries has been undergoing considerable revolution; considering the rapidity of developments in the fields of information and communication technologies. Lehman [22] stated that the ultimate responsibility of collection development has not changed though the methods have. Various libraries at a different time have studied, tested and adopted various methods of acquiring information resources, considering the state of library funds, space and patron needs among others. The methods of acquisition of library resources have continued to
change from the previous traditional individual acquisition methods, to shared collective acquisition and to “Big Deals” methods.

According to [11], Big Deal models are not only burdensome but also unjustifiable based on the cost. The large research libraries have adopted and implemented shared acquisition technique with the aim of having total custody of the collections.

This method seems daunting and undesirable for most libraries. Most libraries are nervous of their inability to offer required research information resources on time to their users as the burden attached to cooperative collection development seems to be time-consuming and demanding compared to individual library ownership despite its potential cost saving [4].

The study aims to explore existing literature to examine DDA practices, control implementation criteria and fear about DDA among academic libraries. This study further explores the justification for libraries transition from the traditional just-in-case model to the recent just-in-time model of acquisition. The just-in-case model of acquisition as the name implies, deals with the selection of library collections by librarians, using the approval plan as a criterion for selection. The model is characterised with long-term objective of satisfying the present and the future needs of users particularly the researchers. The just-in-time model is a model of acquisition that entrusts library collection development to the users based on their learning, teaching and research needs, usually without librarians’ mediation.

Literature Review

Demand-Driven Acquisition

Traditionally, the task of building collections in academic libraries rests on the shoulder of collection development librarians and other faculty members. This was usually done based on the understanding of the past, present and forecasting the future information resources usage [26]. Selection of information resources by librarians or via the approval plan is aimed at purchasing, putting into consideration, its long-term objectives. That is to say, librarians’ responsibility is to build a collection that meets the current and future needs of the patrons [29]. This method of collection acquisition is referred to as just-in-case selection, done in the belief that library users will eventually use the information resources acquired; the “build it and they will come approach” [25]. Regrettably, libraries are recording a high percentage of titles that never circulated, ranging from 40% to 70% [12].

The Demand-Driven Acquisition is a recent practice of acquisition where library patrons decide what the library purchases without librarian mediation [23] DDA is a natural by-product of information technology. Technology enables easy and swift provision of needed information, reducing the necessity to build collections in anticipation that patrons might want the resources someday [1]. There are varied terms used to refer to this model, such as Demand-Driven Acquisition (DDA), Patron-Driven Acquisition (PDA) [11], Evidence-Based Acquisition (EBA) [30], Books on Demand (BoD) [29], and more. The researchers use these concepts to describe library acquisition models and purchasing decisions based on data gathered from actual library patrons.

DDA is a “Just-in-time” economic model of library acquisition, replacing the “just-in-case” collection acquisition technique. Librarians are required to evaluate usage statistics and embrace technology to provide information to patrons in a more effective and efficient manner [12]. The acquisition process (DDA) involves patrons directly

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or indirectly, by clicking on the catalogue or possibly, through Inter-Library Loan (ILL). Library users ordering pleas to libraries to withdraw from just-in-case collection acquisition to a system that is more patrons centred. Many important issues rose concerning the differences between patron-initiated acquisitions and librarian collection development. Most notably, “there is a real difference between building a balanced collection for the future and giving patrons what they want now” [26]

DDA model of acquisition has risen outside the print and media arenas into electronic books. DDA is a simplified model that enhances ordering of individual e-book title just like requesting a book from book jobber’s list, or like selecting a print title from an online store. By adding the e-book to the catalogue and sending the customer an e-mail with the link, the library fulfills the individual patron request in few hours rather than days, with every expectation that the patron-selected e-book will receive consequent use by other patrons than some librarian-selected ones [28]

[1] postulated that DDA began as an experimentation model to cut interlibrary cost. The model favoured embracing buying as a replacement for borrowing, to reduce total costs of acquisition, than librarian-mediated or just-in-case selections. The DDA based on ILL requests purchasing showed that many researchers need information resources outside what might be considered their department’s primary collections. DDA model has made the interdisciplinary nature of research manifested [26] Therefore, DDA model is becoming immensely popular, and in some libraries as a primary mode of acquisition [15] DDA model has been used to acquire print and electronic monographs, media and, in some cases, electronic journals through the pay-per-view model [30].

Demand-Driven Acquisition Practice in Academic Libraries

Various academic libraries have introduced while some are considering introducing DDA programs, making the programs become widespread [36]. Based on some practices of DDA, it has shown that DDA enables libraries save a reasonable amount of money [30] Hence, with the perceived growing acceptance of e-books, different DDA models for academic libraries have arisen [13]

Grand Valley State University in Michigan implemented a cost-centred DDA study in which money served by implementing a short-term loan strategy through E-book Library (EBL). Grand Valley State University acquired about 160 books over a 4-month period and circumvented procuring books that no one utilized [34]. In another study by [5] it was discovered that Wake Forest University acquired quite a lot of her ebooks using the DDA model from E-book Library (EBL) as a platform. More than 215,000 titles compared to about 2,500 single titles and e-book collection was procured and additional access to roughly 200 e-books through Oxford Reference Online Premium. Over 300,000 historical e-books of Wake Forest were also acquired through collections such as Early English Books Online (EEBO) and Eighteenth Century Collections Online (ECCO).

The University of Mississippi Libraries gave access opportunities to students and faculties using the Interlibrary Loan, this is to enable the library test run its pilot DDA model [9], [19]. For Purdue University, 95% of the materials acquired cost under $150, which affirmed the $150 price cap was a sensible measure for the program. Ohio State University Libraries also initiated a DDA program, where similar conditions were set for interlibrary loan requests. If those conditions as for price, publication date, and other criteria were met, the titles were purchased and added to the col-
lection. Several librarians and publishers acknowledged that DDA model aid resources utilization. DDA tolerates libraries to choose and pay for content used and not for which they did not use, irrespective of the format. There is usually hard data to back up the purchase decision [30].

DDA is an attractive acquisition model that has made it visible for users to access a huge volume of seeming impossible titles, in large quantity. This benefit was not achievable in the conventional “just-in-case” model of acquisition. Libraries can decide to extend or terminate the program based on the availability of the budget, and in due course purchase and own the titles that have received usage [20].

Advocates of DDA revealed a high proportion of collection purchased using the usual just-in-case selection methods that never circulated [29]. The authors eluded these collections as the genuine rack sitters and assumed that they may remain on the library shelves for a considerable length of time and never be moved unless the collection is shifted. This can be connected to the zero circulation for 39.8% of Pittsburgh collection after six years on the shelf [16].

Several other library collections use studies concluded that majority of academic library collections never leave the shelves; which implies that they never get used by patrons [23, 29, 30]. For example, based on a crude analysis of the circulating information resources at Wake Forest University, it was concluded that about 50% of the books have never circulated since the local collection of circulation data began in 1991. Considering the circulated books, about 36% circulated precisely once [6]. The author further argues that the resources (cash and labour) expended on the non-circulating information resources were wastage. Similarly, for the titles that changed hand once, the cost-per-use is the total price of the book, plus handling costs, rack costs, etc.

The study conducted at the University of Denver discovered that huge percentage of books were not used and perhaps will never be used. From the 89,496 titles published within 2005 and 2009 in the University of Denver collections, 47,257 (53%) have not circulated; 21,810 (24%) circulated simply once, and 20,429 (23%) circulated about two or more times. Use patterns will grow as time progresses, but a comparison with books that have been in the collections since 2005 specifies that the circulation rate does not increase by much: limiting to books with a 2005 imprint date, 9,112 titles (42%) have not circulated; 5,258 (25%) have circulated once, and 7,124 (33%) have circulated two or more times. If 40% or more of books never circulate and 25% circulate only once, librarians need to re-evaluate purchase of books [6].

Based on the various studies reporting similar findings, academic libraries are well cognizant that significant proportion of their monographs did not circulate [30]. Librarians often expressed concern about the usage of the package purchased. Nevertheless, studies have shown that books acquired using the DDA model were accessed more often than those purchased in packages did. Also, analysis of about half of the collections purchased during the program’s first two years at Purdue University, the university librarians concluded that the Books on Demand program was a valuable balance to collection development activities and steadily supplementing collections with relevant scholarly titles [32].

**DDA Workflow**

The DDA program required completely different plan as regards its workflow. Acquisition of print materials traditionally travels along a similar route. It usually originates
from its selector to the vendor, to the acquisition librarians and finally to the cataloguers before the users can lay hands on the materials. E- Resources, which are on the other hand, virtual items, will have no physical exchange of hand compared to their printed counterparts. Items will not be activated individually in the workflow but rather in bulk. Therefore, batch processing of items is the new normal as far as the workflow is concerned [8]. Strategies, criteria and workflow for different DDA models using interlibrary advance are vast in the literature.

DDA implementation somewhat differs among publishers and vendors, but the stages are usually in same sequence. Some of the publishers for DDA initiatives include E-Book Library (EBL), E-Books on EBSCO Host, Ebrary (ProQuest, MyiLibrary (Ingram) etc. The library will first select some preferred providers that will make the material metadata discoverable on the library catalogue and/or your discovery service. Once patrons find useful material, the first few minutes or pages (usually table of contents or index pages) of use are definitely free. Though, some publishers charge for use outside the free period and that’s referred to as “Short Term Loan” or STL. After definite amount of uses (the “trigger”), the book is automatically procured at full price [6].

On the other hand, not all DDA models offer the same benefits. Publishers and vendors have a number of different approaches to DDA. A particular approach necessitates libraries to pay an advance of a definite sum of money in order to have access to the content for a certain amount of time. After the specified time, the library can explore the used data to choose content that adds up to the initial amount invested [27, 30].

Depending on the Publishers, funds devoted for a DDA program may or may not be repurposed for other products, even if the same vendor offers it. This couple with pools of available several platforms and diverse flavours for demand-driven acquisition, thus, it appears worthy to work with several vendors during the preliminary stage of the project [23].

In the implementation of DDA program, it is important to intimate staff about the new and changing workflow. The use of technology will help play major roles in the process, as there is need for librarian or individual who will be in charge of activities such as:

1. Upload initial sets of records and interrupted apprises.
2. Acquire, obtain, pay for, and catalogue triggered titles.
3. Intermediate for loans (if you choose to mediate)
4. Assess, appraise, evaluate, and adjust.

It is important for library to strike balance between acquiring more titles or to allow meaningful analysis at the conclusion of a period, usually one year. While being wary of monetary constraint and conscientiously build-up the existing collection. Every individual request, match the stipulated criteria are acquired at whatever time conceivable. The first step to decide the consideration of Inter Library Loan (ILL) was the date of publication. An acquisition librarian will be assignd to manage the anticipated acquisition decision. Any request with publication date within five years were acquired automatically [10, 19]

**DDA Control Mechanism**
Librarians take quite a number of steps to control the cost of DDA program, although the method of control varies from one library to the other (Herrera & Greenwood, 2011). One of the steps is to establish a price ceiling; that is, if books are more expensive than the set price then they should be excluded from the DDA program. Another step is to require that loans or purchases of books over a certain price must first get approval (i.e., “mediated”) by a designated librarian. A library can also restrict the program to particular subject areas that are so high-priority to the mother institution [6]. When patrons through ILL, request for materials, libraries commence purchasing such titles if they meet the specified pre-established criteria such as content relevance, price and period delivery. After first usage by the requesting ILL patrons, the books (and, later, media titles) were added to the existing library collections [28].

The implementation of DDA programs requires incorporation of librarians to work with publishers, vendors or e-book aggregators. This will enable them agree and specify the content scope of the model, agreement for the purchase definition. A promised spending level, the feeding of a large number of discovery records into the libraries’ catalogues and their maintenance [20], and price cap for materials [3, 15, 24, 25].

Implementation of DDA model by academic libraries usually leads to setting criteria for inclusion. For instance, purchase of reprints requires librarian’s approval, certain publishers were excluded books could not cost more than a certain amount, or there was a strict spending cap. Fears of excessiveness in the use of library fund are commonly cited as a rationale for the restrictive measures [34].

Ohio State University Libraries, on initiation of her purchase-on-demand program set specific criteria to meet before such information resources can be included in the purchase list. These criteria must meet specific interlibrary loan requests such as price, publication date, and other criteria before the titles can be purchased and added to the library [26].

The Sam Houston State University adopts ebrary as its e-book provider and loaded 100,319 titles into their library catalogue, with a purchase trigger if the number of interactions with a title exceeded a given amount during a defined time period [26]. Publishers also set criteria that activate information resources purchase. For example, what types of books to offer and exclude, will duplication of print collection and e-books purchased through other mechanisms are allowed? For ebrary, several situations can trigger a purchase. Use of an eBook for 10 minutes or 10 pages can trigger a purchase. The first 10% and last 10% of the books are not calculated, this is to allow free access to the table of contents and index. Copying selected text or printing will also automatically constitute a purchase. The ebrary does state that they recognise timeouts and a session with no activity are taken into account as a timeout rather than a purchase after 10 minutes [15].

Library will make various important choices while initiating a DDA program. Some publishers permit the library to indicate the auto-purchase trigger. Some publishers may also allow the library to set a default length of a short-term loan. Libraries that purchase rather than borrow titles also needs to clearly state guidelines about what is appropriate when purchasing rather than borrowing [15].

**Justification for DDA Practice in Academic Libraries**

DDA model unravels several acquisition issues and offers several other great opportunities for both libraries and publishers. Primarily, patrons are exposed to countless more collections than what they should otherwise be accessible to them [20]. For
libraries, they will pay for only what is used, or in contrary, libraries do not pay for what is not used [6]. Studies have shown how DDA model of acquisition has been tested and proven based on several criteria, including its cost-effective information resource purchases; patron satisfaction; high subsequent circulation; and flexibility in meeting local constraints for price, content, and processing. It is no longer a revolutionary concept, but one that is accepted as routine in many sizes and types of libraries [13].

Analysis of DDA requests indicates that the patron-initiated information resources are possible to have several repeated use than the books acquired through normal speculative acquisition processes. DDA requests are usually for specific and prompt need, primarily the books showed more circulation because each requested title already attracts a circulation [29]. An instance of Purdue librarians, in their analysis about half of the acquired books during the first two years of DDA program initiation. They concluded that the DDA program was a valuable complement to collection development activities and constantly including relevant scholarly titles to the collection [29].

Study confirmed that 68% of DDA titles purchased during the project’s first two years in HSSE library circulated at least once after the initial use by the original ILL patron (42% have circulated more than once). In contrast, 36% of titles normally acquired during the same period for the HSSE Library have circulated at least once (16% have circulated more than once). Collection analysis in the Management Library are significantly more sensational: all DDA had at least one checkout, while only 48% of the books selected and purchased with library funds had circulated one or more times during the same two years [2].

In the DDA program for the Faculty of Engineering and Computer in the University of Mississippi, 100% of the acquired collections had been put to use [15]. Even, several more items were used than what was triggered for purchase. This collection cost was tumble to $30 per use for the information resources purchased. If sessions for the materials not purchased were included, the cost per use reduces to $22. With print books requiring additional processing and storage space, the argument for patron-driven eBook programs is becoming increasingly attractive.

After the initiation of DDA program by Hong Kong University of Science and Technology (HKUST) Library, with three concurrent DDA programs the library is said to have accomplished its goal to boost its e-books collections. From the year 2012 to 2014, the e-book collection size suddenly improved by 40%. The overall e-book usage in 2013 surpassed a million downloads, which was 3.5 times higher than 2012 when there was no DDA [20]. However, this made DDA the new normal in HKUST.

Finally, when most DDA program users were asked to judge the DDA programs or to assess the acquisition after delivery, they declared their support and embraced the programs, reasons been that they felt the books were worthwhile and were books that the patrons would use again, and recommend to colleagues, and/ or were books that the patrons felt were good additions to the libraries’ collections [35].

Fear and Concerns about DDA Practice

Some authors have reservations concerning the implementation of DDA model. Some of these authors argue that DDA supports library users to request information resources (e-books) exclusively to meet their instantaneous and personal needs and
never consider institutional collections in their priorities. In addition, they claimed that patrons usually purchase non-academic items via DDA or will lard their libraries’ collections with topically idiosyncratic or otherwise unsuitable information resources [35]. However, recent studies on print DDA and e-book DDA have rather attested that insignificant numbers or percentages of requested or purchased information resources as being non-academic or too popular for their libraries’ collections [7, 11, 14]. Although, suggestions are made that DDA should not be used as the main collection-shaping device for any research library that anticipates fulfilling research needs in the future. If a library intends to build a great collection, then DDA may not be the way to go about it [35].

Other principal worries as regards DDA for many libraries are the fear that; demand for collection especially e-books will surpass their available budgets. For instance, Ohio State authors acknowledged that library users preferred the DDA model but posed a question to whether the library had the fund to cater for requested information resources using current DDA business models [26]. This fear makes academic libraries mostly not broadcast the DDA program, this is because they want the selections to happen spontaneously, and not be forced by any individual attempting to over-select titles for their use [1].

The concern of fiscal ambiguity where libraries will be loading many more records into the catalogue than it can pay for. Of course, in anticipation that library patron will request a portion of the titles characterised by the records. But if the use of the new service is significantly above the use of the current collection, the library will definitely spend its funds quicker than planned [23]. Although this would be a challenge, but there is equally solution: once funds have been exhausted, MARC records will be suppressed and e-books will be blocked from vendor databases until the start of the new fiscal year.

In addition, the question of whether collection development librarians are obsolete in the era of DDA and the librarians’ response is with a decisive “NO”. Thus, they emphasised that “even the largest e-book publishers and aggregators have rights to distribute only a proportion of the titles published each year” and, therefore, a librarian is still required to review the academic value to print-only information resources [1].

Librarians in the University of Denver are of the opinion that patrons are comfortable with DDA of monographs. However, some factors could cause a number of aspects of the project to flop. This deals with the reaction of patrons in the presence of record catalogues for unowned collections. Librarians are of the opinion that patrons may find it puzzling and unsatisfying to discover information resources in the catalogue that they cannot be accessed immediately. In contrast, the patron may be pleased to realise several more books through the catalogue than was possible in the past [23].

Another issue is the fear that library cost will end up the same amount of money as it did in the past on fewer monographs. Duplicated print and electronic versions of the same titles could be acquired and perhaps spend additional cost on first collection rent and before acquiring some e-books, it would have simply purchased them in the first place. If users choose both electronic and print formats, and if use justifies that duplication, then that may be considered a better use of funds than purchasing a wider range of unused titles [23].

Survey of literature shows that implementation of DDA model in most libraries often adopts strict criteria. Such conditions set for purchase include the purchase of
reprints requires librarian approval, certain publishers were excluded, books could not cost more than a certain amount, or there was a strict spending [18, 23, 31]. The rationale for setting criteria for purchase was as reports of overspending. However, with these restrictive criteria DDA patrons at academic libraries have largely purchased items that were appropriate to their libraries’ collections.

Concerns about DDA, especially for publishers, still beg for answers. The concerns include; if libraries transit to DDA program, what will be the effect on scholarly publishing? Can books, articles, or monographs on narrow subjects still be published if no library will acquire them? What might be the effect on publishing, tenure and promotion, and scholarship in general? That notwithstanding, libraries need to be cautious; in order to avoid falling into trick of allowing DDA consent reinvent the library Online Public Access Catalogue (OPAC) into shopping cart or online bookstore for patrons, and growing market for publishers and vendors [33].

Nevertheless, it is important to note that DDA program requires a considerable investment. This sometimes requires librarians to pay for use before actually seeing the collection usage data. Such model needs to be approached with caution. However, if academic libraries or consortia could negotiate a very low or no initial investment for a DDA program to include only content in which the library is interested, the investment on the model will be worthwhile [8].

A study conducted by [15] revealed that Reynolds and colleagues at Texas A & M University Libraries involved librarians and patrons for investigation using surveys, as part of their program evaluation. The patron survey discovered that communication regarding request fulfilment was the only area that needs further improvement. In the survey, another user’s comment suggested to the library that would be helpful to get updates along the process. However, the librarian surveys discovered that 20% of the subject librarians express concern as regards the purchase of inappropriate materials as they found that faculty and graduate students were the main users of the program.

**Conclusion**

The recent shift in paradigm from the traditional speculative (just-in-case) model of acquisition to the present just-in-time model of acquisition has greatly permitted greater participation of library users to make input in academic libraries acquisition based on use. This model of collection development enables a library to add records items to the online catalogue without purchasing them but payment usually occurs when the item is used.

Although, not all institutions have adopted this method, as some are still trying to understand how the method works. It is important for libraries to be careful and understand vendors’ guidelines while initiating the program. The libraries also need to set guidelines that are reasonable to help their library collections grow and at the same time useful to the patrons.

Libraries considering implementation of the DDA program – whether using the Inter Library Loan program or via direct patron ordering – must develop clear guidelines and strategies on the scope of the program and on how to evaluate its success. The bottom line for every acquisition model should be based on improved service for patrons that is cost effective for the libraries.

Finally, libraries planning to adopt the model should follow suit and see the need to furthermore investigate and probably adopt the Demand-Driven Acquisition method in this era of financial recession. The librarians need to be trained on adoption and
implementation of this model. There is a need to create awareness and educate user community on merits and demerits of Demand Driven Acquisition method. The libraries need to conduct user studies in order to understand whether this method is useful to the libraries and patrons or just click to grow usage statistic since the process is usually done organically.

References


Taiwanese Scholars’ Practices and Perceptions of Research Data Management

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Abstract. This study attempts to understand Taiwanese scholars’ practices and perceptions of research data management (RDM). A total of 1,088 valid questionnaire responses were collected to explore their practices and perceptions of various key issues of RDM, including sources and types of research data, data storage and search, metadata of research data, data management plan (DMP) mandates or requirements, training and support, and data sharing and reuse. Most respondents frequently create their own research data, obtain data from their research team, or download data from data repositories. Experimental data and social science surveys are the topmost data types used and produced. A vast majority of scholars are satisfied with their processes in storing and searching their own data, no matter within or beyond the project lifetime. Although most scholars store their data in their own devices or cloud drives for the short or long term, some scholars consider that data repositories created by their institutions or commonly used in their subject disciplines should be appropriate for long-term preserving their data. Scholars have hardly taken any formal trainings on RDM, and they are willing to take trainings and be supported on data management plan (DMP). Scholars are willing to reuse quality and easily accessible data, and they are willing to share their data if they could place conditions on access. Lack of appropriate policies and rights protection, misuse of data, and misinterpretation of data are the three topmost data sharing concerns. The research results are beneficial for academic libraries in Taiwan to plan their RDM services.

Keywords: Research Data Management (RDM), Data Management Plan (DMP), Metadata, Digital Scholarship.

Introduction

Ushering in the digital era, people are now inhabiting in a digital world. Digital information on the Internet is massively increasing and having significant impacts on mankind in many areas, such as education, recreation, research and culture. The primary mission of academic libraries lies in supporting teaching, learning, and research via information resources and services. An emerging services offered by academic libraries is digital scholarship services. Digital scholarship can be defined as the use of digital evidences, investigation methods, research, publication and preservation to demonstrate specialism in a field \cite{dong:2008, dong:2009}. Three catalysts of digital scholarship are digi-
talization of content, networking of peers and content, and openness of technology, content, and mindset [2].

Without doubt, academic libraries have long somewhat involved in digital scholarship, including the acquisitions of electronic resources (e-journals, A&I and citation databases), the digitalization of special collections, and the operation of institutional repositories. With openness in mind, many funding agencies around the world have formulated open access (OA) mandates and/or open data (OD) mandates, which encourages academic libraries to provide research data management (RDM) services.

Academic libraries in Taiwan have endeavored in creating institutional repositories for many years; however, because major funding agencies in Taiwan have not formulated OA or OD mandates yet, it is very difficult for academic libraries in Taiwan to collect OA materials in institutional repository, not to mention research data.

Viewing that research data management is important for digital scholarship, academic libraries in Taiwan are eager to plan and implement RDM services, and one important task during planning is to understand scholars’ perception of research data management.

This paper aims for exploring Taiwanese scholars’ perceptions and practices of research data management. This paper is organized as follows. Section 1 is an overview. Section 2 describes the related studies. Section 3 briefs the methodology. Section 4 elaborates the results. Conclusions are given in Section 5.

Literature Review

Digital scholarship concerns “the use of digital evidence and method, digital authoring, digital publishing, digital curation and preservation, and digital use and reuse of scholarship” [1]. Daily use of information and communication technology (ICT) tools for corresponding, creating teaching or presentation materials cannot be considered as digital scholarship [2]. It involves the embracement of openness, the creation of peer networks, and the facilitation of research collaboration through ICT [3].

With the maturity of digital and information technologies, massive data in digital form can be easily created and shared among researchers; as a result, contemporary scientific research becomes more data intensive and collaborative than the past [4]. Open data is one component of digital scholarship [3], but before data is opened and shared, data has to be well managed.

Research data management (RDM) can be defined as the description, storage and preservation, organization, discovery and sharing of research data through the research life cycle [5]. DataOne uses an eight-stage data life cycle to explain research data management, namely, plan, collect, assure, describe, preserve, discover, integrate, and analyze [6]. RDM is beneficial for preventing data from intentional or unintentional damage or loss, facilitating the discovery, sharing, and reusing of data among scholars, and ultimately making science more affordable, accessible, equitable, reproducible, sustainable, and verifiable [7]. The issues of research data management contain [8]: (1) organization – file naming and formatting, data formats and software, file transfers, file sharing and remote access, and version control; (2) administration: backup and preservation, documentation and metadata, access controls, and security; (3) storing and sharing; (4) ethical and legal aspects of data handling and data ownership.
When academic libraries plan to implement RDM, it is vital to study the data practices of scholars, including data accessibility, discovery, reuse, preservation, and data sharing [4]. Tenopir et al. [4] surveyed 1,329 scientists to explore their current data sharing practices and perceptions of the barriers and catalysts of data sharing. A vast majority of scientists were satisfied with the short-term storage of their data within the project lifetime, but less than half were satisfied with the long-term preservation of their data beyond the project lifetime. Scholars were willing to share their data if they could impose some rules, and they were willing to reuse others’ data if the data was easily accessible. Scholars’ reasons for not making data available included insufficient time, lack of funding, lack of standards, among others.

Chowdhury, Boustany, Kurbanoğlu, Ünal, & Walton [9] conducted a questionnaire survey on research data sharing. They collected 215 completed responses from university researchers in UK, France, and Turkey. They asked questions on data sharing behaviors, metadata and tagging of datasets, open access and data sharing issues, issues and awareness of data management plans (DMPs). Their research showed that although scholars were willing to share research data, they did not quite understand the requirement of open access imposed by their institutions and/or governments, and had few experience in creating DMPs; in addition, scholar had a few concerns about sharing data, such as research ethics, misuse and misinterpretation of data, lack of appropriate policies and rights protection. They suggested that more training and advocacy were necessary to make data sharing come true.

Research Methodology

The authors conducted a questionnaire survey. The questionnaire items were primarily adapted from [4] and [9]. The questionnaire was created using LimeSurvey (https://www.limesurvey.org/), an open-source online survey tool, and the authors invited by Email the faculty members of 15 research intensive universities and institutions in Taiwan to fill out the questionnaire during May to June 2019. A total of 1,088 responses were collected.

Results and Discussion

This section presents the results of the abovementioned questionnaire survey. It begins by analyzing the demographic information of respondents, and follows by respondents’ practices and perceptions of several key issues in RDM.

Demographics of Respondents

Respondents were asked a few demographic information, including age, academic position, subject discipline, years of conducting research, percentage of time spent on research. Of the respondents providing their ages, 4.4% (n=47) are between 26 and 35 years old, 29.1% (n=314) are between 36 and 45 years old, 39.0% (n=421) are between 46 and 55 years old, and 27.6% (n=297) are over 55 years old.

Of the respondents providing their years of conducting research, 5.0% (n=54) are under five years, 14.1% (n=152) are between 6 and 10 years, 21.9% (n=236) are between 11 and 15 years, 17.8% (n=192) are between 16 and 20 years, 17.7% (n=191)
are between 21 and 25 years, 13.4% (n=145) are between 26 and 30 years, and 10.1% (n=109) are over 30 years.

About nine percent (8.7%, n=94) and 20% (n=216) of the respondents reported they spend over 80% and 61%-80% of their time on research, respectively. Many respondents (35.6%, n=384) indicated they spend 41%-60% of their time on research, balancing between research and other activities. About 30.0% (n=324) and 5.7% (n=61) reported they spend less time on research, 21%-40% and 0%-20% respectively.

Nearly forty percent (42.5%, n=454) of the respondents hold the academic titles of professors/research fellows. The next common positions are associate professors/research fellows (32.5%, n=347), and assistant professors/research fellows (23.7%, n=253). Only 1.4% (n=15) are lecturers or postdoctoral research fellows.

With regard to subject disciplines, nearly one quarter (22.3%, n=236) of the respondents are from social sciences, 22.1% (n=234) from biology and medicine, and 19.7% (n=209) from engineering and technologies. The breakdown of respondents by disciplines is shown in Table 1.

Table 1. Subject Disciplines

<table>
<thead>
<tr>
<th>Subject Disciplines</th>
<th>Responses</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social Sciences</td>
<td>236</td>
<td>22.3%</td>
</tr>
<tr>
<td>Biology and Medicine</td>
<td>234</td>
<td>22.1%</td>
</tr>
<tr>
<td>Engineering and Technologies</td>
<td>209</td>
<td>19.7%</td>
</tr>
<tr>
<td>Humanities</td>
<td>157</td>
<td>14.8%</td>
</tr>
<tr>
<td>Natural Sciences and Sustainable Development</td>
<td>134</td>
<td>12.7%</td>
</tr>
<tr>
<td>Management</td>
<td>60</td>
<td>5.7%</td>
</tr>
<tr>
<td>Scientific Education</td>
<td>29</td>
<td>2.7%</td>
</tr>
</tbody>
</table>

Practices and Perceptions of RDM

This section reports Taiwanese scholars’ practices and perceptions of RDM from many aspects including sources and types of research data, data storage and search, metadata issues, DMP mandates/requirements, training and support, and data sharing and reuse.

Sources and Types of Research Data. Table 2 shows the sources of research data. The responses indicated that creating new data, obtaining data from the same research team, and downloading data from research data repositories are three common sources of research data. On the other hand, scholars only occasionally get data through their scholarly communication networks.

Table 2. Sources of Research Data

<table>
<thead>
<tr>
<th>Data Source</th>
<th>Never</th>
<th>Rarely</th>
<th>Occasionally</th>
<th>Frequently</th>
<th>Very Frequently</th>
<th>M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Create new data</td>
<td>34</td>
<td>129</td>
<td>171</td>
<td>335</td>
<td>285</td>
<td>3.74</td>
</tr>
<tr>
<td>Get from the same</td>
<td>34</td>
<td>123</td>
<td>195</td>
<td>402</td>
<td>225</td>
<td>3.68</td>
</tr>
</tbody>
</table>
Table 3 depicts the type of data used and produced by scholars. Experimental data, data of social science surveys, and bibliographic/citation data are ranked as the top three types of data used by scholars. Similarly, experimental data and data of social science surveys are the top two types of data produced by scholars; however, instead of bibliographic/citation data, which is ranked as the 8th place, interviews data is ranked as the 3rd place. Closer examination of the responses shows that 67.3% (n=105) of humanists use bibliographic/citation data, but only 47.3% (n=70) of them produce bibliographic/citation data.

### Table 3. Types of data used and produced by scholars

<table>
<thead>
<tr>
<th>Data Types (Multiple Choices)</th>
<th>Used Responses(Percent)/Rank</th>
<th>Produced Responses(Percent)/Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental</td>
<td>553 (52.1%)/1</td>
<td>538 (51.4%)/1</td>
</tr>
<tr>
<td>Social science surveys</td>
<td>341 (32.1%)/2</td>
<td>287 (27.4%)/2</td>
</tr>
<tr>
<td>Bibliographic/citation data</td>
<td>336 (31.6%)/3</td>
<td>193 (18.5%)/8</td>
</tr>
<tr>
<td>Observational</td>
<td>312 (29.4%)/4</td>
<td>241 (23.0%)/5</td>
</tr>
<tr>
<td>Interviews</td>
<td>305 (28.7%)/5</td>
<td>270 (25.8%)/3</td>
</tr>
<tr>
<td>Text</td>
<td>301 (28.3%)/6</td>
<td>239 (22.8%)/6</td>
</tr>
<tr>
<td>Computer simulation</td>
<td>285 (26.8%)/7</td>
<td>263 (25.1%)/4</td>
</tr>
<tr>
<td>Research-related computer programs</td>
<td>276 (26.0%)/8</td>
<td>203 (19.4%)/7</td>
</tr>
<tr>
<td>Data models</td>
<td>164 (15.4%)/9</td>
<td>187 (17.9%)/9</td>
</tr>
<tr>
<td>Biotic surveys</td>
<td>72 (6.8%)/10</td>
<td>59 (5.6%)/10</td>
</tr>
<tr>
<td>Log data</td>
<td>72 (6.8%)/10</td>
<td>48 (4.6%)/11</td>
</tr>
<tr>
<td>Remote-sensed abiotic</td>
<td>50 (4.7%)/12</td>
<td>22 (2.1%)/13</td>
</tr>
<tr>
<td>Abiotic surveys</td>
<td>42 (4.0%)/13</td>
<td>26 (2.5%)/12</td>
</tr>
<tr>
<td>Remote-sensed biotic</td>
<td>7 (0.7%)/14</td>
<td>8 (0.8%)/14</td>
</tr>
</tbody>
</table>

**Data Storage and Search.** The respondents are quite satisfied with the process for storing or searching for their research data during or beyond the lives of their projects, as shown in Table 4. It indicates that Taiwanese scholars have cultivated a strong foundation of research data management. On the other hand, Tenopir et al. [4] showed that less than half of their respondents were satisfied with the storage of data beyond project lifetime.
Table 4. Storage and search for research data

<table>
<thead>
<tr>
<th>I am satisfied with the process for</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
<th>M (SD.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>storing my data during the life of the project</td>
<td>4 (0.4%)</td>
<td>9 (0.9%)</td>
<td>85 (8.3%)</td>
<td>407 (39.8%)</td>
<td>517 (50.6%)</td>
<td>4.39 (0.71)</td>
</tr>
<tr>
<td>storing my data beyond the life of the project</td>
<td>8 (0.8%)</td>
<td>27 (2.6%)</td>
<td>133 (13.0%)</td>
<td>434 (42.5%)</td>
<td>419 (41.0%)</td>
<td>4.20 (0.82)</td>
</tr>
<tr>
<td>search for my own data during the life of the project</td>
<td>5 (0.5%)</td>
<td>37 (3.7%)</td>
<td>163 (16.3%)</td>
<td>469 (46.9%)</td>
<td>326 (32.6%)</td>
<td>4.07 (0.82)</td>
</tr>
<tr>
<td>search for my own data beyond the life of the project</td>
<td>5 (0.5%)</td>
<td>34 (3.4%)</td>
<td>198 (20.0%)</td>
<td>480 (48.4%)</td>
<td>275 (27.7%)</td>
<td>3.99 (0.81)</td>
</tr>
</tbody>
</table>

About the storage of research data, as indicated in Table 5, almost all respondents (96.3%, n=1030) store research data in their own storage devices, about half (56.1%, n=600) store in cloud drives. For the long term storage of research data, scholars’ own storage devices and cloud drives are still the top two choices; however, more scholars consider to store their research data in data repositories created by their institutions or commonly used by their subject disciplines.

Table 5. Storage of research data (Multiple Choices)

<table>
<thead>
<tr>
<th></th>
<th>I store my data in long term (Percent)</th>
<th>In the long term, my data should be stored in (Percent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>my storage devices</td>
<td>1030 (96.3%)</td>
<td>841 (78.7%)</td>
</tr>
<tr>
<td>cloud drives</td>
<td>600 (56.1%)</td>
<td>670 (62.7%)</td>
</tr>
<tr>
<td>the data repository created by my institutions</td>
<td>219 (20.5%)</td>
<td>362 (33.9%)</td>
</tr>
<tr>
<td>the data repository commonly used by my subject discipline</td>
<td>153 (14.3%)</td>
<td>372 (34.8%)</td>
</tr>
</tbody>
</table>

Metadata Issues. Metadata is vital for the description, preservation, and discovery of research data. Only 803 respondents answered the question about metadata creation, among them, only 41.5% (n=333) create metadata on their research data. The authors classify metadata into four types, namely administrative information (creator, creation date, file name, access condition), discovery information (funding agency, project...
name, project ID, keywords), technical information (file format, file size, HW/SW for using data), and description of the data file (file/data structure, field tag/description, application rule). A majority of scholars who create metadata create administrative information (70.1%, n=230) and description of the data file (68.0%, n=223), about sixty percent of them (59.8%, n=196) create discovery information, but less than forty percent of them (37.8%, n=124) create technical information.

<table>
<thead>
<tr>
<th>Metadata Type (Multiple Choices)</th>
<th>Responses</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administrative information</td>
<td>230</td>
<td>70.1%</td>
</tr>
<tr>
<td>Description of the data file</td>
<td>223</td>
<td>68.0%</td>
</tr>
<tr>
<td>Discovery information</td>
<td>196</td>
<td>59.8%</td>
</tr>
<tr>
<td>Technical information</td>
<td>124</td>
<td>37.8%</td>
</tr>
</tbody>
</table>

DMP Mandates/Requirements. Mandates/Requirements imposed by institutions or major funding agencies is a catalyst for scholars to take action. As revealed in Table , less than half of the respondents agree or strongly agree that their major funding agencies (42.7%, n=366) or institutions (34.7%, n=288) have a DMP requirement. Table also indicates that major funding agencies stand at a better strategic position for formulating a DMP than individual institutions.

<table>
<thead>
<tr>
<th>DMP Requirement</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Your major funding agencies have a DMP requirement</td>
<td>75 (8.8%)</td>
<td>205 (23.9%)</td>
<td>211 (24.6%)</td>
<td>282 (32.9%)</td>
<td>84 (9.8%)</td>
<td>3.11</td>
<td>1.14</td>
</tr>
<tr>
<td>Your major funding agencies should have a DMP requirement</td>
<td>52 (5.8%)</td>
<td>103 (11.5%)</td>
<td>252 (28.2%)</td>
<td>364 (40.8%)</td>
<td>122 (13.7%)</td>
<td>3.45</td>
<td>1.05</td>
</tr>
<tr>
<td>Your institution have a DMP requirement</td>
<td>88 (10.6%)</td>
<td>241 (29.0%)</td>
<td>213 (25.7%)</td>
<td>222 (26.7%)</td>
<td>66 (8.0%)</td>
<td>2.92</td>
<td>1.138</td>
</tr>
<tr>
<td>Your institution should have a DMP requirement</td>
<td>58 (6.8%)</td>
<td>144 (16.9%)</td>
<td>243 (28.5%)</td>
<td>312 (36.6%)</td>
<td>96 (11.3%)</td>
<td>3.29</td>
<td>1.085</td>
</tr>
</tbody>
</table>

Training and Support. Research data management involves some knowledge beyond subject expertise of scholars; hence, scholars might need to take some formal trainings. Table 8 shows that a majority of the respondents (69.6%, n=741) have not had a formal training yet, and only a few have taken a formal training on data citing styles, data management plan, metadata, consistent file naming, and version control of data sets. Only 13.3% (n=142) of the respondents have had a formal training on DMP, but 83.7% (n=715) are willing to take a training on DMP.

Table 9 lists supports and suggestions needed by researchers, and about sixty percent (62.8%, n=592) need supports and suggestions on data management plan. Table 8
Table 8. Formal training subjects taken or willing to take by researchers

<table>
<thead>
<tr>
<th>Formal Training Subjects (Multiple choices)</th>
<th>Have had a formal Training</th>
<th>Willingness for a Formal Training</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>741 (69.6%)</td>
<td>NA</td>
</tr>
<tr>
<td>Data citing styles</td>
<td>212 (19.9%)</td>
<td>290 (34.0%)</td>
</tr>
<tr>
<td>Data management plan</td>
<td>142 (13.3%)</td>
<td>715 (83.7%)</td>
</tr>
<tr>
<td>Metadata</td>
<td>134 (12.6%)</td>
<td>375 (43.9%)</td>
</tr>
<tr>
<td>Consistent file naming</td>
<td>81 (7.6%)</td>
<td>316 (37.0%)</td>
</tr>
<tr>
<td>Version control of data sets</td>
<td>76 (7.1%)</td>
<td>340 (39.8%)</td>
</tr>
</tbody>
</table>

Table 9. Supports and suggestions needed by researchers

<table>
<thead>
<tr>
<th>I need service supports and suggestions on (Multiple choices)</th>
<th>Responses</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data management plan</td>
<td>592</td>
<td>62.8%</td>
</tr>
<tr>
<td>Data storage</td>
<td>440</td>
<td>46.7%</td>
</tr>
<tr>
<td>Technical assistance</td>
<td>367</td>
<td>39.0%</td>
</tr>
<tr>
<td>General data management</td>
<td>336</td>
<td>35.7%</td>
</tr>
<tr>
<td>Related law</td>
<td>288</td>
<td>30.6%</td>
</tr>
<tr>
<td>Research ethics on data</td>
<td>286</td>
<td>30.4%</td>
</tr>
<tr>
<td>Publication and citation</td>
<td>264</td>
<td>28.0%</td>
</tr>
<tr>
<td>Technical problems</td>
<td>245</td>
<td>26.0%</td>
</tr>
</tbody>
</table>

Data Sharing and Reuse. Table 10 shows the perception of data sharing and reuse. More than half of the respondents agree or strongly agree that reusing data shared by other researchers or institutions is beneficial for the progress in science as a whole (65.2%, n=658) or for their individual research (53.3%, n=533); furthermore, accessibility is an enabler for the respondents to use data created by other scholars. (80%, n=821).

About three quarters of the respondents (76.5%, n=781) are willing to share datasets with other scholars, and would like to store some datasets into central repositories without any restrictions (62%, n=625) or share their datasets if they could impose access control (66.1%, n=664). On the other hand, only a few respondents are willing to store all datasets into any central repositories without any restriction (31.0%, n=307).

Table 10. Perception of data sharing and reuse

<table>
<thead>
<tr>
<th>Perception of data sharing and reuse</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of access to data generated by other researchers</td>
<td>23 (2.3%)</td>
<td>113 (11.2%)</td>
<td>216 (21.4%)</td>
<td>454 (45.0)</td>
<td>204 (20.2%)</td>
<td>3.7</td>
<td>0.988</td>
</tr>
</tbody>
</table>
searchers or institutions is a major impediment to progress in science

<table>
<thead>
<tr>
<th>Lack of access to data generated by other researchers or institutions has restricted my ability to answer science questions</th>
<th>27 (2.7%)</th>
<th>171 (17.1%)</th>
<th>268 (26.8%)</th>
<th>392 (39.2%)</th>
<th>141 (14.1%)</th>
<th>3.45</th>
<th>1.017</th>
</tr>
</thead>
<tbody>
<tr>
<td>I would use other researchers’ datasets if their datasets were easily accessible</td>
<td>8 (0.8%)</td>
<td>36 (3.6%)</td>
<td>158 (15.6%)</td>
<td>547 (53.9%)</td>
<td>265 (26.1%)</td>
<td>4.01</td>
<td>0.794</td>
</tr>
<tr>
<td>I would be willing to share my datasets with other researchers</td>
<td>15 (1.5%)</td>
<td>48 (4.7%)</td>
<td>176 (17.3%)</td>
<td>536 (52.5%)</td>
<td>245 (24.0%)</td>
<td>3.93</td>
<td>0.854</td>
</tr>
<tr>
<td>I would be willing to place at least some of my data into a central data repository with no restrictions</td>
<td>50 (5.0%)</td>
<td>143 (14.2%)</td>
<td>187 (18.6%)</td>
<td>445 (44.1%)</td>
<td>180 (17.9%)</td>
<td>3.56</td>
<td>1.09</td>
</tr>
<tr>
<td>I would be willing to place all of my data into a central data repository with no restrictions</td>
<td>158 (16.0%)</td>
<td>304 (30.7%)</td>
<td>220 (22.2%)</td>
<td>214 (21.6%)</td>
<td>93 (9.4%)</td>
<td>2.78</td>
<td>1.221</td>
</tr>
<tr>
<td>I would be more likely to make my data available if I could place conditions on access</td>
<td>22 (2.2%)</td>
<td>65 (6.5%)</td>
<td>253 (25.2%)</td>
<td>484 (48.2%)</td>
<td>180 (17.9%)</td>
<td>3.73</td>
<td>0.904</td>
</tr>
</tbody>
</table>

Table 11. Current data sharing practices

<table>
<thead>
<tr>
<th>Current Data Sharing Practices</th>
<th>Responses</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>My data is available openly upon request</td>
<td>312</td>
<td>30.5%</td>
</tr>
<tr>
<td>My data is open available only to my team</td>
<td>271</td>
<td>26.5%</td>
</tr>
<tr>
<td>My data has restricted access</td>
<td>234</td>
<td>22.9%</td>
</tr>
<tr>
<td>My data is open available to everyone</td>
<td>150</td>
<td>14.6%</td>
</tr>
<tr>
<td>My data is not available to anyone else</td>
<td>57</td>
<td>5.6%</td>
</tr>
</tbody>
</table>

Of the respondents providing their current data sharing practices, as indicated in Table 11, most respondents share their data only in limited circumstances. Two extreme cases are that 14.6% (n=150) of the respondents open their datasets to everyone, but 5.6% (n=57) of the respondents do not open their datasets to anyone else. Furthermore, scholars share their data through a national data repository (41.9%, n=420), PI’s Website (40.5%, n=406), institution’s Website (39.4%, n=395), personal Website (38.1%, n=384), and PI’s email (30.7%, n=304).
(33.8%, n=339), a global data repository (32.0%, n=321), or a regional data repository (24.7%, n=247) (multiple choices).

Scholars have many concerns when they share research data. As indicated in Table 12, lack of appropriate policies and rights protection (72.7%, n=519), misuse of data (72.0%, n=514), and misinterpretation of data (67.6%, n=483) are most concerned by the respondents, which is consistent with the findings of [9].

Table 12. Data sharing concerns

<table>
<thead>
<tr>
<th>Data Sharing Concerns (Multiple Choices)</th>
<th>Responses</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of appropriate policies and rights protection</td>
<td>519</td>
<td>72.7%</td>
</tr>
<tr>
<td>Misuse of data</td>
<td>514</td>
<td>72.0%</td>
</tr>
<tr>
<td>Misinterpretation of data</td>
<td>483</td>
<td>67.6%</td>
</tr>
<tr>
<td>Legal and ethical issues</td>
<td>338</td>
<td>47.3%</td>
</tr>
<tr>
<td>Fear of losing the scientific edge</td>
<td>259</td>
<td>36.3%</td>
</tr>
<tr>
<td>Lack of resources (technical, financial, personnel, storage space, etc.)</td>
<td>207</td>
<td>29.0%</td>
</tr>
<tr>
<td>Nobody needs my shared data</td>
<td>59</td>
<td>8.3%</td>
</tr>
<tr>
<td>Should not share data</td>
<td>32</td>
<td>4.5%</td>
</tr>
</tbody>
</table>

Among 922 respondents who answer the question if they have the experience in reusing the datasets shared by other scholars, 561 (n=60.8%) respondents give the positive response, and the reasons why they reuse the dataset shared by others include expansion of research topics (67.0%, n=370), inability to collect the data by themselves (66.5%, n=367), among other reasons shown in Table 13. Along with the experience in reusing other scholars’ data, the most important criteria for reusing others’ data is data quality (92.0%, n=509), as shown in Table 14. After the respondents obtain the datasets shared by others, they often spent moderate time and effort to clean data for fitting their research (54.0%, n=298), but sometimes scholars might spend a massive time and effort to clean data (57.1%, n=260), or use the shared data directly (41.3%, n=228).

Table 13. Reasons to reuse other scholars’ data

<table>
<thead>
<tr>
<th>Reasons (Multiple choices)</th>
<th>Responses</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expansion of research topics</td>
<td>370</td>
<td>67.0%</td>
</tr>
<tr>
<td>Inability to collect the data by myself</td>
<td>367</td>
<td>66.5%</td>
</tr>
<tr>
<td>Credibility of data from authorities</td>
<td>320</td>
<td>58.0%</td>
</tr>
<tr>
<td>Explore potential research topics</td>
<td>315</td>
<td>57.1%</td>
</tr>
<tr>
<td>Encourage or restriction of discipline cultures</td>
<td>145</td>
<td>26.3%</td>
</tr>
<tr>
<td>Exemption of IRB liability</td>
<td>67</td>
<td>12.1%</td>
</tr>
</tbody>
</table>

The participants were asked a series of questions about the fairness when they use other scholars’ data and when other scholars use their data. The result is shown in Table 15. A vast majority of respondents consider formal citation and formal acknowledgement are of upmost fair conditions no matter when they use other scholars’ data or others use their data. It also reveals that scholars seek for collaboration opportunities through data sharing. A paired t-test was then conducted, and only the
questions on formal acknowledgement, formal citation, and cost recovery show significant difference.

Table 14. Criteria to reuse other researchers’ datasets

<table>
<thead>
<tr>
<th>Criteria to reuse other researchers’ datasets (multiple choices)</th>
<th>Responses</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data quality</td>
<td>509</td>
<td>92.0%</td>
</tr>
<tr>
<td>Data collection process</td>
<td>318</td>
<td>57.5%</td>
</tr>
<tr>
<td>Potential to publish</td>
<td>308</td>
<td>55.7%</td>
</tr>
<tr>
<td>Data up-to-date</td>
<td>268</td>
<td>48.5%</td>
</tr>
<tr>
<td>Data accessibility</td>
<td>232</td>
<td>42.0%</td>
</tr>
</tbody>
</table>

Table 15. Others using data & using others’ data

<table>
<thead>
<tr>
<th>Fairness of data reuse</th>
<th>M</th>
<th>SD</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Co-authorship on publications resulting from use of the data</td>
<td>3.10</td>
<td>1.157</td>
<td>1.279</td>
<td>.201</td>
</tr>
<tr>
<td>When I use</td>
<td>3.08</td>
<td>1.151</td>
<td></td>
<td></td>
</tr>
<tr>
<td>When others use</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Formal acknowledgement of the data providers and/or funding agencies in all disseminated work making use of the data</td>
<td>4.39</td>
<td>0.671</td>
<td>3.323</td>
<td>.001**</td>
</tr>
<tr>
<td>When I use</td>
<td>4.36</td>
<td>0.688</td>
<td></td>
<td></td>
</tr>
<tr>
<td>When others use</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Formal citation of the data providers and/or funding agencies in all disseminated work making use of the data</td>
<td>4.49</td>
<td>.612</td>
<td>2.800</td>
<td>.005**</td>
</tr>
<tr>
<td>When I use</td>
<td>4.46</td>
<td>.642</td>
<td></td>
<td></td>
</tr>
<tr>
<td>When others use</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The opportunity to collaborate on the project</td>
<td>4.11</td>
<td>.697</td>
<td>1.810</td>
<td>.071</td>
</tr>
<tr>
<td>When I use</td>
<td>4.09</td>
<td>.712</td>
<td></td>
<td></td>
</tr>
<tr>
<td>When others use</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>At least part of the costs of data acquisition, retrieval, or provision must be recovered</td>
<td>3.16</td>
<td>0.950</td>
<td>3.065</td>
<td>.002**</td>
</tr>
<tr>
<td>When I use</td>
<td>3.12</td>
<td>0.969</td>
<td></td>
<td></td>
</tr>
<tr>
<td>When others use</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reprints of articles that make use of the data must be provided to the data provider</td>
<td>3.47</td>
<td>.990</td>
<td>-.390</td>
<td>.696</td>
</tr>
<tr>
<td>When I use</td>
<td>3.47</td>
<td>1.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>When others use</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The data provider is given a complete list of all products that make use of the data</td>
<td>3.36</td>
<td>.986</td>
<td>.697</td>
<td>.486</td>
</tr>
<tr>
<td>When I use</td>
<td>3.36</td>
<td>.996</td>
<td></td>
<td></td>
</tr>
<tr>
<td>When others use</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Legal permission for data use is obtained</td>
<td>3.86</td>
<td>.908</td>
<td>.930</td>
<td>.353</td>
</tr>
<tr>
<td>When I use</td>
<td>3.85</td>
<td>.927</td>
<td></td>
<td></td>
</tr>
<tr>
<td>When others use</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mutual agreement on reciprocal sharing of data</td>
<td>3.69</td>
<td>.916</td>
<td>.831</td>
<td>.406</td>
</tr>
<tr>
<td>When I use</td>
<td>3.69</td>
<td>.944</td>
<td></td>
<td></td>
</tr>
<tr>
<td>When others use</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The data provider is given and agrees to a statement of uses to which the data will be put</td>
<td>3.97</td>
<td>.839</td>
<td>-.671</td>
<td>.503</td>
</tr>
<tr>
<td>When I use</td>
<td>3.98</td>
<td>.860</td>
<td></td>
<td></td>
</tr>
<tr>
<td>When others use</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>It is appropriate to create new da-</td>
<td>3.80</td>
<td>.826</td>
<td>-1.810</td>
<td>.071</td>
</tr>
<tr>
<td>When I use</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>When others use</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Conclusions

This study explores Taiwanese scholars’ perception of research data management. This study was conducted through questionnaire survey, with 1,088 valid responses. The survey showed that scholars frequently create new data, or obtain data from the same research teams or from data repositories. Experimental data and data of social science surveys are the topmost data types used and produced. Scholars are generally satisfied with the process for storing and searching for during and beyond the life of their projects. Scholars’ own storage devices and cloud drives are the common choices of scholars to store their data. Although less than 20% of scholars store their data in the data repositories created by their institution or commonly used by their subject disciplines, about one-third of scholars consider that the two kinds of data repositories should be used for the long-term storage. Creating metadata is not a common practice for scholars, and administrative information and description of the data file are the two types of metadata frequently created by scholars. Comparing with individual institutions, more scholars consider funding agencies should have a DMP requirement/mandate. Few scholars have had a formal training on DMP and a majority are willing to take a formal training on DMP and need service support and suggestion on DMP. Accessibility will encourage scholars to use others’ data, but quality is ultimately important. Lack of appropriate policies and rights, misuse of data, and misinterpretation of data are three major concerns of sharing data.

This study only elaborates the descriptive analysis of the questionnaire survey. In the future, in-depth analysis on the demographic groups in relation to data management, reuse, and sharing will be conducted; furthermore, an Asia-Pacific cross-country comparative study will be worth to investigate.

Acknowledgement

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References

Social Media Authenticity for Librarians Service Performance: A Pilot Study in an Academic Library in Selangor

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Abstract. This preliminary study is to examine the authenticity of social media practices by the librarians for their working service performance. A set of questionnaire has been distributed to forty (40) librarians from Perpustakaan Tun Abdul Razak 1 (PTAR 1), UiTM Shah Alam. Thirty-six (36) or 72 per cent of the questionnaires were returned and were used for analysis. The objectives of this study: 1) to identify the authenticity of social media in libraries and 2) to determine librarians’ service performance. Result shows that there is an authenticity in every task performed by the librarians in handling services and disseminates information through an effective ways with social media. The respondents were moderately positive towards the practice of authenticity through social media; promoting the social media authenticity through social media is very important to show the authentic news from the library to the users (mean = 4.27). Most librarians agree that ability to handle feedback through the social media and impressive technological skills are the most important criteria for a librarian to enhance themselves for their excellent service performance (mean = 5.40). The outcome of this study is important as it reflects on the authenticity of social media for librarians’ service performance.

Keywords: Social Media, Authenticity, Librarian, Libraries, Librarian service performance.

Introduction

The rapid advance of social technologies application in today’s era has brought great changes in various aspects of people’s life, work and learning. The madness of using these technologies is greater not only for social networking, in fact already practiced in professional field and also the industry as one of the important tasks. Technology advancement introduces several mediums of social media as it brought easy and fast communications online. Kaplan and Haenlein [20] define social media as a cluster of internet based on application development of ideology and technology Web 2.0, that allows the creation and exchange of user-generated content. This study aims to raise efficacy and meaningful authenticity especially in social media practices as an important cause in improving librarian working performance.

Three (3) popular social media platforms which provided a variety of variations in functions settings through its apps are Facebook, Whatsapp and Twitter. These three (3) apps are always competitive and have successfully attracted the attention of the world. Social media is an easy and effective way of delivering information through
these applications. The world is getting smaller and information retrieval is at your fingertips.

Many professions now require someone who is capable and knowledgeable in managing office matters through the use of social media applications. Thus, the profession as librarian is not to be missed in this modern era technology. Librarians need to have the wisdom and ability to manage loads of information through simple and effective ways. This involves the ability to use social media applications in order to manage the retrieval of information to the public.

Perpustakaan Tun Abdul Razak 1, is an Academic library situated in Universiti Teknologi MARA, Shah Alam committed in providing world-class environment, services and resources to enhance the study, research and teaching experiences which focuses on; delivery user-friendly services to the users, provide weekly updates to users of their new arrival collections, provide response on Inter-Library loan request, offered Information Skills Class, provide 24/7 up time and access the library Portal and electronic resource and to provide access for reference archive materials.

Social media engagement enables human relations through technology as part of library services, which has proven the ability of the library to reach users with updated information. This is where the librarians are practicing the authenticity of social media as their service performance indicator.

Social Media

Social media has reached its popularity in recent years as a result of which people are more dependent on online technology advancement which has become a compulsory practice in their daily lives [2]. Social media has led to paradigm shifts in ways people work and do business, interact and socialize, learn and obtain knowledge [19]. So much so that social media has established itself as an important spatial extension of this nation’s historicity and challenges. Generally, social media can be defined as movement of technologies and networking which enables a revolution of global community. The growth of social media moves the work force of the Internet which incorporates with the features of users who publish their opinions, connect, built community, or produce and share content [34].

De Zuniga [10] in their research mentioned that, social media provides an opportunity for people to express themselves and publicly share their ideas and opinions. Social media is used as a stepping stone to disseminate important information while showing that society is moving towards a high-tech modern world for a more organized and sophisticated lifestyle.

In a positive way, social media can also be considered as a medium to provide social support [31, 24]. The variety of helpful discussions and advice and guidance provided through social media from community to community are very useful for one's self-development. Inspirational images and words of wisdom can be displayed better and more clearly through social media applications and at the same time passionately and enhance one's ability to advance.

A Research done by Berryman [4] highlighted that, social media use interacting with others through online electronic forums such as Facebook, Instagram, Twitter, Youtube, etc. has become an enormously popular tool for social interaction. Social media use is an important interactive tool for youth and young adults and, unlike more traditional media, users play an active role in creating and shaping the experience [26]. Moreover, the use of social media use is an important element of the developmental process for youth and young adults as they interact with others and present their forming identities online [3].
Social Media in Libraries
Libraries are a major information provider and facilitator. Moving from clay tables to card catalogs and then to digital catalogs, libraries have always enhanced their services according to the changes of technologies advancement [14]. Social media offers libraries and librarians the opportunities to be more proactive in their outreach to their users and also giving satisfaction to the users in order to create user loyalty. In line with technological developments, the library has also taken a step forward towards greater transformation, compared with developed countries in the world. Realizing the importance of social networks in the community and learning organization, now the library is transforming their identity and expanding its role in order to achieve the national goal to create a progressive knowledge society. Library now compete to offer the services of social media not only because of the trends and developments in technology, but it is also one of the added value on existing services. Ellison and Danah [13] stated that social media is a device or platform where the libraries using the network application to communicate, share information, build group (networking), update the current status or update content created and so on.

Train, Dalton and Elkin [36] noted that inclusion of social media is equivalent to the philosophy of libraries services, which is to promote equal opportunities for all. Connell [8], in a survey of college students, analyzed the perspective of users and their attitudes towards interaction with librarians via Facebook and MySpace as a means of outreach. Kelly [21], in discussing the risks and benefits of using Library 2.0, provided perspectives and justification for libraries that are currently implementing social media tools to enhance library activities. The mission of librarians is to improve society through facilitating knowledge creation in their communities by building on social media technologies in the libraries [22].

Social media that has been operating with specific tools such as Facebook, Blogs, Wikis and Twitter, have been adopted by libraries in promoting library services with easy and faster way [1, 6, 7, 23, 39]. Libraries and librarians have faced the challenge of equipping themselves well in order to keep abreast of these technologies. In recent years, the Internet has undergone a transformation, from being a static repository of information to being a socially interactive web. The development of what has been termed as Library 2.0 has introduces the collaborative development of content in libraries using social media instruments such as Facebook, Twitter, etc. (Bolan, 2007). Such social media websites are thought to comprise a form of technology that creates outreach opportunities for libraries [11].

Professional librarians who are able to manage information using social media have the potential to enhance their professionalism thus; they may also be called as advocates to academic research advancement. According to a study done by Perssonm et al. [30] librarians at Linkoping University help researchers keep abreast of the developments in their fields and to increase the visibility of their work. Strategic, professional use of social media ought to be an essential part of a researcher’s communication strategy.

Authenticity
Authenticity is the truthfulness of origins, commitments, sincerity, devotion and intentions [37]. This involves assumptions, attentions and practice of the real situations in human life. Douglas-Jones [12] in his article reviewed the concept of authenticity as a moral valence: the true opposed to the false, the real rather than the fake, the original not the copy.
Gilmore [15] proposed that authenticity will be the buzzword of the 21st century. He also added that, authenticity is not devised and structured to make a profit. The modern world is the corporations’ equivalent of a formal garden, where everything is planted and managed for effect. Guariento and Morley [17] suggested that students’ output can be authentic and that their feedback through a post-task questionnaire or class survey can help investigate whether they are genuinely interested in the topic and understand its contextual relevance for the purposes of learning and teaching.

Further study done by Gilpin [16], develops a theoretical model of authenticity from existing literature in various disciplines. The purpose this paper is to produce a preliminary model of authenticity in online communication, with particular emphasis on public institutions. Public trust, which can in turn only exist where citizens have faith in administrative agencies and institutions. This is where a preliminary model of authenticity in public sphere discourse as conducted via social media, to further understanding of how government agencies negotiate questions of accountability and public debate through their use of social media technologies. The findings are from comment threads, to explore the various dimensions of this model of socially mediated authenticity and highlight areas for future research. Many commenter’s’ prefer simply to publicly express their opinion on the topic of the blog, or to engage other commenter’s in discussion. Thus a close reading of the comments is more useful for shedding light on, for example, the specific topics that typically provoke comment and engagement, rather than gauging perceptions of authenticity.

**Librarian Service Performance**

Performance measurement is the process of quantifying the efficiency and effectiveness of action [35], where measurement is the process of quantification and action correlates with performance. It involves the selection and application of performance indicators, which quantify the efficiency and effectiveness of service-delivery methods. Efficiency measures the relationship between resources and the results obtained from using them, and effectiveness is directed to determine how well a service is provided or how successful a department or program is meeting previously established objectives. Librarians in this new technology advancement era are essential to 21st-century academic librarianship as it strives for transformation and to remain relevant and vital [27]. In her study she stated that, solutions and strategies for supporting new librarians at risk are explored, and best practices for recruiting, retaining, and supporting new librarians are recommended. When these solutions and best practices are employed, academic libraries become equipped to leverage the new talent, energy, and innovation that new librarians bring to the 21st-century academic library.

In 2005, Stephen Abram, vice president of Innovation at SirsiDynix, challenged library and information science (LIS) professionals to start becoming “librarian 2.0.” In the last few years, discussion and debate about the “core competencies” needed by librarian 2.0 have appeared in the “biblioblogosphere” (blogs written by LIS professionals). However, beyond these informal blog discussions few systematic and empirically based studies have taken place [28]. This article provides detailed discussion on librarians performance in this new era so called as “Librarian 2.0”. The study's findings also suggest that “librarian 2.0” is a state of mind, and that the Australian LIS profession is undergoing a significant shift in “attitude.”

Shahbazi and Hedayati [32] in their research highlighted the main purpose to identify the necessary competencies for the “Digital Librarian” job performances. The findings indicate that communication skills and social media skills are most in demand for their performance appraisals. It includes comprehensive communication skills and newly emerging IT skills and knowledge of Librarian whereby they are able
to write and post to a blog; create, upload and edit photos, short videos, podcasts and screen casts; edit and avatar’s appearance; and, know how to pick up a new device and figure out how to use it. They is also identified larger-scale that includes understanding how basic IT functions work within a library setting, and how they complement a physical, traditional library. Most importantly, they felt that librarian must be able to tell the library’s story, through various media-writing, photography, audio and video.

Mathews and Pardue [25] observed that librarians continue to look more like IT professionals, pointing out that as technology continues to change so too do the skills sets required by librarians. They challenge the library and information science (LIS) profession to examine what skills are necessary in the age of technology. Whilst this may seem a relatively straightforward challenge, Harvey and Higgins [18] pointed out that as the profession is complex and ever changing generally it does not speak with one voice about the attributes and skills it expects.

The existence of the concept of ‘Librarian 2.0’ pictured the professionalism of a person who works in the library which has the ability and skills to perform well to their work. Cullen [9] claimed that a librarian 2.0 is foremost communicative and user oriented. Peltier-Davis [29] also stated that a Librarian 2.0 must have solid knowledge about user behaviors. Various lists of Librarian 2.0’s skills and traits can be found in many blogs written by library professionals.

Methodology

In this pilot study, questionnaires were personally distributed to forty (40) selected librarians in all departments who work in Perpustakaan Tun Abdul Razak 1 (PTAR 1), UiTM, Shah Alam and thirty six (36) were gathered back for analysis. The questionnaire was designed on a 1 (strongly disagree) through 7 (strongly agree) Likert scale. Descriptive statistics were used in analyzing the data. The data were analyzed by using frequency, percentage, mean and standard deviation as part of the analysis.

Results and Discussions

Reliability Test

The reliability test results indicated the Cronbach’s Alpha value of two (2) variables of interest. It shows social media authenticity (0.915) and librarians’ service performances (0.975) have exceeded 0.7. The value of this coefficient was considered high and acceptable thus satisfying the validity assumption of the items in the respective dimensions.

<table>
<thead>
<tr>
<th>No.</th>
<th>Variables</th>
<th>Cronbach’s Alpha</th>
<th>No. of Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Social media authenticity</td>
<td>0.915</td>
<td>10</td>
</tr>
<tr>
<td>2</td>
<td>Librarians service performance</td>
<td>0.975</td>
<td>10</td>
</tr>
</tbody>
</table>
Profile of Respondents

All demographic items were cross-tabulated to describe the profiles of the respondents. The summary statistics for the profile of the 36 respondents is presented in Table 2. From the total number of respondents, 72.2% of the respondents were female and 27.8% were male, with a large proportion of librarians (81.7%) compared with senior librarians (18.3%). Almost three quarter (73.3%) of the respondents was 31-40 years old, while 6.7% of the respondents were 20-30 years old. Respondents aged between 41-50 and 51 above made up 10% of the total respondents. There was also a relatively higher proportion of education with a degree (51.65%) compared with master’s degree (48.35%).

<table>
<thead>
<tr>
<th>Variable</th>
<th>Category</th>
<th>No. of Respondent</th>
<th>Percent of Sample (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Female</td>
<td>26</td>
<td>72.2%</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>10</td>
<td>27.8%</td>
</tr>
<tr>
<td>Position</td>
<td>Librarian</td>
<td>29</td>
<td>81.7%</td>
</tr>
<tr>
<td></td>
<td>Senior Librarian</td>
<td>7</td>
<td>18.3%</td>
</tr>
<tr>
<td>Age</td>
<td>20-30</td>
<td>3</td>
<td>6.7%</td>
</tr>
<tr>
<td></td>
<td>31-40</td>
<td>25</td>
<td>73.3%</td>
</tr>
<tr>
<td></td>
<td>41-50</td>
<td>4</td>
<td>10%</td>
</tr>
<tr>
<td></td>
<td>51 above</td>
<td>4</td>
<td>10%</td>
</tr>
<tr>
<td>Education</td>
<td>Degree</td>
<td>16</td>
<td>51.65%</td>
</tr>
<tr>
<td></td>
<td>Master’s degree</td>
<td>20</td>
<td>48.35%</td>
</tr>
</tbody>
</table>

Social Media Authenticity

This section analyzes the first objective of the study: to identify the authenticity of social media in libraries. All the variables were then arranged in rank order with the highest mean which was considered as the most preferred response. Table 3 shows the mean scores of social media authenticity statements. On the average, the respondents were moderately positive towards the practice of authenticity through social media. The mean score of the four items are quite similar, ranging from 4.27 (promoting them through social media is very important to show the authentic news from the library to the users), 4.25 (promoting library services through social media is the most effective way to implement), 4.15 (disseminating information using social media) and 4.10 (announcing any activities that will be held in the library through social media) hence, also indicating a moderate positive towards the practice of authenticity through social media. Likewise, there is a lower figure of mean scores from the respondents, ranging from 3.95 (able to disseminate relevant contents of information through social media) and 3.93 (have more trust on using Facebook and Twitter as the most used social media to disseminate information about the library).

However, the four lowest mean scores are quite similar, ranging from 3.79 (highlighting library collections through social media), 3.72 (able to give opinions on online journal articles searching techniques to users), 3.51 (providing the latest information on indexed journals for users’ information through the social media) and 3.40 (displaying the selection of new books for users’ use through social media).
Table 3. Results of Mean Scores by Statements: Social Media Authenticity

<table>
<thead>
<tr>
<th>Variable</th>
<th>Statements</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social media authenticity</td>
<td>1. promoting them through social media is very important to show the authentic news from the library to the users.</td>
<td>4.27</td>
<td>0.915</td>
</tr>
<tr>
<td></td>
<td>2. promoting library services through social media is the most effective way to implement.</td>
<td>4.25</td>
<td>0.916</td>
</tr>
<tr>
<td></td>
<td>3. disseminating information using social media.</td>
<td>4.10</td>
<td>0.907</td>
</tr>
<tr>
<td></td>
<td>4. announcing any activities that will be held in the library through social media.</td>
<td>3.95</td>
<td>0.898</td>
</tr>
<tr>
<td></td>
<td>5. able to disseminate relevant contents of information through social media.</td>
<td>3.93</td>
<td>0.900</td>
</tr>
<tr>
<td></td>
<td>6. have more trust on using Facebook and Twitter as the most used social media to disseminate information about the library.</td>
<td>3.79</td>
<td>0.898</td>
</tr>
<tr>
<td></td>
<td>7. highlighting library collections through social media.</td>
<td>3.72</td>
<td>0.912</td>
</tr>
<tr>
<td></td>
<td>8. able to give opinions on online journal articles searching techniques to users.</td>
<td>3.51</td>
<td>0.907</td>
</tr>
<tr>
<td></td>
<td>9. providing the latest information on indexed journals for users’ information through the social media.</td>
<td>3.40</td>
<td>0.906</td>
</tr>
<tr>
<td></td>
<td>10. displaying the selection of new books for users’ use through social media.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Librarians’ Service Performance**

This section analyzes the second objective of the study: to investigate librarians service performance. The overall mean score of 5.61 in Table 4 indicates that, on the average, the respondents strongly agree that the librarians are able to manage re-
sources in any given subject area (5.40), are capable to build an assertive rapport with users by extending general awareness of the digital content (5.22), are prepared to more sophisticated ways in managing digital collections online direct to user needs (5.21), have to play vital role in providing effective information content (5.20) and are knowledgeable in giving online guidance for e-resources searching (5.11). Likewise, there are four average mean scores items which are quite similar, ranging from 5.08 (are prepared to more sophisticated ways in managing digital collections online direct to user needs), 5.07 (are able to handle online information management training programs to users), 5.05 (are capable to build an assertive rapport with users by extending general awareness of the digital content) and 5.01 (are able to facilitate library information skills classes in an effective way). The lowest mean scores statement is they are knowledgeable in giving online guidance for e-resources searching (4.99).

Table 4. Results of Mean Scores by Statements: Librarians Service Performance

<table>
<thead>
<tr>
<th>Variable</th>
<th>Statements</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Librarians service performance</td>
<td>1. have the ability to handle users feedback by using social media.</td>
<td>5.40</td>
<td>0.979</td>
</tr>
<tr>
<td></td>
<td>2. have the skills to create impressive technological/IT/ digital products particularly in handling relevant information needs.</td>
<td>5.22</td>
<td>0.973</td>
</tr>
<tr>
<td></td>
<td>3. are able to adopt technological services by using social media to library users.</td>
<td>5.21</td>
<td>0.971</td>
</tr>
<tr>
<td></td>
<td>4. have to play vital role in providing effective information content.</td>
<td>5.11</td>
<td>0.971</td>
</tr>
<tr>
<td></td>
<td>5. are able to manage resources in any given subject area</td>
<td>5.08</td>
<td>0.971</td>
</tr>
<tr>
<td></td>
<td>6. are prepared to more sophisticated ways in managing managing digital collections online direct to user needs.</td>
<td>5.07</td>
<td>0.970</td>
</tr>
<tr>
<td></td>
<td>7. are able to handle online information management training programs to users.</td>
<td>5.05</td>
<td>0.971</td>
</tr>
<tr>
<td></td>
<td>8. are capable to build an assertive rapport with users by extending general awareness of the digital content.</td>
<td>5.01</td>
<td>0.971</td>
</tr>
<tr>
<td></td>
<td>9. are able to facilitate library information skills classes in an effective way.</td>
<td>4.99</td>
<td>0.970</td>
</tr>
<tr>
<td></td>
<td>10. are knowledgeable in giving online guidance for e-resources searching.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Conclusion

This study is only based on a small sample size in an academic library institution. The generalizability of the results might be limited and might not be generalized to other universities. The intent of this study was to provide some insight into the authenticity of social media for the librarians’ service performance by highlighting some of the points which also covers the use of newly technology nowadays and to measure service performances. The finding indicates that, there was a positive working environment using the technology applications using social media which produced skilful librarians in order to well manage their work and giving good services for users’ satisfaction. Besides that, the result indicates that most of the librarians agree on the use of social media is authentic and important in this new era of working style. In future, it is hoped that these results may be used to inform future researchers, lecturers and institutions that capitalize on the authenticity of using social media is important and can support their service performance.

References

MyDatabase: an information tool for facilitating dissemination of academic research data

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Abstract. With the rapid spread of the Web, necessary information can be obtained from all over the world. Even in such an information age, dissemination of academic research data using databases remains a challenging problem, especially for humanities' scholars, and therefore, available academic research data on the Web are limited. On the other hand, many academic research databases have not been used or have been forced to stop services due to budget reductions or absence of administrators. This paper considers the background of these problems and explains the trial by Center for Southeast Asian Studies, Kyoto University to facilitate the preservation, dissemination, and utilization of academic research data, through the creation of a database builder tool named MyDatabase.

Keywords: MyDatabase, Area Studies, API, Web Applications, RDF, LOD

Preface

This paper will discuss the problems associated to database creation and describe MyDatabase, which has been developed by the Center for Southeast Asian Studies at Kyoto University (hereafter, CSEAS. More information at https://kyoto.cseas.kyoto-u.ac.jp/). MyDatabase is a database builder tool made especially for humanities' scholars to support preserving, disseminating, and utilizing their academic research data.

With the rapid spread of the Web, it is possible to quickly obtain necessary information from all over the world. However, even in such an information age, dissemination of academic research data using databases remains a challenging problem, especially for humanities' scholars, and therefore, available academic research data on the Web are limited. On the other hand, many academic research databases have not been used well or have been forced to stop services due to budget reductions or the absence of administrators. MyDatabase has been designed and developed to overcome these problems and to facilitate the dissemination and use of academic research data.

In this paper, Section 2 will consider the difference of metadata between libraries, museums, archives, institutional repositories, and research data created by researchers, and then describe the background of MyDatabase development. Section 3 will show overviews, usage, and examples of databases created with MyDatabase. Section 4 will summarize the current status and problems related to MyDatabase, and mention the redevelopment of MyDatabase for adopting an open data environment using RDF (Resource Description Framework) technologies.
Table 1. Characteristics of Organizing Academic Research Data in Major Stakeholder

<table>
<thead>
<tr>
<th></th>
<th>Libraries, Archives, Museums, Institutional Repositories</th>
<th>Researches</th>
</tr>
</thead>
<tbody>
<tr>
<td>Target</td>
<td>Public</td>
<td>Individual / Research Group</td>
</tr>
<tr>
<td>Object</td>
<td>Public / General</td>
<td>Research / Specific</td>
</tr>
<tr>
<td>Collection Organization</td>
<td>Institutional</td>
<td>Individual / Research Group</td>
</tr>
<tr>
<td>Variety</td>
<td>Large</td>
<td>Large</td>
</tr>
<tr>
<td>Collection Policy</td>
<td>Consistent</td>
<td>Inconsistent / Changeable</td>
</tr>
<tr>
<td>Collection</td>
<td>Whole</td>
<td>Parts</td>
</tr>
<tr>
<td>Size</td>
<td>Large</td>
<td>Small</td>
</tr>
<tr>
<td>Metadata</td>
<td>Standard/Large/Complex</td>
<td>Heterogeneous/Small/Simple</td>
</tr>
<tr>
<td>Usage</td>
<td>Simple</td>
<td>Complex / Inconsistent</td>
</tr>
<tr>
<td>Durability (life time)</td>
<td>Long</td>
<td>Short</td>
</tr>
</tbody>
</table>

**Characteristics of Organizing Academic Research Data in Major Stakeholders**

Various kinds of academic research data are created during or as a result of research activities. Parts of these data are digitized and disseminated on the Web operated by data-holding institutions such as libraries, archives, museums, and institutional repositories, or by research groups and individual scholars. These institutions, groups, and individuals organize academic research data according to their policies and guidelines which differ from each other (Table 1).

**Libraries** collect and preserve intellectual materials and make them accessible to user communities for referencing or borrowing. In the past, libraries collected and organized written books and were used by people who could not afford to buy them or those who needed materials that individuals could seldom possess. Modern libraries have been gradually expanding their services to grant unrestricted access to information in many formats and from varied sources, such as not only books, periodicals, newspapers and manuscripts, but also, films, maps, prints, documents, microfilms, CDs, DVDs, e-books, audiobooks, and others. These can be accessed as physical media (and recently, also as digital media). ISO (International Organization for Standardization), national libraries and other institutes have developed many standards related to library activities, e.g., MARC21 which is a set of rules to describe digital catalogs [1], PREMIS which is a preservation metadata to describe preservation information [2], ISO 20775 which is used to describe the holding information about all types of materials [3]. These standards are more pervasive in library communities than in museums and archives. Many libraries organize the holding information of their materials according to detailed cataloging rules, e.g., AACR (Anglo American Cataloguing Rules) [4], NCR (Nippon Cataloging Rules) [5], and they create digital catalog data using MARC21.

**Archives** accumulate materials that have been selected for permanent or long-term preservation based on their cultural, historical, or evidentiary value. Archival materials have various types of media. Those materials have been generated as products of legal, commercial, administrative, or social activities, to record the course of individuals' or organizations' lifetime and their functions. Archival materials are generally unpublished and almost unique; that is, archives are different from libraries concerning their services and organization. ICA (The International Council on Archives) and some national institutes have developed a number of standards; e.g., ISAD(G) (the General International Standard Archival Description) which defines elements and
rules to describe archives [6], EAD (Encoded Archival Description) which is a set of rules to encode structural information regarding archival records [7], DACS (Describing Archives: A Content Standard) which describes content information regarding archives records [8]. Despite such standards, many archives (especially in Japan) use their own rules to describe archival metadata.

**Museums** collect, preserve and display artifacts and other objects of artistic, cultural or scientific significance. The aims of museums vary from serving scholars to serving the general public, and there are many types of museums including art museums, archaeology museums, ethnographic museums, history museums, science museums, war museums, and natural history museums. Unlike libraries, where they use NCR or AACR, there is no standard description rule to describe detailed information about museums' materials probably because museum materials are unique and thus there have been a few needs of data sharing between museums; there is a weak incentive to standardize descriptions. However, it is widely shared that the documentation of materials is essential for museums to fulfill their missions, and some international or national guidelines have been developed and released. CIDOC (International Committee for Documentation) released "CIDOC Conceptual Reference Model (CRM)" which provides definitions and a formal structure for describing the implicit and explicit concepts and relationships used in cultural heritage documentation [9], and "CIDOC Information Categories" which is a description of the information categories that can be used when developing records about the objects in museum collections [10]. In Japan, the Tokyo National Museum has developed a “Structured Model for Museum Object Information,” which supports museum activities and enables information sharing among museums [11].

**Institutional repositories** (hereafter, repositories) collect, preserve, and disseminate digital copies of intellectual outcomes of institutions. Mainly, university repositories, many of which are operated by university libraries, include digital materials such as monographs, preprints, post-prints, theses and dissertations, and often include other digital assets created by scholars such as data sets, learning objects, conference proceedings, and grey literature. Repositories are expected to provide open access to research outputs. Repositories seem to have two features; the first is digital libraries that collect, catalog, and provide access to digital content similar to standard libraries, and the second is open archives to realize interoperability between digital content holders and digital service providers. Many repositories use software based on OAI-PMH, which is an application-independent interoperability framework to collect and move metadata between servers (Data Provider and Service Provider) [12].

There is no doubt that museums, libraries, archives, and repositories (hereafter, MLARs) are essential stakeholders for preserving, disseminating, and utilizing academic research data. Notably, they carry out their jobs organizationally according to their consistent missions and policies. As a result, their data (and databases) are stable and durable. Nevertheless, MLARs are challenging to say that they can cope with scholars' needs regarding academic research data.

A particularly significant problem is the heterogeneity of metadata. Academic research data comprises of various kinds of resources, and there are no appropriate standard rules for some resources to describe metadata. Furthermore, scholars tend to dislike standards. Scholars need specific metadata that should be suitable for their research purposes; in such cases, existing metadata are not always appropriate. Far from that, scholars may wish to modify metadata structure as their research progresses. Also, in a similar context, standardization can become a limiting or impeding fac-
tor in research development. For these reasons, most metadata of academic research resources are heterogeneous, specific, and diverse. Usability is also an essential problem in academic research data. A user interface should be designed and developed according to the data characteristics, data processing algorithms, and the research purpose; therefore, user interfaces are different between scholars. Also, user interfaces should allow for modification or redevelopment as research progresses. Unfortunately, MLARs lack flexibility in terms of the needs described above. MLARs do not accept any metadata that is different from their specifications, and they also cannot provide user interfaces and data processing functions for individual research needs.

These are the reasons why many academic research data are organized and disseminated independently by research centers, projects, and scholars. These databases are adapted to scholars' needs, but in contrast to MLARs, they are fragile because independent research centers, projects, and scholars face difficulties to continuously keep the budget and personnel for data and system management.

MyDatabase has been designed and developed to overcome these problems and to facilitate the dissemination and use of academic research data, which will be discussed in more detail in the next section.

MyDatabase

This section describes the design concepts, usages, an API (Application Programming Interface), and some examples of databases of MyDatabase [13].

A database system must be an essential tool to open and disseminate academic research resources and research results. However, constructing, operating, and managing a database system requires a certain level of information technology and literacy, and these require specific knowledge, which commonly lacks especially for humanities' scholars. Thus, even if a scholar finishes digitizing resources and creating metadata, only a few of these data can be disseminated as databases. Furthermore, if a database is built, its lifetime may be short due to a lack of budget or absence of a system administrator. Therefore, instead of a platform or application, MyDatabase was designed to be a Web service, meaning that scholars are liberated from the need to design, build, operate, and manage database systems.

In addition, as described in the previous section, metadata of academic research resources are heterogeneous, and metadata and user interfaces are frequently modified or redeveloped. These are characteristics of academic research data, and MyDatabase is conceived to be flexible to cope with these circumstances.

Considering these factors, the following are the design concepts of MyDatabase.

1. **Service on the Web**: A user is not required to have any specialized knowledge about database systems and does not need to design, build, operate, or manage the database systems. A user should pay attention only to his or her metadata.
2. **Schema Less**: A user needs not to define data schemas, that is, a user only uploads metadata, which enables a user to modify the metadata structure easily.
3. **MyDatabase API**: MyDatabase opens to the public the specification and functions of the API by which users can easily construct and reconstruct user interfaces and applications that are appropriate for each research purpose or research development.
MyDatabase has been developed to meet these conditions by the Center for Integrated Area Studies (CIAS) and the Center for Southeast Asia Studies (CSEAS) both at Kyoto University. MyDatabase provides the following four functions.

1. **Metadata Management**: Users compile and store metadata using GUI (Graphical User Interface).
2. **Content Management**: Users upload content data (images, movies, data sets etc.) using GUI.
3. **Data Dissemination Management**: Users specify database access control using GUI.
4. **Screen Layout Management**: Layouts for search screens and search result screens can be designed to some extent according to user preferences.

### Table 2. Data Sample of MyDatabase

<table>
<thead>
<tr>
<th>No</th>
<th>姓名</th>
<th>氏名</th>
<th>住所</th>
<th>郵便番号</th>
<th>番地</th>
<th>集合地域</th>
<th>公式</th>
<th>地理位置</th>
<th>DVD</th>
<th>ISBN</th>
</tr>
</thead>
<tbody>
<tr>
<td>20000405</td>
<td>内田也志子</td>
<td>内田也志子</td>
<td>内田也志子</td>
<td>内田也志子</td>
<td>内田也志子</td>
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<td>内田也志子</td>
<td>内田也志子</td>
</tr>
<tr>
<td>20000127</td>
<td>石上多香子</td>
<td>石上多香子</td>
<td>石上多香子</td>
<td>石上多香子</td>
<td>石上多香子</td>
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<td>石上多香子</td>
</tr>
<tr>
<td>20000508</td>
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<td>山本和子</td>
<td>山本和子</td>
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</table>

**Usage of MyDatabase**

This section describes the procedures on how to use MyDatabase. Table 2 shows the example data used in this section.

**Procedure 1 (User Registration).** A user requests the administrator to publish the user authority. The administrator creates the work area with predefined data capacity and issues user ID and password. The user can upload metadata and content data within the given capacity. The user can request more data capacity if needed.

**Procedure 2 (Metadata Creation).** A user may create metadata using editors, spreadsheet software, and more. MyDatabase accepts CSV (comma-separated values) format data, TSV (tab-separated values) format data, and XML data. MyDatabase treats every value as a string; that is, users need not to define data types. If a user requires other data types for data processing, the user can define an appropriate data type.

MyDatabase puts a few restrictions on metadata. CSV format data and TSV format data must follow First Normal Form (1-NF: value cannot be divided any further) and Second Normal Form (2-NF: every record is identifiable by key(s)) of Relational Data Model. There are no strict restrictions on element names (such as length of names, allowing the use of special characters such as space characters in element names). As for XML data, metadata must be a well-formed document.

Table 2 shows an example of a CSV table which is a part of the digital gazetteer data. Here, the first line of the table is the header line, and the second line is the English header line. In this example, the "No" field is the key.
**Procedure 3 (Metadata Registration).** The metadata registration interface is used to upload the created metadata file to MyDatabase only by specifying file names in the text box or by dragging files to the file box (Fig. 1). As MyDatabase does not have a metadata editor, a user needs to re-upload the modified metadata file. However, it is possible to add metadata records. In this case, a user does not need to upload the entire metadata file.

**Procedure 4 (Data Attributes Settings).** A user needs to add attributes to data elements to define their features through the data attribute interface (Fig. 2). Features of data elements include (i) identification of data elements to be displayed on data search screens and search result screens, (ii) selection of keyword input methods such as using a text box, a list box menu, and a checkbox.

For example, the attribute "PRIME" defines the data element to be searched and displayed on detailed search result screens. The attribute "BASIC" indicates the data to be searched and can be displayed on the simple or detail search screen.

In many cases, searches are done by inputting some words in text boxes, but list boxes or checkboxes are sometimes convenient. For example, if an attribute formula "input_type=listbox" is set to a data element, a user can search this data element by selecting a value from a list box. In the example of Fig. 2, this formula is set to "式内社国名" (a country name where the shrine is located). Words presented in the list box are collected and ordered at the moment that MyDatabase registers the metadata (Fig. 4 in 3.3 shows the search screen example using a list box).

**Procedure 5 (Content Registration).** The content management interface is used to upload the user's content files to MyDatabase only by specifying file names in the text box or by dragging files to the file box (Fig. 3). The uploaded content files and their records in the metadata are linked by the file names. The group ID which specifies the
group of content files (e.g., a paper consists of several JPEG files) is also available to link content files and metadata records.

![Content Management Interface of MyDatabase](image)

Fig. 3. Content Management Interface of MyDatabase. Since the previous example (Table 2) does not contain image data, this figure is taken from a different data set.

**Procedure 6 (Screen Design).** Layouts of screens that compose MyDatabase user interfaces are almost fixed; in other words, a user cannot design layouts of MyDatabase user interfaces freely. However, some modifications are possible using the screen design interface. The user can alter some attributes, such as designs of header and footer, the background color, or the arrangement of thumbnails.

**Procedure 7 (Data Dissemination Control).** MyDatabase provides three database access controls (open access, institutional access by IP address, and personal access by ID and password). Furthermore, a user can also define access control to each content using the content management interface.

**Procedure 8 (Database Dissemination).** After the user uploads the metadata and content files, specifies the data element attributes, screen design, and database access control, the database will be built with the push of the "Submit" button. The time required to create the database depends on the data size. If the data size is not too large, it will only take a few minutes to build and distribute the database. An example of a database created using MyDatabase.

**MyDatabase API**

The requirements for database applications vary from researcher to researcher, and applications' enhancements and modifications occur frequently. On the other hand, IT departments cannot respond to each request due to the limitations of human resources and budget. These problems bring dissatisfaction to researchers who are thinking of using academic information systems. To reduce users' dissatisfaction, the authors of this paper put the following policy on MyDatabase.

- MyDatabase supports a user to build databases, register research data, and provide necessary data searching functions.
A user should develop sophisticated user interfaces and advanced applications by themselves. MyDatabase provides the API (Application Programming Interface) as a research environment to support their developments.

Thus, an API is introduced to reduce these problems. It is a set of programs and clearly defined specifications for communication among various software components. It provides the building blocks to quickly develop new computer programs which can be then put together with those made by other programmers. The design outlines of the MyDatabase API are as follows.

- Since SOAP [14], one of the prominent Web service technologies, might be cumbersome and complicated for MyDatabase users to build their applications, MyDatabase provides other type of an API based on REST (However, strictly speaking, the MyDatabase API is a "REST-like" API, which means the MyDatabase API does not adequately follow REST concepts) [15].

- MyDatabase API provides CQL (Context Query Language) as a search expression [16]. CQL is a search expression used in SRU (Search / Retrieve via URL) and SRW (Search Retrieve Web services) [17].

- MyDatabase API uses XML and JSON [18] as its response formats that various applications can accept, which enables MyDatabase users to build reliable applications efficiently.

The search formula of the MyDatabase API is as follows.

\[
\text{Request ::= Base URI?Request Part} \\
\text{Request Part ::= Parameter=value[&Parameter=value]*}
\]

For example, if a query is

\[
\text{http://Some_URI?operation=searchRetrieve&version = 1.2& query= (c2= "宇太水分神社") & recordSchema = original}
\]

Here, "Base URI" in the search formula corresponds to "http://Some_URI" in the example. MyDatabase uses the URI to identify a target database. "Request Part" in the search formula is the substance of the Request, and the expression "parameter=value" repeats more than 0 times here as is required. "c2=宇太水分神社" in the example corresponds to the "query =value" part. This example requests MyDatabase to search for records whose value of "c2" is "宇太水分神社 (Uda Mikumari Shrine)."

In the example, "c2" is a data element name which is the same as that of "延喜式内社名 (Shikinaisha: a name of shrine)" in Table 2. As explained in "procedure 2" in 3.1, MyDatabase does not put strict restrictions on data element names (length of a name, allowing to use special characters such as space characters in element names); for example, many users put "spaces" to describe element names such as "title of a book." A user is more accustomed to Microsoft Excel, which is freer about how to write data element names in the top-row of a metadata table. In contrast, many database systems do not allow spaces (and some special characters) for data element names. Therefore, MyDatabase adopts a compromise; that is, it automatically allocates its data element names (such as "c2" in the example) to bridge users' loose data element names and systems' strict ones.

When the above query example arrives at the MyDatabase API, the following is its response in a simple JSON format.
Here, the "original" block is the body of the search response, which lists the composed of pairs of a data element name and its value. The "itemset" block shows the correspondence between temporary data element names set by MyDatabase and data element names set by the user.

These response formats are useful for post-processing, and a user can quickly build new applications by using search results from a database or by combining search results from some databases. Examples using the MyDatabase API will be shown the next section.

MyDatabase Examples

Each database built by MyDatabase accompanies search screens (simple and detailed) and search result screens (simple and detailed). A simple search screen provides a free word search function. A detailed search screen shows all searchable data elements which are defined by the data attribute interface.

Fig.4 shows a detailed search screen example of the database shown in Table 2. Each label of the column corresponds to the data element name of the metadata in the table. Text boxes are mostly used to input search words. However, in this example, for the 7th column whose data element has the attribute expression "input_type=listbox", a user can choose appropriate words using the list box.
Fig. 5. A Search Result Screen Example using Map Interface

If metadata includes longitude and latitude like this example, a user can search data and display the response using maps (if metadata includes time information, a user can use timelines to search and display data). Fig. 5 shows a search screen using a map, on which a user searches for data in the area designated by the rectangle.

Fig. 6. A Search Result Screen Example with Photos and Map

Fig. 7. A MyDatabase API Example to Link Paper Media and Digital Contents using QR Codes
Databases related to area studies often contain photos and maps, and their metadata include spatial information (longitude and latitude). The detailed search result screen of these databases often show these images with location information simultaneously. Fig. 6 shows the example of Prof. Sadao Sakamoto Field note Database (http://app.cias.kyoto-u.ac.jp/sakamoto/).

Academic publications contain numbers of figures, photos, and maps, but only parts of these can be put on pages due to the limitation of media capacity. Moreover, for example, different from digital maps on the Web, paper media are impossible to zoom-out to see a broader view of the area or zoom-in to see the detail view of the area. As a means to compensate for these limitations of paper media, the authors of this paper developed a new mechanism to link paper media and digital contents in MyDatabase via QR codes [19]. Fig. 7 shows an example. When a reader holds a smart device over a QR code next to a map or a photo, the device reads the query in the QR code and sends it to an appropriate MyDatabase API. The API searches databases and sends back applicable content to the smart device. As a result, it becomes possible for readers to see related content and to manipulate the zoom level and center of maps. This example is expected to overcome the limitations of conventional paper media.

Experts of their research domains build academic databases that are the main targets of MyDatabase. For example, metadata of a foreign paper media often uses its local language. The QALAM Article Database (http://app.cias.kyoto-u.ac.jp/infolib/meta_pub/G0000003QALAM) is such an example. Its original materials are Jawi, which is an Arabic script for writing Malay. This script is difficult to read even for current Malay people because they are now using a different script (Latin alphabet), and therefore, the researcher who built the database used Rumi (Roman script) to describe the metadata. These kinds of databases are not always easy to use by non-experts; for example, they do not know what kind of words are appropriate to search the databases. One solution may be to provide users with query examples. Fig. 8 shows our experiment to list up sample queries as a word cloud (http://majalahqalam.kyoto.jp/eng/). This interface enables users to give an overview of the contents and to select an appropriate search word for the database.

Considerations and Future Development

The initial purpose of constructing an information tool for facilitating the dissemination of academic research data has almost been achieved by developing MyDatabase and the MyDatabase API. MyDatabase accepts CSV, TSV and XML data without strict restrictions on metadata. A user can use MyDatabase without expert knowledge and skills concerning database systems, and without system management costs. My-
Database is easy to use, but service functions are limited to save management costs. MyDatabase API has been developed to compensate for the problem of limited services. A user of MyDatabase can develop advanced applications and services appropriate for each research purpose by oneself.

However, the following problems have been pointed out about MyDatabase.

- **MyDatabase does not support JOIN operations to link records from different databases, and it is bothersome to realize the same function by the MyDatabase API.**
- **MyDatabase is challenging to describe and process a tree or network structure such as family trees, social relationships, thesauruses, and so on that are familiar to humanities. For example, an application to follow ancestors in a family tree will be complex within the current MyDatabase frameworks. XML is rather easy to describe family trees but not easy to trace ancestors.**
- **In MyDatabase, it is difficult to cope with Linked Open Data.**

Most of the above problems are probably caused by the MyDatabase's weakness for describing and processing network data sets. Therefore, MyDatabase has been reconstructed to support network data sets. There are some appropriate frameworks to treat network data sets such as RDF (Resource Description Framework) [20] and Topic Maps [21]. Among them, the new version of MyDatabase uses RDF because RDF is currently more prevalent and more straightforward than Topic Maps to treat network data.

At the time of writing this article, the reconstruction of the system and the migration of data from original data format in the old version MyDatabase to RDF format in the new version of MyDatabase have been completed, and currently, MyDatabase is under the evaluation.

RDF is useful when applied to actions such as creating networks, tracing networks, and searching data within the same database, but is inefficient for using between databases. Generally, as the same things in a particular database have the same ID, it is easy to find relations by linking things that have the same ID. In the same sense, if every "subject" and "object" in different RDF databases have the same URI, RDF can search for the same "subject" and "object," link them and expand networks. Unfortunately, it is common, for example, that the same person has a different ID (e.g., staff number, researcher number, social security number) among different databases. This example shows that it is not easy for RDF to link the same subject and the object among different databases. The authors of this paper are considering the possibility to introduce widely-used ID systems (e.g., ORCID, DOI, and ISBN) and authority files, and then to make mapping rules between a local URI and its well-used URI.
Although RDF has the above problems, LOD (Linked Open Data) using RDF must be worth when considered as a prominent way to link distributed databases. Following, the authors of this paper have engaged in a pilot project to evaluate the effectiveness of LOD between different databases in different institutions [22]. NIHU (National Institutes for the Humanities, http://www.nihu.jp/en) and CSEAS jointly conduct this project. Fig.9 shows the schema of the NIHU pilot LOD system; here, the project uses “日本荘園 (Manors in Medieval Japan Database)” held by National Museum of Japanese History (https://www.rekihaku.ac.jp/) as the hub of the linked data [23].

Fig. 10 shows the simple example of screen transitions while searching the NIHU and CSEAS Pilot LOD system. The first example shows the necessary step to display the location of “古川荘” on a map. This problem is accomplished by firstly searching for "古川荘" in the database of "Manors in Medieval Japan Database" (left screen in the figure), secondly tracing the link to the Gazetteer Database [24] which converts the manor name into the pair of longitude and latitude, and finally linking to Google Maps to display the location of the manor on a map (upper right in the figure). The second example is the procedure on how to search for ownership relations of “古川荘”. This problem is accomplished by firstly searching for "古川荘" in the "Manors in Medieval Japan Database" to get the owner of "古川荘," secondly finding all manors owned by this owner, and repeating the same process as many times as necessary (lower right in the figure).
Although this pilot project has used a limited number of data sets, the authors of this paper consider that these examples show the effectiveness of RDF for LOD. In response to this result, a plan to expand this pilot project has been envisaged.

Finally, research data management is becoming the latest and essential topic in academia. Considering the life path of academic research data (roughly speaking: collection, digitization and description, discovery, integration, analysis, and archiving), MyDatabase takes part in a particular piece of a whole path (i.e., discovery, integration, and analysis). Archiving is essential to long-term data preservation and data reusability in research data management. MyDatabase has a data preservation function, but as a small information center in the humanities' research institution, it is challenging to guarantee long-term data preservation. To compensate for the lack of research data management functions of MyDatabase, we begin collaborating with the Academic Data Innovation Unit of Kyoto University (http://www.cpier.kyoto-u.ac.jp/about/acd/).

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Measuring the Outcome of Information Literacy: Perceptions of Undergraduate Students

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Abstract. This paper reports a part of an investigation on an outcome of information literacy based on undergraduate students’ perception in one of the largest academic library of a public institution of higher learning in Malaysia. The outcome of the modules was assessed based on confidence, confusion and uncertainty. Questionnaires were distributed to 30 respondents of whom 30 (100\%) responded. There were 39 variables of Information Competency Assessment Instrument (ICAI) that formed part of a survey instrument using a seven-point interval scale. The result revealed that the respondents were certain to use the information and confident to determine the topic that needs to be searched. However, they were confused in starting a project and government documents. Their question changes depending on what information they found and they were unsure of how much information they needed for the assignment. The study had a profound impact on making recommendations to all academic libraries concerned with giving the best information literacy modules to the undergraduate students and also in ensuring the librarians to work efficiently and effectively at all times.

Keywords: Information Literacy Skills, Information Literacy Modules, Information Self-Efficacy, User Education Program, Academic Library

Introduction

In Malaysia, university libraries have been conducting, in one way or others, user education programs or courses designed in order to develop students’ information literacy [1]. Information literacy skills are important for students’ academic, work and also personal lives. An information literate student is a lifelong learner, with the skills needed to continually find and evaluate information about new developments in an academic discipline. As the development of Information and Communication Technology (ICT), students no longer go to encyclopedias and referring to reference materials or sources at the library to look up information; they instinctively go to the Internet and google it. The tsunami of information in today’s world has urged modern societies to explore and develop new intelligent search skills and behaviors while accessing and using information from so many sources.
The dramatic changes in information technology have made a considerable impact on libraries and their information literacy programs. Because of these changes, the library’s mission to teach users how to become more effective and efficient, and certainly, more independent in their information seeking, has generated new concerns in developing library user education programs that would be more responsive to their needs. Current user education programs have expanded from teaching tools to teaching concepts and from library instruction to information literacy and lifelong learning. Knowing which level of user education is required by a particular group of students enables the librarian to determine the aims and objectives of the session.

Moreover, [2] stated that ICT is increasing in the contemporary environment of rapid technological change and proliferation of information resources. Due to the escalating complexity of this environment, individuals are faced with diverse and abundant information choices. The librarians need to enhance their ICT skills in helping their patrons and also to survive in the competitive world, for which they need to update their ICT skills from time to time.

Information literacy can be defined as the process of knowing when and why information is required, where to find it and how to evaluate, use and communicate it in an ethical way. It is one of such key competency essential in the present century where it is all about the ability to gather, organize, filter and evaluate information and to form valid opinions based on the results [2]. Besides, [3] defined information literacy as a new liberal art that extend from knowing how to use computers and access information to critical reflection on the nature of information itself. Its technical infrastructure and its social, cultural and philosophical context and impact.

Information literacy helps students recognize misleading, out-of-date, or false information. It also helps them sort through the data and interpret it intelligently. Libraries full of books are still available and a valuable resource for students, but information literacy includes the Internet and beyond. The Association of College and Research Libraries (ACRL) offers Standards for Distance Learning Library Services that emphasize equity for distance learners, including that the “library must provide information and digital literacy instruction programs to the distance learning community in accordance with the ACRL standards” [4]. Librarians’ responsibilities include disseminating learning outcomes, targeting classes for information literacy instruction, outreach to the faculty, and sharing best practices in instruction. That is why they played a vital role in helping develop the learning outcomes, and in their information literacy instruction classes [5].

Other than that, information literacy is widely recognized as crucial for student success in college and beyond. Abilities associated with understanding a research need, and being able to locate, access, evaluate and use relevant information to meet that need are obviously necessary for completing many research and writing assignments, but are also necessary for good informed decision-making in everyday life, and are increasingly sought by employers across job categories and fields [6]. The researchers found that students were better able to articulate gaps in their own knowledge after having the opportunity to apply their skills to a research assignment [7]. Academic librarians have long championed the importance of information literacy, and have worked to integrate learning outcome for information literacy into their library instruction, as well as the wider curriculum when possible. [8] stated the value of teaching using affective learning outcomes. It is vital for the field of library and information science to understand students' shifting conceptions of self as scholar, researcher, and student.
Indeed, instruction for information literacy provides academic librarians an opportunity to align their activities with the educational mission and learning outcome of their institution, while assessment of learning for information literacy offers evidence of the library's value to the campus community [9]. Libraries play as the driving force in achieving the target of the universities and other higher educational institutions in the world. User education is considered as a crucial element of the services provided by any library. It comprises various programs of instruction, education and exploration provided by libraries in order to ensure library users to make more effective, efficient and independent use of information sources, services and facilities which include both formal and informal instruction delivered by a librarian or other staff member one-to-one or in a group. According to [10] the three main aims of user education regardless of level are:

- to train the user to exploit the library resources effectively
- to provide the user with the skills for independent information seeking
- to encourage the user to seek the assistance of library professionals

The goal or objective of user education should be to improve the quality of users’ research output and ensure lifelong learning. User education programs need continuous revision to be up-to-date and parallel with the changing information environment [11]. According to [12], the library supports the reading and research needs of its user for that particular institution. It is the library's responsibility to provide better services to its users to make sure that information sources, services and resources are well utilized for users' benefits. Hence user education program is very crucial for library user's achievements.

[2] stated that libraries should organize Information Literacy Training Program in assisting the users to navigate their information by creating pathfinders and offering training sessions on how to formulate their search strategies, use various e-resources, databases and many more. Therefore, training is required for all the staff members in the concerned institutions especially librarian that responsible to deliver user education programs. The staff members must be encouraged to attend continuing training program for their skill enhancement to be able to use ICT skills to the fullest extent in developing digital collection and delivering qualitative library services. Competencies in the proper use of information are becoming more and more important for students, and academic libraries are playing a key role in helping them to develop those competencies through information literacy programs and activities [13]. Librarians that perform information literacy instruction have a vested interest in examining the factors that impact the effectiveness of their efforts. Students, with their unique skills, attributes, and perceptions, vary in both their ability and willingness to seek out and comprehend information literacy education. Instruction librarians must be able to determine the difference categories between what students actually know and what they think they know in order to find out how to most effectively educate on information literacy skills [14].

Developments in computers, microelectronics, and communication technologies have radically changed the library and information environment. Gone are the days of stand-alone libraries, in which a library was judged less by the quality of its resources and services than by the quantity of materials it had available. The paradigm shifts from stand-alone libraries to library and information networks, available via the Internet, can provide end-users with connection to Internet-based services. Moreover, we are surrounded by automated, digital, and virtual libraries as well as by networked
data, specialized networks, and library networks. Multimedia and the Internet have further made the job of library and information professionals more challenging.

At the end of the 20th century, college and university libraries face enormous challenges and opportunities as campuses move into the information age, the mission and role of the library is being redefined. While the amount of information libraries need to acquire continues to increase, the resources available to do so are insufficient. The growing universe of print-based publications and digital documents on the one hand, and the declining universe of library budgets on the other, can be handled confidently by adopting certain strategies, such as by developing critical thinking skills, as well as promoting information literacy at large.

In the near future, users should expect timely access to quality information. Incorporating end-user education in academic libraries by developing training programs for the library and information professionals, as well as the end-users, will hopefully improve learning attitudes and network-related competence to use with information and communication technologies. This is the crucial part where information literacy develops the basis for lifelong learning and has become one of the core competencies in the twenty-first century.

The primary role and core business of academic libraries is to support the teaching, learning and research in a university. It is imperative to teach students information literacy and to equip them with the critical-thinking skills required to retrieve and evaluate information. Nowadays students who come to a university possess varied background, knowledge and different skills. The diversity in learning exists even among students within the same major, degree of motivation and interest and comparable level of intelligence. Librarians should be aware of a student’s strengths and weaknesses in regards to information seeking. They can then effectively support and collaborate with teaching faculty to integrate information literacy instruction into the undergraduate curriculum.

The specific objective of the study is to measure the outcome of information literacy modules in terms of confidence, confusion and uncertainty from undergraduate students’ perception.

**Methodology**

A quantitative research method was conducted to collect survey data and to perform statistical analysis regarding the study on measuring the outcome of information literacy based on undergraduate students’ perception. A pilot study was conducted to undergraduate students who had participated and attended for information literacy skills on Information searching, literature search, access to electronic resources and reference software classes on March-July 2018 from various faculties.

- The Information Literacy Skill Class consists of eleven (11) modules:
  - Introduction to Library Systems
  - Introduction to Library Electronic Resources
  - Online Databases
  - Reference Management Software – Endnote
  - Reference Management Software – Mendeley
  - Advanced Literature Search I (Scopus: World Largest Scientific Database)
  - Advanced Literature Search II (Identify Collaborators Using Web of Science)
  - Easy Write with Microsoft Word
  - Writing and Publishing
This module focuses on developing understanding and information literacy skills which intends to increase their skills in accessing and using the wide range of information resources available in today’s world. Each session will be delivered via hands-on session for two (2) hours. The purpose of this module is to familiarize students with the library and the various resources to improve information literacy skills as a basic requirement for 21st-century learning and assessment.

Questionnaires were distributed and collected personally by the researcher after the respondents answered the questionnaires. In total, 30 questionnaires were returned and hence, giving a response rate of 100% completed the survey that was adapted from the Information Competency Assessment Instrument (ICAI) [15].

A 39-items information self-efficacy statements, were adapted and modified from Marshall’s (2002) instruments to measure information competency. Ten areas were considered as common importance for an individual to be competent: (1) identify a topic, (2) determine source requirements, (3) know how to search for needed information, (4) how to locate and retrieve the information, (5) evaluate the information, (6) synthesize and organize the information, (7) understand ethical, legal and socio-political issues of the information, (8) appropriately use mass media for information, (9) present the information, and (10) learn from feedback and apply to other projects. The respondents were asked to rate their feelings concerning each statement along a seven-point, Likert-type scale ranging from “Strongly Disagree” to “Strongly Agree”. Descriptive statistical method was used to analyze the data using Statistical Product Service and Solution (SPSS).

Findings

From a total of 30 respondents who had responded, 17 (56.7%) of them were male and 13 (43.3%) were female. The distribution of respondents by age groups shows that respondents aged between 21-22 years old (76.7%) while 23% aged 23-25 years old. There were three faculties that share the same number of respondents which only have 4 (13.3%) respondents from Faculty of Accountancy, Faculty of Business Management and Faculty of Education. Faculty of Health Science showed that only 7 (23.3%) respondents had participated in the study. The other two faculties that participated were Faculty of Hotel and Tourism Management and Faculty of Pharmacy that represented only 8 (26.7%) and 3 (10.0%) respondents. The highest respondents that participated in the study were from the Bachelor of Optometry (Hons.) (HS246) program with 7 (23.3%) respondents followed by Bachelor of Science (Hons.) Food Service Management (HM242), Bachelor of Science (Hons.) Hotel Management (HM240), Bachelor of Accountancy (Hons.) (AC220), Bachelor of Business Administration (Human Resource Management) (Hons.) (BM243) and Bachelor of Education (Hons.) Teaching English as a Second Language (ED241) which share the same number of respondents (4 or 13.3%). The participation from the Bachelor of Pharmacy (Hons.) (PH240) program contributed 3 (10.0%) respondents. There were only 4 (13.3%) respondents from Part 2 and followed by 19 (63.3%) respondents from Part 5 while 7 (23.3%) respondents were from Part 7.
Perceptions of Undergraduate Students toward Information Literacy Modules: Confidence

The perception of undergraduate students in terms of confidence as perceived by the respondents was measured on a seven-point Likert-type scale ranging from “Strongly Disagree” on one end (1) to “Strongly Agree” on the other end (7). Table 1 shows the mean scores of undergraduate students’ perception on information literacy modules by dimension of confidence. There were 20 statements under this dimension. The highest mean score was the statement “I am certain that I can use the information I find” (mean=5.83), followed by “I feel confident determining the topic I need to search” (mean= 5.63) and “I am able to learn what processes would be helpful for finding information in the future” (mean=5.57). The mid mean scores were “I know the difference between “primary” and “secondary” sources”, “I can confidently spot inaccuracy, errors, etc. in the information from mass media” and “I am sure that the information I have answered my question or addresses my topic” (mean=5.33). The lowest mean scores were “It is easy to interpret the results of a search” and “I understand the organization of materials in libraries” (mean= 5.10) followed by “I can tell when information is biased” (mean=5.07).

Table 1. Mean Scores of Respondents by Statement: Confidence

<table>
<thead>
<tr>
<th>Statements</th>
<th>Mean</th>
<th>Std. Deviation</th>
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<tbody>
<tr>
<td>I am certain that I can use the information I find.</td>
<td>5.83</td>
<td>.834</td>
</tr>
<tr>
<td>I feel confident determining the topic I need to search.</td>
<td>5.63</td>
<td>1.033</td>
</tr>
<tr>
<td>I am able to learn what processes would be helpful for finding information in the future.</td>
<td>5.57</td>
<td>.817</td>
</tr>
<tr>
<td>I am confident that my information is clearly and confidently presented.</td>
<td>5.50</td>
<td>1.009</td>
</tr>
<tr>
<td>I can use many different types of media (print, video, photography, etc.) confidently as information for my topic.</td>
<td>5.47</td>
<td>1.074</td>
</tr>
<tr>
<td>The information I use is complete and reliable.</td>
<td>5.43</td>
<td>1.006</td>
</tr>
<tr>
<td>I can confidently get my hands on the material (by printing, e-mailing, inter-library loan, etc.) I need.</td>
<td>5.43</td>
<td>1.124</td>
</tr>
<tr>
<td>While preparing a project, I am certain how it will be received by others.</td>
<td>5.40</td>
<td>9.32</td>
</tr>
<tr>
<td>I know the difference between “primary” and “secondary” sources.</td>
<td>5.33</td>
<td>1.213</td>
</tr>
<tr>
<td>I can confidently spot inaccuracy, errors, etc. in the information from mass media.</td>
<td>5.33</td>
<td>1.124</td>
</tr>
</tbody>
</table>
Perceptions of Undergraduate Students toward Information Literacy Modules: Confusion

The perception of undergraduate students in terms of confusion as perceived by the respondents was measured on a seven-point Likert-type scale ranging from “Strongly Disagree” on one end (1) to “Strongly Agree” on the other end (7). Table 2 shows the mean scores of undergraduate students’ perception on information literacy modules by dimension of confusion. There were 5 statements under this dimension. The highest mean score was the statement “confused is probably the best term to describe me when starting a project” (mean= 5.53), the mid mean score was “I get confused because of the many different formats (print, electronic, etc.) when searching for information” (mean=5.10) and the lowest mean score was “a lot of the information I find is irrelevant or unnecessary” (mean=4.67).

Table 2. Mean Scores of Respondents by Statement: Confusion

<table>
<thead>
<tr>
<th>Statements</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Confused” is probably the best term to describe me when starting a project.</td>
<td>5.53</td>
<td>1.592</td>
</tr>
<tr>
<td>Government documents are confusing to me.</td>
<td>5.27</td>
<td>1.413</td>
</tr>
</tbody>
</table>
I get confused because of the many different formats (print, electronic, etc.) when searching for information.  

<table>
<thead>
<tr>
<th>Statements</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sometimes my question changes depending on what information I find.</td>
<td>5.10</td>
<td>1.561</td>
</tr>
<tr>
<td>The information I find is so confusing that I don’t know if I can use it.</td>
<td>4.97</td>
<td>1.474</td>
</tr>
<tr>
<td>A lot of the information I find is irrelevant or unnecessary.</td>
<td>4.67</td>
<td>1.539</td>
</tr>
</tbody>
</table>

Perceptions of Undergraduate Students toward Information Literacy Modules: Uncertainty

The perception of undergraduate students in terms of uncertainty as perceived by the respondents was measured on a seven-point Likert-type scale ranging from “Strongly Disagree” on one end (1) to “Strongly Agree” on the other end (7). Table 3 shows the mean scores of undergraduate students’ perception on information literacy modules by dimension of uncertainty. There were 14 statements under this dimension. The highest mean score was the statement “sometimes my question changes depending on what information I find” (mean= 5.47), followed by “I am sometimes unsure of how much information I need for the assignment” (mean=5.40) and “I am not sure how to record or cite all my sources” (mean=5.23). The mid mean scores were “I am not confident that the information I get is accurate” (mean=5.03), while “I am not sure which communication medium (transparencies, slides, video, etc.) is appropriate for the delivery of this information” and “I sometimes have doubts as to why I am communicating this information” (mean=5.00). The lowest mean scores were “I am not sure how to use an index (e.g. catalog, database, etc.)” (mean=4.87), “feedback is demoralizing to me” (mean=4.73) and “after the presentation of the information, I am not sure how it was received” (mean=4.70).

Table 3. Mean Scores of Respondents by Statement: Uncertainty

<table>
<thead>
<tr>
<th>Statements</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sometimes my question changes depending on what information I find.</td>
<td>5.47</td>
<td>1.137</td>
</tr>
<tr>
<td>I am sometimes unsure of how much information I need for the assignment.</td>
<td>5.40</td>
<td>1.221</td>
</tr>
<tr>
<td>I am not sure how to record or cite all my sources.</td>
<td>5.23</td>
<td>1.406</td>
</tr>
<tr>
<td>If my topical outline doesn’t make sense, I get discouraged.</td>
<td>5.13</td>
<td>1.279</td>
</tr>
<tr>
<td>Sometimes I feel lost because the topic I want to research is not very clear to me.</td>
<td>5.07</td>
<td>1.461</td>
</tr>
<tr>
<td>I am not confident that the information I get is accurate.</td>
<td>5.03</td>
<td>1.450</td>
</tr>
</tbody>
</table>
I am not sure which communication medium (transparencies, slides, video, etc.) is appropriate for the delivery of this information. 5.00 1.414
I sometimes have doubts as to why I am communicating this information. 5.00 1.145
I have questions about the privacy of the information I receive. 5.00 1.486
Sometimes I cannot figure out for whom the information is intended. 4.90 1.605
Web search engines are unreliable. 4.90 1.539
I am not sure how to use an index (e.g. catalog, database, etc.). 4.87 1.697
Feedback is demoralizing to me. 4.73 1.660
After the presentation of the information, I am not sure how it was received. 4.70 1.622

Conclusion and Recommendations

This study had deepened the understanding of perceptions of undergraduate students pertaining to academic library services which had specifically focused on information literacy. The results of the study have put forward several suggestions or recommendations to assist any library in order to provide better information literacy modules. Since the number of students who participated in library instruction classes was relatively low and did not represent all faculties in the institution, future research should therefore concentrate on the investigation of more data are needed to be collected to the findings in the future, and also data collected from individual class would yield more accurate result.

Apart from that, students should be encouraged to take library classes more than once during their studies to refresh their literacy skills especially on searching strategies and retain more information. Hence, it is appropriate to initiate further research project to measure the information literacy competency among a larger population of university students across disciplines. Further research should be conducted to evaluate the sub-skills possessed by undergraduate students, thus different information literacy patterns and their information seeking needs can be drawn from various students’ educational backgrounds.

The beginning of the 21st century has been called the information age because of the explosion of information output and information sources. It has become increasingly clear that students cannot learn everything they need to know in their field of study in a few years of college. Information literacy equips them with the critical skills necessary to become independent lifelong learners. Too often we assume that as students write research papers and read textbooks they are gaining information literacy skills. This is not so. Information literacy skills may be introduced but what is needed is a parallel curriculum in information literacy forming a strong foundation of
a college education.

Therefore, it is suggested to have a collaboration from the authorities and the faculty of their respective institutions in order to ensure the librarians can play a pivotal role in developing information skills through their user education program that is very important in academic institutions. Schools, colleges and universities have taken it up as one of the most important part of education. Furthermore, as the technological revolution or the other global revolutions, the information revolution has affected our information society. The role of libraries and librarians are significant by the latest information technologies that affect deeply the information literacy innovation. Library professionals have to update themselves with the latest ICT and to educate the users with information literacy for the success of library and satisfaction of users in fulfilling their need as well as to deal with the rapid development of information technology. Therefore, there is a definite need for having libraries and librarians that are significant contributors to the success of their organizations or institutions, as well as active partners in information literacy for lifelong learning.

References


Design of the Informatics Degree Program in University of Tsukuba: from Library and Information Science Education to Informatics Education

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Abstract. This paper discusses the ideas and overall picture of the design behind the informatics degree program that is scheduled to start in April 2020. First, it discusses the history of the Graduate School of Library, Information and Media Studies and reorganization of the graduate schools at the University of Tsukuba. Subsequently, it discusses human resource development in the informatics degree program, the curriculum of the program, the diploma policy and competence, and the course model. The subjects unique to the Informatics Degree Program in the Master's course consist of lecture subjects and exercise subjects. The lecture subjects are composed of the groups of special subjects for media science, information interaction, and library and information science, while the exercise subjects are composed of the groups of basic methodological subjects, practice guidance subjects, and research guidance subjects. The subjects unique to the Informatics Degree Program in the doctoral course consist of the practice guidance subjects and research guidance subjects. The practice guidance subjects are comprised of a research internship designed for those who want to be researchers, the practical exercise for research guidance for those who want to be university faculty members, and PBL (Problem Based Learning) with problem-solving exercises for those who want to go into high-level professions. The research guidance subjects include not only seminars for doctoral thesis guidance by an academic advisor, but also for research guidance delivered in an integrated manner by the faculty members in charge of the Informatics Degree Program.

Keywords: Informatics Degree Program, library and information science education, University of Tsukuba

Introduction

Matters and aspects of information have increased explosively, and its influence on academic studies, education, life, and culture has been growing bigger and bigger. Now that quantity of information has transformed into quality of information, as can be seen in the use of big data and improvements in the function of artificial intelligence, social demand to search for how information should be handled and methods of using it has increased. As globalization gets underway, issues concerning academic studies, information, life, and culture encompass the natural sciences, social sciences,
and humanities, and these require interdisciplinary efforts. Given these social circumstances, we have realized that it is important to train top leaders in informatics who are equipped with technical ability, the ability to make breakthroughs, and the ability to complete tasks. With that view, we have come to establish an informatics degree program.

This paper discusses the ideas and overall picture of the design behind the informatics degree program that is scheduled to start in April 2020. First, it discusses the history of the Graduate School of Library, Information and Media Studies and reorganization of the graduate schools at the University of Tsukuba. Subsequently, it discusses human resource development in the informatics degree program, the curriculum of the first period of the doctoral program, the curriculum of the second period of the doctoral program, the diploma policy and competence, and the course model.

**Development of Library and Information Science Education in the University of Tsukuba**

**Forerunners of the University of Tsukuba's Graduate School of Library, Information and Media Studies**

The University of Tsukuba's Graduate School of Library, Information and Media Studies has roots in the Training Institute for Librarians established in 1921, giving it close to a century-long history of professional education of librarians. The training of librarians of five forerunner institutions was carried out in close connection with the Ministry of Education and the Imperial Library, which had a major hand in formulating library policy in Japan.

The decision to establish the University of Library and Information Science was made in March 1979, and it opened on October 1 of the same year. Student enrolment began on April 1, 1980. In parallel with the setting up of undergraduate courses, the Graduate School Library and Information Science Master’s Degree Program commenced with an enrollment limit of 16 students in 1984. The name of the degree bestowed was Master of Arts.

In 2000, the University of Library and Information Science reorganized and extended the existing Graduate School of Library Information Science, and newly established the Graduate School of Information and Media Studies under the two-semester system: this comprised the Doctoral Program in Information and Media Studies, first semester, and the Doctoral Program in Information and Media Studies, second semester.

The enrollment limit for the first semester was 34 and for the second semester was 18. The names of the degrees bestowed were: Master of Arts, Master of Library and Information Science, Master of Information Science, Doctor of Arts, Doctor of Library and Information Science, and Doctor of Information Science.

Both the Master’s Program and the Doctoral Program consisted of four research areas: Social Studies for Information and Media, Management for Information and Media, Information and Media Systems, and Information and Media Development. Courses for the first and second semesters of the doctoral programs were selected and formed from these four research areas.
Graduate School of Library and Information Studies, University of Tsukuba
(Master’s Program, Doctoral Program) 2002

The University of Library and Information Science was integrated with the University of Tsukuba in October 2002, and the School of Library and Information Studies was established [3]. Concurrently with this, the Graduate School of Library, Information and Media Studies was also established. The enrollment limit for the first semester of the Doctoral Program was 37, and the enrollment limit for the second semester of the Doctoral Program was 21. The names of the degrees bestowed were: Master of Science in Library and Information Studies, Master of Science in Informatics, Doctor of Philosophy in Library and Information Studies, Doctor of Philosophy in Informatics, and Doctor of Philosophy.

The Graduate School of Library and Information Studies started the LIS English Program in 2012. This program is for overseas students, with all lectures and seminars conducted in English. The University of Tsukuba has a large number of international students from various countries and regions across the world; thus, it was important to design a degree program for international students wishing to pursue a degree both in Japanese and English.

The Library and Information Studies Carrier Up Program is designed for experienced workers in libraries, organizations, and information departments at private enterprises. This program gives individuals a high level of knowledge in library and information studies. It is designed to actively support professional students who tend to have day jobs. Since it is difficult for most professional students to attend classes at Tsukuba, we offer a set of lectures in Tokyo focusing on library and information science.

Postgraduate Education Reform at University of Tsukuba

Postgraduate Education Reform in Japan

In a modern society with rapidly changing and complex issues, the role of graduate schools in developing human resources to lead our society is greater than ever before. The November 2018 _Grand Design for Higher Education towards 2040_ paper by the Central Council for Education, a national council under Japan’s Ministry of Education, Culture, Sports, Science and Technology, stated that “… the graduate schools play the role of development of advanced human resources. They will lead society, and this is required of Japan.” [2]. It also argued that the national universities should put more emphasis on postgraduate education [2].

The industrial sector also has increasing expectations for the advancement of human resource development in universities. According to the _Results of the Questionnaire on Higher Education_ conducted in 2018 by the Japan Business Federation, “Efforts to educate leaders capable of innovating” scored the highest points as a top priority for higher education reforms [4].

While society’s expectations and demands for graduate school have increased, some issues have also been raised regarding the current state of postgraduate education. The 2019 _Desirable Status of Postgraduate Education Looking Ahead in 2040 (Process Report)_ released by the Working Group on Universities of the Central Council for
Education stated that, regarding doctoral programs, “… there is a gap between the postgraduate curriculum and expectations of society and companies” and that “… it is necessary to proceed with efforts to improve the culture of postgraduate education.” [6]. The key is considered to be “substantiation of postgraduate education” (Central Council for Education, 2005, pp.6–7) presented in the Postgraduate Education in a New Era (Report) by the Central Council for Education in 2005. That is to say, as a university sector, we face a strong demand for the transformation of postgraduate education as a degree program.

A degree program means an educational program designed systematically such that students can learn to the level of a bachelor's degree, a Master's degree, or a doctoral degree (the diploma policy) and can achieve a level of ability (curriculum policy) based on the type of human resources to be educated [5]. In the past, based on the Criteria for Establishing Graduate Schools of the Ministry of Education, Culture, Sports, Science and Technology in Japan (MEXT), faculty members and graduate students have been affiliated with subdivided areas (majors), and graduate schools have put a high priority on research rather than education. So, in this system, since the faculty members affiliated with each major are fixed, it is difficult for professors in disparate fields to work together in teaching the students, and graduate schools are not regarded as dealing properly with the needs of the society and of students, which have grown increasingly advanced and diversified. At present, the graduate school is required to prioritize its function as an educational institution. By transforming to a degree program, the internal control function of the university should be strengthened and the quality of education should be assured inside the university.

Even 10 years after transformation to a degree program was proposed, the problems of postgraduate education have not been solved. In order for the graduate school to fully exhibit its functions as the center of human resource development that drives the development of our society, a radical review of the postgraduate education system is urgently needed.

Reorganization of Graduate Schools at the University of Tsukuba

As part of this postgraduate education reform in Japan, the University of Tsukuba has moved ahead with reforms to take the lead in realizing a "new university system" based on the founding philosophy, an “open university” in all aspects, and a “flexible education and research organization.” During the period of the Third Mid-Term Plan of the University of Tsukuba (2016–2021), the university aims for education to bring out the individuality and ability of students, with the “interdisciplinary” and "international" qualities that have been its notable strengths since the university’s founding. Providing such education as a system with a degree program is the cornerstone of our educational reform. Therefore, the current graduate schools and majors system was completely reorganized.

This reorganization adopted three perspectives, as follows: (1) transition to a flexible educational system that meets the expectations of society and students; (2) acquisition of universality and specialty to support life-long careers; and 3) human resource development that combines research ability with “practical skill.” In order to put post-
graduate education into actual practice in line with these three perspectives, as Figure 1 shows, the organization was restructured from its current 85 majors in 8 graduate schools to 6 degree programs in 3 graduate schools. (This will be implemented from April 2020).

Fig. 1. Reorganization of Graduate Schools at the University of Tsukuba

The current Graduate School of Library, Information and Media Studies was merged into the new Graduate School of Human Comprehensive Sciences. The current Graduate School of Human Comprehensive Sciences and the current Graduate School of Education were also merged into the new Graduate School.

The current Graduate School of Human Comprehensive Sciences, which was established in 2001 with the integration of six graduate schools in education, psychology, disability science, health and sports science, and arts and medicine, was newly established from multidisciplinary academic systems. Leading-edge fusion of different fields was achieved, resulting in the creation of interdisciplinary majors and research fields that were not confined to the traditional graduate school framework and the opening up of multidisciplinary research fields that were not bound to the traditional academic framework. We have been conducting interdisciplinary research on knowledge and information infrastructures that support human activities from the viewpoint of "promoting fusion of knowledge in the background of the international and interdisciplinary educational research environment." Accordingly, we will be able to create a new body of knowledge about “humans” by organizing into a single academic institute and research group through merging the current Graduate School of Library, Information and Media Studies and the Graduate School of Education.

At the same time, in the transfer of knowledge, it will be possible to train human
resources capable of gaining understanding of diverse people from more complex viewpoints and utilizing a wide range of knowledge and skills at an integrated and advanced level to address the needs and issues of society.

From the perspective of library and information science, our education program strengthens its conventional interdisciplinary nature by conducting interdisciplinary and comprehensive human research in the field of information. For this reason, the name of our program was changed and it was reorganized as the Informatics Degree Program.

Informatics Degree Program at the University of Tsukuba

The focus of this Chapter is on the curriculum of the Informatics Degree Program scheduled for implementation at the University of Tsukuba from April 2020.

Development of Human Resources with the Informatics Degree Program

As mentioned in Chapter 1, the Informatics Degree Program is a degree program in the Faculty of Comprehensive Human Arts and Sciences composed of a Master’s course and a doctoral course in which “human research is conducted from an interdisciplinary and comprehensive point of view.”

The purpose of human resource development in the Master’s course is to cultivate human resources engaged in specialized tasks which involve the application of information to science, education, life, and culture through an interdisciplinary approach to the integration of arts and sciences. The degree to be awarded is Master of Science in Informatics. The course capacity is 54 people. After the completion of Master’s Program, students are expected to pursue their career as doctoral students, researchers, university faculty members, data scientists, IT media engineers, information specialists such as consultants, or will involve in specialized tasks at libraries, museums, archives offices, etc. Also, the program is distinctive in that it is integrally organized with the spring semester curriculum delivered in Japanese, the fall semester curriculum delivered in English, and the curriculum for adults students who are attending lectures held mainly at the Tokyo campus, which is a satellite campus of this university.

The purpose of human resource development in the doctoral course, on the other hand, is to cultivate human resources who are engaged in research for the utilization of information in science, education, life, and culture through an interdisciplinary approach to the integration of arts and sciences. The degree to be awarded is Doctor of Philosophy in Informatics. The course capacity is 12 people. Graduates of PhD program are expected to strive as researchers, university faculty members, senior positions in data scientists, IT media engineers, information specialists such as consultants, or will involve in advanced R&D in libraries, museums, archives offices, etc.

Master's Course Curriculum

The curriculum is composed of subjects common to the graduate school, specialized basic subjects common to the faculty, common research subjects, and subjects unique to the Informatics Degree Program.
As shown in Table 1, the subjects unique to the Informatics Degree Program in the Master's course consist of lecture subjects and exercise subjects. The lecture subjects are composed of the groups of special subjects for media science, information interaction, and library and information science, while the exercise subjects are composed of the groups of basic methodological subjects, practice guidance subjects, and research guidance subjects. The theory and application of data utilization taking advantage of media characteristics will be learned in the special subjects for media science. The theory and application of information utilization focusing on communication will be learned in the special subjects for information interaction, and the theory and application of management of knowledge resources as social infrastructure will be learned in the special subjects for library and information science. The basic skills necessary for carrying out research, such as bibliographic survey methods, including qualitative and quantitative analysis methods and research ethics, will be acquired with the basic methodological subjects. The planning methods for more practical research and specialized tasks will be acquired with the practical guidance subjects. The ability to execute research will be acquired through specific research practices with the research guidance subjects.

Table 1. Curriculum System of the Informatics Degree Program (Master’s course)

<table>
<thead>
<tr>
<th>Subject area</th>
<th>Group of subjects</th>
<th>Number of subjects (credits)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecture subjects</td>
<td>Special subjects for media science</td>
<td>8 subjects (16 credits)</td>
</tr>
<tr>
<td></td>
<td>Special subjects for information interaction</td>
<td>8 subjects (16 credits)</td>
</tr>
<tr>
<td></td>
<td>Special subjects for library and information science</td>
<td>8 subjects (16 credits)</td>
</tr>
<tr>
<td>Exercise subjects</td>
<td>Basic methodological subjects</td>
<td>6 subjects (12 credits)</td>
</tr>
<tr>
<td></td>
<td>Practice guidance subjects</td>
<td>2 subjects (4 credits)</td>
</tr>
<tr>
<td></td>
<td>Research guidance subjects</td>
<td>6 subjects (8 credits)</td>
</tr>
</tbody>
</table>

All of the special subjects (8 subjects, 16 credits) for library and information science, 1 special subject (2 credits) for media science, 4 special subjects (8 credits) for information interaction among the lecture subjects, as well as 3 subjects (6 credits) in the basic methodological subjects, 1 subject (2 credits) in the practice guidance subjects, and all the research guidance subjects (6 subjects, 8 credits) among the exercise subjects will be offered at the Tokyo Campus as well. These classes will be held at night and on Saturdays at the Tokyo Campus, as they are aimed mainly at working graduate students.

To complete the Master’s course, students are required to have delivered an intermediate presentation, earned the prescribed 30 credits (20 credits in lecture subjects, 10 credits in exercise subjects), and been accredited for the acquisition of all universal and exclusive knowledges and skills defined in the diploma policy described later in this document, and must also have passed the dissertation review and the final examination.
Doctoral Course Curriculum

As shown in Table 2, the subjects unique to the Informatics Degree Program in the doctoral course consist of the practice guidance subjects and research guidance subjects. The practice guidance subjects are comprised of a research internship designed for those who want to be researchers, the practical exercise for research guidance for those who want to be university faculty members, and PBL (Problem Based Learning) with problem-solving exercises for those who want to go into high-level professions. The research guidance subjects include not only seminars for doctoral thesis guidance by an academic advisor, but also for research guidance delivered in an integrated manner by the faculty members in charge of the Informatics Degree Program.

Table 2. Curriculum System of the Informatics Degree Program (Doctoral course)

<table>
<thead>
<tr>
<th>Subject area</th>
<th>Group of subjects</th>
<th>Number of subjects (number of credits)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exercise subjects</td>
<td>Practice guidance subjects</td>
<td>3 subjects (6 credits)</td>
</tr>
<tr>
<td></td>
<td>Research guidance subjects</td>
<td>12 subjects (12 credits)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>15 subjects (18 credits)</td>
</tr>
</tbody>
</table>

To complete the doctoral course, students are required to have earned the prescribed 10 credits (6 credits for research guidance subjects, 4 credits for practice guidance subjects), and been accredited for the acquisition of all universal and exclusive knowledges and skills defined in the diploma policy, and must also have passed the dissertation review and the final examination.

Diploma Policy and Competences

At the University of Tsukuba, the knowledge, skills, etc. (hereinafter referred to as "competences") that students should possess at the time of being awarded the degree have been clearly identified based on the basic principle of this reform, which is the construction of an education system centered on the degree program, and such competences are specified in the diploma policy to organize and implement systematic curriculums based on this. In identifying the competences, not only advanced specialized knowledge and skills (professional competences) related to the student’s major field of study, but also universal knowledge and skills (general competences) as an aspect to support lifelong activities in various real-world situations in a rapidly changing society are specified.

There are two types of competences—general competences and professional competences. The general competences are defined as the common competences that should be achieved by all graduate students of this university. The professional competences are organized into a hierarchy with the following order: faculty competences, research group competences, degree program competences. Due to space limitations, only the competences for the Informatics Degree Program are described in this document. However, degree program competences are supposed to be shown with the general competences. Accordingly, the general competences are indicated from 1–5 in the following table.
**Table 3. Competences for the Informatics Degree Program (Master’s Course)**

<table>
<thead>
<tr>
<th>Competence</th>
<th>Evaluation Perspective</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Ability to use knowledge: Ability to use advanced knowledge for society</td>
<td>Whether the student is able to find problems in other fields of expertise based on his/her extensive knowledge</td>
</tr>
</tbody>
</table>
| 2. Management ability: Ability to respond appropriately to issues from a broad perspective | 1. Whether the student can respond systematically to major issues  
2. Whether the student has the ability to recognize and solve problems from multiple points of view |
| 3. Communication ability: Ability to convey his/her specialized knowledge in a precise and easy-to-understand manner | 1. Whether the student can perform sufficient communications to carry out research, etc. smoothly  
2. Whether the student can explain research content and his/her specialized knowledge to those in different fields in a precise and easy-to-understand manner |
| 4. Teamwork ability: Ability to collaborate in a team and actively contribute to the achievement of goals | 1. Whether the student has experience of working on issues actively in a team  
2. Whether the student has made any contribution to the promotion of projects other than his/her own research |
| 5. Internationality: Consciousness of contributing to the international community | 1. Whether the student is conscious of contributing to international society and international activities  
2. Whether the student has sufficient language ability for international information-gathering and actions |
| 6. Semantic research ability: Ability to analyze data semantically with appropriate methods | 1. Whether the student can select appropriate methods to obtain data for research and analyze it semantically  
2. Whether the student can extract reasonable interpretations from analysis results in consideration of the purpose |
| 7. Mathematical research ability: Ability to analyze data mathematically with appropriate methods | Whether the student can obtain data for research and appropriately select a method to mathematically analyze it |
| 8. Media expertise: Expertise to develop new media, being conscious of application to social systems | 1. Whether the student can explain the impact of media and network technologies on society  
2. Whether the student can develop media in consideration of information design and social impact |
| 9. System expertise: Expertise to analyze the interactions between human and information multilaterally and design systems | 1. Whether the student can construct human information behavior as a computational model  
2. Whether the student can propose new service systems in consideration of human interactions with information |
Table 4. Competences for the Informatics Degree Program (Doctoral Course)

<table>
<thead>
<tr>
<th>Competence</th>
<th>Evaluation Perspective</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Creativity of knowledge: Ability to create new knowledge that can contribute to future society</td>
<td>Whether the student has any research results that can be described as creation of new knowledge</td>
</tr>
<tr>
<td>2. Management ability: Ability to discover issues from an overarching perspective and plan and execute solution strategies</td>
<td>1. Whether the student can make long-term plans for important issues and implement them properly 2. Whether the student has the ability to discover issues in areas other than his or her specialized field and solve them from an overarching perspective</td>
</tr>
<tr>
<td>3. Communication ability: Ability to convey the nature of academic achievements positively in an easy-to-understand manner</td>
<td>Whether the student can explain the nature of research content and expertise clearly and logically in an easy-to-understand manner to researchers in different fields and to people who are not researchers</td>
</tr>
<tr>
<td>4. Leadership skills: Ability to demonstrate leadership and achieve goals</td>
<td>Whether the student has the ability to build systems to achieve his or her goals and purposes as a leader</td>
</tr>
<tr>
<td>5. Internationality: High-level awareness and willingness to act internationally and contribute to international society</td>
<td>1. Whether the student has a high level of awareness and motivation for contributing to international society and international activities 2. Whether the student has sufficient language ability for international information-gathering and actions</td>
</tr>
<tr>
<td>6. Research ability in the field of informatics: High-level research abilities to set leading-edge research issues in the field of informatics and plan and execute research independently</td>
<td>Whether the student can set essential research issues in the field of informatics that can be expected to contribute to the future, based on previous research in specialized fields related to the mind, the body, and various human activities</td>
</tr>
</tbody>
</table>
7. Expertise in the field of informatics: Leading-edge and advanced expertise and operational abilities in the field of informatics

| 1. Whether the student has sufficient abilities to operate with leading-edge and advanced expertise in the field of informatics |
| 2. Whether the student has discovered new creative issues supported by the latest expertise in the field of informatics |

8. Ethics in the field of informatics: High-level ethics and norms in the field of informatics

| 1. Whether the student has sufficient knowledge for protecting the safety of intellectual property and information in relation to research |
| 2. Whether the student can explain the ethics and the knowledge needed to protect the safety of intellectual property and information, which are essential to the field of informatics |

Course Models

As the structure of the curriculum and lectures available in our degree program suggests, students in the program can choose lectures from a diverse set of topics in informatics. This allows students to formulate their own learning programs to pursue their own career paths. To assist students in formulating a plan of lectures to take, the program offers a set of "course models" based on expected career paths. This section describes some of these course models.

Our course models are based on a combination of three major factors: degree levels, sub-domains, and students' backgrounds. Degree levels comprise I) Master's degrees and II) Doctor's degrees. Sub-domains in the program comprise A) Media Science; B) Information Interaction; and C) Library and Information Science. Students' backgrounds are typically categorized into 1) Japanese-based students at the Tsukuba Campus starting in the Spring semester; 2) English-based students at Tsukuba starting in the Fall semester; and 3) Japanese-based professional students at the Tokyo Campus starting in the Spring semester. Based on analysis of past students, our course models assume that student groups 1) and 2) are more likely to take any of three sub-domains, while student group 3) tends to focus on sub-domain C). These student profiles and expectations for course models might change in the future.

Course Models for Master's Degrees

Table 5 shows a course model for Student Group 2, focusing on sub-domain C during the two years of the Master's degree (I), in which students take a total of 15 courses (30 credits). As can be seen, the model is designed to offer exercise-based courses (indicated with E) at an earlier stage in the program for students to develop their basic skills so that they can learn effectively in more advanced lectures. This also helps students to develop the hands-on skills to carry out their research. Later, students can develop their domain knowledge by taking various courses such as scholarly communication, community analysis, information access, and intellectual property; history of libraries and information media, and data science. Towards the end of the program,
students take exercised-based courses such as the Special Seminar in Informatics to complete their Master’s dissertation.

There are multiple points that should emphasized in the design of these course models. First, the number of courses is evenly distributed over the course of two years, rather than concentrating on a particular season or semester. This aims to encourage students to construct their study plans in a realistic fashion. Second, the program has courses that take advantage of expertise available in other facilities in the University, such as Archives, which is jointly taught by the Faculty of Library, Information and Media Science and the Faculty of Humanities.

For comparison, Table 6 shows a course model for Student Group 1 focusing on Sub-Domain A. As can be seen, the courses in Sub-Domain A contain more topics on computer science and human sciences, although important topics such as intellectual property are still covered in the model.

Table 5. Course Model for Master’s Degree in Informatics 1.

<table>
<thead>
<tr>
<th>Year</th>
<th>Semester</th>
<th>Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Fall</td>
<td>Research Foundation (E), Literature Survey (E), Scholarly Communication and Infrastructure (L), Community Analysis (L), Information Access (L)</td>
</tr>
<tr>
<td></td>
<td>Spring</td>
<td>Survey and Data Analytics (E), Intellectual Property and Information Society (L), History of Libraries and Information Media (L), Practical Data Science (L)</td>
</tr>
<tr>
<td>2</td>
<td>Fall</td>
<td>Special Seminar in Informatics II (E), Human Computer Interaction (L), Archives (L)</td>
</tr>
<tr>
<td></td>
<td>Spring</td>
<td>Special Seminar in Informatics I (E), Information Organization (L), Machine Learning (L)</td>
</tr>
</tbody>
</table>

Table 6. Course Model for Master’s Degree in Informatics 2.

<table>
<thead>
<tr>
<th>Year</th>
<th>Semester</th>
<th>Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Spring</td>
<td>Research Foundation (E), Literature Survey (E), Intellectual Property and Information Society (L), Practical Data Science (L), Machine Learning (L)</td>
</tr>
<tr>
<td></td>
<td>Fall</td>
<td>Survey and Data Analytics (E), Media Design (L), Visualization (L), Information Access (L)</td>
</tr>
<tr>
<td>2</td>
<td>Spring</td>
<td>Special Seminar in Informatics I (E), Bioinformatics and Life Science (L), Affective and Cognitive Science (L)</td>
</tr>
<tr>
<td></td>
<td>Fall</td>
<td>Special Seminar in Informatics II (E), Structured Data (L), Archives (L)</td>
</tr>
</tbody>
</table>

Course Models for Doctoral Degrees
Table 7 shows a course model for Student Group 2 focusing on Sub-Domain C during the three years of the doctoral degree (II). The model is designed to offer courses based on principles similar to the Master’s degree, but in the doctoral degree program all courses are exercise-based. Our program offers practical courses such as Project Based Learning and Research Internships, so that students can develop advanced practical skills to conduct high-quality research on various topics in informatics.

Table 7. Course Model for Doctoral Degree in Informatics. All courses are exercise-based.

<table>
<thead>
<tr>
<th>Year</th>
<th>Semester</th>
<th>Lectures and Exercises</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Fall</td>
<td>Synthetic Seminar on Informatics Ib</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Informatics Seminar b, Synthetic Seminar on Informatics Ia</td>
</tr>
<tr>
<td></td>
<td>Spring</td>
<td>Project Based Learning,</td>
</tr>
<tr>
<td>2</td>
<td>Fall</td>
<td>Informatics Seminar a</td>
</tr>
<tr>
<td></td>
<td>Spring</td>
<td>Research Internship</td>
</tr>
<tr>
<td>3</td>
<td>Fall</td>
<td>Synthetic Seminar on Informatics Iib</td>
</tr>
<tr>
<td></td>
<td>Spring</td>
<td>Synthetic Seminar on Informatics IIa</td>
</tr>
</tbody>
</table>

Conclusion

In Japan, a system has previously been maintained in which teachers and students are affiliated with fragmented domains (academic specialties), based on the Standards for Establishment of Graduate Schools, and in which graduate schools have focused on research rather than education. However, because teachers are fixed in their academic specialties under this system, it is difficult for teachers across various fields to collaborate, which makes it impossible to respond appropriately to the advanced and diversified needs of society and of students. This is why a degree program has come to be offered in which the level of the degree (the diploma policy) and the competences to be achieved are clearly identified in accordance with the ideal human resources as which students are being trained, and in which flexible and systematic educational plans can be designed to enable students to achieve such competences.

This paper describes how a degree program that takes the lead in realizing a new college system has been introduced, and it explains the details of the informatics degree program originating in education in library and information science. The Graduate School of Library, Information and Media Studies at the University of Tsukuba has been continuing to reform college education while expanding subjects of study as well as areas of study. The Informatics Degree Program is the biggest achievement of this reform so far; and with it, education in library and information science has entered a new era.

References


The Relationship between System Effectiveness and User Satisfaction: Case Study of STAMPS at Inland Revenue Board of Malaysia (IRBM)

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Abstract. This research aims to provide practical perspectives by exploring the relationship between effectiveness of the system and satisfaction of the user. This study evaluated STAMPS system from internal users (IRBM’s officers) perspective and validated the proposed framework which combined from several model like TAM, TPB, ISS and IDT. The framework developed the relationship between behavior/ attitude, information quality, system quality and innovation adoption with user satisfaction. Using quantitative approach, specifically online questionnaire, internal users of STAMPS responses were gathered regarding the overall use of the system. The findings of the study revealed that the behavior/ attitude, system quality and innovation adoption under this study was quite successful through internal user’s satisfaction which present strong relationship, except for information quality.

Keywords: Information System Effectiveness, IS Effectiveness, User Satisfaction

Introduction

The main concern of the information system (IS) is to support many tasks including decision-making in order to provide efficient management and operation at various levels. With regard to the implementation of the information system, researchers proposed that the use of IS leads to many benefits such as improving efficiency, improving the quality of service, reducing costs, adopting innovation and other associated characteristics that are effectively acquired from the use of Internet technology [10, 20]. Due to that, Inland Revenue Board of Malaysia (IRBM) has launched the new interface of STAMPS as shown in Fig. 1. on 16th July 2017 replaced the old STAMPS.
Stamp Assessment and Payment System (STAMPS) is an electronic stamp duty system, which is used to automate stamp duty operation. STAMPS is an important information system, where it helps in improving assessing instruments or documents levied for stamp duty. The new STAMPS after a year years of its implementation, the user number keep increasing. The purpose of this research was to gain an understanding of the system effectiveness variables (behavior / attitude, information quality, system quality and innovation adoption) that affect user satisfaction in STAMPS from internal user perspective. Since the IRBM is currently promoting the use of STAMPS, the results may assist the IRBM to plan a more effective strategy to improve STAMPS in future.

The term of effectiveness according to Doll et al [23] “relates to the accuracy and completeness with which users achieve certain tasks and sub-tasks. Indicators of effectiveness include quality of solution and error rates”. Doll et al [23] also describes that effectiveness measurement is associated with the quantity of effectiveness achieved with the resources used in the operations carried out. Indicators of efficiency include time for completing task and time for learning. In addition, satisfaction are depends on the acceptance of the user (whether the user feels good and happy or tense and awkward) and attitudes towards the system's use. Effectiveness of the information system from Hamilton & Chervany's [28] view is a degree of how much value the information system contributes to the accomplishment of organisational objectives. Grover, Jeong & Segars [26] refer to the same thing where “IS efficacy acts as a value-added structure influencing user actions or attitude such as interaction, efficiency, and efficiency”. In the meantime, Myers, Kappelman & Prybutok [44] stated that effectiveness is an dimension dealing with the effect on the working setting and the advantages that could be derived from its use of the system. Moreover, Flynn [25] in his report stated that the effectiveness of information system is providing information for decision-making purposes.

A number of research have tried to capture the general user satisfaction and its variables in the field of information system discipline. User satisfaction is a judgment and perception of desired outcome. Oliver [47] define that user satisfaction is an emotional form of human. Meanwhile, Bailey and Pearson [8] defined user satisfaction in a certain situation as “the sum of one’s feelings or attitudes toward a variety of factors affecting that situation”. Measuring user’s satisfaction of information systems would facilitate detecting weaknesses and strength of a system from a users’
point of view. They also claimed that user satisfaction is also a measure of IS productivity involving efficient and effective of information delivery; thus user satisfaction can be a significant indicator of system efficiency. Bates [9] and Belkin et al. [11] created internet strategy browsing and searching models. Cognitive factors and user behaviors were researched by Saracevic et al. [57].

**Research Objectives**

The objectives of this study are:

i. To identify the relationship between behavior/ attitude with user satisfaction.

ii. To determine the relationship between information quality with user satisfaction.

iii. To study the relationship between system quality with user satisfaction.

iv. To identify the relationship between innovation adoption with user satisfaction.

**Research Questions**

The study is trying to answer the following questions:

i. What is the relationship between behavior/ attitude with user satisfaction affect the effectiveness of STAMPS system?

ii. What is the relationship between information quality with user satisfaction affect the effectiveness of STAMPS system?

iii. What is the relationship between system quality with user satisfaction affect the effectiveness of STAMPS system?

**Literature Review**

**Information System Effectiveness**

Davis [17] demonstrates that system assessment is crucial for the organization to evaluate its effectiveness and suggest further modifications to the system to better meet organizational objectives and strategic goals. The efficacy of the system from the perspectives of Doherty and King [22] and Willcocks [68] is the method of discovering the value and significance of IS through quantitative and/or qualitative method. It is a method mostly carried to measure the performance of the system after implementing new information systems, such as e-taxation / e-government system. Efficiency is defined as the proportion of output to input of any system in order to achieve full benefit with lesser cost. On the other hand, according to Myers, Kappelman, and Prybutok [44], “effectiveness is more concerned with the influence on the environment, results caused by a system, thus has an external focus”. Hamilton and Chervany [28] had been using effectiveness as the accomplishment of organizational objectives.

**User Satisfaction**
Zeithaml [73] described customer satisfaction as the evaluation of a product or service as to whether that item or service fulfilled its internet platform requirements and requirements. Satisfaction is also said to be significantly related to loyalty and this impact also happen in online platform. Shankar et al. [60] stated that the internet impact of satisfaction is greater than offline on loyalty. Satisfied users tend to have a greater use of service, have a strong interaction and are often interested in recommending the item or service to their friends. Ribbink et al. [51] is also investigating user satisfaction. The findings of their research revealed that if a customer is happy with and frequently interacts with an online service provider, the interest in the system would increase.

**Behavior/ Attitude and User Satisfaction**

According to Fishbean and Ajzen [24] attitude towards behavior act as user’s evaluation involving an object or outcome. As such, user may love to do any payment transaction online rather go to physical shops. It shows that payment transaction through online is the behavior and their feeling is their attitude. The similar concept mention in studied by Joshi [31] where he use attitude of users as a variable to determine users perception of software application. Adesina and Ayo [1], were investigated on the level of user’s acceptance of e-banking in Nigeria and they found that attitude are one of the most important factors that determine technology usage especially in developing nations in e-banking system in Nigeria.

**Information Quality and User Satisfaction**

Numbers of independent research discovered that the information quality of the information system's user satisfaction is assessed in terms of understandability, completeness, timeliness, currency, precision, and significance of the information it contains is significant. These elements underlie user perspective and form criteria for measuring system effectiveness In their report, Rai et al. [50] stated that the quality of information deals with the content, correctness and information arrangements. Wu & Wang [70] also strongly stresses the relationship between information quality and user satisfaction. In addition, numerous studies have found a consistent relationship between information quality and user satisfaction at the individual unit of analysis [39, 35, 14, 27]. Moon and Kim [42] and Aggeldis and Chatzoglou [3] were also discovered that the quality of information affect user satisfaction. Beside that, Wang [66] found that user satisfaction level on e-government online services were significantly associated with the quality of information provided Seddon & Kiew [59] has shown that there is a important connection between information quality and user satisfaction.

**System Quality and User Satisfaction**

Delone and McLean [18, 19] stresses that system quality is the primary quality characteristic for evaluating system efficiency. They indicates in their study that it can be evaluated from the view of the user towards the system. DeLone and McLean [18] also count system quality as main dimension which constitutes to the desirable characteristics of an information system. These measures typically focus on usability aspects and assessment characteristics of the system. Other studies [66, 15] show that system quality is measured by attributes, such as accessibility, ease of use, usability, flexibility, functionality, response time, convenience, data quality, integration, system accuracy / reliability, and interactivity & navigation. In the other hand, Lin et al [37]
found “the influence of system quality on user satisfaction was very strong. Thus the system needs a critical analysis and proper adjustment to further enhance users experience and satisfaction”. System quality according to Al-Maskari and Sanderson [6] was regards on how the system fulfills user daily activities and their requirements. Therefore, they found quality of the system is derived from user satisfaction. Before that, previous study by Seddon [58], “system quality is concerned with whether there are bugs in the system, the consistency of user interface, ease of use, quality of documentation, and sometimes, quality and maintainability of program code”. According to McKinney, Kanghyun and Zahedi [40], website information and system quality are the major variables of Web user satisfaction.

Innovation Adoption and User Satisfaction

Adoption of innovation specifically on technological aspects concerns is significant key drivers of satisfaction in user perception of system effectiveness. Studies by Cahill et al [13] and Whyte and Bytheway [67] mention the importance of the technological aspect on user satisfaction. Additionally, Davis [16] and Rogers [54] propose that the difficulties of the innovation influence on how user understand to use it. Meaning, the user satisfaction were depend on the complexity of the system itself. The less complex of the system, the more users like to use it [49]. Roger [55] seeks to explain why in a social system certain technologies (fresh goods, facilities, thoughts or procedures) are embraced faster than others. He originally introduced the DOI theory in 1962 when he was perplexed as to why peasants close to his house in Iowa were progressively adopting fresh agricultural practices because of the complexity of technology.

Research Model Development and Hypotheses

Theoretical Background

There are primarily four theories given in the area of system effectiveness and user satisfaction. The first theory is Technology Acceptance Model (TAM) where it demonstrates how new technology is embraced and used by users. The model describes factors that affect user behavior on how and when to use new technology in specific. The model, established by Davis et al. [17] and Davis [16], states that perceived usefulness and perceived ease of use together determine the user's behavioral intention to use the system. Rod et al. [53] in their studies highlight two important factors in measuring online service quality, there were ease of use and usefulness. TAM is a useful method to measure satisfaction, enhance customer support and improve the quality of service. Prior to that, many researchers have been continuously studying and expanding the TAM model; examples include antecedents of perceived ease of use and perceived usefulness [71]. The model was also developed with moderating factors such as age and gender [72] and effectively implemented in a variety of environments, including e-government systems such as STAMPS.

The second theory is Technology of Planned Behavior (TPB). TPB [5] is developed through the extension of Theory of Reasoned Action (TRA). TRA was modified by adding the behavior construct to the existing theory [5]. The addition is to explain the failure of the user to control their behavior in what they do. TPB suggests
that behavior can be explained by real behavioral intention, where intention towards behavior is also influenced by attitude, subjective norm and perceived behavioral control. There are some studies that adopt this theory to investigate the actual usage, behavioral using attitudinal variable [24, 61]. Therefore, TPB is used in this research to assess the behavior of the STAMPS system user.

The third theory is Information System Success Model (ISS) which is known as the most extensive model used as a theoretical framework to study and evaluate the effectiveness of information system. The first IS success model was given by DeLone and McLean [18] with six factors namely system quality, information quality, use, user’s satisfaction, individual impact, and organizational impact [18]. In order to address criticism by several studies (such as Seddon and Kiew [57]) relating to some of its constructs such as individual and organizational impact and use, Seddon [58] introduced a re- specified model of DeLone and McLean where use of the system was considered to have results of various types, perceived usefulness was introduced in the model as an IS measure. Latter in the year 2003, DeLone & McLean revised IS Success Model which comprises of six interrelated aspects of successful data technologies: System Quality (SQ), Information Quality (IQ), Service Quality (SerVQ), Use, Intent to Use, User Satisfaction, and Net Benefits.

The fourth theory is Innovation Diffusion Theory (IDT). IDT is a model that explains the process by which innovations in technology are adopted by users. Rogers defines an innovation as “an idea, practice, or object that is perceived as new by an individual or other unit of adoption.” Diffusion, on the other hand, is “the process by which an innovation is communicated through certain channels over time among the members of a social system” [54]. Therefore, the IDT theory argues that “potential users make decisions to adopt or reject an innovation based on beliefs that they form about the innovation” [2]. IDT comprises five important attributes of innovation: relative advantage, compatibility, complexity, and trialability and observability.

Theoretical Framework

The theoretical framework is based on the above described model of TAM, TPB, ISS and IDT. The combination of four models will be studied to explore the effectiveness of STAMPS from both technological and non-technological aspects. According to Fishbein and Ajzen [24], merger or integration of some models from specific area could give more meaningful explanation on the researched phenomenon or issues. Therefore, this research adopts the merger approach so that the effectiveness of STAMPS can be explained more clearly. The decision for not considering certain constructs of these models for this study is based on certain logical facts. Since this study is concerned with a specific information system (STAMPS), only five variables constructed. The first part of the block refers to the factors that affect the satisfaction of the user towards the STAMPS system effectiveness.
Considering the above discussion, proposed research framework (see Fig. 2), postulate that behavior/attitude, information quality, system quality and innovation adoption will have significant relationship with user satisfaction.

**Hypothesis Development**

As illustrated in Fig. 2, a total of four hypotheses are proposed based on the relationships between five constructs.

**Behavior/Attitude (BA) -> User Satisfaction (US)**

Determining user behavior/attitude towards adopting a new system. User behavior is a variable used to evaluate user satisfaction towards STAMPS effectiveness. Agarwal [2] stated that behavior or attitude towards the usefulness of the system affect users satisfaction. Lee, Hsieh, and Hsu [36] also found that user behavior was significantly associated with user satisfaction. According to them, reaction and attitude when using the system influenced their acceptance and satisfaction either to adopt or reject the system. In addition, Ajzen and Fishbein [5] mentioned in their study that behavioral intention to use determines customer satisfaction. Zhang and Prybutok [74] also discover that user experiences are linked to behavioral intentions. Udo et al. [63] stated that, “the more positive the customer’s experience, the more likely he or she is willing to reuse the service”.

H1: User behavior/attitude significantly associated with user satisfaction.

**Information Quality (IQ) -> User Satisfaction (US)**

The quality of information relates to the quality of results generated by the information system [18, 19]. The provision of information is indeed an crucial job of the information system, and quality is considered as a major problem. There are several
quality measurement aspects, including the accuracy of output information, the accessibility and exhaustiveness of the output information information in a time appropriate for use [40].

H2: Information quality significantly associated with user satisfaction

System Quality (SQ) -> User Satisfaction (US)

Narasimhaiah et al. [45] define system quality as the quality of the information system itself, which involves software and data elements, and is a metric of how technically good the system is. Nelson et al. [46] suggested a related study. The quality of the system is evaluated in terms of users’ view of their engagement with IS. Five main aspects are identified: availability, accuracy, flexible, response time and integration.

H3: System quality significantly associated with user satisfaction

Innovation Adoption (IA) -> User Satisfaction (US)

Innovation adoption is related with the use of latest technology. Thompson [62] in his studied, found that innovation adoption were significantly associated with user satisfaction. This result due to the complexity and compatibility is correlated with the adoption of latest technology and user experiences. Parasuraman et al. [49] clarify that the acceptance of technology was depending on user belief. They tend to assess on difficulty of using and adapting innovation [17, 54]. In other words, the less complicated to use, the more probable it is to be accepted by the users.

H4: Innovation adoption significantly associated with user satisfaction

Research Methodology

For the purpose of examining the effectiveness of STAMPS, the researchers considered web survey as an appropriate research method. Taking into consideration the advantages and disadvantages of different survey techniques and procedures, and having in mind that the target sample is computer-literate people with access to the Internet, it was decided to use a web questionnaire for the survey technique. Kiernan, et al. [34] also considered that the “Web survey could be as effective as a mail survey in the completion of quantitative questions that measure knowledge, attitudes, behaviours, and intentions”. Therefore, only closed and multiple-choice questions were included in the questionnaire. The final questionnaire consisted of total 31 questions including 4 questions from respondent’s demographic characteristics and 27 questions on the five different constructs of the proposed research framework. All these questions were multiple-type, closed-ended and five-point Likert scale type questions. Likert scales (1-5) with anchors ranging from “strongly disagree” to “strongly agree” [48] were used for all non-demographic based questions. Appendix A. lists all the items for the constructs used in this study. The target respondents of this study was focusly only on users of STAMPS System which is IRBM’s officers who use this system like Pentadbir Aplikasi, Ejen LHDNM, Penaksir, Timbalan Pemungut Duti Setem (TPDS) and many more. The number of internal users (IRBM’s officers) who actively using STAMPS is approximately 700 officers according statistic by Jabatan Operasi Setem & CKHT as at September 2018. Pre test was conducted in this study to ensure each item in the questionnaire will provide the accurate definition, which leads to the question of validity of the questionnaire. One lecturer and another for the non-target audience was selected to test the pre test, followed by 30 respondents for the
pilot test. Deriving from the success of the pilot test, web survey link were shared to 300 target respondents through email. From that, there were only 285 data manage to be collected. It indicates the percentage of response rate as 95% in which according to the rules of thumbs, the response rate is acceptable for the questionnaires to be used for data analysis.

**Research Findings**

**Respondent’s Demographic Profile**

This section analyses demographic data (in Table 1) obtained from the respondents. As per the questionnaire results, the most of the respondents engaged in this research were aged 36 – 40 years, presenting 76 frequency with 26.7 percent compared to others, with female accounting for 51.9% of the sample and 48.1% were male. As far as the academic qualifications are concerned, 62.8% of the total sample are having a bachelor degree. Meanwhile for user experience, majority (105 or 36.8%) of the respondents have more than 5 years of experiences using STAMPS.

<table>
<thead>
<tr>
<th>Table 1. Demographic characteristics of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Characteristics</td>
</tr>
<tr>
<td>Age</td>
</tr>
<tr>
<td>21 - 25</td>
</tr>
<tr>
<td>26 - 30</td>
</tr>
<tr>
<td>31 - 35</td>
</tr>
<tr>
<td>36 - 40</td>
</tr>
<tr>
<td>41 - 45</td>
</tr>
<tr>
<td>46 - 50</td>
</tr>
<tr>
<td>&gt; 51</td>
</tr>
<tr>
<td>Gender</td>
</tr>
<tr>
<td>Female</td>
</tr>
<tr>
<td>Male</td>
</tr>
<tr>
<td>Academic Qualification</td>
</tr>
<tr>
<td>SPM</td>
</tr>
<tr>
<td>Diploma / STPM / STAM</td>
</tr>
<tr>
<td>Bachelor Degree</td>
</tr>
<tr>
<td>Master and higher</td>
</tr>
</tbody>
</table>
Reliability Analysis – Cronbach’s Alpha

The results of reliability analyses for scales are presented in Table 2. De Vau [21] stated that measurement for data analysis must be reliable and valid. It is vital to do the reliability analysis in order to test the measurement. He also added that Cronbach is most widely used in statistical method that provides consistency of the scale. Table 2. shows the reliability test of this study. The value of Cronbach’s Alpha for Behavior/Attitude is 0.920, which is excellent reliability. Meanwhile, the value of Cronbach’s Alpha for Information Quality is 0.801 which is shows a high reliability. System Quality shows the highest of Cronbach’s Alpha with value of 0.956, which is excellent reliability. For Innovation Adoption, the value of Cronbach’s Alpha is 0.853, which is high reliability. The value of Cronbach’s Alpha for User Satisfaction shows 0.949, which is excellent reliability. The result illustrate that the Cronbach’s Alpha values for each of the group are more than 0.6. As the Cronbach’s Alpha values are well above 0.6, suggesting that the instrument (questionnaire) used in the study is highly reliable.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Cronbach’s Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Behaviour/Attitude</td>
<td>0.920</td>
</tr>
<tr>
<td>Information Quality</td>
<td>0.801</td>
</tr>
<tr>
<td>System Quality</td>
<td>0.956</td>
</tr>
<tr>
<td>Innovation Adoption</td>
<td>0.853</td>
</tr>
<tr>
<td>User Satisfaction</td>
<td>0.949</td>
</tr>
</tbody>
</table>

Correlation Analysis

Based on Table 3. data (n = 285) were collected and bivariate correlations being tested to understand the relation between the independent and dependent variables. Since both the selected variables are continuous, bivariate correlation analysis was performed using Pearson's correlation coefficient after checking the normality assumptions for both variables. The Pearson's correlation coefficient, i.e., r = 0.666, P < 0.001, implies that a large or strong correlation, yet statistically significant linear relation, is present between Behavior/Attitude and User Satisfaction. Meanwhile, for Information Quality and User Satisfaction present the Pearson's
correlation coefficient, i.e., \( r = 0.375, P < 0.001 \), implies a medium or moderate correlation, yet statistically positive linear relationship. Information Quality was the lowest correlation among other variables in this analysis. The Pearson’s correlation coefficient, i.e., \( r = 0.776, P < 0.001 \), implies that a large or strong correlation, yet perfectly positive linear relationship, is present between System Quality and User Satisfaction. For Innovation Adoption and User Satisfaction, shows result of Pearson’s correlation coefficient, i.e., \( r = 0.696, P < 0.001 \), which indicates that this two variables has a large / strong correlation and perfectly positive linear relationship.

### Table 3. Correlations

<table>
<thead>
<tr>
<th></th>
<th>BA</th>
<th>IQ</th>
<th>SQ</th>
<th>IA</th>
<th>US</th>
</tr>
</thead>
<tbody>
<tr>
<td>BA</td>
<td>1</td>
<td>.329</td>
<td>**</td>
<td>.520</td>
<td>.666</td>
</tr>
<tr>
<td>IQ</td>
<td>**</td>
<td>1</td>
<td>.366</td>
<td>**</td>
<td>.375</td>
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<tr>
<td>SQ</td>
<td>**</td>
<td>**</td>
<td>1</td>
<td>**</td>
<td>.776</td>
</tr>
<tr>
<td>IA</td>
<td>**</td>
<td>**</td>
<td>**</td>
<td>1</td>
<td>.696</td>
</tr>
<tr>
<td>US</td>
<td>**</td>
<td>**</td>
<td>**</td>
<td>**</td>
<td>1</td>
</tr>
</tbody>
</table>

**Regression Analysis**

As shows in Table 4. (ANOVA) below, the p value for multiple regression analysis is 0.000 (p = 0.000, p < 0.005), therefore regression model is significant. Meanwhile, as represented in Table 5. (Coefficients) below, the most significant predictor of User Satisfaction is System Quality with t value = 7.373. Hence, it can be concluded that System Quality is the most significant predictor compared to the other independent variables. Therefor, Behavior / Attitude (t value = 2.247) and Innovation Adoption (t value = 7.079) also significant predictor of User Satisfaction with t value > 1.645. However, Information Quality shows that this variable is not significant predictor of User Satisfaction with t value = 0.751.

### Table 4. ANOVA

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Regression</td>
<td>95.436</td>
<td>4</td>
<td>23.859</td>
<td>145.914</td>
</tr>
<tr>
<td>Residual</td>
<td>45.784</td>
<td>280</td>
<td>.164</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>141.220</td>
<td>284</td>
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<td></td>
</tr>
</tbody>
</table>
Table 5. Coefficients

<table>
<thead>
<tr>
<th>Model</th>
<th>B</th>
<th>Std. Error</th>
<th>Beta</th>
<th>t</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (Constant)</td>
<td>-.209</td>
<td>.211</td>
<td>-.991</td>
<td>.322</td>
<td></td>
</tr>
<tr>
<td>Behavior /</td>
<td>.130</td>
<td>.058</td>
<td>.125</td>
<td>2.247</td>
<td>.025</td>
</tr>
<tr>
<td>Attitude</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Information</td>
<td>.033</td>
<td>.043</td>
<td>.028</td>
<td>.751</td>
<td>.454</td>
</tr>
<tr>
<td>Quality</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>System</td>
<td>.469</td>
<td>.064</td>
<td>.457</td>
<td>7.373</td>
<td>.000</td>
</tr>
<tr>
<td>Quality</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Innovation</td>
<td>.455</td>
<td>.064</td>
<td>.326</td>
<td>7.079</td>
<td>.000</td>
</tr>
<tr>
<td>Adoption</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Discussion and Recommendation**

The hypothesis testing results indicated that only three variables has strong links with user satisfaction and support the hypotheses. Meanwhile, one variable were not significantly associated with user satisfaction. In pertaining to this, discussion on adopting all of the objectives were explained as below.

**To identify the relationship between behavior/ attitude with user satisfaction**

**(H1): (BA -> US)** *User behavior/ attitude significantly associated with user satisfaction*

The findings of this study mention that behavior/ attitude does have significant relationship with user satisfaction where, it shows that user satisfaction towards STAMPS effectiveness does affected with user behavior or attitude. It proven that from correlation analysis made using Pearson’s correlation rule, the result indicates large/ strong correlation between “Behavior/ Attitude” and “User Satisfaction”. This also means that user behavior / attitude have a direct effect on user satisfaction to use STAMPS. It implies that they will participate in the system if they find the system is easy to use or understand and provide them more benefits. This finding is consistent and similar with Lin and Shao [38] where they found that user attitude and user satisfaction on system effectiveness, occur simultaneously. Empirical results from their study shows positive link between user satisfaction and user attitude and provided evidence for the interplay them. This study is congruent with the scholars whose names are Joshi [31] and Murugiah and Akgam [43].
To determine the relationship between information quality with user satisfaction

(H2): (IQ -> US) Information quality significantly associated with user satisfaction

Hypothesis H2 examined the relationship between information quality with user satisfaction of STAMPS system. From the analysis of the data, hypothesis 2 was not found to be supported by the data. In other words, hypothetical relation between information quality with user satisfaction was found to be insignificant in STAMPS context. The association between these two constructs indicates that this variable is not significant predictor of User Satisfaction with t value = 0.751. This means that in the STAMPS system context, information quality does not directly affect user satisfaction.

This is contrary to the research’s expectations since the direction of the path was proposed to be positive. This finding is contrary to some previous studies [18, 7, 66, 33] as these studies show significant effect of information quality on user satisfaction. Further, considered information quality is an important determinant of user’s satisfaction. Conversely, study of Saha et al., [56] for measuring the success factors of e-government shows disagreement on this relationship between information quality and user’s satisfaction.

To study the relationship between system quality with user satisfaction

(H3): (SQ -> US) System quality significantly associated with user satisfaction

System quality variable has been adapted for this study after do some research from previous study. In this study, innovation adoption shows a significant relationship with satisfaction among internal users STAMPS system at IRBM. It proven from the analysis that has been made through Pearson's correlation coefficient, where the result shows r = 0.776, P < 0.001, indicates that a large or strong correlation, yet perfectly positive linear relationship present between system quality and user satisfaction. Beside that, from the result of multiple regression analysis (Coefficients), system quality is the most significant predictor of user satisfaction t value = 7.373. Hence, it can be concluded that System Quality is the most significant predictor compared to the other independent variables.

According to DeLone and McLean [18, 19] and Molla and Licker [41], system quality affects user satisfaction. Other studies [66, 56] also found strong support for the relationship between system quality and users’ satisfaction and considered system quality is an important determinant of satisfaction. Based on the theoretical support of DeLone and McLean [18, 19] from their study, they found that increase in system quality will cause increase in user satisfaction. Furthermore, most of IS researchers also highlighted that there is a positive significant relationship between SQ and US (such as, Almutairi and Subramanian [7], Wixom and Todd [66], Seddon and Kiew [59]). So, it is clearly seen from the review that the relationship is already existed in most of studies.

To identify the relationship between innovation adoption with user satisfaction

(H4): (IO -> US) Innovation adoption significantly associated with user satisfaction
Based on the findings of the study, it shows innovation adoption also one of the independent variables that has significant relationship with user satisfaction. Innovation adoption is a variable adapted from IDT model. From the result of Pearson's correlation coefficient analysis that has been made, relationship between innovation adoption and user satisfaction, indicates that this two variables has a large/strong correlation and perfectly positive linear relationship with \( r = 0.696, \ P < 0.001 \).

This finding is consistent and similar with several research, where there has strong relationships between innovation adoption characteristics and user satisfaction (Karahanna [32], Brancheau & Wetherbe [12], Hardgrave et al. [29]). It shows that system developer and designer need to adopt innovation characteristics on the system to ensure user satisfy with the system. Therefore, it's very important for any information system to has interactive features of latest technology to get more engagement with the system by users.

**Recommendation**

Based on the finding of this study, some recommendations that might help IRBM to improve the effectiveness of STAMPS system.

STAMPS system should updates their FAQ section frequently based on the needs and queries addressed by their users. It is because from the perspective of user behavior and attitude towards the system, the item “My needs/queries were adequately addressed by the STAMPS in FAQ section” perceived the lowest rank than the other item. Beside, during the design, establishment of any module of STAMPS, IRBM should consider the behavioral aspects of the users and participate them in system creation process. Any input from them need to be taken and address to improve the effectiveness of STAMPS in future.

Report/statistic become one of the important instrument in information quality for decision-making purposes and measure performances. In order to ensure information quality deliverable in STAMPS, IRBM should updating this system continuously and provides all information needed in the system. It is because, there’s a few report or statistic are not details and not meets with their requirement. STAMPS users need data generated by the system to be accurate, unambiguous and relevant. The information should also provide an efficient decision-making mechanism at the right time and right user. Information not only needs to be precise and timely, but it also needs to be complete because the incomplete information may result in incorrect and untimely decision making from the management.

“STAMPS was error free (function in each modules i.e adjudication, assessment, endorsement, appeal, payment etc)” is the lowest mean score for system quality, which indicates respondents disagree with it. To reduce the error of the system, it is very important for IRBM to engage users of STAMPS in the each phases of analysis, design, testing and construction of the system. Beside that, with clear understanding about business case will help the developer and tester of the system to reduce the error. Therefore, by managing the issues and problems raised by users and provide them with adequate and fast feedback will increase the user satisfaction towards the implementation and acceptance of the system.

Train users of STAMPS on how to use the system to improve their performance. Training is very important for users to understand how the system work and how to use the system efficiently. By training, it helps to educate users about the usefulness and benefits of the system, and to insure users are able to work properly with the complex business rules of STAMPS. Training and education should be tailored to the
users role and specific tasks, continues also after the implementation of the STAMPS. The training should be designed to improve the perception of the STAMPS compatibility with the users work practices and emphasize the benefits of the system. Beside that, by provide a complete and details of user manual will help STAMPS user to understand how to use the system.

**Conclusion**

The main focus of this research is to conceptualize and establishing a new model for evaluating the IS effectiveness at IRBM, namely STAMPS system. This study’s sample focus on internal users of STAMPS who has different background and experiences using STAMPS. The current study is regarded to be one of the few that focuses on the magnitude of IS efficiency variables: “Behavior/ Attitude”, “Information Quality”, “System Quality” and “Innovation Adoption” that contribute to the user satisfaction. By evaluating and analyze relationship all these variables with user satisfaction, leads to the need to develop a multidimensional instrument and subsequently a new instrument has been created and examine through testing its validity, reliability, factor analysis and correlation. Hence, from the result of analysis the sample data gathered, the instrument developed has adequate validity and reliability to be used for measuring all the variables involved in this study. Additionally, it is discovered that the behavior/ attitude , system quality and innovation adoption have significant relationships with user satisfaction. However, this study found that the quality of information has no significant effect on user satisfaction. The proposed model of this study is therefore acceptable, promising and would brings contribution to the empirical research of IS effectiveness field.

**Limitation and Future Research Directions**

As with almost every research, there are still certain limitations, apart from their achievements, but some of these could give further exploration opportunities. The selected respondents of this study was the first limitation of this study. That’s because the respondent’s chosen for this study is from internal users only, which is IRBM’s officer. STAMPS are widely used by external users who are from banking sector, lawyer firm, insurance company and other tax agent in Malaysia. In order to evaluate STAMPS effectiveness from the view of user satisfaction, the needs to expand the research sampling to external user’s of STAMPS. This is because external users of STAMPS are more than 3000 users which shows that they are majority user of the STAMPS and has more point of view regarding the system effectiveness. Hence, the future researcher should classify both the internal and external user’s of STAMPS. Secondly, the future researcher should extend the sample size more than 500. Theoretically, the more involvement from the people in the study, the effective the research is. Finally, the future researcher should find out the correlation between descriptive statistics consisting of age, and gender with the adoption of government.

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Appendix A. Questionnaire

Please tick / in the table below

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<th>PART A</th>
<th>DEMOGRAPHIC INFORMATION</th>
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<tr>
<td>1.</td>
<td>Age</td>
</tr>
<tr>
<td></td>
<td>&lt; 20</td>
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<tr>
<td></td>
<td>21 to 25</td>
</tr>
<tr>
<td></td>
<td>26 to 30</td>
</tr>
<tr>
<td></td>
<td>31 to 35</td>
</tr>
<tr>
<td></td>
<td>36 to 40</td>
</tr>
<tr>
<td></td>
<td>41 to 45</td>
</tr>
<tr>
<td></td>
<td>46 to 50</td>
</tr>
<tr>
<td></td>
<td>&gt; 51</td>
</tr>
<tr>
<td>2.</td>
<td>Gender</td>
</tr>
<tr>
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</tr>
<tr>
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<td>Female</td>
</tr>
<tr>
<td>3.</td>
<td>Academic Qualification</td>
</tr>
<tr>
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<td>SRP / PMR</td>
</tr>
<tr>
<td></td>
<td>SPM</td>
</tr>
<tr>
<td></td>
<td>Diploma / STPM / STAM</td>
</tr>
<tr>
<td></td>
<td>Bachelor Degree</td>
</tr>
<tr>
<td></td>
<td>Master and higher</td>
</tr>
<tr>
<td>4.</td>
<td>User Experience</td>
</tr>
<tr>
<td></td>
<td>0 – 3 years</td>
</tr>
<tr>
<td></td>
<td>3 – 5 years</td>
</tr>
<tr>
<td></td>
<td>&gt; 5 years</td>
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Please complete all sections and choose only one option based on the table below:

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<tr>
<th></th>
<th>Strongly disagree</th>
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<tbody>
<tr>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Disagree</td>
</tr>
<tr>
<td>3</td>
<td>Neutral</td>
</tr>
<tr>
<td>4</td>
<td>Agree</td>
</tr>
<tr>
<td>5</td>
<td>Strongly Agree</td>
</tr>
</tbody>
</table>
## PART B BEHAVIOR / ATTITUDE

<table>
<thead>
<tr>
<th>Questions</th>
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<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>5. STAMPS system offered adequate user guidelines to help me.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. My needs/queries were adequately addressed by the STAMPS in FAQ section.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. It was easy to use STAMPS (i.e. submit adjudication online, assessing and endorsing adjudication, printing STAMPS certificate).</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. The language use in STAMPS to me was clear and easy to understand.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. It was easy to navigate on the STAMPS system.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## PART C INFORMATION QUALITY

<table>
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<tr>
<th>Questions</th>
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<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>10. Information provided by STAMPS was clear and meaningful.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. STAMPS provide sufficient information to me.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. STAMPS provide report/ statistic that seems to be just about exactly what I need.</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
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## PART D SYSTEM QUALITY

<table>
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<tr>
<th>Questions</th>
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<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>13. STAMPS was flexible for me to access anytime and anywhere.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. STAMPS function was easy to use.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. STAMPS function was easy to learn</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>16. STAMPS allowed data integration with other system and platform.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17. STAMPS has good features in term of user design /</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
interface.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>18.</td>
<td>STAMPS meets users requirement.</td>
</tr>
<tr>
<td>19.</td>
<td>STAMPS was error free (function in each modules i.e adjudication, assessment, endorsement, appeal, payment etc)</td>
</tr>
<tr>
<td>20.</td>
<td>STAMPS was fast in performing my requests or action.</td>
</tr>
</tbody>
</table>

### PART E  INNOVATION ADOPTION

<table>
<thead>
<tr>
<th>Questions</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>21. STAMPS was a convenient system for stamp duty operation.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22. STAMPS was useful for managing stamp duty operation from assessment until payment of stamp duty</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>23. STAMPS can increase the number of stamp duty collection.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24. STAMPS does not require technical skills in order to use the system (i.e setup printing installation for STAMPS).</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25. STAMPS was compatible to access in any browser and operating system.</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>26. STAMPS printing certificate application was compatible with any version of operating system.</td>
<td></td>
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</tr>
</tbody>
</table>

### PART F  USER SATISFACTION

<table>
<thead>
<tr>
<th>Questions</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>27. STAMPS has eased my work process and my job performances related to stamp duty.</td>
<td></td>
<td></td>
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<tr>
<td>28. I was well satisfied with my experience using STAMPS where it meet my needs.</td>
<td></td>
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</tr>
<tr>
<td>29. STAMPS were a pleasant experience and easy to adapt with.</td>
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<tr>
<td>30. I am satisfied with how the system works.</td>
<td></td>
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<tr>
<td>31. Overall, I was satisfied with using STAMPS.</td>
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</tr>
</tbody>
</table>
Research Productivity of Journal of Documentation
During 2007-2016

Dinesh Kumari¹, Nirmal Kumar Swain² and
Seema Parmar³

¹Research Scholar, Dept. of Lib. & Inf. Sc., MDU, Rohtak
²Head, Dept. of Lib. & Inf. Sc., MDU, Rohtak.
³Assistant Librarian, Nehru Library, CCSHAU, Hisar

Abstract. The present research paper is based on the bibliometric analysis of 554 documents published in Journal of Documentation from 2007 to 2016. The paper carried out various parameters of bibliometrics with special reference to Journal of Documentation such as total research output and cited publications; year-wise distribution of research output; most prolific authors, top five countries in terms of research output and top cited article of the journal during a period of ten years. This study results that the majority of literature published in the Journal were research papers (90.80%) and rest were review papers. Most productive author was Bawden, D., most productive year was 2015 with 63 (11.37%), more citations to the publications were noted for the year 2008 (20.46%) and UK was on top with 26.53% contribution in total research output.

Keywords: Bibliometrics, Journal of Documentation, Scopus, Research Output, Authorship Pattern.

Introduction

Today’s society is the information society. The growth and development of any discipline is best reflected in the scientific literature of that discipline. Research output are considered as scientific literature of any discipline and the journal literature containing the research papers reflects certain trends in that discipline. To quantify the growth of a discipline and its literature; to evaluate the quality and productivity of research of an individual, organization or country; to identify core journals of a discipline and to regulate the flow of information and scientific communication some statistics techniques are in existence. The community of librarianship, informational professionals and documentationist has exhibited specialized skills of mixed nature of statistics which are popularly called “Bibliometrics”. The term bibliometric, is interchangeably used as scientometrics, infometrics, informatics webometrics and so on. In fact, Bibliometrics is a well-known research technique which aims to examine the latest publishing trends in different field of study. So, one of the core journals of library & information sciences titled “Journal of Documentation” has been selected to find out the latest research trend in this discipline by using bibliometric techniques.

Bibliometrics
The word ‘Bibliometric’ is coined by two words ‘biblio’ and ‘metrics’. The word ‘biblio’ is derived from combination of a Latin and Greek Word ‘biblion’, which means book, paper. On the other hand, the word ‘metrics’ indicates the science of meter i.e. measurement. Bibliometrics is statistical analysis of written publication, such as books or articles. It is a type of research method used in library and information science. There are various definitions used for ‘Bibliometrics’.

Bibliometrics is defined as “the application of mathematics and statistical methods to books and other media of communication”.

Potter in 1981 defines bibliometrics as “the study and the measurement of the publication pattern of all forms of written communication and their author.”

Bellis in 2009, “Bibliometric is a set of methods to quantitatively analyze scientific and technological literature”.

Source Journal
Journal of Documentation is a publication of Emerald Group Publishing of United Kingdom. It is a double-blind peer reviewed academic journal in library science. It is a bimonthly journal and is published since 1945 regularly. The scope of journal is broadly information sciences including librarianship and related discipline like information and knowledge management, information seeking and retrieval and digital literacy etc. The journal regularly achieves the highest citation ratings in ISI Web of Science. The present study cover the bibliometric analysis of journal between the year 2007 to 2016.

Objectives
The study has been conducted with taking following objectives in to consideration:
- To identify the total output and cited publications of Journal of Documentation during 2007-2016
- To find out year-wise distribution of research output in Journal of Documentation
- To identify the most prolific authors of Journal of Documentation
- To find out top five countries produced more research output during 10 years
- To identify top cited articles of Journal of Documentation during 10 years

Review of the Related Literature
For any research, review of related literature serves as a mandate to go ahead with. The reviews entail numerous messages and information for further research. Often its serves whether an area is fit to be studied for a doctoral work or not. Further from the previous studies, we come to know about the methodology, applied for, how the data was collected analyzed and presented and the best part is to glance through, arriving at the results on the basis of analyzed data. Few important literature reviews are presented from the scientific literature completed both in India and abroad.

Khanna et al. [5] conducted a bibliometric study of ‘Journal of Academic Librarianship’ (JAL) during the period 2007-2016 through Web of Science and found that highest contributive country was USA (89.85 percent), top 14 countries produced collectively 94.36 percent articles, most authors were K. Coyle and G. Little with 9 articles each and highest contributed institutions were California State University
System and University of Illinois System with 21 and 16 articles respectively. Abdi et al [1] studied a journal “Information Processing & Management (IP & M)” for the period from 1980 to 2015 and found that a total of 2,913 papers were published during the period. Among types of publications highest were articles (67.15%), the highest proportion of papers were by single authors (51.01%), most prolific author was SPINK A (28 articles & 292 citations) and university of California system was most producing institution with 4.05 percent share. Mulla [9] described the bibliometric analysis of 998 articles of Information Science and Scientometric (ISS) that appeared in different journals during the period of 2005-2009. He revealed that, most researchers preferred to publish their research results in journals as 91.98% of articles were published in journals. More numbers (329, 32.97%) of articles were published in 2009. The authorship trend showed that highest number of articles (40.96%) were two authored. The degree of collaboration in ISS was 0.78, and the country wise contribution of articles, India would contribute more documents i.e., 83.99% of the total publications. Chang and Huang [2] in their article “A study of the evolution of interdisciplinary in library and information science: Using three bibliometric methods “investigate interdisciplinary changes in library and information science (LIS) from 1978 to 2007. The study reveals that LIS researchers most frequently cited publications in their own discipline and the degree of interdisciplinary within LIS was increased, particularly co-authorship. The degree of interdisciplinary was found ranging from 0.61 to 0.82 with citation to references in all articles being the highest and that of co-authorship being the lowest. A bibliometric study of Library and Information Science research literature emanating from India based on the data abstracted in Library and Information Science Abstracts (LISA). Standard bibliometric techniques were employed to analyze the collected data and accordingly got indicators. Bradford's law of scattering was used to identify core journals of library and information science wherein Indian authors published their research output. To understand the productivity pattern of authors, Lotka's Law was applied. The identified core journals are mostly published from India. Indian author's contribution in international journals was very low. A list of authors who have published 10 and more papers during 1967-2004 were 37 (1.35%) in number and authors with single publication had major share (74.63%). The Malaysian Journal of Library & Information Science for a five year period from 1996 to 2000 and found that the average number of references per article was 22.5 and the average length was 41.2 pages which were purely tentative. The most popular subject was scientific and professional publishing. Most of the contributions were from Malaysian academics and single-authored articles were found from the governing places. In 2001, Schoepflin et al. in their research paper “Two decades of scientometrics: an interdisciplinary field represented by its leading journal “suggests that the field is in fact heterogeneous, and each sub-discipline has its own characteristics. The nature of growth of literature on geology between 1987-1996 and examined the type of collaboration among 40 authors and the trend of growth, the degree of collaboration among various categories of authors, correlation of the growth of various categories of authors, and the impact of collaboration on the growth of literature. In the year-wise publication analysis the year 1989 attained the peak of value 551 (11.45%) publications. In the authorship pattern 36.58% were contributed by two authors, 29.16.5 were contributed by single authors and the rest by three and more than three authors. Articles published in the journal of Plantation Crops during the period 1973-1996 find out the nature of communication, geographical distribution, authorship pattern and citations. Indian authors had contributed 89.96% and foreign authors had contributed

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10.04% articles. The maximum number of contributions was on coconut 167 (29.93%). Central Plantation Crops Research Institute had contributed 42.83% of the total contributions. Two author papers had accounted 38.17% followed by the three author papers 26.34%. The results of statistical and bibliometric analysis of the articles published on various aspects of Library and Information Science (LIS), emanating from Bangladesh during the period 1966 to 1997. The results of the study showed that, during 1966-1997, a total of 308 articles, authored by 116 librarians were published in various periodicals with the highest number 256(83%) from Bangladesh, followed by India 21(6.82%). All these papers were published in 37 periodicals originating from 14 countries. About 92% of the articles were of single authorship and only 25 articles were collaborative papers. Some other studies were also consulted for interpreting and analysis of data [12,13].

Methodology

In the present study, documents published in Journal of Documentation from 2007 to 2016 have been analyzed. The data has been extracted from the largest abstracting and citation database of peer-reviewed literature i.e. Scopus database. The data was extracted from the Scopus in August 2019 using the strings “Journal of Documentation” and afterwards followed a few filters for refining the results. The data was shifted to MS-Excel for analysis and presented in tabular form for further interpretations.

Data Analysis

Type of Publications

There were two type of publications appeared in the different issues of Journal of Documentation (JOD) during the period under study. It is very apparent from table 1 that majority of literature published in JOD was in form of research articles 503 (90.80%) while about 10 percent (9.20%) literature was in form of review papers.

<table>
<thead>
<tr>
<th>Document Type</th>
<th>No. of Papers</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Article</td>
<td>503</td>
<td>90.80</td>
</tr>
<tr>
<td>Review</td>
<td>51</td>
<td>9.20</td>
</tr>
<tr>
<td>Total</td>
<td>554</td>
<td>100</td>
</tr>
</tbody>
</table>

Yearly and Decadal Distribution of Research Publications

Table 2 shows the year wise distribution of research publications and citations during the period 2007 to 2016. It is very clear from the above table that there was not accountable increase in the percentage of growth of publication during the period under study, as total output of publications for the period remained between 9 percent to 11 percent, however, most productive year was 2015 with 63 (11.37%) publications. More citations to the publications were noted for the year 2008 (20.46%) followed by 2007(13.97%). It is also noteworthy to mention here that the latest years recorded
comparatively less citations than the previous years. ACPP was also found highest in the year 2008 (27.92%) followed by 2007 (19.44%).

Table 2. Research output of JOD during 2007-2016

<table>
<thead>
<tr>
<th>Year</th>
<th>TP</th>
<th>%</th>
<th>TC</th>
<th>%</th>
<th>ACPP</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>52</td>
<td>9.38</td>
<td>1011</td>
<td>13.97</td>
<td>19.44</td>
</tr>
<tr>
<td>2008</td>
<td>53</td>
<td>9.56</td>
<td>1480</td>
<td>20.46</td>
<td>27.92</td>
</tr>
<tr>
<td>2009</td>
<td>59</td>
<td>10.64</td>
<td>833</td>
<td>11.51</td>
<td>14.11</td>
</tr>
<tr>
<td>2010</td>
<td>56</td>
<td>10.10</td>
<td>890</td>
<td>12.30</td>
<td>15.89</td>
</tr>
<tr>
<td>2011</td>
<td>58</td>
<td>10.46</td>
<td>826</td>
<td>11.42</td>
<td>14.24</td>
</tr>
<tr>
<td>2012</td>
<td>50</td>
<td>9.02</td>
<td>569</td>
<td>7.86</td>
<td>11.38</td>
</tr>
<tr>
<td>2013</td>
<td>48</td>
<td>8.66</td>
<td>559</td>
<td>7.72</td>
<td>11.64</td>
</tr>
<tr>
<td>2014</td>
<td>55</td>
<td>9.92</td>
<td>406</td>
<td>5.61</td>
<td>7.38</td>
</tr>
<tr>
<td>2015</td>
<td>63</td>
<td>11.37</td>
<td>370</td>
<td>5.11</td>
<td>5.87</td>
</tr>
<tr>
<td>2016</td>
<td>60</td>
<td>10.83</td>
<td>288</td>
<td>3.98</td>
<td>4.80</td>
</tr>
<tr>
<td>Total</td>
<td>554</td>
<td>100</td>
<td>7232</td>
<td>100</td>
<td>13.05</td>
</tr>
</tbody>
</table>

(YP=Total Publications, TC=Total Citations, ACPP=Average Citations Per Paper)

Most Prolific Authors

The list of five top authors who gave highest contribution to Journal of Documentation during the period 2007-2016 is given in Table 3. Out of these 5 productive authors, 03 authors are from UK, 02 authors from Finland. In terms of number of publications, Bawden, D. is most productive author with 44 publications (7.94% of total publications) distantly followed by Savolainen, R. 12 publications (2.16%). It is also noticed that these five authors collectively published 15.52 percent research output of total publications.

Table 3. Most prolific authors

<table>
<thead>
<tr>
<th>Authors</th>
<th>Affiliation</th>
<th>TP</th>
<th>% of TP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bawden, D.</td>
<td>University of London, UK</td>
<td>44</td>
<td>7.94</td>
</tr>
<tr>
<td>Savolainen,R.</td>
<td>Tampereen Yliopisto Finland</td>
<td>12</td>
<td>2.16</td>
</tr>
<tr>
<td>Robinson, L.</td>
<td>University London, UK</td>
<td>10</td>
<td>1.80</td>
</tr>
<tr>
<td>Urquhart, C.</td>
<td>University of Aberystwyth, UK</td>
<td>10</td>
<td>1.80</td>
</tr>
<tr>
<td>Vakkari, P.</td>
<td>University of Tampere, Finland</td>
<td>10</td>
<td>1.80</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>86</td>
<td>15.52</td>
</tr>
</tbody>
</table>

Top Five Countries in terms of Research Output
Table 4 lists the top five countries in terms of publications produced by JOD under the period 2007-2016. As per table United Kingdom produced a little more than one fourth share of total publications (26.53%) slightly followed by United States (22.02%) and distantly followed by Finland which contributed 7.40 percent of total publications under the period of study. Australia and Canada produced equal share of research output through Journal of Documentation i.e. 5.95 percent each.

<table>
<thead>
<tr>
<th>Country</th>
<th>No. of Papers</th>
<th>% of TP</th>
</tr>
</thead>
<tbody>
<tr>
<td>United Kingdom</td>
<td>147</td>
<td>26.53</td>
</tr>
<tr>
<td>United States</td>
<td>122</td>
<td>22.02</td>
</tr>
<tr>
<td>Finland</td>
<td>41</td>
<td>7.40</td>
</tr>
<tr>
<td>Australia</td>
<td>33</td>
<td>5.95</td>
</tr>
<tr>
<td>Canada</td>
<td>33</td>
<td>5.95</td>
</tr>
</tbody>
</table>

**Top Institutions in terms of Publications**

Table 5 lists the top 10 institutions that produced 13-32 papers during period of 10 years under study. These institutions produced 182 (32.79%) papers in all. Tampereen Yliopisto contributed highest number of papers (32) which was 5.77% share of total contribution, followed by University of Sheffield (4.51%), University of London (3.79%), Loughborough University (3.24%), Aberystwyth University (3.06%), Danmarks Biblioteksskole (2.70%), University of Strathclyde and Hogskolan i Boras (2.52% each), University of Texas and UCL (2.34% each).

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Institution</th>
<th>No. of Papers</th>
<th>% of TP</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Tampereen Yliopisto</td>
<td>32</td>
<td>5.77</td>
</tr>
<tr>
<td>2.</td>
<td>University of Sheffield</td>
<td>25</td>
<td>4.51</td>
</tr>
<tr>
<td>3.</td>
<td>University of London</td>
<td>21</td>
<td>3.79</td>
</tr>
<tr>
<td>4.</td>
<td>Loughborough University</td>
<td>18</td>
<td>3.24</td>
</tr>
<tr>
<td>5.</td>
<td>Aberystwyth University</td>
<td>17</td>
<td>3.06</td>
</tr>
<tr>
<td>6.</td>
<td>Danmarks Biblioteksskole</td>
<td>15</td>
<td>2.70</td>
</tr>
<tr>
<td>7.</td>
<td>University of Strathclyde</td>
<td>14</td>
<td>2.52</td>
</tr>
<tr>
<td>8.</td>
<td>Hogskolan i Boras</td>
<td>14</td>
<td>2.52</td>
</tr>
<tr>
<td>9.</td>
<td>University of Texas</td>
<td>13</td>
<td>2.34</td>
</tr>
<tr>
<td>10.</td>
<td>UCL</td>
<td>13</td>
<td>2.34</td>
</tr>
</tbody>
</table>

**Total**

182 32.79

**Most Cited Papers**
Top 20 highly cited papers of JOD during 2007-2016 are listed in table 6. These papers received 1909 citations in all during 2007-2016. The paper titled ‘What do citation counts measure? A review of studies on citing behavior’ authored by Bornmann L., Daniel H. published in the year 2008 received highest number of citations (554) and the paper at 20th position in receiving highest citation etitled ‘Do libraries matter? Public libraries and the creation of social capital’ written by Varheim A., Steinmo S., Ide E. received 50 citations.

Table 6. Most cited papers

<table>
<thead>
<tr>
<th>Authors</th>
<th>Title</th>
<th>Year</th>
<th>Cited by</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bornmann L., Daniel H.</td>
<td>What do citation counts measure? A review of studies on citing behavior</td>
<td>2008</td>
<td>554</td>
</tr>
<tr>
<td>Prabha C., Connaway L.S., Olszewski L., Jenkins L.R.</td>
<td>What is enough? Satisficing information needs</td>
<td>2007</td>
<td>104</td>
</tr>
<tr>
<td>Boon S., Johnston B., Webber S.</td>
<td>A phenomenographic study of English faculty's conceptions of information literacy</td>
<td>2007</td>
<td>95</td>
</tr>
<tr>
<td>Williams S.A., Terras M.M., Warwick C.</td>
<td>What do people study when they study Twitter? Classifying Twitter related academic papers</td>
<td>2013</td>
<td>84</td>
</tr>
<tr>
<td>Lloyd A.</td>
<td>Framing information literacy as information practice: Site ontology and practice theory</td>
<td>2010</td>
<td>81</td>
</tr>
<tr>
<td>Neuhaus C., Daniel H.</td>
<td>Data sources for performing citation analysis: An overview</td>
<td>2008</td>
<td>81</td>
</tr>
<tr>
<td>Lloyd A., Kennan M.A., Thompson K.M., Qayyum A.</td>
<td>Connecting with new information landscapes: Information literacy practices of refugees</td>
<td>2013</td>
<td>79</td>
</tr>
<tr>
<td>Oakleaf M.</td>
<td>The information literacy instruction assessment cycle: A guide for increasing student learning and improving librarian instructional skills</td>
<td>2009</td>
<td>76</td>
</tr>
<tr>
<td>Yi K., Mai Chan L.</td>
<td>Linking folksonomy to Library of Congress subject headings: An exploratory study</td>
<td>2009</td>
<td>66</td>
</tr>
<tr>
<td>Catalano A.</td>
<td>Patterns of graduate students' information seeking behavior: A meta-synthesis of the literature</td>
<td>2013</td>
<td>65</td>
</tr>
<tr>
<td>Lloyd A.</td>
<td>Informing practice: Information experiences of ambulance officers in training and on-road practice</td>
<td>2009</td>
<td>65</td>
</tr>
<tr>
<td>Liu Z., Huang X.</td>
<td>Gender differences in the online reading environment</td>
<td>2008</td>
<td>61</td>
</tr>
<tr>
<td>A piranec S., Banek Zorica M.</td>
<td>Information literacy 2.0: Hype or discourse refinement?</td>
<td>2010</td>
<td>59</td>
</tr>
<tr>
<td>Author(s)</td>
<td>Title</td>
<td>Year</td>
<td>Pages</td>
</tr>
<tr>
<td>---------------------------</td>
<td>----------------------------------------------------------------------</td>
<td>------</td>
<td>-------</td>
</tr>
<tr>
<td>Sundin O.</td>
<td>Negotiations on information-seeking expertise: A study of web-based tutorials for information literacy</td>
<td>2008</td>
<td>58</td>
</tr>
<tr>
<td>Makri S., Blandford A.</td>
<td>Coming across information serendipitously - Part 1: A process model</td>
<td>2012</td>
<td>55</td>
</tr>
<tr>
<td>Lloyd A.</td>
<td>Information literacy as a socially enacted practice: Sensitising themes for an emerging perspective of people-in-practice</td>
<td>2012</td>
<td>54</td>
</tr>
<tr>
<td>Hartel J.</td>
<td>Managing documents at home for serious leisure: A case study of the hobby of gourmet cooking</td>
<td>2010</td>
<td>52</td>
</tr>
<tr>
<td>Lewandowski D.</td>
<td>The retrieval effectiveness of web search engines: Considering results descriptions</td>
<td>2008</td>
<td>51</td>
</tr>
<tr>
<td>VÃ¥rheim A., Steinmo S., Ide E.</td>
<td>Do libraries matter? Public libraries and the creation of social capital</td>
<td>2008</td>
<td>50</td>
</tr>
</tbody>
</table>

**Conclusion**

Quantifying measurement has become an established method of doing research and bibliometric studies can be useful for understand various aspects and recent research trends. The present study explores the various publication trend of Journal of Documentation. The study shows that during the study period, there were two type of publications appeared and majority was of research article 503 (90.80 %). Decadal distribution of research output of journals shows that average citation per paper is 13.05 %. The study shows that most prolific author (7.94 %) was from United Kingdom and most productive country (26.53 %) is also United Kingdom. The study shows that most cited paper got 554 citations which was published in 2008.

**References**

Understanding reading on social media: A model of factors affecting the behavior of reading others’ sharing among urban high-educated readers

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² Nanjing University, Nanjing 210023, China

Abstract. Since the development of social media on Internet, there are still lots of argument about the influence of social reading, which is a new reading trend with lots of interaction and sharing behavior on Internet. Urban high-educated readers because they have good reading ability, reading habits and also have advantages in information resources. They are typical as readers on social media. As an empirical study, we measured the social reading motivation of these readers. According to 2755 samples in Hangzhou, China, we find there are four dimensions motivation of social reading. The LOGISTIC model verified influencing factors of social reading behavior, helped us to understand why some readers like reading something shared by others on social media. This research helps us to understand the positive and negative effects of social reading, and discuss the possibility of promoting National reading program through social reading on Internet in China.

Keywords: Social Media, Reading Motivation, Influencing Factors, Urban, high-educated.

Fund: Scientific Research Project “The Internet + Zhejiang Reading Program, Research on “Social Reading” (zw2016101) Provided by Zhejiang Province Cultural Department

Introduction

According to the “2019 Social Media Trends Report” published by GlobalWebIndex, 98% of digital consumers are social media users, those respondents are from different countries and regions (except for Chinese, because Facebook is not provided in China). Users receive and send messages on social networks for an average of 2.33 hours per day [1]. Similar in China, according to a survey, 78% respondents share their readings on social media (WeChat, Weibo, Douban, Zhihu, etc.) [2]. With the rapid development of social media around the world, “social reading” online has changed the mode of knowledge and information dissemination, provided a personalized reading experience through interaction, sharing, user generated content [3]. Social reading is a new reading mode that emphasizes social interactions among readers such as sharing, comments, and communication [4]. Some scholars believe that social media provides users a virtual space for reading and communication conveniently, which could help citizens read online [5]. Interaction online helps readers collect information con-
veniently and get feedback [6], beneficial to knowledge sharing, innovation, knowledge transformation and gains [7]. However, some empirical studies point out that social reading online may lead to poor reading comprehension [8,9,10]. There is even more surprisingly found according to some studies, Asian readers’ social reading behavior lead to more negative effects , much more than readers from other countries and regions [11,12].

We believes that the academic controversy on social reading online is because there are different research objects and measurement methods between these studies. Most of the domestic studies about social media and social reading focus on new technology adoption, only a few focus on the motivation and the behavioral differences driven by motivation. Compared with traditional paper reading or individual e-book reading, what is the readers motivation on social media ? Since different readers have different motivation, do research on typical samples is the key. Therefore, this research objects are: 1) readers with good reading habits and reading ability; 2) sufficient reading resources; 3) Readers who have social reading behavior online. The concept operation is: high-educated readers in the city (college degree and above), and use social media for social reading. For these readers, who have advantages in collecting information and knowledge acquisition, what is the significance of the social reading behavior in virtual space ? Can this new reading trend online promote the National Reading Program in China? Through a empirical study, we point out the relationship between their reading motivation on social media and their reading performance.

**Literature Review and research design**

Mennella [3] and Stein [14] and other scholars believe that social reading online can help readers built a social network, provide readers (users) with a virtual space to exchange information and communicate equally, through text sharing, participation in discussions or writing reviews [13], creative content [14]. Bi emphasized that social reading is a new reading mode based on social network, interaction and sharing [15]. Lu calls it "socialized based on reading", interaction through UGC, co-communication, and mutual profit, the value of reading behavior is infinitely magnified [16].

The research on paper reading motivation is rich. The scholars consider it to be a multi-dimensional system [17,18,19], can be divided into internal motivations such as personal goals, interests, and external motivations such as reward mechanisms [20]. But the research on social reading motivation is still under proceeding.

Online reading motivation: Cai proposed that college students’ online reading motivation includes five dimensions: personal cultivation, information acquisition, social interaction, emotional expression and reading interest [21]. Xiong extracted four factors of online literature reading motivation: reading interest, communication in community, self-cultivation, psychological superiority [22].

Motivation of mobile reading: Luo and Cong extracted five common factors in college students' mobile phone reading: Media trait motivation", information motivation, social motivation, entertainment motivation and self motivation [23]. Li and others found that mobile reading motivations of college students in China, Japan and Korea are: interactive needs, innovative needs, information needs, entertainment needs, alternative needs [24] a study on adolescents’ motivation in WeChat shows that there are three categories: intrinsic motivation, social motivation, and achievement motiva-
tion, includes 6 dimensions: Information acquisition, emotional development, hobbies, personal development, social interaction, and other people's identification [25].

3) Motivation in the knowledge sharing communities online: by adapting the motivation scale of Kaye, Bazarova and Choi conducted a survey of 2,955 readers and combined with the research of 40 randomly selected science blogs, found their motivation can be clustered as: one-way entertainment users, information acquisition users, super users [26]. Ma pay attention to the participation behavior in reading community online among college students, and find that social and entertainment motivation is their main motivation, but the participation behavior is still less [27].

Other scholars’ research refer to TRA (Theory of Reasoned Action), TAM (Technology Acceptance Model), IDT (Innovation Diffusion Theory), SCT (Social Cognitive Theory), Unified Theory of Acceptance and Use of Technology etc [28]. With technology acceptance model, Kang finds that users’ 7 types of motivations are: perceived usefulness, perceived ease of use, social interaction, entertainment, reading cost, trust, and normative pressure [29]. Others factors may also effected: demographic factors such as gender, age, education, etc., psychological factors and individual prior knowledge and experience [30]. Zhang Yun suggested that the low-educated students are apt to accept the recommended readings. The higher the education, the stronger the purpose [31].

According to others’ research, this study measures the social reading motivation among urban high-educated readers, and construct a behavior prediction model, to explore the influencing factors on behavior of reading others’ sharing.

The Hypothesis of the study:
H1 For urban high-educated readers, social reading on social media, their primary motivation is collecting information, entertainment, and social interaction.
H2 Readers with different education degrees have significant different reading motivation.
H2.1 The higher the education degree, the stronger the personal cultivation motivation on social media;
H2.2 The higher the education degree, the weaker the entertainment motivation on social media;
H3 For urban high-educated readers, read other people’s sharing on social media, they are motivated by collecting information, entertainment, personal cultivation and social interaction motivation;
H4 The low-educated, young readers, are apt to accept the readings shared by others.

Data analysis

Data source

The survey did in Hangzhou, the 2nd-ranked city of 2018 China's top ten digital reading cities. Unlike the first-lever cities such as Beijing, Shanghai, Guangzhou and Shenzhen, the economic and social development of Hangzhou is closer to most second-lever cities in China. But Hangzhou has consistently ranked among the top ten digital reading cities in China, and it becomes the 2nd-ranked city in 2018 (1st-ranked city: Beijing, the capital city of China). We did the survey in only one city, limited among high-educated readers, so that we can control some variables such as public
reading cultural resources that the respondent can obtain, reading abilities and so on. The model can be simplified and effective. According to the research needs, multi-layer sampling is adopted. The first step, we selected 19 categories industries in the city based on the statistics of the Hangzhou Municipal Bureau [32], and freelance/unemployed, total 20 categories. According to the proportion, we selected 1 to 3 typical companies or organizations. The second step, in these 50 research sites, with random sampling, we collect paper questionnaires from respondent who has college education or above and did read on social media. There are 2,755 effective samples. 1,491 males, accounting for 54.12%, 1,264 females, accounting for 45.88%. 62.58% was born in cities, 37.42% was born rural areas (the urban population of Hangzhou is 63.77% in 2017) [33]. The major of literature, history, philosophy, economics, or law accounted for 36.99%, science and technology, agriculture and medicine accounted for 38.33%, and other categories accounted for 24.68%. Among the age distribution, 18 to 35 years old accounted for 63.38%, 36 to 60 accounted for 33.94%, and over 60 years old accounted for 2.69%.

**Variable Operation**

**Independent Variable**

The independent variable is the social reading motivation of urban high-educated readers. We adopted and revised the social reading motivation scale that other scholars have developed [21,24,26,28], using Likert Scaling, 1 is disagree at all, 5 is total agree. Through pre-test, we finally selected 12 scale questions. The Cronbach's Alpha coefficient is 0.823, indicating that the scale reliability is good; the KMO test result is 0.826, Bartlett sphericity test results are significant, indicating that the scale validity is good.

The exploratory factor analysis was carried out. By the principal component analysis method, the maximum variance method was used, and the minimum coefficient under 0.5 was eliminated. Four common factors with eigenvalues greater than 1 were extracted, and the variance explanation cumulative percentage was 67.24%, which was ideal. The four factors are named as: infotainment motivation, personal cultivation motivation, social interaction motivation, technology substitution motivation, and the comprehensive index generation method is used to calculate every respondent’s motivation scores in these four dimensions.

**Table 1. Factor analysis of high-educated readers' social reading motivation (after rotation)**

<table>
<thead>
<tr>
<th>Dimensions of Reading Motivation</th>
<th>Factor score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1 For the latest information</td>
<td>F1=(Q1 * 0.724 + Q2 * 0.745+ Q3 * 0.663) / 2.132</td>
</tr>
<tr>
<td>Infotainment</td>
<td></td>
</tr>
<tr>
<td>Q2 Killing time</td>
<td></td>
</tr>
<tr>
<td>Q3 In order to read topics related to my hobbies</td>
<td></td>
</tr>
</tbody>
</table>
As mentioned above, this survey did in only one city, so that the variable of public reading resources is effectively controlled. The variable of reading ability and reading habit was controlled by surveying high-educated readers. According to other scholars’ studies, the demographic variables also included in the model: gender, age, from urban or rural, education level, industry/occupation.

Many scholars use income as an independent variable. Since the dependent variables in this study should be influenced by social culture and psychology, we set up the industry/occupation variable instead, according to the occupation reputation scores in China [34,35], there are 7 groups of industry/occupation variable, 5 groups are divided by the scores: 99-90 group (scientific scholars, university professors), 89-80 (engineers, attorney, doctors, middle school teachers, government agencies, etc.), 79-60 group (primary school teachers, leaders in party organizations, business agencies, etc.), group of 59 or less (accounting managers, administrative staff, Policemen, nurses, etc.), group of 39 or less (drivers, chefs, workers, cleaners, etc.). The students and the other are listed as the 6st and 7st group. Compared with the economic income, comparing the groups divided by the scores of professional reputation is better for this study, since it reflects the influence of social statues. Considering the individual's previous experience and family background, we also choose the education level of their parents as a proxy variable.

**Dependent Variable**

Because this study focuses on the interaction in social reading behavior, we use the Likert five-point scale to measure the frequency of reading others’ sharing behavior, In order to reduce the model error, then divided into 2 groups: the high-intensity group and the low-intensity group. Logistic regression is used to establish a behavior
prediction model, for answering the question “what is the reason for the urban high-educated readers to read the content shared by others?”

**Analysis the variables**

Descriptive analysis of the dependent variable “reading frequency of sharing content by others”, the overall mean and standard deviation is 2.97±0.94, of which the mean and standard deviation of the college degree is 2.95±0.95, the undergraduate degree is 2.96±0.94, and the master’s degree is 3.00±0.95, doctoral degree or above is 2.87±0.0.86. Except the group of doctor degree or above, which is low, other groups are very similar.

The mean score of the social reading motivation showed in Table 3. Hypothesis1 is partially rejected, the primary motivation is the infotainment motivation, but the second one is the personal cultivation motivation.

Subsequently, the ANOVA analysis was carried out to confirm that if there are any differences of motivation intensity between readers with different education background. Hypothesis2 is confirmed, the reading motivation intensity in different education group is significantly different, but the hypothesis 2.1, 2.2 are overturned. F1 infotainment motivation (sig =0.01) and F2 (sig =0.00) personal cultivation motivation, the higher the education background, the higher the motivation intensity, not the progressive growth, but as an inverted U-shaped, the two-two comparison results shows that there is no significant difference between college degree and bachelor group. There is no significant difference between master degree and doctoral degree (or above). Master degree group got the highest average scores of infotainment and personal cultivation motivation intensities, but the readers with doctoral degrees (or above) has low average scores.

The F4 technology alternative motivation (sig= 0.03) is significantly different between readers, the higher the education background, the lower the intensity of this motivation.

F3 social interaction motivation (sig=0.09) , there is no significant difference, but in multiple comparisons ,only in one comparison (sig =0.01), the group of doctor degree (and above), their motivation for social interaction is significantly lower than others.

Table 2. Comparison of the social reading motivation between readers with different educational background

<table>
<thead>
<tr>
<th>Degree</th>
<th>Infotainment MEAN±SD</th>
<th>Personal cultivation MEAN±SD</th>
<th>Social interaction MEAN±SD</th>
<th>Technical alternative MEAN±SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>College Degree</td>
<td>3.6±0.69</td>
<td>3.21±0.86</td>
<td>3.12±0.81</td>
<td>3.01±0.86</td>
</tr>
<tr>
<td>Bachelor</td>
<td>3.62±0.72</td>
<td>3.20±0.85</td>
<td>3.07±0.84</td>
<td>2.96±0.87</td>
</tr>
<tr>
<td>Master</td>
<td>3.71±0.68</td>
<td>3.36±0.85</td>
<td>3.08±0.79</td>
<td>2.91±0.88</td>
</tr>
<tr>
<td>Doctor</td>
<td>3.68±0.66</td>
<td>3.19±0.98</td>
<td>2.96±0.87</td>
<td>2.83±0.85</td>
</tr>
</tbody>
</table>
Regression model analysis

Logistic regression model can be used to detect the correlation of variables in the model, especially for classification prediction [36]. The model is:

\[
\log \frac{P}{1-P} = \beta_0 + \beta_1 F1 + \beta_2 F2 + \beta_3 F3 + \beta_4 F4 + \beta_5 \text{sex}(1) + \beta_6 \text{city}(1) \\
+ \beta_7 \text{agegroup}(1) + \beta_8 \text{agegroup}(2) + \beta_9 \text{degree}(1) + \beta_{10} \text{degree}(2) + \beta_{11} \text{degree}(3) \\
+ \beta_{12} \text{major}(1) + \beta_{13} \text{major}(2) + \beta_{14} \text{occupation}(1) \cdots + \beta_{16} \text{occupation}(6) \\
+ \beta_{17} \text{parentdegree}(1) \cdots + \beta_{19} \text{parentdegree}(5)
\]

After Hosmer and Lemeshow statistic, the test result is not significant (χ²=3.51, df=8, sig=0.90), indicating that the model has good goodness of fit, and the results are significant after comprehensive test of model coefficients (χ²= 107.56, df=39, sig=0.00), within 99% of the confidence interval, the model is established. The R-square value of the binary logistic regression model is pseudo R-square, the reference value is too low to be considered. Therefore, the accuracy of the model is tested. It is 70.3%, which is ideal.

The results of the β values of these variables in the model shows in Table 3. Two reading motivations are positively and significantly correlated to the frequency of reading others’ sharing behavior, there are F3 social interaction motivation and F1 infotainment motivation, but without F2 or F4, so Hypothesis 3 is rejected. Different genders and different birthplace are also significantly correlated to the dependent variable. But other variables, like education background (except doctor degree or above), or age, has no significantly correlation with the dependent variable, so Hypothesis 4 is rejected. It should be noticed that only degree (3) group, which is doctor degree or above, is significantly negatively correlated to the dependent variable, which means the odds for them to read others’ sharing as a high frequency behavior is lower than others.

Unexpectedly, the occupation (5), the professional reputation score of this group is lower than 39, occupations such as drivers, chefs, industrial workers, cleaners, etc., and occupation (6), which stands for other occupations, were significantly negatively correlated to the dependent variable, which means for these readers, the odds to read others’ sharing as a high frequency behavior is lower than those with higher occupation reputation scores.

<table>
<thead>
<tr>
<th></th>
<th>MEAN±SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>3.65±0.70</td>
</tr>
<tr>
<td></td>
<td>3.25±0.87</td>
</tr>
<tr>
<td></td>
<td>3.08±0.82</td>
</tr>
<tr>
<td></td>
<td>2.95±0.87</td>
</tr>
</tbody>
</table>
Table 3. The Logistic Regression Model: Factors affecting the behavior of reading others’ sharing among urban high-educated readers

<table>
<thead>
<tr>
<th></th>
<th>B</th>
<th>S.E.</th>
<th>Wals</th>
<th>df</th>
<th>Sig.</th>
<th>Exp (B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>F1</td>
<td>0.19</td>
<td>0.07</td>
<td>7.03</td>
<td>1.00</td>
<td>0.01</td>
<td>1.21</td>
</tr>
<tr>
<td>F2</td>
<td>-0.09</td>
<td>0.06</td>
<td>2.45</td>
<td>1.00</td>
<td>0.12</td>
<td>0.91</td>
</tr>
<tr>
<td>F3</td>
<td>0.34</td>
<td>0.07</td>
<td>27.48</td>
<td>1.00</td>
<td>0.00</td>
<td>1.41</td>
</tr>
<tr>
<td>F4</td>
<td>0.08</td>
<td>0.06</td>
<td>1.95</td>
<td>1.00</td>
<td>0.16</td>
<td>1.09</td>
</tr>
<tr>
<td>sex(1)</td>
<td>0.22</td>
<td>0.09</td>
<td>5.47</td>
<td>1.00</td>
<td>0.02</td>
<td>1.25</td>
</tr>
<tr>
<td>city(1)</td>
<td>-0.29</td>
<td>0.10</td>
<td>8.80</td>
<td>1.00</td>
<td>0.00</td>
<td>0.75</td>
</tr>
<tr>
<td>agegroup(1)</td>
<td>-0.06</td>
<td>0.10</td>
<td>0.30</td>
<td>1.00</td>
<td>0.59</td>
<td>0.94</td>
</tr>
<tr>
<td>agegroup(2)</td>
<td>-0.40</td>
<td>0.29</td>
<td>1.95</td>
<td>1.00</td>
<td>0.16</td>
<td>0.67</td>
</tr>
<tr>
<td>degree(1)</td>
<td>-0.04</td>
<td>0.13</td>
<td>0.09</td>
<td>1.00</td>
<td>0.76</td>
<td>0.96</td>
</tr>
<tr>
<td>degree(2)</td>
<td>-0.21</td>
<td>0.15</td>
<td>1.94</td>
<td>1.00</td>
<td>0.16</td>
<td>0.81</td>
</tr>
<tr>
<td>degree(3)</td>
<td>-0.49</td>
<td>0.22</td>
<td>4.75</td>
<td>1.00</td>
<td>0.03</td>
<td>0.61</td>
</tr>
<tr>
<td>major(1)</td>
<td>0.06</td>
<td>0.13</td>
<td>0.25</td>
<td>1.00</td>
<td>0.62</td>
<td>1.07</td>
</tr>
<tr>
<td>major(2)</td>
<td>-0.05</td>
<td>0.13</td>
<td>0.18</td>
<td>1.00</td>
<td>0.67</td>
<td>0.95</td>
</tr>
<tr>
<td>occupation(1)</td>
<td>0.13</td>
<td>0.18</td>
<td>0.52</td>
<td>1.00</td>
<td>0.47</td>
<td>1.14</td>
</tr>
<tr>
<td>occupation(2)</td>
<td>-0.07</td>
<td>0.17</td>
<td>0.18</td>
<td>1.00</td>
<td>0.67</td>
<td>0.93</td>
</tr>
<tr>
<td>occupation(3)</td>
<td>0.08</td>
<td>0.18</td>
<td>0.19</td>
<td>1.00</td>
<td>0.67</td>
<td>1.08</td>
</tr>
<tr>
<td>occupation(4)</td>
<td>0.13</td>
<td>0.22</td>
<td>0.35</td>
<td>1.00</td>
<td>0.55</td>
<td>1.14</td>
</tr>
<tr>
<td>occupation(5)</td>
<td>-0.64</td>
<td>0.27</td>
<td>5.36</td>
<td>1.00</td>
<td>0.02</td>
<td>0.53</td>
</tr>
<tr>
<td>occupation(6)</td>
<td>-0.41</td>
<td>0.17</td>
<td>5.72</td>
<td>1.00</td>
<td>0.02</td>
<td>0.67</td>
</tr>
<tr>
<td>parentsdegree(1)</td>
<td>0.08</td>
<td>0.17</td>
<td>0.20</td>
<td>1.00</td>
<td>0.66</td>
<td>1.08</td>
</tr>
<tr>
<td>parentsdegree(2)</td>
<td>0.04</td>
<td>0.17</td>
<td>0.07</td>
<td>1.00</td>
<td>0.80</td>
<td>1.04</td>
</tr>
<tr>
<td>parentsdegree(3)</td>
<td>0.08</td>
<td>0.20</td>
<td>0.15</td>
<td>1.00</td>
<td>0.70</td>
<td>1.08</td>
</tr>
<tr>
<td>parentsdegree(4)</td>
<td>0.03</td>
<td>0.19</td>
<td>0.03</td>
<td>1.00</td>
<td>0.86</td>
<td>1.03</td>
</tr>
<tr>
<td>parentsdegree(5)</td>
<td>0.09</td>
<td>0.30</td>
<td>0.10</td>
<td>1.00</td>
<td>0.76</td>
<td>1.10</td>
</tr>
<tr>
<td>constant</td>
<td>-0.61</td>
<td>0.37</td>
<td>2.72</td>
<td>1.00</td>
<td>0.10</td>
<td>0.55</td>
</tr>
</tbody>
</table>

Research findings

Based on Motivation Theory, social reading behaviors are triggered by reading motivations. We find that high-educated readers’ social reading motivations can be divided into these four dimensions: infotainment motivation, personal cultivation motivation, social interaction motivation, and technology alternative motivation. However, among readers with different education background, the motivation intensities in three dimensions are significant different: Infotainment, personal cultivation and technology alternative. What’s more, different dimensions of reading motivations have different affects on specific social reading behaviors, such as sharing or interacting with others.
Social reading online can’t replace traditional reading

The data showed that among urban high-educated readers who read on social media, the higher the education background, the higher the infotainment motivation intensive they have, but the higher the education background, the lower the motivation intensive of technical alternative.

Urban high-educated readers, compared with other readers, have better reading habit and reading skill, have more advantages in accessing reading resources. According to the study, when these readers adopt the new reading mode on social media, their purpose is definite, the primary motivation is infotainment. It reveals that, although the reading habit of these urban high-educated readers has changed gradually due to the new technology, but compared with traditional paper reading or individual e-book reading, the primary reason for reading on social media is that this new reading mode brings an infotainment lifestyle to the new generation.

The data also indicated that social reading online can not replace the traditional reading mode, even though the new technology is convenient. For urban high-educated readers, measured by motivation intensity, personal cultivation is the second important motivation when they are reading on social media, which was often mentioned by other scholars as a primary motivation of traditional paper reading. It can be inferred that, urban high-educated readers have multiform resources to collect information or acquire knowledge, social reading in virtual space is one of these resources, but won’t be the main resource instead of the traditional way.

Reading others’ sharing online become a new way of socializing

It is proved that, among urban high-educated readers with different education background, the motivation intensities of infotainment, personal cultivation, technology alternative are significant different. But the ANOVA analysis for social interaction motivation shows that, the only significant difference is between doctor degree (or above) readers and others. And according to the Logistic Regression Model, education background (except doctor degree or above), or age, has no significant correlation with the frequency of reading others’ sharing behavior. It means for the new generation, reading on social media is considered as a new way of socializing, no matter the readers’ age or their education background.

However, readers with doctor degrees (or above) are often an exception. Their motivation intensity of social interaction is significantly lower than others and the odds to read others’ sharing as a high frequency behavior is also lower than others. It shows that they are less inclined to read content shared by others. It could be explained: for them, traditional “social reading” like book clubs offline, professional forums with knowledge sharing activities, and more professional BBS, may cater to their socializing expectation and requirement much better.

Sharer become as important as content itself on social media

As the Logistic Regression Model shows, the frequency of reading others’ sharing behavior on social media could be predicted by their reading motivations. Controlling other variables, the motivations of infotainment and social interaction are significantly correlated to the frequency of reading others’ sharing behavior. It also indicates that, with interaction activities like sharing, comment etc., reading on social media be-
comes more meaningful. Since it is not only reading behavior, but also socializing behavior, sharers who share the contents with other readers become as important as contents themselves on social media.

Like some scholars proposed, social reading online is a new reading mode of reader-central paradigm, rather than book-central paradigm but why do these readers adopt the reader-central paradigm? We found out the answer through this empirical study. Since the one of the primary motivations for this reading behavior is social interaction, the relationship between readers, either the relationship in virtual space or in reality, will be more and more important. Who would share the contents with others, sometimes become even more important than what kind of information they are sharing. Online reading promoters or online librarians could be more effective and influential in this new reading mode, so that it is possible to promote the National Reading Program by new technology, but how should reading promoters be chosen online is essential.

Social media cannot meet readers’ personal cultivation requirement

It should not be overlooked that although there is an entertainment tendency on social media, but the urban high-educated readers do have high motivation intensity of personal cultivation. The higher the degree background, the higher the expectation of using social reading to help individuals improve their learning and work performance. As the development of WeChat, Weibo or derivative APP such as WeChat Reading, it is possible for readers to use social media as a personalized learning tool.

However, readers with doctor degrees (or above), are still the exception. According to the average score of personal cultivation motivation, it can be inferred that their expectation for using social reading as a learning tool is not as much as others.

On the other hand, when the urban high-educated readers read others’ sharing on social media, the personal cultivation motivation has no significantly correlation with the dependent variable. We could tell, since now, reading on social can’t satisfy their personal cultivation needs very well. Reading others’ sharing on WeChat, Weibo or UGC, readers are still motivated by infotainment and socializing purpose.

Some scholars hope that social reading, as a new mode will become a tool to promote knowledge dissemination and cultural inheritance. Based on this empirical study, even for the urban high-educated readers, this is still an overly optimistic idea. Perhaps it only works in readers with the doctor degree or above.

Reading on social media widen the gap of digital divide

Some scholars optimistically suggest that the new reading mode provides readers with equal opportunity to access to information resources, one-way communication model has changed, and a decentralized communication mode was built on social networks. Readers are exposed in variety of information resources and they can access to knowledge by interacting with experts, friends or people with strong willing to exchange information [37]. However, according to this study, readers from rural area, or readers with less social capital in real life, are still passive on using new reading mode.

Therefore, social reading in virtual space does provide readers with opportunities to exchange information resources equally, but like some scholars have mentioned before, the popularization of technology does not mean that the technology is used ef-
fectively. Differences in the adaption of the new technology depend on economic and social status, education background, geographical location etc. New Digital Divide is emerging [38]. This study confirmed that even in the urban high-educated readers, the digital divide has not been eliminated yet. To avoid information and knowledge gaps, more instructors and guidance are needed.

This study only focuses on the urban high-educated readers’ social reading behavior. The limitations are inevitable. It is necessary to understand the impact of new reading trend. A stratified study of different readers is needed in the future.

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Using Face Detection to Assist the Exploration of Social Relationship in Historical Photographs

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Abstract. Taiwan Biographical Database (TBDB) is a database collecting biographical information on historical personages in Taiwan. It provides functions including relational database (RDB) and full-text search, social network analysis (SNA) and geographic information system (GIS) analysis. The primary purpose of TBDB lies in establishing a digital humanities tool that inspires historians to explore Taiwan history. Through semi-automatic named entity recognition from the full text of biographies, TBDB assists historians to construct kinship or social relationship networks. However, the full text of biographies might not describe all kinship or social relationship of a historical person. In consideration of the fact that historical photographs were usually taken in formal occasions, historical photographs might be utilized to uncover additional relationship. In view of this, this paper elaborates the implementation of a face detection function in TBDB that utilizes the OpenCV Library to detect faces of historical persons in an old photograph. An experiment using 45 historical photographs shows that the function can achieve average 98.16% recall, but with a much lower precision.

Keywords: Taiwan Biographical Database (TBDB), Social Network Analysis (SNA), Face Detection, OpenCV.

Introduction

Digital technology changes how humanities scholars conduct research and even the whole research environment. In the era of big data, humanists and social scientists need the help of information technologies (such as text mining, artificial intelligence) to analyze massive amount of digital information, and this is what we call digital humanities [1,2].

Historical Science is one application field of digital humanities. Research on personages is essential for historical sciences. The personality, family background, experience, social class of a historical person, and even social mobility, marriage and political network of the whole society are all historical issues. In view of this, several digital humanities systems for exploring historical persons have been developed. The China Biographical Database (CBDB), co-developed by Harvard University, Academia Sinica and Peking University, is one such paragon. Japan Biographical Database (JADB) is another example. Using CBDB as a benchmark, the authors have been
participating in the development of Taiwan Biographical Database (TBDB) [3]. The primary purpose of TBDB lies in supporting historians to discover information on Taiwan historical personages and explore research topics on them. TBDB offers historians software services including relational database (RDB) search, full-text search, social network analysis (SNA) and geographic information system (GIS) analysis.

During the development of TBDB, a lot of historical photographs have been collected. In comparison with nowadays, taking photographs in late 19th century and early 20th century was not very common, and might only happened in formal occasions. It inspires the authors that detecting and recognizing persons in historical group photographs might be beneficial for exploring the hidden social relationship among them.

This paper presents our efforts in developing a utility that detects faces from historical photographs collected in TBDB. This paper is organized as follows. Section 2 introduces TBDB and OpenCV, the function library used in this paper for face detection. Section 3 describes the method and the experiment, and Section 4 presents the implementation of the face detection function in TBDB. Section 5 concludes the paper.

Related Works

In this section, we briefly describe the development of TBDB, and then introduce the OpenCV library.

TBDB

TBDB attempts to collect historical personages in Taiwan from 16th century, especially personages in late 19th century or 20th century. TBDB offers historians software services including RDB search, full-text search, text mining, SNA, and GIS. The system architecture of TBDB comprises the data layer, the data processing layer, and the service layer. The data layer comprises a RDB for storing structured information on historical persons (e.g. name, years of birth and death, birth place), organizations, gazetteers, and so on. Lucene-based full-text index, and full text of biographies. The data processing layer contains functionality of the processing of MS Word documents, named entity recognition, SNA, GIS coordinate transformation, text mining, and quality control. The service layer includes RDB search, full-text search, drawing engine, map engine, and value-added services [3]. At the initial stage, TBDB uses the Personage Biographies in the revised Local Gazetteers of ChangHua County, and contains the biographies of 887 historical personages, and it is incorporating more biographies from the gazetteers of other metropolitan and counties in Taiwan.

In addition to providing RDB and full-text search functionality, TBDB exploits semi-automatic named entity recognition to detect person names, organization names, and place names from the full text of biographies [3], and on the basis of the detected named entities, kinship and social relationship can be explored.

Three social network analysis functions have been developed for TBDB. The first function directly lists the persons mentioned in the biography of a personage no matter whether the former persons’ biographies are included in TBDB. For instance, Fig. 1 is the network diagram of the persons mentioned in the biography of Xian-Rong Gu (辜顯榮).

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The second function enables users to identify those who are mentioned in an individual’s biographical full text and whose biographies are also included in TBDB. In this manner, historians can explore the relationship between important or famous personages quickly. Fig. 2 illustrates the network diagram of Xian-Rong GU created by the second function. Users can choose the level of network expansion for the above two functions.

As poetry clubs were an important kind of organization in the Japanese colonial period in Taiwan, because personages might gather in poetry clubs for creating poems as well as discussing social issues. In view of this, the third function shows the relationship between poetry clubs, members of poetry clubs, and primary activity places of members. This can be used to understand the geographical distribution of poetry club members. For example, Fig. 3 shows the main activity places of members of a certain club were Lukang, Taipei, Taichung, Yuanlin, Changhua, Dacun and other places. This function can be expanded into other kinds of organization.

Fig. 1. Social network of Xian-Rong GU (辜顯榮) created by the first SNA function

1 In order to be easily understandable, in this paper, we use a mapping function that converts Chinese words into alphabet characters by Pinyin system and connects each word by “_”. For example, Xian-Rong GU is displayed as gu_xian_rong.
The above three SNA functions are developed according to the full text of biographies. Because the authors have collected a few historical group photographs while
developing TBDB and historical group photographs were usually taken in formal occasions, those photographs could be employed as a channel to peek into the lives of historical personages, and hidden relationship which were not described in biographies might be explored through those photographs. In view of this, the authors attempt to detect faces in historical group photographs, and the method and experiment will be presented in the following Sections.

OpenCV

OpenCV (Open Source computer vision) is a function library for instant image processing, computer vision and graphic recognition (https://opencv.org/). OpenCV was initiated and developed by Intel Labs from 1999, and from August 2012, a non-profit organization, OpenCV.org, has taken the place of supporting OpenCV. OpenCV is a cross-platform open source library that supports a variety of programming languages, using BSD license for reusing, modification and re-distribution.

In order to process the photographs of the historical personages in TBDB, and discover social relationship hidden in the photographs, TBDB utilizes the Haar feature-based cascade classifier (the Haar Classifier, in short) in OpenCV to assist the face detection of historical persons in old photographs, which can then be recognized, annotated, and used for constructing social relationship. The Haar Classifier uses a machine learning algorithm with a training dataset of a large number of correct images (images with faces) and incorrect images (images without faces). The final classifier consists of more than 6,000 features which can be used to identify front faces that appear in an image [4].

Method and Experiment

The Haar Classifier in OpenCV was used to detect faces in old group photographs of TBDB. OpenCV has trained several feature profiles of facial features. After testing, TBDB utilizes the profile named haarcascade_frontalface_default.xml, and adjusts the parameters in consideration of the tradeoff between system response time and recall. The parameter scaleFactor can control the scaling ratio of a photograph so that more facial features can be extracted according to the training dataset. On the other hand, because TBDB is an online service, in addition to achieving good detection recall, it is necessary to detect faces within an acceptable response time. After a few experiments in adjusting the parameter, the scaleFactor parameter is finally set to 1.01 to obtain a satisfactory response time without losing to much recall.

Fig. 4 illustrates a face detection result. The photograph contains two persons and our method can correctly detect the two faces, but also detect a false-positive face.

Forty-five old group photographs were used to test the precision and recall of the Haar Classifier. Table 1 depicts the experimental result. The average recall is 98.16% with a poor average precision 32.38%. Closer examination of the photographs reveals that several key factors may lead to the low average precision, including the low resolution of photographs, photographs with a large group of persons, and stained or worn photographs. For example, Fig. 5 is a low-resolution old group photograph with many persons. In this photograph, each person in the photograph only occupies few pixels and therefore it is difficult to detect each face. In spite of the poor average precision, it is believed that detecting as more as possible faces in a photograph is vital for history
science, and our method can achieve nearly 100% recall. In addition, users can easily eliminate false faces in a photograph with the designed user interface.

Fig. 4. Face detection result

Fig. 5. Low-resolution old photograph

Table 1. Experimental Result

<table>
<thead>
<tr>
<th>Photo ID</th>
<th>Persons Detected</th>
<th>Correct</th>
<th>Precision</th>
<th>Recall</th>
</tr>
</thead>
<tbody>
<tr>
<td>0001</td>
<td>18</td>
<td>49</td>
<td>18</td>
<td>36.73%</td>
</tr>
<tr>
<td>0002</td>
<td>16</td>
<td>92</td>
<td>16</td>
<td>17.39%</td>
</tr>
<tr>
<td>0003</td>
<td>18</td>
<td>23</td>
<td>18</td>
<td>78.26%</td>
</tr>
<tr>
<td>0004</td>
<td>36</td>
<td>57</td>
<td>34</td>
<td>59.65%</td>
</tr>
</tbody>
</table>
### Implementation

A user interface has been implemented in TBDB that allows a user with privilege to upload historical photographs with metadata based on Dublin Core Metadata Element Set (DC). After a photograph is uploaded, TBDB will automatically detect faces in the photograph, and the user can judge the detection result, delete false-positive faces and...
fill in the corresponding person names. A follow-up quality control procedure will be performed by a TBDB manager to verify the quality and correctness of photographs, metadata, and face detection. The photographs, detected faces, and the metadata are stored in TBDB for constructing kinship and social networks. The detected faces, associated metadata and person names can be used as a training data for further developing a function that automatically recognizes historical personages in photographs.

Fig. 6 is the preliminary interface for photograph upload and metadata creation. TBDB will automatically fill in metadata fields such as format, creation, and date. Fig. 7 is the result of the face detection for the photograph shown in Fig. 6, and Fig. 8 is the resultant social network for the personages in Fig. 6.

![Fig. 6. The user interface for photograph upload and metadata creation](image)

<table>
<thead>
<tr>
<th>Correct faces</th>
<th>False-positive faces</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Correct faces" /></td>
<td><img src="image" alt="False-positive faces" /></td>
</tr>
</tbody>
</table>

Fig. 7. The face detection result for the photograph in Fig. 6.
Integrating social relationship found in biographies, social relationship detected from historical photographs, and even social relationship found from external source, TBDB could produce several social networks to inspire historians. Fig. 9 shows one such example. Historians provide a list of founders of Changhua Bank, the list of founders of Taichung No. 1 Middle School. After integrating the above external information with the information discovered from TBDB, TBDB depicts the social network for personages and organizations.

More interestingly, when the social networks of poetry clubs are combined with the social network shown in Fig. 9, some hidden relations can be revealed. Although none of the major shareholders of Changhua Bank participated in Taiwanese Parliament Movement directly, many of them participated in poetry clubs. This suggests that capitalists (major bank shareholders) actually also cared about politics, but in order not to confront with the Japanese government directly, they chose to influence the politics in
an indirect way, participation in cultural activities (such as joining poetry clubs) to a certain extent concealing their political engagement.

Social networks shape the era in which historical persons lived and their related people, and they can even be used to explore historical people’s activities; therefore, historians can exploit social networks to assess when, how, and why historical personages leverage kinship and social relationship. In view of this, TBDB has implemented a function that automatically merges the social networks of two or more historical personages, and historians can use this function to reveal indirect relationship between historical persons. Fig. 10 is an example that merges the social networks of historical personages marked in red.

![Fig. 10. Example of the merge of several social networks](image)

Conclusions

Although a biography provides a history of a person’s family, education, work experiences, and social relationship, it could not perfectly cover every aspect and detail of a person. Currently, history of a person’s social relationship are an important research topic, and a lot of personal information can be obtained from this social network. It still lack of history person’s photographs to build-up a completed data set for automatic recognition, but the face detection is still a good way to help identify people's relations from photos uploaded by users. One picture is worth a thousand words. Photographs might complement some relationship missed out in biographies. In view of
this, this paper presents how TBDB employs the OpenCV library to automatically detect faces from historical photographs and then assist the exploration of social relationship that were not described in biographies. The face detection function can achieve an average 98.16% recall, but with a poor average 32.38% precision. In spite of the poor average precision, a convenient user interface has been implemented in TBDB that facilitates users to delete false-positive faces in old photographs. On the other hand, the average high recall allows users to retrieve nearly all faces in old photographs.

TBDB has been launched with the URL http://tbdb.ntnu.edu.tw. An ordinary user can search and browse the biographies collected in TBDB, and peek into the social network of a historical personage. The upload of historical photographs can be only conducted by privileged users. In the future, the authors would like to implement a crowdsourcing mechanism that leverages the power of crowd to assist the collection of historical photographs and the recognition of personages in those photographs.

Acknowledgement

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References

Evaluating Library and Information Science publications in the Asia-Pacific region from 2015 to 2018

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Abstract. This study aims to evaluate Library and Information Science (LIS) publications in the Asia-Pacific region from 2015 to 2018 to provide information on publication analysis, citation analysis, research performance benchmarking, and research topics prevalence. The publication data was gathered from the Clarivate Analytics’ Web of Science and InCites. InCites and Web of Science were used to evaluate publication productivity, analyse citations and benchmark outputs against similar publications within the same category, year, and document type worldwide. Author keywords assigned to each publication were examined to identify prevalent research topics in the publications. The findings of this research have wide practical implications including informing the LIS community on the insights into prevalent research topics in LIS publications in the Asia-Pacific region from 2015 to 2018 which can be used as a benchmarking tool to evaluate the curriculum of LIS schools in the Asia-Pacific region.

Keywords: Bibliometrics, Library and Information Science, Asia-Pacific Region.

Introduction

Library and Information Science (LIS) is a growing discipline in the Asia-Pacific. In the region, LIS education has a long history and can be dated back to the 1920s, where LIS education was first introduced in China [1]. Today, 26 iSchools in the Asia-Pacific region are distributed in China, Australia, Thailand, Japan, Taiwan, South Korea, Malaysia, the Philippines, and New Zealand [2]. The growth of LIS education in the Asia-Pacific region has resulted in the increased number of LIS scholars, research in the LIS sector, and thus LIS research publications.

There is a need to evaluate these LIS publications to indicate its importance and impacts on the research community. Some studies have been conducted to evaluate the LIS publications. For example, a study on LIS top journals from 1980 to 2008 showed that publications from Asian countries had increased from 4.5% in 1980 to 18.2% in 2008 [3]. In 2010, Mukherjee [4] conducted a study on LIS research in Asian countries based on articles published in journals indexed by the Social Science Citation Index (SSCI) of Web of Knowledge (WoS). The result showed that during 2001–2007 the publication rate increased twofold. The research findings also
revealed that researchers from China are the most productive article authors followed by Taiwan and South Korea.

Bibliometrics is a dynamic research area and therefore an up-to-date study is needed to analyse the current research performance and to get the insights of the current research landscape. This study aims to evaluate LIS publications in the Asia-Pacific region from 2015 to 2018 to provide information on publication analysis, citation analysis, research performance benchmarking, and research topics prevalence.

**Literature Review**

There is a growing awareness of the importance of measuring research performance through research outputs. Bibliometrics is a field of study that provides ‘a powerful set of methods and measures for studying the structure and process of scholarly communication’ [5]. It ‘relies on the use of quantitative methods to examine documents, thus, helping to uncover knowledge structure and development of the research field’ [6].

Bibliometrics approach has been used since the 1920s and it is getting more popular today as there are many tools developed to do bibliometric analysis and also the ease to harvest publication data from citation databases [7]. Citation databases provide ‘the ability to follow a digital path through the scholarly literature’ [8]. It can be used to analyse articles and citations to measure scholarly outputs productivity [8]. These analyses also can reveal collaboration and referencing patterns or network of literature. Citation analysis has become ‘more sophisticated, and the advent of networked information technologies has led to quantitative and qualitative advances in other bibliometric methods’ [5].

Rolland Stevens divides bibliometrics into two basic categories, i.e.: descriptive bibliometrics which is used to measure productivity and evaluative bibliometrics which is used to count literature usage of a specific topic, subject or discipline. Descriptive bibliometrics is further differentiated as bibliometrics based on geographic aspect; based on period, and based on disciplines. Descriptive bibliometrics is ‘the study of the number of publications in a given field or productivity of literature in the field for the purpose of comparing the amount of research in different countries, the amount produced during different periods, or the amount produced in different subdivisions of the field’. While evaluative bibliometrics is further divided into literature usage count based on reference count, and based on citation count [9].

Bibliometrics studies of LIS publications worldwide have been done previously with various timespans. For examples, bibliometrics studies of LIS publications from 1980 to 2017 [10], from 2003 to 2012 [11], from 1900 to 2010 [12], from 1956 to 2010 [13], and from 1996 to 2005 [14]. These studies analysed LIS publications in a global scope with no location limitation. Bibliometric studies of LIS research also have been conducted based on particular regions, such as in Iran [15], India [16-17], and Malaysia [18]. However, there is no recent bibliometrics study of LIS publications in the Asia-Pacific region scope. Therefore, this study will try to fill in the gap by providing analysis of the LIS publications in the Asia-Pacific region from 2015 to 2018.
Objectives of the study

Objectives of this study are:

- To analyse LIS publications in the Asia-Pacific region from 2015 to 2018 and the citing publications
- To compare the performance of LIS publications in the Asia-Pacific region from 2015 to 2018 against similar publications within the same category, year, and document type worldwide
- To identify research topics prevalence of LIS publications in the Asia-Pacific region from 2015 to 2018

Methodology

Publication and citation analyses using Clarivate Analytics’ Web of Science (WoS)

We used the Web of Science (WoS) database and InCites by Clarivate Analytics to gather the data for this study. WoS contains 10 indexes which are Science Citation Index Expanded (SCI-Expanded), Social Sciences Citation Index (SSCI), Arts & Humanities Citation Index (A&HCI), Emerging Sources Citation Index (ESCI), Conference Proceedings Citation Index-Science (CPCI-S), Conference Proceedings Citation Index-Social Sciences & Humanities (CPCI-SSH) Book Citation Index-Science (BKCI-S), Book Citation Index-Social Sciences & Humanities (BKCI-SSH), Current Chemical Reactions (CCR-Expanded), and Index Chemicus (IC) [19]. These indexes consist of a large number of bibliographic metadata from scholarly articles, reviews, proceedings papers, news items, editorial materials, books, book chapters, etc. WoS was chosen as the data source for this study because it listed Information Science & Library Science as one of its subject categories which made the data collection for this study more effective and efficient.

We accessed the WoS database to collect the data for this study on 2 August 2019. Using an advanced search feature, we created a search query using WoS Category (WC) field tag of “Information Science Library Science” to limit the search by the proposed WoS category. In this study, we limited the search by document types to only search for articles, reviews, and proceeding papers, written in English, and published in from 2015 to 2018. The decision to limit the search strategy by document types, language, and timespan was due to several practical reasons such as currency of the publications, amount of time it takes to get a work published and cited, and number of the publications. Therefore, restrictions by language (English), document types (Article, Review, and Proceedings Paper), and timespan (2015–2018) were also applied in the search strategy.

The search results were then refined by countries located in the Asia-Pacific region. The total number of records after the final refinement was 6,528 [20]. Then, we analysed the data in WoS using ‘Analyze Results’ and ‘Create Citation Reports’ features to create publication and citation reports.

Benchmarking using Clarivate Analytics’ InCites

InCites by Clarivate Analytics allows us to analyse and benchmark outputs against similar publications within the same category, year and document type worldwide. InCites uses bibliographic metadata records and citation data generated from WoS and
Journal Citation Reports (JCR) by Clarivate Analytics. For benchmarking purposes, we exported the results data in WoS to InCites. InCites did not include 29 out of 6,528 records in the exported dataset. These 29 records might not be available if they were published before 1980 or were recently added to the WoS Core Collection. Therefore only 6,499 publications were available in InCites to be analysed. The InCites dataset in this study was updated on 31 July 2019 which includes WoS content indexed through 28 June 2019.

**Author keywords analysis using R**

To identify the research topic prevalence of those 6,528 publications, we analysed it at the article level by using author keywords assigned to each publication. WoS provides two types of keywords, Author Keywords (DE) and Keywords Plus® (ID). Author Keywords are a list of words assigned to the publication by the original authors to best represent their study. Meanwhile, Keywords Plus® is a list of words and phrases that are indexed automatically by a computer algorithm to find recurrent words and phrases in the title of the references that do not essentially appear in the title of the article or listed as Author Keywords [21-22]. Keywords Plus® is a unique feature of WoS. According to Fu, et al., ‘Keywords Plus is as effective as Author Keywords in terms of bibliometric analysis investigating the knowledge structure of scientific fields, but it is less comprehensive in representing an article’s content’ [23]. In this study, we decided to only evaluate Author Keywords as it best represents the publications’ content to identify the research topics prevalence.

To gather the Author Keywords data, we downloaded full bibliographic metadata records from WoS in Tab-delimited (Win) format which we opened using Microsoft Excel. We copied the Author Keywords (DE) column from the dataset into a new Excel document and cleaned the data using OpenRefine. We used the clustering feature in OpenRefine to find and merge different values that represent the same thing. For example, “Librarian”, “librarians”, and “Librarians” refer to the same concept and only have plural and capitalisation differences. The total number of Author Keywords after the data cleaning was 25,910 [20]. To analyse the Author Keywords based on each occurrence, we used the dplyr package in R.

**Results and Discussion**

The data in this study were accessed on 2 August 2019 from Clarivate Analytics’ WoS and InCites. The InCites dataset was updated on 31 July 2019 which includes WoS content indexed through 28 June 2019. Search strategy, publication analysis, citing publication analysis, benchmarking data, and author keywords analysis of this study are published as an accompanying associated data by Mulatiningsih & Setyowati [20].

**Publication analysis**

There were 6,528 LIS publications in the Asia-Pacific region from 2015 to 2018 indexed in WoS. To analyse these publications, we used the Analyze Results feature in WoS. The data showed 2017 as the most productive year with 1,943 publications between 2015-2018 timespan as shown in Fig.1.
The top 12 countries in Fig. 2 were ranked by the number of publications. Of 6,528 publications, China (1,615 publications), India (1,264 publications), Australia (871 publications), Taiwan (573 publications), and South Korea (461 publications) were ranked in the top 5 Asia-Pacific countries by publications in LIS research during 2015-2018. It is important to note that these are overlapping datasets because of co-authored publications (such as China-India, Australia-Japan, etc.).

The data analysis also revealed the Chinese Academy of Sciences as the most productive organisation with 162 publications followed by Wuhan University (147 publications) and Nanyang Technological University (122 publications) respectively. In this study, we merged Nanyang Technological University (NTU) and Nanyang Technological University National Institute of Education NIE Singapore as one organisation. Both organisations are NTU and they share the same number of publications. Therefore, we decided to list them as one organisation under Nanyang Technological University to represent both organisations. Table 1 below provides information on the top 20 most productive organisations in LIS research in the Asia-Pacific region from 2015-2018.
Table 1. The top 20 Asia-Pacific organisations by productivity in LIS research from 2015-2018.

<table>
<thead>
<tr>
<th>Organizations-Enhanced</th>
<th>Records</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chinese Academy of Sciences</td>
<td>162</td>
</tr>
<tr>
<td>Wuhan University</td>
<td>147</td>
</tr>
<tr>
<td>Nanyang Technological University</td>
<td>122</td>
</tr>
<tr>
<td>Indian Institute of Technology System</td>
<td>105</td>
</tr>
<tr>
<td>Universiti Malaya</td>
<td>100</td>
</tr>
<tr>
<td>City University of Hong Kong</td>
<td>84</td>
</tr>
<tr>
<td>University of New South Wales Sydney</td>
<td>84</td>
</tr>
<tr>
<td>Korea Advanced Institute of Science Technology</td>
<td>82</td>
</tr>
<tr>
<td>National University of Singapore</td>
<td>78</td>
</tr>
<tr>
<td>Yonsei University</td>
<td>78</td>
</tr>
<tr>
<td>East China Jiaotong University</td>
<td>76</td>
</tr>
<tr>
<td>Monash University</td>
<td>74</td>
</tr>
<tr>
<td>Harbin University of Science Technology</td>
<td>67</td>
</tr>
<tr>
<td>University of Melbourne</td>
<td>67</td>
</tr>
<tr>
<td>Nanjing University</td>
<td>66</td>
</tr>
<tr>
<td>Queensland University of Technology</td>
<td>66</td>
</tr>
<tr>
<td>University of Science Technology of China</td>
<td>61</td>
</tr>
<tr>
<td>Charles Sturt University</td>
<td>60</td>
</tr>
<tr>
<td>University of Technology Sydney</td>
<td>60</td>
</tr>
<tr>
<td>Royal Melbourne Institute of Technology</td>
<td>56</td>
</tr>
</tbody>
</table>

In total, 6,528 publications were published in a wide range of 334 sources. Table 2 below shows the top 15 productive sources accounting for 2,503 publications (38.34%). Scientometrics published the most LIS research publications in Asia-Pacific region with 382 publications (5.85%) followed by Telematics and Informatics in second place with 234 publications (3.58%) and Journal of Information Optimization Sciences with 222 publications (3.4%) in third place. The percentage of publications in the top sources was not significant which showed the wide range of publications distribution and the broad interest in LIS from various research perspectives.
Table 2. The top 15 source titles by productivity in Asia-Pacific LIS research in 2015-2018.

<table>
<thead>
<tr>
<th>Source Titles</th>
<th>Records</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scientometrics</td>
<td>382</td>
</tr>
<tr>
<td>Telematics and Informatics</td>
<td>234</td>
</tr>
<tr>
<td>Journal of Information Optimization Sciences</td>
<td>222</td>
</tr>
<tr>
<td>Procedia Computer Science</td>
<td>215</td>
</tr>
<tr>
<td>Desidoc Journal of Library Information Technology</td>
<td>196</td>
</tr>
<tr>
<td>Library Journal</td>
<td>173</td>
</tr>
<tr>
<td>Chandos Information Professional Series</td>
<td>169</td>
</tr>
<tr>
<td>Electronic Library</td>
<td>137</td>
</tr>
<tr>
<td>International Journal of Geographical Information Science</td>
<td>130</td>
</tr>
<tr>
<td>5th International Conference on Information Technology and Quantitative Management 2017</td>
<td>116</td>
</tr>
<tr>
<td>Information Management</td>
<td>107</td>
</tr>
<tr>
<td>International Journal of Information Management</td>
<td>107</td>
</tr>
<tr>
<td>Journal of the Association for Information Science and Technology</td>
<td>107</td>
</tr>
<tr>
<td>New Industrialization and Urbanization Development Annual Conference the International Forum on New Industrialization Development in Big Data Era Information Science and Electronic Engineering</td>
<td>106</td>
</tr>
</tbody>
</table>

Among 6,528 publications, there are 30 Highly Cited Papers and one Hot Paper (see Appendix A for details of the publications). Highly Cited Papers have received enough citations as of March/April 2019 to place them in the top 1% of papers by field and publication year. These Highly Cited Papers ‘help to identify breakthrough research within a research field and are used within WoS to identify and refine the most influential research papers’ [24]. Meanwhile, Hot Papers are ‘selected by virtue of being cited among the top one-tenth of one percent (0.1%) in a current bimonthly period. Papers are selected in each of 22 fields of science and must be published within the last two years’ [24].

This publication analysis provides information on the publications productivity data, highly cited paper, and hot papers. The most productive Asia-Pacific countries and organisations in publishing their LIS research from 2015 to 2018 were also revealed. It also provides information on the source titles where Asia-Pacific LIS research were published within the timespan.

Citation analysis

6,528 LIS publications in the Asia-Pacific region from 2015 to 2018 indexed in WoS have been cited 17,063 times by 12,821 publications. The h-index was 38 and the average citation per item was 2.61. Fig. 3 below illustrates the significant increase in times cited of Asia-Pacific LIS publications from 2015 to August 2019.
6,528 publications have been cited by authors affiliated with organisations from over 130 countries. Fig. 4 below shows the majority of citations coming from China (3,299 publications), USA (2,026 publications), Australia (1,055 publications), India (847 publications), and England (745 publications). Likewise, it is important to note that these are overlapping datasets because of co-authored publications (such as China-USA, Malaysia-Australia, etc.).

Furthermore, those 6,528 publications have been cited by authors affiliated with more than 6,600 organisations both in and out of the Asia-Pacific region including Yale University, University of Oxford, Stanford University, University of Cambridge, and Leiden University. Similar to the case in publication analysis, in citation analysis we
also merged Nanyang Technological University (NTU) and Nanyang Technological University National Institute of Education NIE Singapore as one organisation and listed them as one organisation under Nanyang Technological University to represent both organisations. The top 20 citing organisations were ranked by the number of citing publications (Table 3). Among the top 20 organisations, 7 were in China, 4 were in Australia, 3 were in Hong Kong, 2 each in Malaysia and the USA, and 1 each in India and Singapore.

Table 3. The top 20 citing organisations.

<table>
<thead>
<tr>
<th>Organization</th>
<th>Total publications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chinese Academy of Sciences</td>
<td>282</td>
</tr>
<tr>
<td>Wuhan University</td>
<td>265</td>
</tr>
<tr>
<td>Indian Institute of Technology System</td>
<td>131</td>
</tr>
<tr>
<td>Universiti Malaya</td>
<td>122</td>
</tr>
<tr>
<td>State University System of Florida</td>
<td>112</td>
</tr>
<tr>
<td>University of Chinese Academy of Sciences</td>
<td>108</td>
</tr>
<tr>
<td>University of Hong Kong</td>
<td>102</td>
</tr>
<tr>
<td>University of California System</td>
<td>97</td>
</tr>
<tr>
<td>City University of Hong Kong</td>
<td>95</td>
</tr>
<tr>
<td>Nanyang Technological University</td>
<td>95</td>
</tr>
<tr>
<td>Harbin Institute of Technology</td>
<td>93</td>
</tr>
<tr>
<td>Universiti Teknologi Malaysia</td>
<td>93</td>
</tr>
<tr>
<td>University of Melbourne</td>
<td>91</td>
</tr>
<tr>
<td>Huazhong University of Science Technology</td>
<td>90</td>
</tr>
<tr>
<td>University of Technology Sydney</td>
<td>88</td>
</tr>
<tr>
<td>Sun Yat Sen University</td>
<td>87</td>
</tr>
<tr>
<td>Hong Kong Polytechnic University</td>
<td>85</td>
</tr>
<tr>
<td>Monash University</td>
<td>85</td>
</tr>
<tr>
<td>University of New South Wales Sydney</td>
<td>85</td>
</tr>
<tr>
<td>University of Science Technology of China</td>
<td>83</td>
</tr>
</tbody>
</table>

This citation analysis provides insights on the times cited of LIS publications in the Asia-Pacific region from 2015 to 2018. It also provides information on the top citing countries and organisations.

**Benchmarking**

There are 6,499 publications available in InCites to be analysed. The InCites dataset in this study was updated on 31 July 2019 which includes WoS content indexed through 28 June 2019. Table 4 below shows the benchmarking data from InCites accessed on 2 August 2019.
Table 4. Data from InCites

<table>
<thead>
<tr>
<th>Web of Science Document</th>
<th>Category Normalized Citation Impact</th>
<th>% Documents in Q1 Journals</th>
<th>% Documents in Q2 Journals</th>
<th>% Documents in Top 10%</th>
</tr>
</thead>
<tbody>
<tr>
<td>6,499</td>
<td>0.83</td>
<td>40.26</td>
<td>24.06</td>
<td>9.12</td>
</tr>
</tbody>
</table>

The Category Normalized Citation Impact (CNCI) for the Asia-Pacific LIS publications from 2015 to 2018 was 0.83. CNCI is ‘an indicator of impact normalized for subject focus, age, and document type. A CNCI value of one represents performance at par with world average, values above one are considered above average, and values below one are considered below average’ [25]. Therefore, CNCI 0.83 means that these publications were performing 17% under the world average when compared to similar publications in the same category, year, and of the same document type.

Of 6,499 publications indexed in InCites, 40.26% of the publications were published in Q1 journals and 24.06% of the publications were published in Q2 journals for at least one of its classified sub disciplines. Also, 9.12% of the publications (593 publications) have been cited enough times to place them in the top 10% when compared to papers in the same category, year, and of the same document type. This benchmarking analysis provides information on the publications’ performance against similar publications within the same category, year, and document type worldwide.

Author Keywords Analysis

Of 6,528 publications, 5,141 publications (78.75%) had author keywords (DE). We used OpenRefine to clean these author keywords. Several keywords that shared the same concept were merged into one keyword and the total number was aggregated. After the data cleaning process, there were 25,910 author keywords available to be analysed. The average number of the author keywords per publication is 5.04.

Author keywords were analysed and ranked by total using the dplyr package in R. We found several country names as author keywords and decided to eliminate these country names in the final result as this study focus is to identify the research topics prevalence in publications. Those author keywords that appeared ≥ 35 times are displayed in the following Table 5.
Table 5. Frequency of author keywords used ≥ 35 times (not including country names).

<table>
<thead>
<tr>
<th>Ranking</th>
<th>Author Keywords</th>
<th>Total Publications</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Bibliometrics</td>
<td>216</td>
</tr>
<tr>
<td>2</td>
<td>Social Media</td>
<td>158</td>
</tr>
<tr>
<td>3</td>
<td>Academic Libraries</td>
<td>132</td>
</tr>
<tr>
<td>4</td>
<td>Citation Analysis</td>
<td>127</td>
</tr>
<tr>
<td>5</td>
<td>Social Networking Services</td>
<td>116</td>
</tr>
<tr>
<td>6</td>
<td>Knowledge Management</td>
<td>109</td>
</tr>
<tr>
<td>7</td>
<td>Big Data</td>
<td>105</td>
</tr>
<tr>
<td>8</td>
<td>Scientometrics</td>
<td>86</td>
</tr>
<tr>
<td>9</td>
<td>Knowledge Sharing</td>
<td>83</td>
</tr>
<tr>
<td>10</td>
<td>Digital Library</td>
<td>69</td>
</tr>
<tr>
<td>11</td>
<td>Qualitative Research</td>
<td>67</td>
</tr>
<tr>
<td>12</td>
<td>Public Library</td>
<td>60</td>
</tr>
<tr>
<td>13</td>
<td>Technology Acceptance Model (TAM)</td>
<td>59</td>
</tr>
<tr>
<td>14</td>
<td>Case Study</td>
<td>58</td>
</tr>
<tr>
<td>15</td>
<td>Open Access</td>
<td>53</td>
</tr>
<tr>
<td>16</td>
<td>E-commerce</td>
<td>52</td>
</tr>
<tr>
<td>16</td>
<td>Library</td>
<td>52</td>
</tr>
<tr>
<td>18</td>
<td>E-books</td>
<td>51</td>
</tr>
<tr>
<td>19</td>
<td>E-government</td>
<td>50</td>
</tr>
<tr>
<td>20</td>
<td>Cloud Computing</td>
<td>49</td>
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<tr>
<td>20</td>
<td>Collaboration</td>
<td>49</td>
</tr>
<tr>
<td>22</td>
<td>Information Literacy</td>
<td>48</td>
</tr>
<tr>
<td>23</td>
<td>Information Retrieval</td>
<td>47</td>
</tr>
<tr>
<td>24</td>
<td>Social Network Analysis</td>
<td>46</td>
</tr>
<tr>
<td>25</td>
<td>Information and Communication Technologies (ICT)</td>
<td>43</td>
</tr>
<tr>
<td>26</td>
<td>Trust</td>
<td>42</td>
</tr>
<tr>
<td>27</td>
<td>Sentiment Analysis</td>
<td>41</td>
</tr>
<tr>
<td>27</td>
<td>Text Mining</td>
<td>41</td>
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<tr>
<td>29</td>
<td>Cluster Analysis</td>
<td>39</td>
</tr>
<tr>
<td>29</td>
<td>Facebook</td>
<td>39</td>
</tr>
<tr>
<td>29</td>
<td>Library and Information Science</td>
<td>39</td>
</tr>
<tr>
<td>32</td>
<td>Information Technology</td>
<td>37</td>
</tr>
<tr>
<td>32</td>
<td>Internet of Things (IoT)</td>
<td>37</td>
</tr>
<tr>
<td>32</td>
<td>Structural Equation Modeling</td>
<td>37</td>
</tr>
</tbody>
</table>
The author keywords analysis revealed “Bibliometrics”, “Social Media”, “Academic Libraries”, “Citation Analysis” and “Social Networking Services” as the top 5 most popular research topics. This method of statistical analysis of author keywords provides insights into prevalent research topics in LIS publications in the Asia-Pacific region in the last 3 years. It can be used to reveal the direction of the LIS and to monitor the development of the LIS as a research area [26]. This prevalent research topic information also can be used as a benchmarking tool to evaluate the curriculum of LIS schools in the Asia-Pacific region.

Conclusion

This study provides a bibliometrics analysis of LIS publications in the Asia-Pacific region from 2015 to 2018. The publication data were gathered from Clarivate Analytics’ WoS and InCites. We used WoS and InCites to analyse LIS publications in Asia-Pacific region from 2015 to 2018 and the citing publications. Author keywords were analysed using the dplyr package in R. This study provides information on publication analysis, citation analysis, research performance benchmarking, and research topics prevalence of LIS publications in the Asia-Pacific region from 2015 to 2018. The findings of this study have wide practical applications for learning, organisational, and research purposes such as to predict the direction of LIS research in the Asia-Pacific region and to evaluate the curriculum of LIS schools in the region.

References


26. Garfield, E.: Citation analysis as a tool in journal evaluation—Journals can be ranked by frequency and impact of citations for science policy studies. Science, 178 (4060) 471–479 (1972).
### Appendix A Highly Cited Papers and Hot Papers

This table is sorted by Times Cited (TC). Hot Paper is highlighted.

<table>
<thead>
<tr>
<th>No.</th>
<th>AU</th>
<th>TI</th>
<th>SO</th>
<th>TC</th>
<th>PY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ngai, EWT; Tao, SSC; Moon, KKL</td>
<td>Social media research: Theories, constructs, and conceptual frameworks</td>
<td>International Journal of Information Management</td>
<td>148</td>
<td>2015</td>
</tr>
<tr>
<td>2</td>
<td>Hsiao, CH; Chang, JJ; Tang, KY</td>
<td>Exploring the influential factors in continuance usage of mobile social Apps: Satisfaction, habit, and customer value perspectives</td>
<td>Telematics and Informatics</td>
<td>83</td>
<td>2016</td>
</tr>
<tr>
<td>3</td>
<td>Chung, N; Koo, C</td>
<td>The use of social media in travel information search</td>
<td>Telematics and Informatics</td>
<td>74</td>
<td>2015</td>
</tr>
<tr>
<td>4</td>
<td>Yang, H; Yu, J; Zo, H; Choi, M</td>
<td>User acceptance of wearable devices: An extended perspective of perceived value</td>
<td>Telematics and Informatics</td>
<td>67</td>
<td>2016</td>
</tr>
<tr>
<td>5</td>
<td>Bian, MW; Leung, L</td>
<td>Linking loneliness, shyness, smartphone Addiction symptoms, and patterns of smartphone use to social capital</td>
<td>Social Science Computer Review</td>
<td>61</td>
<td>2015</td>
</tr>
<tr>
<td>6</td>
<td>Yu, DJ</td>
<td>A scientometrics review on aggregation operator research</td>
<td>Scientometrics</td>
<td>56</td>
<td>2015</td>
</tr>
<tr>
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<tr>
<td>7</td>
<td>Tang, JH; Chen, MC; Yang, CY; Chung, TY; Lee, YA</td>
<td>Personality traits, interpersonal relationships, online social support, and Facebook addiction</td>
<td>Telematics and Informatics</td>
<td>55</td>
<td>2016</td>
</tr>
<tr>
<td>8</td>
<td>Yao, Y; Li, X; Liu, XP; Liu, PH; Liang, ZT; Zhang, JB; Mai, K</td>
<td>Sensing spatial distribution of urban land use by integrating points-of-interest and Google Word2Vec model</td>
<td>International Journal of Geographical Information Science</td>
<td>47</td>
<td>2017</td>
</tr>
<tr>
<td>9</td>
<td>Onodera, N; Yoshikane, F</td>
<td>Factors affecting citation rates of research articles</td>
<td>Journal of the Association for Information Science and Technology</td>
<td>45</td>
<td>2015</td>
</tr>
<tr>
<td>10</td>
<td>Zhang, ML; Guo, LY; Hu, M; Liu, WH</td>
<td>Influence of customer engagement with company social networks on stickiness: Mediating effect of customer value creation</td>
<td>International Journal of Information Management</td>
<td>39</td>
<td>2017</td>
</tr>
<tr>
<td>11</td>
<td>Hu, YH; Chen, YL; Chou, HL</td>
<td>Opinion mining from online hotel reviews—A text summarization approach</td>
<td>Information Processing and Management</td>
<td>38</td>
<td>2017</td>
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<td>No.</td>
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<td>Erdt, M; Nagarajan, A; Sin, SC; Theng, YL</td>
<td>Altmetrics: An analysis of the state-of-the-art in measuring research impact on social media</td>
<td>Scientometrics</td>
<td>35</td>
<td>2016</td>
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<td>13</td>
<td>Yue, Y; Zhuang, Y; Yeh, AGO; Xie, JY; Ma, CL; Li, QQ</td>
<td>Measurements of POI-based mixed use and their relationships with neighbourhood vibrancy</td>
<td>International Journal of Geographical Information Science</td>
<td>34</td>
<td>2017</td>
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<tr>
<td>14</td>
<td>Zhang, SW; Zhao, L; Lu, YB; Yang, J</td>
<td>Do you get tired of socializing? An empirical explanation of discontinuous usage behaviour in social network services</td>
<td>Information and Management</td>
<td>34</td>
<td>2016</td>
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<tr>
<td>15</td>
<td>Zhao, Y; Ni, Q; Zhou, RX</td>
<td>What factors influence the mobile health service adoption? A meta-analysis and the moderating role of age</td>
<td>International Journal of Information Management</td>
<td>33</td>
<td>2018</td>
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<td>16</td>
<td>Shin, DH</td>
<td>Conceptualizing and measuring quality of experience of the Internet of Things: Exploring how quality is perceived by users</td>
<td>Information and Management</td>
<td>29</td>
<td>2017</td>
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<tr>
<td>17</td>
<td>Jamali, HR</td>
<td>Copyright compliance and infringement in ResearchGate full-text journal articles</td>
<td>Scientometrics</td>
<td>29</td>
<td>2017</td>
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<tr>
<td>18</td>
<td>Kim, J; Vasardani, M; Winter, S</td>
<td>Similarity matching for integrating spatial information extracted from place descriptions</td>
<td>International Journal of Geographical Information Science</td>
<td>26</td>
<td>2017</td>
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<tr>
<td>19</td>
<td>Liu, XP; He, JL; Yao, Y; Zhang, JB; Liang, HL; Wang, H; Hong, Y</td>
<td>Classifying urban land use by integrating remote sensing and social media data</td>
<td>International Journal of Geographical Information Science</td>
<td>25</td>
<td>2017</td>
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<tr>
<td>20</td>
<td>Yao, Y; Liu, XP; Li, X; Zhang, JB; Liang, ZT; Mai, K; Zhang, YT</td>
<td>Mapping fine-scale population distributions at the building level by integrating multisource geospatial big data</td>
<td>International Journal of Geographical Information Science</td>
<td>21</td>
<td>2017</td>
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<td>21</td>
<td>Kim, MO; Coiera, E; Magrabi, F</td>
<td>Problems with health information technology and their effects on care delivery and patient outcomes: A systematic review</td>
<td>Journal of the American Medical Informatics Association</td>
<td>21</td>
<td>2017</td>
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<tr>
<td>22</td>
<td>Yu, J; Lee, H; Ha, I; Zo, H</td>
<td>User acceptance of media tablets: An empirical examination of perceived value</td>
<td>Telematics and Informatics</td>
<td>18</td>
<td>2017</td>
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<tr>
<td>23</td>
<td>Latif, Z; Yang, MK; Danish; Latif, S; Liu, XM; Pathan, ZH; Salam, S; Zeng, JQ</td>
<td>The dynamics of ICT, foreign direct investment, globalization and economic growth: Panel estimation robust to heterogeneity and cross-sectional dependence</td>
<td>Telematics and Informatics</td>
<td>17</td>
<td>2018</td>
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<tr>
<td>No.</td>
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<td>24</td>
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<td>25</td>
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<td>Kim, N; Kim, W</td>
<td>Do your social media lead you to make social deal purchases? Consumer-generated social referrals for sales via social commerce</td>
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<td>Zhang, X; Liu, S; Chen, X; Wang, L; Gao, BJ; Zhu, Q</td>
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<td>Ayaz, S; Masood, N; Islam, M</td>
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<td>Enhancing team creative performance through social media and transactive memory system</td>
<td>International Journal of Information Management</td>
<td>8</td>
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AU=Authors  
TI=Document Title  
SO=Publication Name  
TC=Times Cited  
PY=Year Published
When Social Media Use for Formal Learning is Voluntary: A Study of Students’ Use of Self-Regulated Learning Strategies

Quan Zhou1, Chei Sian Lee1, and Sei-Ching Joanna Sin1

1 Wee Kim Wee School of Communication and Information, Nanyang Technological University, Singapore. {zhou0245,leecs,joanna.sin}@e.ntu.edu.sg

Abstract. With a wide array of social media available and accessible, it is common that students use social media to support formal learning in a voluntary manner. Due to the high autonomy in the voluntary context, it is important for students to engage in active learning and employ self-regulated learning (SRL) strategies to manage the learning process with social media. However, there has been limited work concerning what SRL strategies that students use in the voluntary context of learning with social media. Based on focus group discussions with 41 university students, this study uncovered two different categories of SRL strategies: regulation of learning and regulation of social media use. The findings have implications on how students achieve effective learning with new technologies like social media in formal education and lifelong learning. This paper concludes with contributions and limitations.

Keywords: Social Media, Formal Learning, Voluntary Use, Self-Regulated Learning.

Introduction

Social media, such as Facebook, YouTube, Quora, and WhatsApp, have become increasingly ubiquitous to the younger generation and provided new channels of socializing, entertaining, and information seeking. To keep pace with the trends in technological advances, educators in formal learning contexts, especially in the higher education sector, have tapped into the potential of social media to enhance teaching effects and to encourage active learning for students [22]. Social media have advantages over traditional classroom learning and institution-based learning management systems in terms of extending communication and connections outside the classroom and enhancing personal and collaborative learning [7]. Moreover, as the younger generations have easy access to and high familiarity with social media in their everyday life, it is natural for students to voluntarily adopt social media for educational purposes [10]. Voluntary use of social media for formal learning refers to a learning context in which social media use for course learning in school is determined by students themselves. That is, social media use is not assessment-driven, not a requirement of the course design or a mandate from the instructor [11, 38]. In the voluntary context, students are free to choose and use any social media tools in a personalized way for the purpose of complementing their formal learning. Research suggests that the learning activities in the voluntary context can increase the students’ learning motivation and engagement [11, 22]. Using social media voluntarily for learning is also deemed
as a conducive context for students to practice how to gain knowledge and solve problems with available information technologies in everyday life [33].

Yet, even with the availability of various social media and students’ willingness to learn, it remains questionable whether students can well manage their learning in a context with high autonomy [10, 23]. This concern is especially salient in the voluntary context, where individual students are fully responsible for their social media selection and use, as well as the learning activities. Students who are not able to well manage their learning and social media use may easily get distracted by social and entertaining activities in social media and even quit from learning, resulting in decreased learning motivation and dissatisfaction with the learning experience [37]. To manage the high autonomy in a learning context, educational scholars have stressed that learners must be capable of using self-regulated learning strategies to maintain effective learning and achieve desirable learning outcomes [31, 41].

SRL strategies refer to the deliberate actions that individuals employ to direct, monitor, and regulate learning to achieve their goals [42, 43]. Using SRL strategies can help students achieve effective learning through aiding cognition, controlling effort and time, and directing learning actions [28]. That is, the SRL strategies are used to assist learners in acquiring and retaining knowledge in a structured and methodological way [43]. Prior research on online course learning has reported that students’ engagement in using SRL strategies could lead to positive educational outcomes such as higher course grades (e.g., [3, 4]), satisfaction with online learning experience (e.g., [2]), and continuous enrolment in other online courses (e.g., [29]). In those studies, while students have more autonomy than the classroom learning without the presence of an instructor or other learners, the use of an online learning system was mandatory and learning activities were instructor-led. Instead, students in the voluntary context have relatively more autonomy and less or no guidance from the teacher regarding what to learn through social media, as well as how to appropriately choose and use various social media for learning. Thus, using SRL strategies is a critical component of effective learning with social media in the voluntary context.

Despite a large volume of research on using SRL strategies, there has been limited work concerning the voluntary context of using social media for formal learning. Much of prior research on using SRL strategies has dealt with online learning, in which an institutionalized adoption of a learning technology or social media is a mandate from the course instructors and a requirement for the course [11, 15]. Further, research on social media learning has examined the use of SRL strategies by students in the formal education context [41], but not specifically in the voluntary context. The voluntary context needs research attention, as SRL has been highlighted as a critical lifelong learning skill when students move beyond structured academic environments [7, 16]. In a fast-changing learning environment with rapid emergence and update of new technologies and new knowledge, the ability to employ SRL strategies when engaging in learning with technologies can be the key skill for successful lifelong learning [33]. Thus, informed by the void in current research, this study aims to investigate how student use SRL strategies when learning with social media in the voluntary context. Specifically, this study attempts to answer the following research question: What are the SRL strategies that students use when using social media voluntarily for formal learning?
Literature Review

Voluntary Use of Social Media for Formal learning

Given that social media enables easy access to a large volume of knowledge and connections with knowledgeable users, educators have begun to integrate social media tools to enrich the teaching and learning experiences in formal education. For example, studies have suggested how instructors could use social media such as Facebook and wikis to facilitate collaborative learning among students [9], and how YouTube could be an effective tool to support classroom teaching with videos [14]. Some research also discussed the pedagogical affordances of social media that can support and foster student self-regulated learning in a synergistic and interdependent way [7].

While prior studies of social media use for formal learning mainly focused on the context in which social media use is a mandate in a course, recent research has highlighted that students also tend to use various social media as a complement for formal learning in a voluntary manner. It is common that students voluntarily select and use available social media for course-related activities, such as communicating with peer students on collaborative projects [22], engaging in active searching for useful content that can supplement learning in the classroom [16], and even incidentally getting inspirations on course-related topic from other online users [11]. In this vein, different from mandatory-use context, in which social media use is externally directed or required by the outside (e.g., the course instructor), social media use in the voluntary context is internally initiated by students themselves [38].

The high availability, accessibility, and usability of social media have made it natural for students’ voluntary integration of social media in their formal learning [10]. At the same time, there are concerns regarding how students manage their learning with social media in the voluntary context, in which there is no guidance from the course instructor regarding what to learn through social media, as well as how to appropriately choose and use various social media for learning. To maintain effective learning with social media in the voluntary context, it is important for students to engage in SRL strategies to cope with challenges or problems in the process of learning with social media [7].

Using Self-Regulated Learning Strategies

Self-regulated learning (SRL) is “an active, constructive process whereby learners set goals for their learning and then attempt to monitor, regulate, and control their cognition, motivation, and behavior, guided and constrained by their goals and the contextual features in the environment” ([27], p. 453). The central idea underlying SRL is the use of SRL strategies to maintain an active learning process. The role of using SRL strategies in students’ success in academic learning has long been stressed in educational research. Earlier studies in the traditional academic context have identified a consistent positive relationship between the use of SRL strategies and academic achievements (e.g., [42, 43]). Later research related to online course learning, in which the use of an online learning system was mandatory, also revealed that students’ use of SRL strategies not only influenced their academic achievement (e.g., [3, 4]), but also predicted their satisfactory learning experience and continuous intention to enroll in future online courses [2]. In this light, students’ use of SRL strategies can be considered as an important indicator of effective learning both offline and online.
In research on online course learning, SRL strategies, in terms of goal setting, environment structuring, time management, help seeking, task strategies, and self-evaluation, were found to be important strategies that students should adopt to achieve online learning success [3, 4]. Research on social media use in education has discussed how instructors could use social media to support student’s engagement in SRL strategies. For example, SRL strategies, such as goal setting, time management, and self-evaluation, could be supported by the use of blogs and wikis, whereas social networking sites could enhance the use of help-seeking and self-evaluation strategies [17]. A recent study investigated how students self-regulated their learning when using social media for course study in school. While the use of social media was not limited to the voluntary context, it uncovered the prevalent use of four SRL strategies, which are goal setting, environment structuring, performance control, and self-evaluation [41]. These SRL strategies have also been observed in the context of mandatory online course learning (e.g., [32]) and web-based job training (e.g., [35]). However, it is unclear whether these SRL strategies were also used by students, particularly in the voluntary context, where the students are responsible for initiating and regulating their learning and social media use. Thus, this study proposes the first specific research question within the voluntary context:

**RQ 1**: Do students engage in SRL strategies, in terms of goal setting, environment structuring, performance control, and self-evaluation, in the context of voluntary use of social media for formal learning?

Even if these SRL strategies are used by students in the voluntary context of learning with social media, it should be noted that the SRL strategies examined in prior research on social media learning were mainly derived from the literature on online learning in mandatory context (e.g., [3, 7]). That is, these strategies are mainly used to regulate a learning process within a structured guidance provided by course instructors. In the voluntary context, learning activities and social media use are not guided by course instructors. Rather, students have the freedom to decide how to learn, as well as how to adopt and adapt various social media for learning. With less instruction and guidance from instructors, students need to cope with new challenges in social media such as the unguaranteed quality of the learning resources, the uncertainty of the availability of learning support, and distractions from online social activities that are not related to learning [11, 30, 37]. Thus, it calls into question whether self-regulated students may also engage in other SRL strategies to manage the tensions when learning with social media in the voluntary context. Hence, the second specific research question is proposed:

**RQ 2**: Do students engage in other SRL strategies, in addition to goal setting, environment structuring, performance control, and self-evaluation, in the context of voluntary use of social media for formal learning and, if so, what are these strategies?

**Method**

To explore the SRL strategies used by students in the context of voluntary use of social media for formal learning, focus groups were used to empirically investigate the research questions. The interactive dynamic of the focus group allows participants to share and compare their experiences, which can help surface multiple layers of inter-
pretation of the use of social media for formal learning and multiplicity of learning experiences [25].

Focus Group Participants

Participants were recruited based on convenience and purposive sampling, which is typically used in qualitative research to find participants who are proficient and well informed with the phenomenon of interest [8]. Potential participants of this study were screened on the requirement that they must be university students aged 18-years and above and must have the experience of using social media for coursework in school, regardless of whether the use of social media is mandatory or voluntary. After recruiting through email invitations and campus advertisement and qualification screening, 41 students joined this study and were randomly assigned to six focus group sessions, ranging from 5 to 8 participants each. Table 1 shows the number of participants and the demographic information in each group.

Data Collection

The six focus groups were conducted following the same procedures. Each session was moderated by an experienced moderator and a research assistant. Informed consents were obtained from all participants at the beginning of each session of focus group discussion. During the discussion, the moderator explained to students the differences between mandatory use of social media and voluntary use of social media for formal learning. Later, participants who had the experience of voluntarily using social media for formal learning were asked to share their past experiences of using strategies to manage learning with social media, while participants who did not have the experience of voluntarily using social media for formal learning were asked to think about useful strategies to manage learning with social media in the voluntary context. Each focus group session took about 90 to 120 minutes. The audio recordings of all focus groups were fully transcribed; the transcripts were used for subsequent analyses.

| Table 1. Demographic characteristics of focus group participants (N = 41) |
|--------------------------|---|---|---|---|---|---|---|
| Group | 1 | 2 | 3 | 4 | 5 | 6 | Total |
| Number of participants | 7 | 8 | 5 | 6 | 8 | 7 | 41 | 100% |
| Gender | | | | | | | |
| Women | 1 | 2 | 2 | 4 | 2 | 3 | 14 | 34% |
| Men | 6 | 6 | 3 | 2 | 6 | 4 | 27 | 66% |
| Educational Level | | | | | | | |
| Postgraduate | 5 | 4 | 3 | 1 | 2 | 6 | 21 | 51% |
| Undergraduate | 2 | 4 | 2 | 5 | 6 | 1 | 20 | 49% |
| Educational Background | | | | | | | |
| Humanities and Arts | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 2% |
| Natural Science | 0 | 1 | 1 | 1 | 1 | 0 | 4 | 10% |
| Social Science | 0 | 3 | 0 | 2 | 0 | 1 | 6 | 15% |
| Engineering | 7 | 4 | 4 | 2 | 7 | 6 | 30 | 73% |

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Data Analysis

MAXQDA, a qualitative data analysis software, was used for data analysis. The first author, who was trained with qualitative research methods, conducted a close and iterative reading on each transcript carefully from beginning to end, highlighting all participants’ utterances that appeared to describe the learning strategies in the voluntary context. These highlighted texts were deemed as relevant data for the following two-phase data analysis. The basic unit of analysis was an uninterrupted utterance of one participant, which was a natural segmentation of the recorded group discussion [12]. Content analysis, which is a technique for analyzing qualitative data [18], was used to analyze the text in the transcripts of focus group discussions. In detail, the coding proceeded through two phases informed by Hsieh and Shannon’s research [13]. The first phase of data analysis was conducted with the directed content analysis approach in which prior research was reviewed by the research and a list of variables was identified as the initial coding scheme; the second data analysis phase used the conventional content analysis where new codes may emerge inductively from data and some codes were combined during this process. Thus, a combination of deductive and inductive approaches can lead to a comprehensive understanding of the phenomenon under investigation [5, 20].

Direct Content Analysis. The first phase of direct content analysis focused on using predetermined codes to characterize the SRL strategies, which are goal setting, environment structuring, performance control, and self-evaluation. These SRL strategies were derived from prior studies into self-regulated learning in social media learning context [41]. The initial coding schemes were summarized in Table 2.

<table>
<thead>
<tr>
<th>SRL Strategy</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goal setting</td>
<td>Making decisions on the specific objective of learning.</td>
</tr>
<tr>
<td>Environment structuring</td>
<td>Using strategies to seek suitable environments that are conducive to learning</td>
</tr>
<tr>
<td>Performance control</td>
<td>Using strategies, including task strategies, time management, and help seeking, during the actual learning process to regulate their performance.</td>
</tr>
<tr>
<td>Self-evaluation</td>
<td>Assessing learning outcomes according to a standard or a goal.</td>
</tr>
<tr>
<td>Other strategies</td>
<td>Strategies students used to manage learning with social media other than the four strategies described above.</td>
</tr>
</tbody>
</table>

Conventional Content Analysis. The second data analysis phase of conventional content analysis sought to capture new occurrences of a phenomenon beyond the limit of the predetermined coding scheme [20]. This phase followed a two-step inductive analysis process. First, data that could not be coded into one of the codes in phase 1, i.e., data in “other strategies”, were reexamined to describe as new strategies. In particular, three new strategies were identified from the data, which provided insights on new SRL strategies students used to manage learning with social media in the voluntary context. The three new strategies are information evaluation, support exchange, and distraction management. Next, the researcher examined the data for each SRL
strategies determined whether all SRL strategies identified could be grouped into a few broad categories. Accordingly, two main meaningful categories of codes were identified depending on the focuses of the strategies of self-regulation. In particular, strategies that are related to managing the learning process, in terms of goal setting, environment structuring, performance control, and self-evaluation, were grouped as regulation of learning. The newly-identified strategies were more related to managing information flow and communication activities in social media, such as information evaluation, support exchange, and distraction management. Taken together, the pre-determined strategies from the initial coding scheme could be grouped as a category of strategies as “regulation of learning”, while new strategies emerging from the data were grouped as a cluster of “regulation of social media use”. The final codes of SRL strategies and descriptions are listed in Table 3.

**Reliability.** To avoid personal bias and ensure the reliability of the coding, another coder was recruited and trained on the final coding scheme created in the MAXQDA software after the two-phase content analysis. A Cohen’s Kappa, which has been mostly used to measure reliability in social science [40], was calculated to determine the extent to which the author and the second coder were in agreement. The final Cohen’s Kappa is .82, indicating very acceptable agreement [26].

<table>
<thead>
<tr>
<th>SRL strategy</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regulation of learning</td>
<td>Strategies that are used to manage the learning process.</td>
</tr>
<tr>
<td>Goal setting</td>
<td>Remarks indicating awareness of the goal of learning with social media in the voluntary context.</td>
</tr>
<tr>
<td>Environment structuring</td>
<td>Remarks suggesting behaviors of making the physical environment conducive to learning.</td>
</tr>
<tr>
<td>Performance control</td>
<td>Remarks describing the behaviors to maintain good performance in the learning process, such as time management and effective learning strategies.</td>
</tr>
<tr>
<td>Self-evaluation</td>
<td>Remarks indicating the review or reflection on what have learned.</td>
</tr>
<tr>
<td>Regulation of social media use</td>
<td>Strategies that are used to manage social media usage.</td>
</tr>
<tr>
<td>Information evaluation</td>
<td>Remarks describing behaviors of checking the credibility of information in social media.</td>
</tr>
<tr>
<td>Support exchange</td>
<td>Remarks describing seeking and getting support in social media to solve problems related to learning.</td>
</tr>
<tr>
<td>Distraction management</td>
<td>Remarks describing behaviors to make the social media environment less distracting.</td>
</tr>
</tbody>
</table>

Table 3. Final coding scheme of SRL strategies
Results and Discussion

From the analysis of the focus group discussion, two meaningful categories of strategies were identified: regulation of learning and regulation of social media use. That is, there were two dimensions of self-regulation regarding learning with social media in the voluntary context: regulation of learning and regulation of social media use. The findings will be elaborated as below.

Regulation of learning

Regulation of learning is about using strategies to manage the learning process, which includes setting goals at the beginning of learning, structuring learning environment, controlling performance, and evaluating learning outcomes. These strategies were SRL strategies that have been widely discussed in the traditional classroom and online course learning settings (e.g., [36, 43]), and were also observed in the context of general use of social media for formal learning [41]. This study further validates the use of these SRL strategies in the voluntary context of learning with social media.

Goal setting. The analysis suggests that students engaged in setting their own learning goals when using social media voluntarily to supplement their course study, which was mostly driven by the lack of clarification from formal teaching. As a female student participant from Focus Group 1 described the goal of solving problems from tutorials, “I use it to mostly search questions that I don’t understand or I don’t know how to answer from tutorial, or some concepts that I don’t understand. I use it mostly for quantum mechanics and algorithm and computing courses.” The goal of learning in social media was also sometimes related to students’ eagerness to extend knowledge and dig deeper from what was learnt in formal classes. For example, a male student participant from Focus Group 5 talked about his goal of learning in YouTube was to relate concepts in class to real-world application, “As many of them used YouTube as one common thing, so during my undergraduate, our curriculum was mostly broad based rather than learning one subject. So we took a lot of common courses like some mathematical courses etc., but for the core courses we have like very limited subjects. That is how the curriculum was for the undergraduates. So I am about to take an exam for the masters. So the syllabus there is much wider in terms of subjects and so for my learning, apart from doing my undergraduate, I do watch a lot of YouTube videos where it will quickly help me brush up those topics for exam. As for most of the difficult things that are difficult to visualize for example refining the vertical columns for defining everything into separate parts so how does it work sometimes it can show how different parts can be separated so to visualize those things it helps.”

Environment structuring. A physical learning environment with fewer distractions is important for learning productivity. To complete a learning task without interruption, students discussed their effort to find a quiet space to learn with social media. For example, “NTU has a lot of places, so we can go anywhere for study. I don’t think it very difficult to find a secluded place,” as a male student participant from Group 1 mentioned. It also seems that when structuring a learning environment, while some students preferred to study separately, they would still connect with peer learners via
social media. As a female student participant from Focus Group 3 mentioned, “It’s hard to make everyone meet and discuss, and many of us prefer to study at home when there is no class. But we can still discuss our group assignment through WhatsApp and Skype.”

**Performance control.** To maintain active engagement in learning towards learning goals, students enacted strategies to regulate their learning performance. In the context of voluntarily using social media for course study, students expressed their feelings of autonomy and engagement in taking control of their learning process. A female student participant from Focus Group 3 mentioned about balancing time spent on learning and social activities, “Actually for me it’s more of time management. So if you set yourself, just for example this time I want to study then at that time you just find yourself a place where no one else is there and then just turn off everything, like your Facebook or whatever, and just study. For me it’s more of like time management. When it’s your social time, of course you have to hangout, I mean like don’t multitask, like study and hang out at the same time. It’s just your time management.”

To maintain active engagement in learning, students chose learning materials in social media that were more interesting and easier to comprehend. As a male student participant from Focus Group 3 described, “I feel that the quality of the video itself also matters. Like for example, if the quality is very bad, you will feel very bored just to finish even like one minute of the video. But if like ‘One Minute Physics’, it’s very interesting and then the content is very good. So even though it’s like four minutes, you also will spend time to watch.”

**Self-evaluation.** To make sure the learning goals were achieved, students evaluated what they had done and whether a further study was needed. As a female student participant from Focus Group 5 talked about her strategy of self-evaluation before an exam, “I think it depends on what time you are using… so you can use Facebook and you can ask your doubts ten days before exam but when the exams approach and you just want to concentrate…so you don’t need any more information…you already have all the information. You just need to go through it again or something like that. So that’s when you stop any more information coming your way and go through what you already have.” In this case, this student had some new doubts after evaluating her learning, but she chose to review the resources she already had instead of reaching out for more information. One male student participant from Focus Group 5 also mentioned about engaging in self-evaluation of his learning by looking back to notes he took when learning from a video, “I’m watching a video I write down the notes and later on I can refer to the notes instead of the video itself. So then it also solves the problem of a one hour or two-hour-long video I can select the things I want to remember and write them down and later on I can refer from own notebook. Those are my notes so they are credible and reliable.”

**Regulation of social media use**

Most scholarly attention of prior research has been paid to the regulation of learning. That is due presumably to the fact that prior online learning research (e.g., [19]) mainly investigated the use of learning technologies that are specifically designed and used for formal educational purposes, thus the students’ use of technology for learning is structurally directed by the course design. However, students in the voluntary context
have more autonomy and control over their learning process, as well as social media use, such as selection and use of social media platforms, instruments, materials, and online human resources. While students engaged in the strategies to regulate their learning process, they also strategically used social media to deal with tensions with learning in social media (e.g., the differentiation of useful information and misinformation), as well as tensions with learning in the voluntary context (e.g., the blurred boundary between learning activities and social activities in social media). In this vein, this study contends that the new category of SRL strategies, i.e., strategies related to the regulation of social media use, are also important in the voluntary context. These strategies were also observed in prior studies about the mandatory use of social media for learning [37], health information seeking [34], and news sharing [21]. It is possible that because social media are not specifically designed for educational purposes, students need to strategically regulate the use of social media so that it can be more conducive to learning. The strategies related to the regulation of social media use include information evaluation, support exchange, and distraction management.

Information evaluation. When learning with social media in the voluntary context, the learning content was not directly provided by the course instructors. Thus, the evaluation of what was credible information to learn relied on students themselves. As a male student participant from Focus Group 1 talked about the need for credible resources, “But suppose I have a time constraint and I have to finish the course now within just three months, I don’t have really that much of time I have some more work, project and three other courses to do, but then I would be more inclined towards taking the best credible source and finishing off.” Regarding this, it was found that students evaluated the credibility of information and sources on social media with relevant heuristic cues. For example, as a female student participant from Focus Group 4 said, “I think user profile is practically helpful because I think for these Q&A sites, credibility will be important to the users. To the people who are seeking answers. So if the person answers you is from that particular profession, or has a lot of experience, or is a very high VIP user or something, then you will take his answer better.”

Support exchange. In terms of solving problems related to learning, students reported that social media could be effective channels for solution-seekers to post problems and helpful users to offer support. One main support students needed in social media information support that could help answer a learning problem. As a male student participant from Focus Group 3 students described the use of ResearchGate and Quora to ask questions, “Other classmates or other experts as well like if we have...well either it can be for your classmates or if you have like... ResearchGate wherein you just put in your doubt and then experts from those fields feed in on Quora... we use Quora to put out peer questions and people would reply to them, so you might be having some understanding of the thing but then those views clear it more.” In addition to the exchange of informational support on problem-solving, there were also the exchange of emotional support such as encouragement and inspiring words in social media. This might be because social media by nature was more related to social activities. As said by a male student participant from Focus Group 6 about encouragement from peers in WhatsApp, “Especially when you will do the presentation, other group members just send supporting words.” In this case, although learning with social media voluntarily was mostly independent, the immediacy and interactivity afforded by social media broke the limitation of time and space for social inter-
action, thus making students feel less lonely and helpless when facing learning problems [1].

**Distraction management.** One significant problem that students had to deal with was to balance between the use of social media for social purposes and learning purposes. For example, the unrelated notifications and recommendations in social media may distract students from learning. As a male student participant from Focus Group 5 described, “And just don’t spend time on YouTube because I might end up looking at some other videos. They have the recommendation bar, which brings you down to different things that you don’t want to see.” Accordingly, they strategically use social media to cope with such interruptions, “So when I was watching the video, I just made it full-screen. So I could be more focused,” as mentioned by a male student participant from Focus Group 4. One other male student participant from Focus Group 5 also described the strategy to manage social interactions and system recommendations unrelated to learning. “For me, the advantage is obviously accessibility. A small way in which I try to overcome that distraction, which is the biggest problem for me, is to have a separate account. For Twitter, I have a personal account, and I have a professional account which I follow news or entertainment outlet which is relevant to me. Or for YouTube, I open incognito tab, so all my historical data, which are my interests, are not directed to me so everything is very default, so I can focus on things which are there in the first place. Like I want to focus on math and things like that.”

**Conclusion**

This exploratory study has uncovered the use of two different categories of SRL strategies when students voluntarily use social media for formal learning. The findings of this study can yield important implications for research and practice.

For research in the fields of SRL and social media use in education, this is the first study that explores the use of SRL strategies in the voluntary context of using social media for formal learning, to the best of knowledge. In particular, two categories of SRL strategies were identified, i.e., regulation of learning and regulation of social media use. The findings of the two dimensions of SRL strategies used to manage learning with technologies have extended prior research that only examined SRL strategies related to regulation of learning (e.g., goal setting, environment structuring, performance control, and self-evaluation, which are common in the online course learning contexts (e.g., [2, 3, 39])). The new strategies identified from this study include information evaluation, support exchange, and distraction management, which were also commonly used by students in the voluntary context of learning with social media. Future research could further explore the effects of using these strategies on student’s learning outcomes.

For students and educators, the findings of this study could be used as a guidance of learning with social media in the voluntary context. As suggested in the findings of this study and prior research [22], students already know how to use social media and it is natural for them to use familiar tools to support their formal learning. But it should be noted that students are navigating diverse learning resources from a wide array of social media platforms without much guidance and instruction from a specific instructor. To prepare students to become self-regulated learners, there is a need for students to gain knowledge of self-regulated learning and the opportunities to practice the use of SRL strategies. For example, students should be able to differentiate falsehoods/misinformation from accurate information when seeking knowledge on social
media, which is important for learning quality [6]. For libraries in formal educational institutions, it is also suggested that training programs concerning social media use for learning should also incorporate the education of SRL and guide students to be capable of managing their learning with social media effectively.

This study has some limitations, which suggest directions for future research. One limitation is the use of convenience sampling at a single university in Singapore. While the focus on a single research site can control for potential varieties in the educational policies in different schools and countries, such control of the research design may limit generalizability. Thus, future research could verify the SRL strategies in this study with different educational institutions and different groups of students so that students’ use of SRL strategies in the voluntary context can be better understood. Another limitation is that only inductive qualitative inquiry is employed in this study; hence, the extent to which SRL strategies are used by students are unexamined. Nevertheless, the qualitative research method such as focus group discussions can help gain breadth and depth of understanding about SRL behaviors [25]. Future research can build on the findings of this exploratory study to develop a more accurate measurement of SRL strategies and verify the measurement with a larger sample size.

Note

This paper is part of the first author’s doctoral thesis “Voluntary use of social media for formal learning: an investigation of using self-regulated learning strategies from the social cognitive perspective” completed in July 2019 at Nanyang Technological University in Singapore under the supervision of the second author and the third author.

References

Assessing of Digital Economy Competency in Sarawak Manufacturing Sector

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Abstract. This paper addressed on assessing the digital economy competency in different level of management in the manufacturing sector. The management level comprises of strategic, managerial and operational in the organisation. This paper compares and contrasts the dimension of digital economy from previous literature to develop the understanding of digital economy competency. The digital economy competencies model then will be formulated as strategy to assist the Sarawak Government in providing the worker with competencies or the skill set that is suitable in digital economy environment. In the context of the paper, digital economy competency involves digital communication, digital literacy, digital security, digital content and creation, digital infrastructure, competency development, digital governance and business enabler. These are the digital competencies required by the worker in the manufacturing sector in producing the high quality of worker with appropriate competencies as proposed in the theoretical model. Finally the paper proposed a Sarawak Digital Economy Competency known as SarDEC model to assist the Sarawak manufacturing sector’s employees with appropriate skills and knowledge in the digital economy environment. A quantitative way of study will be applied to ascertain the model, and the data collected will be analysed using the Statistical Package for Social Science (SPSS).

Keywords: digital economy, digital economy competency, manufacturing sector, digital governance.

Introduction

The Internet and digital economy track focus on how the internet affects people, groups, organisations, and societies [16]. It is expected to gain force locally and internationally when it has become part of various government agendas. Through the advancement of the digital economy, the government has recognised the importance of integrating the digital economy initiatives into a national agenda as a means to keep pace with the latest advancement. In this new economy, digital networking and communication infrastructures provide a global platform over which people and organizations formulate strategies, interact, communicate, collaborate and search for information. It is widely accepted that the growth of the digital economy has a widespread impact on the whole economy is its activities in and around the digital world. The digital economy is taking shape and undermining conventional concepts about how businesses are structured, how firms interact, and how consumers obtain services, information, and goods. With understanding the nature of the dynamic relationship between digital economy, Government organisations and citizens’ adoption of technologies may help the policymakers more accurate and comprehensive decisions [4].
Through the explanation above, the digital economy plays a vital role in the evolution of economic [2]. Furthermore, on 13th January 2017, Sarawak Chief Minister (YAB Datuk Patinggi Dr Abang Haji Abdul Rahman Zohari Bin Tun Datuk Abang Haji Openg) announced to create Sarawak as becoming a digital economy state. Hence, to support this, the large gap between demand and supply of digital skills must be overcome to lead employees and job seekers who possess the new foundational digital skills to have the potential to succeed in a digital economy. They need to become more adaptable to future enhancement, increasing their earning power, and improving their long-term career visions.

Quoted from global consulting firm McKinsey in 2018, digital economy “is the next phase in the digitisation of the manufacturing sector. Thus, the purpose of this paper is to assess the digital economy competencies in each of level of management at Sarawak manufacturing sectors which they are one of the highest contributing sector in Sarawak economy [5] Hence, digital competencies supposed to enables the organisation to meet the goals of the digital [11]. In the long run, digital economy competencies set by the manufacturing sector can be used as a benchmark to other sectors in Sarawak as the implementation of the digital economy has been announced by the Sarawak Chief Minister (CM) in 2017. As shown below are the state contribution to the manufacturing sector in Malaysia. It shows that the contribution of the manufacturing sector in Sarawak towards Malaysia economy contrast with its size as compared to others.

![Fig. 1. Concentration of manufacturing establishment in Malaysia (Department of Statistic, Malaysia (2016))](image)

Through the geographical factors, Sarawak is the largest state in Malaysia. However, it only contributed 5.2% to the Malaysia economy as compared to others. In consequence, seemly the Sarawak CM intends to implement the digital economy. Therefore, it is the right time to investigate the competencies among the workers of the organisation in Sarawak, especially in the manufacturing sector as this sector contributes most of gross domestic product (GDP) to the state. Plus, it is the best issues to explore as Sarawak is ready towards the digital economy and to alert the organisation that they should feel insecure in the industries if their workers without digital skills and could not cope with digital advancements.

**Purpose of Study**
This conceptual paper seeks to obtain data which will help to assess the digital economy competency in different types of management of Sarawak manufacturing sector. This paper is also to find out the digital economy competencies required by workers in the manufacturing sector in Sarawak in meeting the digital economy demands. The digital economy competency will be based on digital communication, digital literacy, digital creation and content, digital security, digital infrastructure, business enablers, digital governance and competency development according to the case study conducted in advance country, e.g., Germany, Australia, China, France and Estonia.

The result will be used to formulate a digital economy competency model, which suit to be implemented in the Sarawak manufacturing sector to induces the competency of the workers and will be known as SarDEC model. According to the [8], Digital Economy Board Advisor members recommended to developing measurement tools of the competency on digitisation on economic to understand more on the organisation strength and weaknesses in digital economy implementation. It surely can contribute to new statistics which can help policymakers and stakeholders can make accurate decisions and strategies.

**Literature Review**

According to [9], the shifting advancement of new technology poses another factor that organisations are forced to deal with due to changing technology trends. Employees can become content with the technology they have learned and grown accustomed to while performing their job responsibilities. Plus, [12] employees can commit to new technology and attract their commitment toward improving their job performance as they relate to the new technology. However, upper management must be willing to introduce new technology while being aware of the resistance that is likely to be encountered. This statement has agreed by [1], new technology tools and data analytics are helping address critical challenges, while also supporting a highly productive and effective workforce. [16], stated that the digital economy track focuses on how the Internet affects people, groups, organisations, and societies. This chapter will encompass the research more detail through previous study and any review regarding the competency skills of digital economy implementations.

Recent evidence stated that without consistent and comparative measurement indicators to identify the digital implementation in organisation sectors, policymakers are disempowered, and will not be able to implement digital transformation objectives and give the upper management a hard time to make right decisions [12]. Meanwhile, according to [19], quoted from [7], identified effective technology leaders as those who value technology as the primary tool that will change the way we view teaching and learning process in many sectors. They believe that in order to integrate technology the leader must be able to model it and understand how it can be used in all disciplines to ensure the staffs can believe that it is crucial for them to participate and to learn the new technology to make sure they can understand what are the things that their leader need or instructions.

However, according to [15], in their literature, it showed that several factors that affect the adoption of digital economy relate to owner/manager characteristics. They also found that the owner’s lack of awareness of the technology and perceived benefits is a significant barrier to a take up of the digital economy. The lack of knowledge on how to use technology and low computer literacy are other contributory factors for not adopting the digital economy. Mistrust of the IT industry and lack of time are two other factors that affect the decision to adopt the digital economy. SME owners are
Concerned about a return on their investments, reluctant to make substantial investments, particularly when short-term returns are not guaranteed.

Thus, the upper management needs to cater to these issues to meet the organisation objectives. Moreover, this will help the staffs to meet the expectation of their leader goals. This is agreed through their statement that, autonomous decision making, digital literacy, and excellent digital communication skills are crucial for both success as a worker and also to avoid feelings of separation and alienation from their team, their colleagues, or the larger project in which they contribute only small part.

However, on the other side, according to [23], there are issues of trust within organizations and between people, misunderstandings, linguistic barriers and the entire social level of cultural dissimilarities, different values and beliefs, as well as plain and simple economics to name a few which could possibly send the digital economy spiraling out of control in the wrong direction.

Communication

Different issues raised in the process of acquiring internet skills. The ability to find, select, process and evaluate information, to cooperate online with other users and to use digital sources for improving one’s position in society could facilitate socio-economic transformation, whereas lacking skill creates a significant barrier to aiding effectively and fully from what internet has to offer through digital communication [10].

According to Enoch and Soker [14], fundamental factors such as age, gender and ethnicity play a significant part in the continuous existence of digital communication through internet usage gap. Lower-income and less educated internet users are more possible than wealthy users to use the internet in general and to find jobs using the internet. Higher levels of web use skill are associated with higher levels of parental education. Younger generations or so-called “Gen-Y” are considered especially skilled users of the internet because they have had exposure to the internet throughout their experiences, including at school. However, there were also reported it is still the sufficient differences in the digital skills, digital uses and content production within the young group.

Moreover, vast studies have found that, although young people have an advantage in operational and formal digital skills, older generations outperform them in content-related (information and strategic) digital skills. In other words, in contrast to existing stereotypes, the people in the late-career life stage have an advantage in the skills that are more beneficial for one’s career [25].

According to [17] communication is one of the competencies characteristics whereby it is combinations of the attitude skills and knowledge that user can apply through the daily task. Meanwhile, agreeing to Murphy and Sashi (2018), the increasingly digital and decentralised economy of the 21st century requires not only a new approach to doing business on a macro level but also new skills for success on a micro-level. These four areas are among the most fundamental competencies necessary to excel in today’s rapidly changing economic environment.

- Digital Fluency
- Communications Skills
- Sales/Marketing Skills
- The ability to quickly and confidently assimilate change
Perhaps, based on the statement, digital communication play a vital roles as the competency of the workers in order to deliver or received the information. Apart from that, with the high ability of this variable, the workers could do the task given smoothly with the proper instructions.

**Digital Literacy**

According to [10], acquiring digital skills and being digital career literate enables late-career employees to benefit fully from their strengths and avoid some of their disadvantages. Furthermore, digital career literacy may facilitate attempts to change jobs, fight stereotypes, feel wanted in the workplace and ultimately receive desired rewards. This has been supported through [11] the 21st-century workplace requires digital literacy, information literacy, industry-specific skills and, most importantly, the “soft” skills that facilitate communication, interaction, autonomous decision making, and relationship building.

Meanwhile, there is highly relevant for examining how workers try to impress current employers and propose that workers may be involved in providing the various task to prove they are still productive, competent and able to adapt to the changing needs of the labour market. At present, digital literacy is one of the most desirable characteristics a worker may have. More specifically, skills of searching, evaluating, managing and using the information and digital resources are essential for working effectively in the digital workplace environment [3]. There is growing awareness in Europe and the USA that learning in a fully digitalised, networked and knowledge-based society is dramatically different from traditional learning. The growing prevalence of ICT, together with other socio-economic and demographic changes raise the need for acquiring digital skills and competencies that are necessary for employment.

**Digital Content and Creation**
The Digital Competence Framework for Citizens, also known by its acronym DigComp, was first published in 2013 by the European Commission. It aimed to be an instrument to expand citizens’ digital competence, to help top management as policy-makers to formulate policies that support digital competence structure and to plan education and training initiatives to improve digital competence of specific target groups. DigComp also provided a common language on how to indicate and define the key areas of digital competence and thus presented a standard measurement indicator at European level [24]. Suitable with the lack of worker digital literacy, it also affects the developing of digital content and creation. Therefore, this paper has selected one of the dimensions, which are digital content and creation as part of the SarDEC model.

Table 1. Competencies Dimension [24]

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<th>Competence areas Dimension</th>
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| Information and data literacy | i. Browsing, searching and filtering data, information and digital content to articulate information needs, to search for data, information and content in digital environments, to access them and to navigate between them. To create and update personal search strategies.  
ii. Evaluating data, information and digital content to analyse, compare and critically evaluate the credibility and reliability of sources of data, information and digital content. To analyse, interpret and critically evaluate the data, information and digital content.  
iii. Managing data, information and digital content to organise, store and retrieve data, information and content in digital environments. To organise and process them in a structured environment. |
| Communication and collaboration | i. Interacting through digital technologies to interact through a variety of digital technologies and to understand appropriate digital communication means for a given context.  
ii. I am sharing through digital technologies to share data, information and digital content with others through appropriate digital technologies. To act as an intermediary, to know about referencing and attribution practices.  
iii. Engaging in citizenship through digital technologies to participate in society through the use of public and private digital services. To seek opportunities for self-empowerment and for participatory citizenship through appropriate digital technologies.  
iv. Collaborating through digital technologies to use digital tools and technologies for collaborative processes, and for co-construction and co-creation of resources and knowledge.  
v. Netiquette to be aware of behavioural norms and know-how while using digital technologies and interacting in digital envi-
vi. Managing digital identity to create and manage one or multiple digital identities, to be able to protect one's own reputation, to deal with the data that one produces through several digital tools, environments and services.

| Digital content creation | i. Developing digital content to create and edit digital content in different formats, to express oneself through digital means. |
| i. Developing digital content to create and edit digital content in different formats, to express oneself through digital means. |
| ii. Integrating and re-elaborating digital content to modify, refine, improve and integrate information and content into an existing body of knowledge to create new, original and relevant content and knowledge. |
| iii. Copyright and licences to understand how copyright and licences apply to data, information and digital content. |
| iv. Programming to plan and develop a sequence of understandable instructions for a computing system to solve a given problem or perform a specific task. |

| Safety | i. Protecting devices to protect devices and digital content, and to understand risks and threats in digital environments. To know about safety and security measures and to have due regard to reliability and privacy. |
| i. Protecting devices to protect devices and digital content, and to understand risks and threats in digital environments. To know about safety and security measures and to have due regard to reliability and privacy. |
| ii. Protecting personal data and privacy to protect personal data and privacy in digital environments. To understand how to use and share personally identifiable information while being able to protect oneself and others from damages. To understand that digital services use a “privacy policy” to inform how personal data is used. |
| iii. Protecting health and well-being to be able to avoid health-risks and threats to physical and psychological well-being while using digital technologies. To be able to protect oneself and others from possible dangers in digital environments (e.g. cyber bullying). To be aware of digital technologies for social wellbeing and social inclusion. |
| iv. Protecting the environment to be aware of the environmental impact of digital technologies and their use |

| Problem solving | i. Solving technical problems to identify technical problems when operating devices and using digital environments, and to solve them (from trouble-shooting to solving more complex problems). |
| i. Solving technical problems to identify technical problems when operating devices and using digital environments, and to solve them (from trouble-shooting to solving more complex problems). |
| ii. Identifying needs and technological responses to assess needs and to identify, evaluate, select and use digital tools and possible technological responses to solve them. To adjust and customise digital environments to personal needs (e.g. accessibility). |
| iii. Creatively using digital technologies to use digital tools and technologies to create knowledge and to innovate processes and products. To engage individually and collectively in cognitive processing to understand and resolve conceptual problems and problem situations in digital environments. |
iv. Identifying digital competence gaps to understand where one’s own digital competence needs to be improved or updated. To be able to support others with their digital competence development. To seek opportunities for self-development and to keep up-to-date with the digital evolution.

Digital Security

The pace of technological development has threatened the security and one of the examples is the development of economy in digital. The increasing of subscriptions from 97 million in 2000 to over 331 million at the beginning of 2012 have potentially to threaten security because monitoring devices can be placed in the software in the smartphone or any hardware without the user knowledge and awareness of it, allowing someone else to track the owner’s conversations, locations and activities. Hence, this showed us the security is one of the crucial factors in digital economy competencies.

Another issue, there is no evidence of sensitivity classification of information and handling procedure in the organisation environment by the view of security managers. They stated that all the information regarding the sensitive data and knowledge existed, where they are stored, who had access to them and how the information was circulating in the organisation were beyond of the security manager knowledge. From here, it showed to us, in this case, even the security manager itself doesn’t know the information that being handle by him or her. Therefore, it is the right variables to explores further.

Digital Infrastructure

Digital Capabilities is also known as digital infrastructure. It is defined as the ability to store and exchange data through a centralised communication system. Data communication and exchange are all simplified with the right software and hardware equipment. Your infrastructure can be personalised to include any number of hardware and software configurations based on size and demand for information. Hardware such as servers, routers and telecom equipment, enable the storage and 24/7 access of your electronic information. The software provides interpretation, alteration and graphic display of the information. Exchanging data in this manner provides your organisation with an electronic pulse reducing the paper trail and storage requirements.

According to Alt and Zimmermann [6], there are debates which we are facing with new industrialisation and that in the digital economy the standard resource shifts from production to communication in an innovative way. Therefore, the entire design of value creation systems is challenged. On the other hands, the development of the Internet has allowed Small- and Medium-sized Enterprises (SMEs) to compete effectively and efficiently in both local and global markets [15]. It is a well-known fact that the digital economy and Internet technologies can benefit an organisation. Developing countries have the potential to achieve rapid and sustainable economic and social development by building an economy based upon an ICT enabled and networked SME sector capable of applying affordable yet effective ICT capabilities. Even
though the advancement with business transformation, it also struggles to keep pace with evolving technologies. In a challenging universal society, effective use of ICT is critical for the triumph of organisation. Additionally, in the organisation, ICT plays a prominent part in the field of commerce and trade nowadays.

**Business Enablers**

The new foundational skills for the digital economy (Business-Higher Education Forum & Burning Glass Technologies in 2018). For instance, a leader or a business team with high levels of skill in software development, a Digital Building Block, can growth their earning power and productivity by developing skills in project management, a Business Enabler. Skills in this building block appear to be of continuing value, often becoming more critical as people advance. Overall, these new foundational skills are 49% more to be expected request in senior or managerial level roles than in other professions. Seemly business enabler variable is essential competencies which can relate to this topic, and the author has chosen it as one of the components to be evaluated on digital economy competencies. Each sub-element in business enablers are a business process, project management, and digital design are the core elements to verify the workers either there are competent enough to be appointed as part of management representatives.

![Fig. 3. Digital Building Block - The new foundational skills for the digital economy (Business-Higher Education Forum & Burning Glass Technologies in 2018)](image)

**Digital Governance**

According to the new skills for the digital economy, digital governance is criteria for establishing standards, policies, liability, roles, and decision-making strategy as the board of authority for an organisation's digital occurrence. Which digital means here is, its involvement with websites, mobile sites, social channels, and any other internet and web-enabled products and services within the organisation and also the clients. Few researchers are agreed that organisation who create core competencies in digital governance can qualify for many analytically demanding roles parallel with the advancement of the technology itself. However, through the preliminary data gathering showed, only one over five organisations are applying the digital governance, and others are still comfortable performing through traditional ways, vice versa from the digital economy initiatives. This competency is needed to be revised within the organ-
isation to ensure the goals and objective of the digital economy are parallel with the competencies of the workers.

**Competency Development**

Developing digital competence does not merely require the acquisition of skills in using ICT, but the development of one’s knowledge about technology and media, the application of these tools and resources to subjects, and the understanding of the role of technology and media in the real world also need to be concerned. According to Stephenie, Vourikari and Yves [24], focusing on the development of children’s digital competency, therefore, means that teachers are seeking to make more over the ways in which technologies and media transform learners’ engagement with subject content. It may also help teachers to find creative, effective and engaging ways to deliver the curriculum. On the other hands, teachers and schools are progressively being required to combine the development of students’ subject knowledge with the capability to use technology safely and effectively. Hence, in the organisation, focusing on notions of developing digital literacy and digital competency can be precise initiatives to start to achieve this integration.

**Level of Management**

According to the Drucker and Macariello [13], there is three fundamental characteristics of an effective organisation structure, and one of it is there should contain the least possible number of management levels

- Top management (Strategic)
- Middle management (Managerial)
- Lower management (Operational)

According to [22], quoted from Mintzberg, he stated each role and responsibilities in each level of management. Therefore, considering these statement, three-level of management proposed in this paper are strategic, managerial and operational level to replace the terms previously.

**Research Methodology**

This conceptual paper is based on a review and analysis of previous research and data from the literature. Few methods were used to assemble and analyse the literature such as interviewed the expertise in the digital economy areas to gain the current information related to the dimension of the variable regarding the real situation of the population to be tested. Afterwards, the quantitative approach will be conducted to compares with the existing literature and claims made by the interviewee to find the contras or correlation within the topic areas, whereby it is the best technique to cover the Sarawak manufacturing sectors due to the variety of the industries and the geographical factors of Sarawak.

As mentioned, in this research, two phases of data gathering conducted. First, as secondary sources, research was conducted using Google Scholar and online databases. It is to gather the theories and analysis has been done by the previous study to understand the fundamentals and gaps of the study. Here, eight dimensions have been enclosed as the prominent variables for the digital economy competencies. Mean-
while, as primary sources, three interviewed sessions have been done with expertise. And the result is Company X, Company Y and Company Z agreed with the eight dimensions are crucial to explore for the digital economy competency scenarios in the sample population.

The sample population to be studied will be three levels of management of the manufacturing organisation in Sarawak. The respondents will be different types of management in the organisation. The explanations of this selection are because they are the first persons who will involve and facing the changing environments before it expands towards the workers in the organisation.

In this paper, because of the constraint of time and budget, the study will only select 20% of the population of the respondent in the manufacturing sectors. Moreover, because of the limitations also, the respondent is selecting randomly without dividing it into experiences. Hence, the selected 20% of the respondent will answer the questionnaire distribute and going through the random sampling techniques. It is according to the percentage given by the raosoft.com. According to [18], sampling is the process of selecting a few respondents from a bigger group to become the basis for estimating the prevalence of information of interest to you.

This research uses simple random sampling. According to [18] explained that simple random sampling is the most commonly used method of selecting a random sample. The sampling will be based on the manufacturing sectors in Sarawak, which are:

- Basic Metal Products
- Food Manufacturing
- Wood-based & Wood Products
- Chemical & Chemical Products
- Paper, Printing & Publishing Products
- Miscellaneous Manufacturing Products
- Non-Metallic Mineral Products
- Services
- Electronic & Electrical Products
- Transport Equipment Products
- Rubber Products
- Textiles & Garments Products
- Petroleum & Other Related Products
- Beverages Manufacturing
- Plastics Products
- Renewable Energy Products

Findings

Proposed Theoretical Model

Based on previous literature, the author has proposed a theoretical framework towards assessing Digital Economy Competency in Malaysia Manufacturing Sector. In this paper, the digital economy competency can be defined as the knowledge, skills, or the ability of workers such as digital communication, digital literacy, digital content and creation, digital security, digital infrastructure, business enablers, digital governance and competency development in utilizing the digital technologies to support the organizational strategies, interaction and communication of doing business in the digital platform.
The independent variable in this paper is the digital economy competency while the dependent variable is the level of management in the manufacturing sector in Sarawak. There is eight dimensions on digital economy competency which are digital communication, digital literacy, digital security, digital content and creation, digital infrastructure, business enablers, digital governance and competence development. While, there is three dimensions of the level of management which are strategic, managerial and operational level in the manufacturing sectors.

**Hypotheses**

i. Considering the importance of digital communication, there is a relationship between digital communication towards each level of management in the Sarawak manufacturing sector.

ii. Considering the importance of digital literacy, there is a relationship between digital literacy towards each level of management in the Sarawak manufacturing sector.

iii. Considering the importance of digital security, there is a relationship between digital security towards each level of management in the Sarawak manufacturing sector.

iv. Considering the importance of digital content and creation, there is a relationship between digital content and content towards managerial and operational of the level of management in the Sarawak manufacturing sector.

v. Considering the importance of digital infrastructure, there is a relationship between digital infrastructure towards managerial and operational in the level of management in the Sarawak manufacturing sector.

vi. Considering the importance of business enablers, there is a relationship between business enablers towards the strategic and managerial level of management in the Sarawak manufacturing sector.

vii. Considering the importance of digital governance, there is a relationship between digital governance towards strategic and managerial in the level of management in the Sarawak manufacturing sector.

viii. Considering the importance of competency development, there is a relationship between competence development towards a managerial and operational level of management in the Sarawak manufacturing sector.
Conclusion

As a conclusion, this paper will assess the digital economy competencies in Sarawak Manufacturing sector. There are two main elements that will be assessed by the author which are digital economy competencies and level of management. For the digital economy competencies, there are eight dimensions come out from previous literature which are digital communication, digital literacy, digital security, digital content and creation, digital infrastructure, business enablers, digital governance and competence development. While, there are three dimensions of the level of management which are strategic, managerial and operational level in the manufacturing sector. Based on this dimension, the author would like to propose a theoretical model of digital economy competency for Sarawak Manufacturing sector.

This model can be a reference in assist not only Sarawak Government but Malaysia Government as a whole, to provide the worker with the appropriate skill that has been a highlight in this paper. This model will assist the worker in the manufacturing sector with a set of skill in facing the digital economy that much more tough in the future. The worker can gain and learn more knowledge and skill in providing them with appropriate and suitable skill present and future. With the good and enough skill will produce the worker that is competent and full commitment with the task given to them. The result will be giving a massive contribution to the organisation because they own the worker with the appropriate skill to complete the task given by their superiors. On the academic perspective, it may help to provide the literature for the researcher to refer and discuss further suitable with their atmosphere of study.

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Leadership Styles among Academic Librarians:  
A Case Study Investigation

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Abstract. The playing field of universities in Malaysia has drastically changed since international rankings have become a priority by universities across the globe. As the government aims to be regional education hub, local universities must at the higher rank in order to attract potential students especially from abroad. Rankings are based on evaluation on several criteria namely academic reputation, citations per faculty, employer reputation, faculty students, international faculty and international students. Library plays a critical role in ensuring sound academic activities by providing collections and access to information or references relevant to fields of studies. Moreover, library also managed university or institutional digital repositories, which is not an easy task considering variety of information objects both in analog and digital forms. In the Industrial Revolution 4.0 era, the role of libraries has become more important and challenging than ever particularly in supporting universities fulfilling their international rankings goal. Therefore, leaders of academic libraries must be competent in knowledge and skills as well as possessed strong leadership qualities to meet higher expectation from various stakeholders and remain relevant and significant underpinning the existence of the university.

Keywords: Academic library, Leadership, Librarian, Rankings, Succession planning

Introduction

The second decade of the 21st century has seen tremendous changes and application of technology advancement in work places. It is known as the Fourth Industrial Revolution (IR4.0) which means organizations must scramble to adapt fast-changing technological trends in order to stay relevant and significant in the industry. This includes libraries particularly, academic libraries as international rankings such as Quacquarelli Symonds (QS) World University Rankings and Times Higher Education (THE) World University Rankings have become a priority by most universities across the globe. This means the higher the ranking, the better the university. In turn, higher rankings universities will be the choice of prospective students to pursue their study which means more income for the universities. These rankings are based on evaluation on several criteria namely academic reputation, citations per faculty, employer reputation, faculty students, international faculty and international students [6]. To this end, universities in Malaysia are competing to be at higher ranks in order to attract more students from local and abroad. In this context, libraries require a strong leadership to ensure that libraries can a pivotal role in supporting the
universities. However, there is concern that a serious leadership issue as Riggs [7] warns at the beginning of the new millennium, that leadership in libraries can no longer be pushed aside and ignored. It must be brought to center stage. Without strong, dynamic and visionary leadership, libraries are certainly to drift backward into the future or worse the leadership role will be assumed by someone without library or information science background.

**Literature Review**

Librarianship requires strong leadership in order to remain and be seen significant in delivering services and supporting parent organization. Rapid changes of technology and new generations of users with high expectations demand uncompromised services. Hence, there is an imperative need for highly competence leaders to satisfy the ever increasing changing demand.

**Changing Nature of Universities**

The playing field of universities in Malaysia has drastically changed since international rankings such as Quacquarelli Symonds (QS) World University Rankings and Times Higher Education (THE) World University Rankings have become a priority by universities across the globe. The higher the ranking means the better the reputation and perceived better quality of academic programs offered by a particular university. Higher rankings universities will be the choice of prospective students either from local or international.

Another pushing factor towards achieving higher international rankings is the needs for local universities to generate income to fund their operations. It is evident that the amount of fund allocated by the government is no longer huge as previously, hence universities administration must identify new strategies to ensure their sustainability. Arguably the main source of income is student fees aside from research grants, consultation fees, business profits, endowment and sponsorship. There is urgency for universities to ensure optimal operational cost and generate more income in order to sustain and be more competitive in the education field.

Fulfilling international rankings requirement is not an easy task and not without cost either. Indeed, rankings are based on evaluation on several criteria namely academic reputation, citations per faculty, employer reputation, faculty students, international faculty and international students [6]. There will be comprehensive and meticulous audit in order to verify evident of these criteria. Arguably, it is an investment with expected return on investment (ROI) in terms of higher rankings and subsequently better financial income through more students intake, higher research grants etc.

How does library relevant here? In any academic institutions, library plays a critical role in ensuring sound academic activities by providing collections and access to information or references relevant to fields of studies. Moreover, library also managed university or institutional digital repositories, which is not an easy task considering variety of information objects both in analog and digital forms. To this end, the role of libraries has become more important than ever particularly in supporting universities fulfilling their international rankings goal. Therefore, leaders of academic libraries must be competent in knowledge and skills as well as possessed strong leadership qualities to meet higher expectation from various stakeholders.
Why Library Leadership Matters?

The last two decades of the millennium has seen tremendous changes in librarianship. Martin [4] insists that the most crucial characteristics that organizations will need to survive and thrive in the future are collaboration, transparency, inclusivity and being able to handle change. In other words, present and near future library leaders must be prepared to collaborate and be more inclusive than ever as the role library has change. It requires library leaders to possess good communication and negotiation skills in order to facilitate achieving their new role.

Another worrying factor is huge age gap between retiring librarians and successors. A research involving Academic Research Librarians (ARL) in the United States revealed that 39 % of ARL directors are over 65 years old. They will be retiring within a year and this draws concern about finding competence successors. Although the scenario occurred in the United States, it is almost similar in Malaysia too. Hence, it is imperative to investigate leadership styles among academic librarians in Malaysia in order to groom future academic library leaders.

A great leader is someone who is seen as affecting change, possessing great experience and knowledge, and providing their followers with the opportunity to reach their unique potential. Leaders, through their traits, skills, abilities and personalities, and sometimes through sheer will alone will move and inspire followers to achieve the impossible. There are three commonly adopted leadership styles namely transformational leadership, transactional leadership and laissez-fair leadership [1,12,3,5,11].

Transformational leadership

Transformational leadership creates positive change in the followers which concern about each other’s interest and act toward the interests of the group as a whole. There are four components namely:

Charisma or idealized influence

A leader who act with admirable ways and showing convictions that the leader has clear set of value and act as a role model for the followers and make the followers acknowledge about it.

Inspirational Motivation

A leader who provides a clear vision that is interesting and motivates the followers’ brightness regarding the future goals and provides meaning for the current tasks in hand.

Intellectual Stimulation

A leader who encourages creativity among followers by giving them a framework which, requires them to connect and be creative in solving any barriers to achieve the mission.

Personal and Individual Attention

A leader who follows in each individual follower's needs and act as a mentor and appreciate their contribution in a team. This also can inspire the followers to achieve their goals with effectively [11].

In conflicting situations, transformational leaders are likely to be more effective because they seek new ways of working, positively managing conflicts, seek
opportunities in the face of risk and are less likely to support the status quo. This is essential to ensure that they remained focus on achieving their organizational goals.

**Transactional leadership**

Transactional leadership sets clear goals and objectives and clearly specify what rewards can be expected for achieving those goals. Transactional leadership leader makes decisions using consultative style [9]. This leader uses different ways to guide the followers, but still in final decision where the leader will endure. Followers who give good commitment will retrieve the sources such as rewards, agreements and expectations that negotiated with the leader. In other words, a reward is for compliance. The leader will motivate the followers through the offer of a contingent reward where it focuses on individual follower's needs. The reward can be positive for good followers and as well as negative [5].

In a conflicting situation, transactional leaders will compromise and develop a positive relation. This, however, must be based on the fulfillment of individuals' obligations which in turn would lead to reward depending on their behaviors.

**Laissez-faire leadership**

Laissez-faire leadership provides little guidance for followers, gives freedom to make decisions with their own, the followers have power in complete the task, yet leaders still take responsibility for the groups decisions and actions [2]. Meanwhile Sandhaland et al. [8] argued that leaders of this type tend to absent when needed, fail to follow up requests for assistance and resist expressing their views on important issues. Indeed, there nothing much positive about this type of leadership except their willingness to take responsibility for the groups decisions and actions. In a conflicting situation, laissez-faire leaders avoid involvement in managing conflict and usually left it to conflicting department or individuals to deal with the situation. This is certainly not helpful, as someone with full authority avoids managing conflicting parties as sometimes conflict is unavoidable. However, for certain conflict is manageable.

**Methodology**

This research adopts quantitative methodology using case study approach. Data were collected using questionnaire. 60 academic librarians were chosen from a university in the state of Selangor. 56 respondents returned the questionnaire. Data were analyzed using Statistical Package for Social Sciences version 21. Dimensions of leadership styles derived from relevant earlier research by [10,1,12,3,5].

Demographic data in Table 1 shows that majority of respondents i.e. 41 respondents or 73.2 % are below 40 years old. Age 40 – 50 years is 12 respondents (21.4 %). Whereas for age 50 years and above only 3 respondents (5.4%). It is important to know that majority of the respondents’ age below as this would be helpful for chief librarian in developing succession planning. Future library leaders require new set of competencies which means their knowledge and skills must suit with ever changing stakeholders demand and expectation.
Table 1. Frequency analysis of age

<table>
<thead>
<tr>
<th>Age</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid %</th>
<th>Cumulative %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20-25 years</td>
<td>1</td>
<td>1.8</td>
<td>1.8</td>
<td>1.8</td>
</tr>
<tr>
<td>26-30 years</td>
<td>4</td>
<td>7.1</td>
<td>7.1</td>
<td>8.9</td>
</tr>
<tr>
<td>31-35 years</td>
<td>20</td>
<td>35.7</td>
<td>35.7</td>
<td>44.6</td>
</tr>
<tr>
<td>36-40 years</td>
<td>16</td>
<td>28.6</td>
<td>28.6</td>
<td>73.2</td>
</tr>
<tr>
<td>41-45 years</td>
<td>6</td>
<td>10.7</td>
<td>10.7</td>
<td>83.9</td>
</tr>
<tr>
<td>46-50 years</td>
<td>6</td>
<td>10.7</td>
<td>10.7</td>
<td>94.6</td>
</tr>
<tr>
<td>50 years and above</td>
<td>3</td>
<td>5.4</td>
<td>5.4</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>56</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

Findings show that transformational leadership style scores the highest total mean i.e. 26.14 followed by transactional leadership 26.01 and laissez-faire leadership only 13.17. This shows that apparently librarians in this university possessed transformational leadership and transactional leadership style whereas laissez-faire leadership style is not being their preference.

Score of each dimension of transformational leadership style is above 4 with highest ‘I treat staff with dignity and respect’ at 4.50, whereas the lowest is ‘I encouraged new service possibility’ at 4.26. The findings show that most librarians possessed strong transformational leadership style. This is certainly a good indicator that junior librarians in particularly already have strong leadership foundation which would be meaningful in grooming of future library leaders.

Table 2. Descriptive analysis of transformational leadership style

<table>
<thead>
<tr>
<th>B5 I treat staff with dignity and respect</th>
<th>N</th>
<th>Range</th>
<th>Min</th>
<th>Max</th>
<th>Mean</th>
<th>Std. Err</th>
<th>Std. Dev</th>
<th>Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>B6 I facilitate teamwork and trust</td>
<td>56</td>
<td>2.00</td>
<td>3.00</td>
<td>5.00</td>
<td>4.41</td>
<td>.08</td>
<td>.56</td>
<td>.32</td>
</tr>
<tr>
<td>B7 I encourage new service possibility</td>
<td>56</td>
<td>2.00</td>
<td>3.00</td>
<td>5.00</td>
<td>4.26</td>
<td>.06</td>
<td>.48</td>
<td>.24</td>
</tr>
<tr>
<td>B8 I am willing to take risks with new services</td>
<td>56</td>
<td>2.00</td>
<td>3.00</td>
<td>5.00</td>
<td>4.28</td>
<td>.07</td>
<td>.49</td>
<td>.24</td>
</tr>
<tr>
<td>B9 I engage the imagination and creativity of all staff members in problem solving</td>
<td>56</td>
<td>2.00</td>
<td>3.00</td>
<td>5.00</td>
<td>4.39</td>
<td>.07</td>
<td>.52</td>
<td>.28</td>
</tr>
<tr>
<td>B10 I encourage an organizational culture of continuous improvement</td>
<td>56</td>
<td>2.00</td>
<td>3.00</td>
<td>5.00</td>
<td>4.28</td>
<td>.07</td>
<td>.49</td>
<td>.24</td>
</tr>
<tr>
<td>Valid N (listwise)</td>
<td>56</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>26.14</td>
</tr>
</tbody>
</table>
Table 3 illustrates descriptive analysis of transactional leadership with total mean score 26.14. The table reveals the highest mean score 4.48 for ‘I monitor the outcomes of whether the objective is achieved or not’. Followed by ‘I ensure the work standards are met’ (4.46); ‘I help staff to look at problems in different angles’ (4.41). There is one element that usually synonym with transactional leadership i.e. ‘I provide staff with material rewards such as pay rise or bonus on the fulfillment of the obligations’ with the lowest mean score 3.92. It is understandable as being in the public sector, there is limited opportunity to reward staff for annual excellent service award as the number allocated for each department extremely small.

Table 3. Descriptive analysis of transactional leadership style

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Range</th>
<th>Min</th>
<th>Max</th>
<th>Mean</th>
<th>Std Dev</th>
<th>Variance</th>
<th>Std. Error</th>
<th>Stat</th>
<th>Stat</th>
<th>Stat</th>
<th>Stat</th>
</tr>
</thead>
<tbody>
<tr>
<td>C11 I make clear on what staff can expect to receive when performance goals are achieved</td>
<td>56</td>
<td>1.00</td>
<td>4.00</td>
<td>5.00</td>
<td>4.39</td>
<td>.06</td>
<td>.49</td>
<td>.24</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C12 I monitor the outcomes of whether the objective is achieved or not</td>
<td>56</td>
<td>1.00</td>
<td>4.00</td>
<td>5.00</td>
<td>4.48</td>
<td>.06</td>
<td>.50</td>
<td>.25</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C13 I spend time in teaching and coaching the staff to clarify the role and task requirements</td>
<td>56</td>
<td>1.00</td>
<td>4.00</td>
<td>5.00</td>
<td>4.33</td>
<td>.06</td>
<td>.47</td>
<td>.22</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C14 I help staff to look at problem in different angles</td>
<td>56</td>
<td>1.00</td>
<td>4.00</td>
<td>5.00</td>
<td>4.41</td>
<td>.06</td>
<td>.49</td>
<td>.24</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C15 I provide staff with material rewards such as pay raise or bonus on the fulfillment of obligations</td>
<td>56</td>
<td>4.00</td>
<td>1.00</td>
<td>5.00</td>
<td>3.92</td>
<td>.11</td>
<td>.82</td>
<td>.68</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C16 I ensure the work standards are met</td>
<td>56</td>
<td>1.00</td>
<td>4.00</td>
<td>5.00</td>
<td>4.46</td>
<td>.06</td>
<td>.50</td>
<td>.25</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Valid N (listwise)</td>
<td>56</td>
<td></td>
<td></td>
<td></td>
<td>26.01</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4 illustrates descriptive analysis of laissez-faire leadership style which shows total mean score 13.17, which is the lowest compared to transformational and transactional leadership style. The table also shows extremely low mean score for all elements except for ‘As long as work meets minimal standards, I keep from trying to make improvement’ with 3.67. Others are below 2.05 with the lowest 1.73 for ‘In general, it is best to leave subordinates alone’. This finding is consistent with previous research where laissez-faire is the least popular leadership style.
Table 4. Descriptive analysis of laissez-faire leadership style

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Range</th>
<th>Min</th>
<th>Max</th>
<th>Mean</th>
<th>Std Dev</th>
<th>Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Stat</td>
<td>Stat</td>
<td>Stat</td>
<td>Stat</td>
<td>Std</td>
<td>Stat</td>
</tr>
<tr>
<td>D17</td>
<td>56</td>
<td>4.00</td>
<td>1.00</td>
<td>5.00</td>
<td>3.67</td>
<td>.15</td>
<td>1.1</td>
</tr>
<tr>
<td>D18</td>
<td>56</td>
<td>4.00</td>
<td>1.00</td>
<td>5.00</td>
<td>1.83</td>
<td>.11</td>
<td>.88</td>
</tr>
<tr>
<td>D19</td>
<td>56</td>
<td>3.00</td>
<td>1.00</td>
<td>4.00</td>
<td>1.92</td>
<td>.13</td>
<td>1.0</td>
</tr>
<tr>
<td>D20</td>
<td>56</td>
<td>4.00</td>
<td>1.00</td>
<td>5.00</td>
<td>2.05</td>
<td>.14</td>
<td>1.0</td>
</tr>
<tr>
<td>D21</td>
<td>56</td>
<td>3.00</td>
<td>1.00</td>
<td>4.00</td>
<td>1.94</td>
<td>.11</td>
<td>.84</td>
</tr>
<tr>
<td>D22</td>
<td>56</td>
<td>4.00</td>
<td>1.00</td>
<td>5.00</td>
<td>1.73</td>
<td>.10</td>
<td>.75</td>
</tr>
<tr>
<td>Valid N (listwise)</td>
<td>56</td>
<td></td>
<td></td>
<td></td>
<td>13.17</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Why it is important to determine leadership styles among librarian in universities? Empirical data provide evident which is valid. This supersedes perception as assumption is not necessarily true. Therefore, the findings of this research would provide a strong basis for chief librarian to consider for long term and comprehensive succession planning which ensures the availability of successors at all levels in the library. It is essential for succession plan to embrace distinction between leadership, management and administration. As junior librarians climb the leadership ladder, they must be made known of their changing role towards more strategic function. Successful leaders know to what extent their involvement in any task as delegation and trust must be in place to allow creativity of subordinates in performing their task and meeting the target.

Considering present expectation and challenges, leadership would be core requirement for academic libraries to ensure that they remain relevant and significant. There are two aspects that chief librarian must prioritize. First, identify the most crucial characteristics that organizations will need to survive and thrive in the future i.e. collaboration, transparency, inclusivity and being able to handle change [4]. Second, identify leadership talent and succession plan which eventually establish a talent pool where future library leaders are readily available for replacement. There is a growing concern as the experience of ARL in the United States where retiring library directors of baby boomers generation left a leadership gap which cannot be immediately fulfilled by qualified candidate. Here, there were situations where chief librarian position occupied by someone without library or information science background and without employment experience in library environment. Arguably, there is an attraction to be chief librarian in a university as it is a senior government position with special grade which equivalent to professor. Not just librarians, but anyone else who believes that he is qualified will put an effort to get the post. To this
end, succession planning is crucial to ensure that in-house future leaders are readily available.

Conclusion

This research shows that librarians in this university possessed apparent transformational leadership and transactional leadership styles whereas laissez-faire is almost inexistence. These findings would be helpful for chief librarian to plan succession planning in order to ensure future library leaders are competence to deal with fast changing technology and stakeholders’ expectation. Worth noting that chief librarian must be someone with library and information science as academic background as managing library requires knowledge and technical skills in the field. Although it is uncertain for how long international rankings will last, it is that certain academic libraries must fulfill their users’ expectation which is their everlasting primary goal across the time line. Leaders must rise to the occasion, therefore it is not just knowledge and skills in managing core library business, but they also must demonstrate strong leadership qualities. The reputation and significance role of libraries can only be seen with the presence of reputable leadership particularly in underpinning research, teaching and learning, and other academic activities in the university.

References


Shifting from Item-Centric to Content-oriented:  
A Metadata Framework for Digital Archives in the 
Cultural and Historical Domains

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Abstract. Many memory institutions have built various digital collections of cultural and historical resources since early 1990s. Those digital collections, which are called digital archives in this paper, cover various types of cultural and historical resources. Metadata is a key for organizing and utilizing those digital archives. As metadata of those digital archives are defined based on conventions at the memory institutions, their metadata schemas are mostly oriented to physical items collected by the institutions, which is called item-centric metadata in this paper. However, the item-centric metadata scheme would not fit to the heterogeneity of the cultural and historical resources nor users’ demands to access the cultural resource via the Internet. For example, conventional item-centric metadata schemes would not fit to Intangible Cultural Heritage and historical events of a community such as disaster. The aim of this paper is to propose a framework for metadata which solves those issues by shifting the basic standing point of metadata from Item-centric to Content-centric. This paper first discusses the basic problems of metadata for digital archives and claims the importance of content-oriented-ness of metadata. Then, it proposes a metadata framework as a generic model for solving the basic problems. The framework has three layers, which are Concepts/Knowledge, Embodiment and Digital Archives, and is named CEDA in this paper. Some discussions on CEDA and related issues follow the definition of CEDA.

Keywords: Metadata Models, Digital Curation, Digital Content Services at Memory Institutions.

Introduction

Digital information is a central issue for the communities working on cultural and historical resources [1, 2]. Many digital collections of cultural and historical resources have been developed since 1990s. This paper calls those digital collections of cultural and historical resources as Digital Archives. Almost 30 years have passed since the early development of digital archives such as American Memory and Making of America. Digital archives and related services have been continuously developed by memory institutions, i.e., libraries, museum, archives, and galleries. Some well-known digital archive portals such as Europeana and DPLA (Digital Public Library of America) have been developed to provide large collections of digitally archived resources across institutions.
On one hand, information technologies to digitize original items have been changing over these decades and the number of born digital resources curated into archives has been increasing. Contrarily, the state-of-the-art technologies allow us to present those archival resources in various digital forms, e.g., virtual reality and 3D printers. However, the basic model of digital archives is unchanged, i.e., a digital collection of items archived by memory institutions for use on a display via the Internet and over time.

The authors consider that shifting from Item-centric to Content-oriented is a crucial trend of metadata models for resource description and access in the networked information environment. A typical example is FRBR (Functional Requirements for Bibliographic Records) and its related standards adopted by the library community [3, 4]. Work, Expression and Manifestation of the group 1 entities of FRBR represent abstract entities and only Item represents physical entities which may be digital or non-digital. In particular, Work provides crucial access points for users who do not care about any specific physical items but only intellectual content of a resource. Bibframe also has its Work entity representing the conceptual essence of the catalogued resource [5]. Kiryakos et al. proposed a model of bibliographic entities to represent popular culture objects, e.g., comics (manga), animation and video games [6, 7, 8]. Their model proposes Superwork as an abstract entity representing a multimedia franchise such as Gundam and Dragon Ball. A common feature among these models is the conceptual entities such as Work and Superwork by which users can easily identify the contents of items and use them as a primary access point for the items.

Catalogues and audio guides provided at museum exhibitions are very useful resources for the audience. Those catalogues and audio guides are linked to items in the exhibitions using pointers or marks attached to exhibited objects in conventional physical museum environments. Nowadays, this linkage in the physical exhibitions is often provided using digital technologies such as sensors and GPS. For example, augmented reality and mixed reality technologies are used to show virtual objects to the audience at a physical exhibition. Those exhibition catalogues and audio guides explain not only physical objects in front of the audience but also facts and events related to the objects.

Typical cultural resources curated into existing digital archives are digital objects created by digitizing tangible objects held by museums. We can find other types of resources archived digitally such as festivals, dance performances, disasters, natural heritage and so forth. These digital resources are recordings created directly or indirectly from the source objects. Generally, these digitally curated items are indexed and provided for use by digital archives. In general, metadata about a digital resource used for organizing those digital archives is created based on conventional item-centric policy, i.e., items as a primary instance. On the other hand, any objects can be linked on the Internet regardless of the type of the contents, e.g., an image created by digitizing tangible object, a digital video of a dance performance, an article describing a historical event and a subject heading term. The authors consider that we need a metadata model which covers the heterogeneity of the resources and helps define rules to identify individual entities on the Internet.

Metadata aggregation a key topic for digital archives, in particular for those for intangible cultural heritage and events. For example, in a research project on digital archives of Great East Japan Earthquake, the authors have learned that a disaster can be taken as an event may be represented by a set of resources created by aggregating individual photographs collected from a digital archive(s) [9]. Events are a better access point to the disaster digital archives for general users rather than individual
photographs. However, there is no well-established metadata model for digital archives which defines events as a primary access point.

This paper is aimed to discuss metadata models for building digital archives of cultural and historical resources and propose a basic model which covers the heterogeneous resources. This paper first discusses several problems on metadata for digital archives learned from those research projects. Then, this paper presents a conceptual model for digitally archiving various types of resources and a generalized metadata model for describing objects curated in a digital archive followed by discussions and concluding remarks. The paper focuses on theoretical aspects for metadata design and application of the proposed model in a specific domain or to a digital archive is left out of the scope of this paper.

**Metadata for Digital Archives - General Issues**

**Metadata Standards for Digital Archives - from Item-centric to Content-oriented**

Libraries, museums and archives have different standards and conventions for creating metadata; for example, MARC at libraries, CIDOC-CRM, CDWA, CARARE etc. at museums, ISAD(G) at archives [10, 11, 12, 13, 14]. Metadata for digital archives is built based on those standards because digital archives are often built as an extension of their services, so that those metadata standards are item-centric.

Europeana which harvests metadata from participating institutions, is built on Europeana Data Model (EDM) that is a data model to aggregate information about the original cultural heritage resources and their digital representations (i.e., digital surrogates) collected from the participating institutions [15]. Fig. 1 is a core model of EDM, which shows a digitally archived object as an aggregation of an original cultural heritage object and its digital surrogates. Japan Search, which is a relatively new service and being built in Japan by the Japanese government [16], harvests metadata from memory institutions and organizations in the cultural and historical domains and provides an integrated interface to search and access the cultural resources. Japan Search has its own metadata model to collect and aggregate metadata from heterogeneous participating institutions and organizations. The data models of Europeana and Japan Search are basically item-centric because of the nature of the participating institutions.

![Fig. 1. Visualization of the three core EDM classes for data providers](Europeana Data Model Primer, p.10)
The authors consider that we need metadata description schemes which clearly define correspondence between original cultural objects and the digital objects created as surrogates, and correspondence between the original/digital objects and their metadata. In addition, the authors consider that abstract instances expressing cultural and historical entities such as concepts and events are crucial entities for the schemes to provide content-oriented resource access environment and to semantically link archived objects. In general, it is expensive to manually organize those conceptual entities as a dictionary which can be used by both humans and machines. We think that we can find resources which describe about cultural objects on the Web, e.g., Wikipedia created by collective intelligence of crowds and websites created by authorities.

A crucial aspect for content-oriented-ness of metadata is an expansion of the domains of digital archives - from tangible cultural heritage objects to those objects such as intangible cultural heritage, media art works, computer software and historical and cultural events. Digital archives available today are mostly a collection of digital objects created by digitizing physical objects. There are many digital images of dance performances and disasters created from analog photographs and motion pictures. A simple question from these cases is “Is a digital image of a dance performance a digital surrogate of the film or a dance as intangible cultural heritage?” The answer is the original analog film is an item collected by an institution and the dance is its content which cannot be collected as an item. For a digital archive of intangible cultural heritage, the dance should be obviously a primary object.

**Metadata Aggregation - Issues Learned from Preceding Research Projects**

Fig. 2 shows a British Museum’s web page for Statue of Tara which is an important cultural heritage of Sri Lanka. This page shows typical metadata provided by memory institutions about a cultural heritage object which includes descriptions about an orig-
inal cultural object and those about its digital surrogate(s). In addition, it may include
administrative information about the object and surrogate(s). Thus, metadata about
cultural heritage objects is an aggregation of descriptions of different objects. Digital
archives and their portals may aggregate digital surrogates of an identical original
object collected from multiple sources.

**Modeling Cultural Objects - Tangible, Intangible, Event-oriented**

Relationships between an original cultural heritage object and its digital surrogates is
clear in the case of tangible cultural heritage objects, but not clear in the case of in-
tangible cultural heritage or events.

![CHDE model](image)

Fig. 3. CHDE model

It is obvious that what we can digitally archive are the instances expressed in machine
processable forms and renderable on user interfaces for human users. In general, in-
tangible cultural heritage is a collection of knowledge and skills inherited from genera-
tion to generation. It is not possible to digitally archive intangible cultural heritage as
a collection of knowledge and skills unless those knowledge and skills are presented
in a machine processable form. Based on this understanding, the authors proposed a
metadata model for curating both tangible and intangible cultural heritage objects into
a digital archive [17, 18]. The model, which is named CHDE (Cultural Heritage in
Digital Environments) and shown in Figure 3, explicitly splits performances from
intangible cultural heritage as an instantiation and defines a digital archive of intangi-
able cultural heritage as a collection of curated digital instances composed of digitized
objects of the instantiations and other related digital entities.

Event is an important category for digital archives, e.g., disasters, wars, and games.
Events are recorded in various types of resources, e.g., textual documents, photo-
graphs and audio recordings. We can find events in the cultural domain as objectives
for digital archiving, e.g., exhibitions at museums, performances of a traditional
dance, media art works created for one-time presentation. These events and event-like
objects need to be properly modeled for digital archiving. Event is not included in the
primary domains of CHDE. However, we can apply the Instantiation model of CHDE
to Event, i.e., any physical object or incident in an event which is recordable in a re-coding medium may be mapped to Instantiation of CHDE.

**Modeling Cultural Objects for Digital Archives**

This section proposes a generalized metadata model to describe various types of cultural objects. It first discusses the types of objects, then proposes the model followed by discussion on mapping the model to existing metadata schemes.

**Metadata Standards for Digital Archives - from Item-centric to Content-oriented**

Cultural objects are obviously heterogeneous. Intangible cultural heritage is composed of knowledge, skills, customs, and so forth, and is presented for humans as a performance or action by people who inherit those knowledge and skills. In their performances and actions, costumes and props might be used, which are tangible cultural objects. Therefore, we need a data model to describe these heterogeneous objects curated into digital archives keeping the relationships among them.

Figure 4 shows a generalized view of entities which compose a domain for cultural and historical archives. It roughly splits the domain into two spaces; Conceptual/Knowledge space and Embodied space.

![Fig. 4. Entities in cultural and historical domains](image)

In this paper, we roughly classify embodied objects into Intangible objects (Performance/Action), Tangible Objects, and Events. Tangible objects are further classified from the three aspects - size/shape, temporal and function. The paragraphs below show definitions of Tangible and Intangible Cultural Heritage in this study.

1. **Tangible Cultural Objects**: A cultural entity which is embodied as a physical instance, e.g., paintings, sculptures, manuscripts, and buildings.
   - **Size/Shape as Movable/Immovable**: “Movable” means those objects which may be moved, collected and exhibited by a museum, e.g., paintings on canvas and manuscripts. “Immovable” means in situ structures and monuments.
   - **Temporal as Ephemeral/Perpetual**: “Ephemeral” means those objects which naturally disappear after some time, e.g., ice carvings and flower arrangements. “Perpetual” means permeant thing such as a building.
   - **Function as Dynamic/Static**: “Dynamic” means those objects which have some functionality and are curated with their functionality alive, e.g., machineries such...
working steam locomotives and video games, media art works realized using computers, and so forth. “Static” is objects with fixed functionality.

(2) Intangible Cultural Objects: A cultural entity which can be given physical embodiment by humans who have skills and knowledge to embody the entity, e.g., festivals, dance, and craftsmanship.

Cultural objects in our current information environment include digital objects such as digital photographs and videos, computer graphic images and digital video games. In this paper, those digital objects created as a cultural object, either born-digital or converted-into-digital, are classified as an embodied instance. Digital objects can be stored in an online file or an offline medium. An offline medium which stores a digital cultural object may look like a tangible object. On the other hand, the fundamental difference between digital media and analog media is obvious—we can make an exact copy of contents between digital media but not between analog media. Therefore, information media (or carrier) does not have significant meanings for modeling digital objects.

A bibliographic entity such as FRBR-Work is a conceptual entity. This research identifies Intangible cultural heritage as an entity which can be considered as a conceptual entity. These conceptual entities have to be presented in some form recognizable by humans. In CHDE shown in a previous section (Fig. 3) has Instantiation to represent a particular performance of an intangible cultural heritage such as a dance performance and a paper-making practice. Conceptual entities may be found in tangible cultural heritage objects as well. For example, “Rosette Stone” may be used as a term to mean not only the original physical object maintained by the British Museum but also it may be used to mean “Rosette Stone” as a conceptual object which is shared among people.

These conceptual entities have to be described in some media for communication and sharing between humans as well as computers. Those descriptions about conceptual instances are a kind of metadata about the conceptual instances. They can be embodied in various forms such as dictionary, encyclopedia and thesaurus. A typical example is a Wikipedia article about a cultural heritage object.

Figure 5 shows a conceptual model of the entities discussed in the paragraphs above. It has two spaces - Concepts/Knowledge Space and Embodied Space. Concepts/Knowledge Space is composed of conceptual entities, and Embodied Space is composed of all kinds of entities embodied for use by humans as well as computers. “Gion Matsuri” is a historical festival in Kyoto, Japan, so that the festival in a particular year is an instantiation. “Rosette Stone” is a tangible cultural heritage object so that it is an embodied entity. On the other hand, as it is a very well-known cultural heritage, it can be recognized as a conceptual entity.
Metadata Standards for Digital Archives - from Item-centric to Content-oriented

Based on the identification of the entities in the cultural domains discussed above, this paper proposes a model for digital archives in three layers named CEDA model (Concepts, Embodiment and Digital Archives), which is illustrated in Fig. 6.

Memory institutions can collect and archive only embodied instances but not conceptual entities. Conceptual entities have to be documented or described for communication among humans and computers. The documentations and descriptions are an embodied entity. On the other hand, all kinds of tangible cultural heritage and instantiations of intangible cultural heritage are embodied instances. Among tangible objects, only those which are movable, perpetual and static objects can be curated at memory institutions as an original object. Some dynamic object may be curated and preserved in their original shape and original functionality, but it depends on the ability and environments of the memory institutions; for example, curation of machineries such as old steam locomotives and computers and media art products such as video games. On the other hand, for memory institutions that have difficulties to preserve the functionality of the original objects, it would be a natural solution to curate video recordings of those objects in action as a digital surrogate of an instantiation of their functionality with documentations about the objects.
In Fig. 6, both primary and secondary objects may be digital or non-digital. Digitization process is necessary for non-digital objects. Conversion process may be required for born digital objects in accordance with the archiving environments and requirements; for example, file format conversion to an archive-oriented format such as PDF/A. However, the conversion process and other components required for developing practical digital archives in the lowest layer of Figure 6 are out of the scope of this paper because they are implementation issues.

**Metadata Data Model based on CEDA Model**

An item collected in digital archives is an individual digital object or a set of digital objects. The item has to be connected to an original cultural heritage object, which is shown well by the base model of EDM. Therefore, metadata for the item has to contain descriptions about the digital object(s) and the original object.

Identification of an original object is a fundamental issue in the case of intangible cultural heritage and ephemeral object. We need to use a recording of a cultural heritage object as its surrogate, but we need a scheme to identify the recording as a surrogate of a particular original object which existed at a particular location and time. Another crucial issue is a description (or documentation) about such embodied entities which are ephemeral and/or intangible. Those instances of descriptions may be used as a surrogate of those objects as well as conceptual objects.

Figure 7 shows relationships among CEDA instances and a metadata for an archived item defined for Gion Matsuri as an example. The table on the right-bottom shows a metadata. Properties shown in the left column of the table are borrowed from categories define in the Description Module model shown in the next section.
A Metadata Framework for Digital Archives - Description Modules Model

A British Museum's page about Statue of Tara (Fig. 2) shown in an earlier section includes several properties of the original object including a front image of the object and it include links to several images of the statue. Descriptions about the images are not directly visible but obviously they are used to show thumbnail images and links to the full images. Thus, the metadata is a mixture of descriptions about the original object and their digital images. Metadata composed of descriptions about two or more target objects is generally called hybrid. In contrast, a basic guideline to keep the relationship between metadata and its target object 1-to-1 is called the One-to-One Principle of Metadata [19, 20, 21].

It is a crucial issue to define a metadata framework for digital archives which need hybrid feature. The authors proposed a metadata model named Description Module (DM) model to structurally describe hybrid feature of items of digital archives [22]. The DM model is defined based on the Application Profiles [23] and One-to-One Principle of Metadata of Dublin Core Metadata Initiative.

Table 1 shows the overall structure of DM model. A metadata instance is composed of four categories of description modules - Original Object, Digital Surrogate, Administrative and External Resources. Description modules are given in each category; for example, Content Description, Agent, Location, Timeline, Technical Description, Provenance and so forth. In the case of Statue of Tara shown in Figure 2, Content Description module of the Original Object category is for descriptions about the original statue and that of the Digital Surrogate category is descriptions about digital images.
Table 1. Object categories of description modules model

<table>
<thead>
<tr>
<th>Object Category</th>
<th>Target Objects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Original Object</td>
<td>Original physical object or its surrogate which are identifiable</td>
</tr>
<tr>
<td>Digital Surrogate</td>
<td>Digital files representing the original object or its surrogate</td>
</tr>
<tr>
<td>Administrative</td>
<td>Agent(s) managing the original object and digital surrogate(s)</td>
</tr>
<tr>
<td>External</td>
<td>Any objects related to the archived item</td>
</tr>
</tbody>
</table>

Discussions

This study was started from the following two requirements found in our previous research projects [9].

1. From item-centric to content-oriented: Item-centric metadata of current digital archives, which are built based on the conventions at memory institutions, need to be more content-oriented.

2. Digital archives as a resource to keep community memory: Digital archives contents are a crucial resource for communities to keep their memories for the future, so that we need a scheme to connect these archived contents to preserve this community memory for long run.

Regarding the first requirement, as metadata at memory institutions were originally built for search, access and manage their holdings, it is natural that those metadata are oriented to items collected by the institutions as discussed in previous sections. Memory institutions have created such resources as authority files, thesauri and other resources to help find, access and manage those items. In principle, these resources are designed for use at the memory institutions, for their holdings and by their patrons and information professionals. However, the environments of digital archives are very different - heterogeneous users, online remote access to the archives and access not only by humans but also by machines. Those abstract entities such as Work entities, cultural heritage objects as a conceptual entity discussed in Section 3 might be useful for the general users to find and access items in digital archives. The basic problems in this regard are lack of standardized models for describing those conceptual entities across domains and well-known authority resources usable across domains. We are thinking that Linked Open Data provides the standardized foundation for describing those conceptual entities. For the second problem, we can use some domain ontologies and dictionary resources available on the web as embodiment of the conceptual entity resources; for example, Wikipedia and related resources like Wikidata and authority resources such as Getty AAT.

The second requirement is also related to the item-centricity of metadata of digital archives. The authors have learned from the disaster archive project that a set of photographs taken at a specific place/area and time period can be aggregated into one instance representing an event and situation at the location. These photographs should be linked to an event(s) by which regional people and communities remember what happened in their communities. Indexing those items (i.e., photographs) by events would help users find items. In the practical environments, it is known that temporal and spatial information are often used to help find the items. We think that we need to
extend temporal and spatial dimensions to “events” which should be uniquely identifiable and documented.

CIDOC Conceptual Reference Model (CRM) which is an ontology developed mainly for the museum community covers not only physical entities but also conceptual entities. CEDA model is a conceptual model and we have not implemented a metadata schema based on CEDA. We think that the CIDOC-CRM classes are useful to define CEDA entities; for example, E22 Man-Made Object as Primary Physical Object and E24 Physical Man-Made Thing as Instantiation, and so forth. Further elaboration of CEDA model is required for detailed mapping as its semantic basis.

This study started as a research on issues of digital archives for South and Southeast Asia where countries are mostly under development [24]. We have learned two important aspects in the previous studies; (1) memory institutions in Europe and North America maintains many cultural heritage objects of the region and many of them are digitized for use on the Internet, (2) digital archives are crucial infrastructure for the region which has very rich and diverse culture and is being developed very rapidly, and (3) digital archives are still not highly developed in the region. Digital archives allow much larger flexibility than physical collections at memory institutions but, at the same time, it increases the heterogeneity of the archived resources accessible by the users. Bridging the difference is a crucial issue for building digital archives in the region. Metadata aggregation is obviously a key technology for building digital archives. The authors thought that we need more content-oriented scheme to describe resources than conventional item-centric metadata scheme to cope with the diversity issue.

Item-oriented-ness and Content-oriented-ness of metadata are the key aspects of this study. Library catalogs and museum catalogs started as a tool to manage the holdings of libraries and museums. So, they are inherently item-oriented from this viewpoint. Subject headings and authority files which are created to support management and use of the resources define conceptual and/or abstract entities, e.g., subjects and authors as a conceptual instance. Subject headings and authority files are created basically neutral to a particular item. These resources are content-oriented. However, there was no good way to link the items and concepts. The entities defined by the Group 1 entities of FRBR give us a useful aspect to clearly separate contents and items. And, more importantly, all of the Group 1 entities may be realized as a resource identifiable on the Internet, i.e., seamless linking across contents and items is possible. In practice, we can define a metadata scheme to define these conceptual and abstract entities. However, we think that a comprehensive framework which defines the conceptual/abstract entities as well as items is crucial to define metadata schemas for specific digital archives.

CEDA model, which was developed based on above mentioned understanding, is a comprehensive framework to identify entities that should be described by metadata and relationships among the entities. The authors think that the main contribution of this study is identification of those entities each of which can be realized as a digital object in the Internet environment. Metadata standards used by conventional digital archives primarily define schemes to describe digital objects identified as an archived item and conceptual entities are defined as external entities. On the other hand, CEDA model seamlessly connects those digital objects representing cultural objects to those digital objects representing conceptual entities such as object classes defined in CIDOC-CRM and Getty AAT and those described in Wikipedia.

Linked Open Data is a very important idea to improve usability of digital archives. In theory, any entities can be represented as a digital object which is uniquely identi-
fiable if they are embodied in either the physical or digital space. Further formalization using LOD technologies is required as a future study [25][26][27].

**Conclusion**

This study is based on the former three different projects - metadata aggregation for disaster archives, metadata models for the Japanese popular culture database, and metadata model for digital archives of intangible cultural heritage. A common feature of these projects is that the target resources are not tangible cultural heritage objects, which pushed us to design a new data model for digital archives covering the heterogeneous resources. The CEDA model was first designed as a conceptual model for modeling cultural resources based on the experiences of the preceding projects [28]. The authors consider that abstract entities such as events and contexts are very important to link archived resources across digital archives and improve the usability of the digital archives. We think to create a mapping from CEDA model to an existing ontology such as CIDOC-CRM is an important step to use the model in practical environments.

Digital archives have a large potential as a resource not only for research, education and tourism but also for keeping community memories for the future. We think that linking resources created by communities such as webpages, social media articles and Wikipedia and archived resources is a challenging but important research issue. Longevity of digital archives and metadata are also a crucial issue for the future.

**Acknowledgements**

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**References**

The Public Services Acceptance on Sarawak Government
Electronic Document Management System

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Abstract. This is a concept paper to study on the public services acceptance
towards the use of Sarawak government electronic document management sys-
tem (EDMS). Sarawak e-government are represented by installation and inno-
vation of IT elements in the transaction within government agencies managing
more than 20 EDMS; comprises of Government to Community (G-C) Services,
Government to Business (G-B) Services and Government to Government (G-G)
Services. However, not much had been discovered in the literature with respect
to the perception on the use and acceptance of EDMS among the public sectors.
Moreover, a study by Raja Abdullah & Roseline (2011) indicated that the per-
centage of IT-related usage among the public servants is still very low. This
finding may be alarming with the fact that the government moving forwards’ is
focusing on digital Malaysia. The aim of the study is to investigate the impact
of these six factors; attitude, subject norm, perceived behavioural control, per-
ceived usefulness and perceived ease of use on the use of EDMS. The scope of
the study is focusing on selected Sarawak Government’s public services man-
aged by the Sarawak Government agencies. Due to main intention to be given
on particular characteristics of a population of interest i.e. the Sarawak Gov-
ernment offices, the study opt survey method via purposive sampling approach
of various departments ranging from the State Ministries, Chief Ministers to
State Department and State Statutory Bodies. The data collection is made
through questionnaires where all the research constructs are incorporated in the
structured questions designated as the study instrument. The relationships under
study are in accordance with the posited hypotheses generated which will be
analyzed accordingly. The findings may serve as leads to moving forward plans
and strategies in creating, interactive and proactive citizen-related services digi-
tally, across public domains and time dimensions.

Keywords: Electronic Document Management System; Sarawak e-Government
digital, public services

Introduction

The presence phenomena of Information Technology application driven in the modern
lifestyle in the whole world have very big impact in the changing of conventional
government to an e-government. Innovations in information technology have swept
the government old method or approach over the past decade. A fast-moving and
evolving trend in digital technologies are leading to a radical change in the public
sector administration expectation.
With the rise of information technologies, growths of document management systems have changed the way of creating, storing, organizing, transmitting, accessing, manipulating, updating and making available of digital documents in the electronic document management systems (EDMS) that have gained a strong position with the extensive use of computers in organizations. However, the success of EDMS effort in the organization depends on the use and acceptance of a large number of employees as the active user of EDMS.

This is a concept paper to study on the public services acceptance towards the Sarawak government electronic document management system (EDMS). EDMS refers to organizational of information systems and technology (IST), which emerged from the 90s to manage digital documents for organizational needs [1]. EDMS enables organizations to manage documental records, improve management processes, organizational communication of concepts and ideas, manage knowledge and improve activity efficiency, and play an important role in organizational memory. EDMS allows organizations to manage documents from creation to destruction throughout the life cycle [2]. In Sarawak, implementation towards an E-government are represented by installation and innovation of IT elements in the transaction within government agencies to ensure that the public sector is relevant and trying to meet the evolving needs of the public and the private sectors as to strives towards the goals of its Sarawak Digital Economy Strategy 2018-2022. [3].

In the Sarawak Government public services, the applications are supported by decentralized microcomputer / personnel computer-based systems in 152 establishments consisting of 11 State Ministries; 18 Chief Minister’s Department; 21 State Departments; 12 State Residents’ Offices; 40 District Offices; 25 State Local Authorities and 25 State Statutory Bodies. These systems are used to create, use and maintain born digital records consisting of variety of DBMS, EDMS and EIMS. However, the percentage of Information Technology usage is still very small amongst the public services by staff at a prominent government agency in Malaysia, as they preferred to use manual approach in their daily work [4].

L. T. Nguyen, P. M. C. Swatman, and B. Fraunholz [5] claimed that the existing literature shows lack of research on the implementation of EDMS in public service administration. This was later supported by M. J. Lawellen [6] in his findings that most of the researches done are on the EDMS itself but not on the acceptance of EDMS by users especially amongst the public administration. Studies aimed at investigating the adoption of EDMS by users were uncommon. Most of the research engaged e-government acceptance rather than managing EDMS and kept EDMS as part of it [7]. Thus it is crucial to explore from the user’s perspective with regard to for e.g. issues of experience, how they interacts with the system, what impacts their experience, what motivates them, their feelings, usability and what internal environmental factors affect their experience towards acceptance of the EDMS in their daily work [8].

Hence, the main aim of the study is to examine factors influencing the use of electronic government system in the public sector and the acceptance of technology by the end users in each government agencies. The paper is organized as follows. The ensuing section provides the description of Sarawak Government online services, followed by sections of the background of the study and the past works. Subsequent sections present the proposed study methodology. Final section concludes the paper.
Background of Study

The transformation of Sarawak Government Online Services

Through the formulation of a long-term development plan known as the Sarawak Digital Economy Strategy 2018 - 2022, the state government is taking measures to tackle important issues and issues facing the state and set out possible direction for Sarawak to leapfrog into a digital economy. The digital economy strategy shall be adopted to be implemented. The major challenge is to ensure it is being accepted by the public service as they are already known around the globe to be reluctant to embrace the digital initiatives. Thus, Sarawak Government have decided to change their approach by providing government services to the general public and within government agencies through digital government initiatives. Therefore, Sarawak Government decided to develop Sarawak Digital Economy Strategy in-house. There are four clusters of subject matters namely Governance and Infrastructure, Economic Sectors, Smart City and Talent and Research and Development. Under these four clusters, seventeen areas were identified namely Legislation and Governance, Digital Infrastructure, Digital and Data, Cyber Security, Digital Government, Agriculture, Tourism, Manufacturing, e-economics, Health, Physical Infrastructure and Utilities, Housing and Urban Development, Transport, Logistics and Supply Chain, Talent Management, Digital Village, Centre of Excellence, and Digital Inclusivity. One of the strategies and strategic actions, Sarawak government provides three types of online services that manages by the public service namely Government to Community (G-C) Services, Government to Business (G-B) Services and Government to Government (G-G) Services. Tables below listed EDMS (online services) by the Sarawak Government.

Table 1. Government Online Service to Community

<table>
<thead>
<tr>
<th>EDMS</th>
<th>Description</th>
<th>EDMS</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Talikhidmat</td>
<td>For enquiries, complaints and suggestion to all the Government and non-Government organisation</td>
<td>eR&amp;DO</td>
<td>Apply for child adoption</td>
</tr>
<tr>
<td></td>
<td>For payment of Water Bills (Rural Water Supply Department of Sarawak, Kuching Water Board, Sibu Water Board, LAKU Management Sdn. Bhd.)</td>
<td>Check child adoption application status</td>
<td></td>
</tr>
<tr>
<td>Paybills</td>
<td>For payment of Electricity bills (SESCO)</td>
<td>Register Probate with District Office</td>
<td>Check Probate registration status</td>
</tr>
<tr>
<td></td>
<td>For payment of Telecommunications (Telephone and Internet Service) bills (Telekom Malaysia Bhd.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>For payment of Study loan (State Public Service Commissions)</td>
<td>e-Booking</td>
<td>Booking of the State Government facilities</td>
</tr>
<tr>
<td></td>
<td>For payment of Study Loan (Yayasan Sarawak)</td>
<td>Handy</td>
<td>Guide to Sarawak Government Services</td>
</tr>
<tr>
<td>EDMS</td>
<td>Descriptions</td>
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<td>-------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td></td>
<td></td>
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<tr>
<td>eLibraries</td>
<td>Sarawak Business Directory</td>
<td></td>
<td></td>
</tr>
<tr>
<td>eR&amp;D0</td>
<td>Search business name availability</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Register business name</td>
<td></td>
<td></td>
</tr>
<tr>
<td>e-Contractor and</td>
<td>Search and view contractors Registry.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consultant</td>
<td>Register as Government Contractor / Consultant</td>
<td></td>
<td></td>
</tr>
<tr>
<td>e-Tender Notice</td>
<td>View the state government tender notice</td>
<td></td>
<td></td>
</tr>
<tr>
<td>eMINDS</td>
<td>Electrical Inspectorate Unit Main Information, Network and Database System (Wayleave, Energy Balance, Register as Switchboard Manufacturer, Register as Electrical Installation Contractor, Certification of Approval (COA)/ Import Permit, Register as Competent Person (Wireman/Chargeman/Competent Electrical Engineer/Electrical Services Engineer/Electrical Supervisor)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Entrepreneur</td>
<td>Register with the State Government to participate in the training and promotion programme for native entrepreneur.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Registration</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Industrial</td>
<td>Application for Manufacturing Permit and Industrial Lot developed by MID via Ministry of Industrial Development Sarawak.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coordination</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Committee System</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(ICCS)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Home Apps</td>
<td>For housing developers and advocates in Sarawak to apply for normal and low cost housing licenses and permits. And for the house purchasers to lodge a Tribunal claims.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 3. Government Online Service to Government Agencies

<table>
<thead>
<tr>
<th>EDMS</th>
<th>Descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCS-GEMS</td>
<td>Government Employee Management System</td>
</tr>
<tr>
<td>Webmail</td>
<td>Sarawak Government Email</td>
</tr>
</tbody>
</table>
Based on the growth of IT, Electronic Document Management Systems (EDMS) is developing for organisations to assist generate basic improvements in service effectiveness, comfort and quality [9]. EDMS’ success depends on the extent to which such a system is used and eventually adapted by potential users, if the employee of organizations is not willing to accept the information system, the organization will not benefit fully [10].

**Objective of the Study**

The objective of the study is to identify which of these posited factors; attitude, subject norm, perceived behavioral control, perceived usefulness and perceived ease of use have influence on the use of Electronic Document Management System among the public service at the Sarawak Government agencies.

**Research Questions**

Against the above background, this study seeks answer the following research questions i.e. Does attitude contribute to the usage of EDMS by the public service in Sarawak Government agencies? In addition, it also attempts to find answers to the following: (i) Does subject norm contribute to the usage of EDMS by the public service in Sarawak Government agencies? (ii) Does perceived behavioral control contribute to the usage of EDMS by the public service in Sarawak Government agencies? (iii) Does perceived usefulness contribute to the usage of EDMS by the public service in Sarawak Government agencies? (iv) Does perceived ease of use contribute to the usage of EDMS by the public service in Sarawak Government agencies.

**Research hypotheses**

The research hypotheses are proposed as follows:

H1: Attitude will positively influence the usage of EDMS among public service in the Sarawak Government

H2: Subject norm will positively influence the usage of EDMS among public service in the Sarawak Government.

H3: Perceived Behavioural Control will positively influence the usage of EDMS among public service in the Sarawak Government.

H4: Perceived Usefulness will positively influence the usage of EDMS among public service in the Sarawak Government.

H5: Perceived Ease of Use will positively influence the usage of EDMS among public service in the Sarawak Government.
Scope and limitation of study

This study offers an empirical insight on evaluation of an extension of Davis’s TAM and UTAUT by Venkatesh and others to investigate on how the public service’s subject norm, perceived behavioural control, perceived usefulness and perceived ease of use influence the use of electronic document management system in Sarawak Government agencies. Another limitation relates to the secretive nature of staff in some government departments which will lead them to provide partial information related to the study.

Significance of the Study

Due to the lack of the presence of previous studies in the user acceptance of EDMS among the public service organization, this study seeks to highlight the importance of its usage on these extents: 1) to achieve the objectives of organizations, 2) for encouragement of future research which related to this subject area, 3) to assist the decision makers in the Sarawak Government with planning for future implementation of information technology innovations and as well as to enhance their understanding of innovation acceptance and use and 4) act as contribution to a new knowledge as this study focuses on a particular extent on the EDMS functionality from the top to bottom management of users’ perspective. Moreover, this study could also be used as a reference to design technology acceptance of EDMS by public service in the developing world contexts and can then be useful for the system developer team and top management of the agencies for the improvement and spread of the EDMS and figuring out the worth, the related institutional effects.

Past Works

A study by H. Alshibly [11] found that the system characteristics were shown to be the most important determinant affecting the acceptance of EDMS. The direct effects of system characteristics on perceived usefulness and perceived ease of use were verified by an empirical test. These results partly refine the TAM that includes the immediate impact between external variable and acceptance. The findings showed that both perceived user-friendliness and perceived usefulness had a beneficial impact on adoption of EDMS, implying that the TAM could also extend to the EDMS. The findings also suggested that a cross-cultural study could also be conducted to identify differences in EDMS acceptance due to cultural effects.

The Tenth Malaysia Plan (2011–2015) strengthened the government's focus on enhancing the delivery of government service to people and businesses through ICT by implementing a government-wide attitude to the development of ICT facilities by the government to improve the productivity and effectiveness of the Malaysian government industry [12]. While under Vision 2020, focuses on effectively and efficiently delivering services from the government to the people of Malaysia that focus on the area of record keeping and document management. The study by Yatin, et al. [13] investigate the use and efficiency of Generic Office Environment-Electronic Government Document Management System (GOE-EGDMS) application and found user satisfaction has a beneficial impact on individual impact and a beneficial impact on organizational impact on individual impact. This means that public organizations should place greater emphasis on achieving high levels of use and efficiency in the
use of the GOE-EGDMS system in order to achieve the objectives of implementing the system towards an electronic government.

Literature was useful for understanding the topic for this conceptual paper. The literature enabled me to find answer to the five research questions. For Research Question 1: Does attitude contribute to the usage of EDMS by the public service in Sarawak Government agencies? According to F. D. Davis [14], attitude toward using the system is defined as “the degree of evaluative affect that an individual associates with using the target system in his/her job. In this study, these relationships will be predictive of behavior when the attitude and belief factors are specified in a relationship between attitude and use of EDMS among public service in the Sarawak Government.

The finding found in literature, the attitude towards use of EDM has changed for the better due to the construction project by using the EDM system in Finland [15]. Several literature studies indicated that it is prevalent to resist change among employees at all levels in the application of EDMS. Negative attitudes towards pcs, computer anxiety, the complexity of DWMS and its incompatibility with present work procedures affect the unwillingness of action and record officers to embrace and use EDMS [16]. For Research Question 2: Does subject norm contribute to the usage of EDMS by the public service in Sarawak Government agencies? Subjective norm (SN) is derived from Theory of Reasoned Action (TRA) where it is verified that it is major determinant of behavioral intention to use. In further developments of Venkatesh and Davis [10] utilized subjective norm in TAM2 and scored important results. For that reason, in this study, the higher the perceived expectations from the public service in the Sarawak Government towards EDMS, the stronger the subjective norm, and the stronger the subjective norm, the stronger the intention to use of EDMS. The findings confirmed by M. J. Lawellen [6] that subjective norm contribute to the usage of EDMS as the compliance effect and the internalization effect of the subjective norm on the intention to use EDMS become particularly salient in New Zealand. While Perceived behavioral control were the most influencing factors that affect the user acceptance of EDMS for government agencies and users in Turkey [7] answer to the Research Question 3 which is, does perceived behavioural control contribute to the usage of EDMS by the public service. Perceived Behavioral Control is influenced by adequate resources and ability to control behavioral barriers. The more resources and obstacles individuals perceive, the greater their perceived conduct control and the stronger their intention to conduct behaviors [17]. Therefore, this study is to confirm that, an individual (public service of Sarawak Government) who has a firm belief that he/she is competence necessary to use EDMS is likely to perceive that the actual usage is under his/her own control. Findings by B. H. Wixom and P. A. Todd [18] showed that information and system characteristics explained 75% variance for system and information quality is matched with the Research Question 4: ) Does perceived usefulness contribute to the usage of EDMS? Perceived Usefulness (PU) is one of the independent constructs in the Technology Acceptance Model (TAM). It is “the degree to which a person believes that using a particular system would enhance his/her job performance” [19]. PEOU is also a component of Davis [19] original TAM model measured through seven self-report questionnaire items defined as “the degree to which a person believes that using a particular system would be free of effort”. In this study, PEOU will be used to explain the adoption of an innovation of EDMS in the Sarawak Government. In this study, this construct is a public service of Sarawak Government’s believes that using EDMS would enhance their social relationships with other people. Alshibly [11] highlighted that there was significant effect of EDMS quality on per-
ceived ease of use for the Research Question 5: Does perceived ease of use contribute to the usage of EDMS?

Hence, based on the past study, the author hopes to provide valuable insights into the study of EDMS acceptance among the public service in the government of Sarawak.

**Proposed study methodology**

The proposed methodology of this study follows a quantitative approach. Literature review will be utilized, and a survey will be opted to collect the study data. The analytics proposed to achieve the study objective is via Partial Least Squares (PLS) model where the widely tool used for analyzing such model is. PLS is proposed due to its credibility on constructing predictive models when factors incorporated are many and suspected with highly collinearity (Tobias, 1997).

**Measurement of items**

The answers to each item of constructs of this study will be measured by a 7-point Likert scale, in which 1 represents the negative extreme of the scale (1=completely disagree) and 7 the positive extreme of the scale (7=completely agree). The questionnaire also contained demographic questions.

**Population and Sample**

The population of interest is defined as the group of public services in Sarawak Government from various agencies. The participants consist of employees of the organization who use the EDMS. It will include operation-level, mid-level, and top-level employees of the organization. Thus, the acceptance feedback from these participants is of utmost importance.

**Conclusion**

The paper provides the concept on the study on public services acceptance towards the Sarawak government electronic document management system. The quality of service by public services not only depends on costs and large number of employees in the public sector but as well as to technology to provide online services to create opportunities via public participation. This is what digital government of Malaysia is all about. The transformation from manual to digital has been started since 2015 (Muamillah, 2015) and yet the achievement may far behind target. Moving forward to become digital Malaysia, the use of digital services is vital to the nation to explore life or life at workspace on the virtual frontier. Better plans are essential to be strategized in narrowing the gap between the growth in individuals’ ICT use and governments’ engagement in the digital economy. Efficiency, effectiveness, quality service become the most important factor especially in the usage and users’ satisfaction of government online services. In this context, the real benefits of information technology in bridging the online interactions at all level of the entire public service administrations are prominent. Moreover, it is already known that information technology utilization is capable to strengthen our economic and social structure. In general, the consump-
tion of findings from this study would mainly be used to leverage on the moving forward plans in understanding the current EDMS usage phenomena in Sarawak Government. Moreover, the findings may be used as guideline to nurture the attitude of ‘going digital’ and as well to open the opportunity for embarking new innovations to be deployed in EDMS for Sarawak Government.

References


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Research Trends in Marine Pollution: A Global Perspective

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Abstract: Today the majority portion of the marine pollution comes from the land that contributes to 80% of the marine pollution. Environment’s clean seas campaign and UN are urging governments to enact policies to reduce the use of plastic before irreversible damage is done to our seas. This study examines the global output of marine pollution literature during 1994–2018 reflected in Web of Science database. Scientometrics indicators such as relative growth rate, doubling time, future growth, collaborative coefficient, and collaborative index, degree of collaboration, document type and geographical distribution have been employed to analyze the data. The study reveals that, Out of total 1412 papers; the maximum numbers of publications contributing 112 (7.93%) are in the year 2018. The growth rate has been increased from 16 publications in 1994 to 112 (2018). The average collaborative index 4.48 has been counted between years 1994-2018. The average value of collaboration coefficient for marine pollution is 0.61. The degree of collaboration in the marine pollution literature is 0.86, which clearly indicates its dominance of multiple authors. Among the Prolific authors, Bellas, J. is the top ranker who has contributed 22 articles. In geographical distribution of publications the highest numbers of contributions were from England 560 (39.66%). India has been placed sixth 23 (1.63%). This study will help the researchers to have better insights in framing science strategy and guiding the researchers.

Keywords: Marine Pollution, Scientometrics, Authorship Pattern, Collaborative Index, Collaborative Coefficient and Co-Authorship Index

Introduction

The nautical environment becomes polluted and contaminated through various sources and forms. Major sources of marine pollution are the inflow of chemicals, solid waste, discharge of radioactive elements, industrial and agricultural runoff, man-made sedimentation, oil spills, and many such factors. The majority portion of the marine pollution comes from the land that contributes to 80% of the marine pollution. Air pollution also carries pesticides from farms and dust into the sea waters. Air and land pollution is a major contributor to the growing marine pollution that is not only hampering the aquatic ecology but also affecting the life on land. The non-point sources like wind-blown debris, agricultural runoff, and dust become the major source
of pollution. Apart from these, factors like land runoff, direct discharge, atmospheric pollution, pollution caused by ships, and deep sea mining of natural resources contribute heavily.

UN Environment’s Global Programme of Action for the Protection of the Marine Environment from Land-Based Activities, which has been active since 1995, aims to provide guidance to national and regional authorities on how to prevent, reduce, control and eliminate marine degradation from land-based activities. Launched in 2017, UN Environment’s Clean seas campaign is urging governments to enact policies to reduce the use of plastic; targeting industry to minimize plastic packaging and redesign products; and calling on consumers to change their throwaway habits – before irreversible damage is done to our seas.

Scientometrics is one of the most important measures for the assessment of scientific production. One of the most trustworthy ways to track science and technology activities is the study of scientific literature. During the last few years Scientometrics analysis has been increasingly used to evaluate the research performance of researchers and the growth of various disciplines of sciences. The analysis has also been used to evaluate the research output of many researchers around the world. Scientometrics studies are useful to understanding the growth and development of literature, identifying strengths and weaknesses of a country, organizations and individual in various fields of scientific activities. These studies will help the researchers to have better insights in framing science strategy and guiding the researchers. As a result, the present study was undertaken on the global publication output in marine pollution.

**Review of Literature**

Chen, D., et al. [2] have Scientometrics analysis of water research on the Yangtze River from 1996 to 2016 was presented on the Science Citation Index Expanded and Social Science Citation Index of the Web of Science database. The annual number of publications in this field has rapidly increased over the past decade. The most productive authors were all Chinese. China produced 90.4% of all pertinent publications followed by the USA and Japan. The Chinese Academy of Sciences was the major institution, producing 31.9% of all publications. The most frequently cited publications and author keywords provided the clues for research focuses. ThanuskJodi [9] have analyzed the performance of scientists in the field of ecology, working in various institutions in India, in terms of growth rate, areas of research concentration, author productivity, and authorship pattern.

Sudhakar, K. and ThanuskJodi, S. [8] studied the trends of Marine pollution literature output. A total of 5416 publications were published during the period of 2008 to 2017 in the Marine Pollution Bulletin journal. Out of total 5416, the results revealed that the maximum numbers of publications are in the year 2017. The relative growth rate (RGR) has decreased from 2009 to 2017 and the doubling time has increased from 2009 to 2017 in the span of 10 years. The study indicates the dominance of multiple authors’ contributions. Liu J. is the most prolific author. The major contributions are from USA.

ThanuskJodi [9], have observed the bibliometric analysis of articles and references in Library Philosophy and Practice from 2005 to 2009. The analysis covers the number of articles, authorship patterns, subject distribution of articles, average number of references per article, forms of documents cited, year-wise distribution of cited journals, rank list of journals, etc. Strong and weak points are discussed, as the
basis for improvement and development.

Manendra Kumar Singh [4] has analyzed the growth trend about authorship pattern and author collaboration in the Biotechnology for sixteen years with the sample of 18918 articles. In the study, the collaboration coefficient for (2001-2016) is an average as 0.63 for India. Multi-authorship pattern are dominant over single authorship pattern. The mean of relative growth rate shows the decreasing rate and for last four years its pattern of publication is stable. The corresponding doubling time for different years gradually followed the increasing pattern. The highest AI year for India is 2016 with 180.3. The international collaboration pattern shows India & United States is the most favoured nation.

Santha Kumar, R. [7] has analysed Spintronics publication research output for 15 years. A total of 6195 articles were published on spintronics, which received 134,467 citations. The average number of publications per year was 413 and the average number of citations per publication was 21.71. The publications peaked in 2014 with 874 publications, whereas the highest number of citations 16,696 was received in 2005. The highest number of publications was from USA with 1506 (24.31%) publications and 64,479 (47.95%) citations followed by China. The average value of collaboration coefficient for spintronics is 0.65. Physics accounts the largest share of 5,023 (81.08%) publications from the total worldwide output on spintronics.

Elango, B. and Rajendran, P. [3] have examined the authorship trend and collaboration pattern in Marine Sciences literature from Indian Journal of Marine Sciences published from 2001 to 2010. Applicability of Lotka's law has been tested. Further, level of collaboration has been observed among the authors. The study reveals that the coauthored papers are dominated and the author productivity follows the Lotka's law. Average collaboration rate (0.57) is better collaboration and mean number of authors per joint authored paper is 3.4.

Thanuskodi [9], have observed the bibliometric analysis of articles and references provided at the end of each article contributed in Indian Journal of Chemistry from 2005-2009. The analysis cover mainly the number of articles, authorship pattern, forms of document cited, etc. All the studies point towards the merit and weakness of the journal which will be helpful for its further development. This study showed that most of the contributions are India. The authorship pattern of the articles published during the period of study. Maximum number of articles were contributed by two authors. This study also showed that majority of the contributors preferred journals as the source of information which occupied the top position. All the studies point towards the merits and weakness of the journal which will be helpful for its further development.

Zell, Hanna et al. [10] have examined time span between 1955 and 2006, 26,253 items were listed and related to the topic of air pollution, General citation activity has been constantly increasing since the beginning of the examined period. The USA, UK and Germany were the three most productive countries in the area, with English and German ranked first and second in publishing languages, followed by French. An article published by Dockery, Pope, Xu et al. was both the most cited in total numbers and in average citation rate. J. Schwartz was able to claim the highest total number of citations on his publications, while D.W. Dockery has the highest citation rate per publication. Most of journals concentrated on the Environmental subjects which dealt with environmental interests.

Objective of Study

- To identify and determine the relative growth rate and doubling time of articles published in marine pollution
- To find out the time series and future growth of publications in marine
pollution

- To measure the collaboration trends in the marine pollution research.
- To examine the authorship trends in articles published in marine pollution

**Scope and methodology of the study**

The present study is limited to the field of Marine Pollution. The data was collected from Web of Science databases which covers the Marine Pollution literature from 1994 to 2018 (25 years) and used MS Excel to organize, tabulate and analyze the data for the study. Further, scientometric indicators such as relative growth rate, doubling time, future growth, collaborative coefficient, and collaborative index, degree of collaboration, document type and geographical distribution have been employed to analyse the data.

**Data Analysis and Interpretation**

In this paper, an attempt has been made by the researcher to analyze the data collected for the study to achieve the desired objectives. To make the analysis more meaningful tabular representation and diagrammatic representations are used.

**Year wise distribution of articles**

During the period from 1994 to 2018, 1412 publications were published. Table 1 shows that the numbers differs from year to year. Out of total 1412 publications, the maximum numbers of publications are in the year 2018 (112), which is 7.93% to the total publications output. The minimum numbers of contributions found to be in the year 1994 with 16 publications, which is 1.13% to the total contributions.

<table>
<thead>
<tr>
<th>Year</th>
<th>No. of Publications</th>
<th>Percentage</th>
<th>Cumulative Growth</th>
<th>Cumulative %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1994</td>
<td>16</td>
<td>1.13</td>
<td>16</td>
<td>1.13</td>
</tr>
<tr>
<td>1995</td>
<td>37</td>
<td>2.62</td>
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<td>33</td>
<td>2.34</td>
<td>86</td>
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</tr>
<tr>
<td>1997</td>
<td>34</td>
<td>2.41</td>
<td>120</td>
<td>8.50</td>
</tr>
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<td>1998</td>
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<td>42</td>
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<td>38</td>
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<tr>
<td>2003</td>
<td>53</td>
<td>3.75</td>
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<td>25.92</td>
</tr>
<tr>
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<td>48</td>
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<tr>
<td>2005</td>
<td>33</td>
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</tr>
<tr>
<td>2006</td>
<td>49</td>
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<tr>
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<tr>
<td>2008</td>
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<tr>
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<tr>
<td>2010</td>
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<td>4.53</td>
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<tr>
<td>2011</td>
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<td>3.75</td>
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<tr>
<td>2012</td>
<td>83</td>
<td>5.88</td>
<td>863</td>
<td>61.12</td>
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</table>
Relative Growth Rate and Doubling Time – Year Wise

Table 2 shows that the Relative Growth Rate (RGR) has decreased from 1995 (1.20) to 2018 (0.08) in the span of 25 years. The Doubling Time (DT) has increased when calculated year-wise. The Doubling Time increases from 0.58 in 1995 to 8.66 in 2018. The study reveals that there exists fluctuation in RGR and doubling time during the study period.

Table 2. Relative Growth Rate and Doubling Time

<table>
<thead>
<tr>
<th>Year</th>
<th>No. of Publications</th>
<th>Cumulative</th>
<th>W1</th>
<th>W2</th>
<th>R(a) = W2 – W1 / T2-T1</th>
<th>Dt. = 0.693 / R(a)</th>
</tr>
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<tr>
<td>1994</td>
<td>16</td>
<td>16</td>
<td></td>
<td></td>
<td>2.77</td>
<td></td>
</tr>
<tr>
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<td>37</td>
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<td>3.97</td>
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<td>33</td>
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<td>1.44</td>
</tr>
<tr>
<td>1997</td>
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<td>275</td>
<td>5.48</td>
<td>5.61</td>
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<td>7.17</td>
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</tr>
<tr>
<td>2018</td>
<td>112</td>
<td>1412</td>
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<td>7.25</td>
<td>0.08</td>
<td>8.66</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>1412</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Time Series Analysis – Future Growth

Table 3 and Figure 1 show the future growth value of the publications, it is observed from the table that there is increasing trend during the study period. The trend value has been increased from 16 in 1994 to 112 in 2018. Prediction for the year 2030 is
also indicating the upward trend in the growth of literature.

Table 3. Time series analysis – future growth

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<th>Sl. No.</th>
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<th>X</th>
<th>X²</th>
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<td>-407</td>
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<tr>
<td>3</td>
<td>1996</td>
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<td>100</td>
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<tr>
<td>4</td>
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<td>81</td>
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<td>111</td>
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<td>144</td>
<td>1344</td>
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<td>0</td>
<td>1300</td>
<td>4015</td>
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</tr>
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</table>

The equation of the straight line trend is \( Y_c = a + bX \)  
(1)

Since \( \sum X = 0 \), therefore

\[
\begin{align*}
\sum Y &= 1412 \\
N &= 25 \\
\sum XY &= 4015 \\
\sum X^2 &= 1300 \\
a &= \frac{\sum Y}{N} = \frac{1412}{25} = 56.48 \\
b &= \frac{\sum XY}{\sum X^2} = \frac{4015}{1300} = 3.08
\end{align*}
\]

Estimated Literature in 2025 is when \( X = 2025 - 2006 = 19 \) years
\( a = 56.48 + 3.08 \times 19 = 115 \)
Estimated Literature in 2030 is when
\[ X = 2030 - 2006 - 24 \text{ years} \]
\[ = 56.48 + 3.08 \times 24 \]
\[ = 130.40 \]

Fig. 1. Time series analysis – future growth

Authorship pattern

Table 4 and Figure 2 show that the single authorship contribution has 191 (14%) publications. The multiple authorship patterns are further analyzed to shed more light on the pattern of collaboration. Publication with two authors are 257 (18%) papers contributed followed by three authors with 246 (17%) papers, five authors and more than five authors contributions were 172 (12%) and 290 (21%) papers respectively. The average number of authors found to be 3.98 per paper during the study period.

Table 4. Authorship pattern

<table>
<thead>
<tr>
<th>Year</th>
<th>Single author</th>
<th>Two authors</th>
<th>Three authors</th>
<th>Four authors</th>
<th>Five authors</th>
<th>More than Five authors</th>
<th>Anon</th>
<th>Total</th>
<th>%</th>
<th>Author Count</th>
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<td>2</td>
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<td>1</td>
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<td>37</td>
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<td>2</td>
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<td>1</td>
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<td>7</td>
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<td>1</td>
<td>2</td>
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<td>99</td>
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<tr>
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ISBN (online) 978-967-2251-02-6
Table 5 and Figure 3 show the variation in the Collaborative Index (CI). It varies from

Collaborative Index, Collaborative Coefficient and Degree of Collaboration distribution

Fig. 2. Authorship pattern
2.91 in 1995 and highest collaboration were noticed in the year 2015 (5.48). The average CI 4.48 has been counted between years 1994-2018 (25 years). Collaborative coefficient (CC) has increased from 0.43 in 1995 to 0.66 in 2018 indicating that research among scientists is fairly collaborative with an average CC of 0.61. As a result, Degree of collaboration (DC) in the Marine Pollution literature is 0.86 between years 1994-2018, which clearly indicates its dominance of multiple authors’ contributions.

Table 5. CI, CC and DC distribution

<table>
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<tr>
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<th>CC</th>
<th>DC</th>
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</tr>
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<td>1997</td>
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<td>0.39</td>
<td>0.56</td>
</tr>
<tr>
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<td>3.19</td>
<td>0.46</td>
<td>0.64</td>
</tr>
<tr>
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<tr>
<td>2000</td>
<td>3.88</td>
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<td>0.89</td>
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<td>0.54</td>
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<tr>
<td>2002</td>
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<td>0.74</td>
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<td>0.90</td>
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<tr>
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<td>0.82</td>
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<td>0.89</td>
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<td>Total</td>
<td>4.48</td>
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Pattern of Co-Authorship Index (CAI)

The Co-authorship Index (CAI) obtained by calculating proportionately the publication by single, two and multi-authored papers. Authorship values are categorized single, two, three, four, five and more than five authors. CAI > 100 indicates that the number of publications is higher than the average. It is seen from the table 6 that there is an increasing trend in more than five and above authors from 2011, when compare to the other authorship pattern. The single authorship pattern is seen in a decreasing trend from 2006 onwards.

Table 6. Co-Authorship index

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<th>3</th>
<th>4</th>
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<td>103.73</td>
<td>12</td>
<td>82.99</td>
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</table>
Prolific Authors

Table 7 shows that there are a total of 5621 authors have contributed 1412 papers. Among the top 25 authors Bellas, J. found to be the most prolific author with twenty two publications (0.39%); followed by Beiras, R. with fifteen papers (0.27%), whereas Sarkar, A. has contributed ten papers (0.18%) and scored third place among top 25 authors.

Table 7. Top 25 Prolific Authors

<table>
<thead>
<tr>
<th>Authors</th>
<th>Contributions</th>
<th>Percentage</th>
<th>Rank</th>
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<td>4</td>
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<td>6</td>
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<tr>
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<td>Van Wijk, D.</td>
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</table>

Document type of distribution

Fig. 4 show the document type of distribution. Out of 1412 Papers published in the Marine Pollution literature, Article plays the major role in this research, which has 1045 publications with 74.01%, followed by proceeding paper 201 with 14.24%, review got 76 with 5.38%, editorial material 57 with 4.04%.
Source Title Wise Distribution

The total research output was scattered over 550 sources. The table 8 presents the top 25 most productive journals in the field of Marine Pollution. The top 25 journals together contributed about 47 percent of the total research output. It is found that the Marine Pollution Bulletin is the most productive journal 256 (18.13%), followed by Science of the Total Environment 44 (3.12%) and Environmental Monitoring and Assessment 31 (2.20%).

Table 8. Top 25 Source title wise distribution

<table>
<thead>
<tr>
<th>Source Title</th>
<th>No. of Publications</th>
<th>Percentage</th>
<th>Rank</th>
</tr>
</thead>
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<tr>
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<td>3.12</td>
<td>2</td>
</tr>
<tr>
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<td>2.20</td>
<td>3</td>
</tr>
<tr>
<td>Ocean &amp; Coastal Management</td>
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<td>2.05</td>
<td>4</td>
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<td>5</td>
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<tr>
<td>Ecotoxicology</td>
<td>19</td>
<td>1.35</td>
<td>10</td>
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<tr>
<td>Aquatic Toxicology</td>
<td>16</td>
<td>1.13</td>
<td>11</td>
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<tr>
<td>Marine Environmental Research</td>
<td>16</td>
<td>1.13</td>
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<tr>
<td>Water Science and Technology</td>
<td>16</td>
<td>1.13</td>
<td>11</td>
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</tbody>
</table>
Geographical Distribution of Contributions

Table 9 and Figure 5 show the geographical distribution of Marine Pollution literature output originated from 44 countries dispersed in the different parts of the globe. A total of 1412 publications were contributed by 44 countries to the global marine pollution output for the period of 25 years (1994 to 2018). Out of 1412 contributions, the highest number of contribution was from England 560 (39.66%) followed by USA 322 (22.80%), Netherlands 226 (16.01%), Germany 87 (6.16%), Switzerland 39 (2.76%) and India 23 (1.63%). Among the top ten countries contributed articles, India has been placed sixth position.

<table>
<thead>
<tr>
<th>Country</th>
<th>Total</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>England</td>
<td>560</td>
<td>39.66</td>
</tr>
<tr>
<td>USA</td>
<td>322</td>
<td>22.80</td>
</tr>
<tr>
<td>Netherlands</td>
<td>226</td>
<td>16.01</td>
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<tr>
<td>Germany</td>
<td>87</td>
<td>6.16</td>
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<tr>
<td>Switzerland</td>
<td>39</td>
<td>2.76</td>
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<tr>
<td>India</td>
<td>23</td>
<td>1.63</td>
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<tr>
<td>China</td>
<td>16</td>
<td>1.13</td>
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<tr>
<td>France</td>
<td>14</td>
<td>0.99</td>
</tr>
<tr>
<td>Turkey</td>
<td>13</td>
<td>0.92</td>
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<tr>
<td>Japan</td>
<td>12</td>
<td>0.85</td>
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<tr>
<td>Others</td>
<td>100</td>
<td>7.08</td>
</tr>
</tbody>
</table>

Table 9. Top 10 Geographical distribution of publications
Conclusions

The publishing trend totally depends on the output of contributors, patterns of contributions and the quality of research. The year 2018 shows the maximum number of contributions to the Marine Pollution literature. This study reveals that the categories of article distributions are remarkable in this research analysis. The majority of the articles were contributed by multiple authors. It is registered that Bellas, J. was most prolific author who have contributed 22 articles. Marine Pollution Bulletin journal is notably a scholarly journal that stipulates or induces fruitful research towards field of marine pollution. The contemporary research direction in this study can be used to formulate policies to foster future research and development. It is desirable that government and other funding agencies should give high priority to marine pollution research area.

Acknowledgment

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Additional Reading


Preparing Future Librarians to Provide Service for New Immigrants and Cultural Heritage Language Rights

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Abstract. This article offers a blueprint for how Library and Information Science (LIS) / iSchool educators, can help prepare better librarians who can serve immigrants in their community. It highlights the need for research and training, regarding the information needs and recreation needs of immigrants. The paper includes an overview of the history and current situation of public library service to immigrants in the United States, noting that public library development was closely tied to the history of immigration. It offers a brief list of efforts that librarians today are implementing in order to better serve new Americans in terms of collections, programs, outreach, community engagement. The paper argues that as America becomes more of an immigrant nation, librarians need to refocus our philosophy to provide more inclusive support for immigrant heritage language rights and cultural survival by fortifying this aspect of library service and codifying it into policy on the basis of the Universal Declaration of Human Rights

Keywords: library service to immigrants, cultural and language sustainability, Immigration, Immigrants, Public Library Service, LIS Education, Professional Education, Librarians.

Introduction

Libraries, if they are to remain relevant and thrive, must continuously reinvent themselves in response to social trends. Although global immigration is hardly a new development, the current transnational flow of laborers and refugees is creating many challenges for both receiving and sending nations. In this paper we would like to reflect on some of these changes from the perspectives of librarians and LIS educators. Our focus is primarily on public libraries, and educating future public librarians in the United States, but we will try to bring in some examples from libraries in other nations as well. Through this paper we hope to review basic practical steps libraries are taking, but our larger goal is to point the way towards educating a future generation of library professionals who have the philosophical framework and skills to do even more to advocate for immigrant library services, collections, programs, and users themselves.

Defining Immigrants and Some Data Points

Before focusing on what librarians can do for immigrants, it is may be useful to review some key terms and definitions for the different types of immigrants. This is especially important in America since most Americans are immigrants or their descendants. Indeed, the only people who are not immigrants are the descendants of enslaved Africans, along with Native Americans, and the descendants of Mexicans,
Pacific Islanders, Puerto Ricans, and others who were living in lands that America claimed as the nation expanded its borders. Immigration is not only limited to the nation’s history but is a continuing movement. The last census data show that 13.4% of the country’s population are foreign-born (US Census Bureau). The concept of immigrating and of settling is central to the nation’s founding story and usual narrative of the American success story.

Immigrants are often classified by legal status, including such “New Americans” as naturalized U.S. citizens (who can vote and have all other rights), as well as permanent residents. Some immigrants are refugees who are escaping political repression or other problems in their home country. The most controversial category are undocumented migrants who are in somewhat of a legal limbo until the United States finally passes a comprehensive immigration reform legislation. This group includes the “Dreamers” who lived most of their lives in the United States, were educated there, and who may have

American-born (thus citizen) brothers and sisters, but do not have the same legal rights. Since 2001, Illinois Democratic U.S. Senator Richard Durbin has proposed legislation to protect them through the DREAM (Development, Relief, and Education for Alien Minors) Act to give them a path to citizenship. This faced serious challenges in Congress, so President Barrack Obama launched the Deferred Action for Childhood Arrivals (DACA) Program as a Presidential order, ceasing immigration enforcement and permitting work authorization for roughly 800,000 Dreamers [20]. Some states offered Dreamers additional recognition and rights. As we will see in the next section, some nativists greatly opposed this policy and referred to them as “illegal immigrants,” treating border crossing as a criminal violation rather than a civil crime. President Trump vowed to end the program, and the U.S. Supreme Court is scheduled to decide its fate this autumn.

In addition to immigrants, most communities also have short-term community members including international students, workers on non-immigrant visas and tourists; however, these are not technically migrants. From most public libraries’ perspective, all people are potential users, although most library systems require a local address in order to secure a card, a recognition that American public libraries are supported largely by local property taxes.

Another factor that is relevant to immigration today is that, we now recognize that people may have a transnational life, migrating from one country, and possibly returning “home” or migrating to a third or fourth country over time. A person might migrate from China to the United States, study for a year abroad in Taipei, later find employment in Singapore or Berlin, and later retire in Auckland. Years ago, the consensus of libraries and most people – and even of many immigrants – was that the only pathway to success was reinventing oneself as an American and shedding “foreign language” and identity. From a transnational perspective, we can see value in developing English language skills and competence with “American” culture(s), but that in this global economy one’s first language has increasing value for personal and professional development. For some Americans, this new or renewed pride in a more diverse American culture(s) is also causing an ethnocentric backlash, contributing to the revival of Nativism and “Speak English” monolingualism. This can also impact libraries, as we will next examine.

Nativism, the Politics of Immigration, and the Library in the Crosshairs
Despite its important role, shaping immigration has always been a political debate. Factory and agriculture owners want to recruit workers who will toil in difficult conditions for lower wages, while some workers fear that migrants will increase competition for jobs and lower salaries. Migrants with high skills, like programmers, are also in very high demand by employers. On the other hand, cultural nativists fear the country changing from one that is largely White, Protestant Christian, and English-speaking. As alluded above, the U.S. has gone through several periods with quite different immigration policies, many of which reflected an often racist construct of what an American looks like. Unfortunately, President Trump has based his 2016 and 2020 presidential campaigns on the basis of demonizing immigrants and people of color, including his attacks on Mexican immigrants, the Muslim Ban, and racist quote about migrants from Africa and the Caribbean. Many Americans are calling on government, media, and courts to reject his racist efforts and to treat all people fairly, and for Americans to recognize that the country has become a vibrant culture and economic powerhouse precisely because of its diversity, inclusion, and creative energy that immigrants have brought to the country.

Librarians need to fully understand the political debate not only as participants in democratic discourse, but also because local schools and public libraries often become the battlefield for such cultural wars – especially during election times. For example, even before Trump came to office, public libraries in Republican districts near Washington D.C. received mandates from local officials not to serve undocumented residents even though they are tax-payers and following the order violates librarians’ professional ethics. In order to better understand this, let’s briefly review the history of public library service to immigrants.

A Brief History of Public Library Service to Immigrants in America

The development of public libraries in 19th century America was to a large degree in response to the need to educate and assimilate immigrants for a rapidly industrializing and urbanizing nation. One can see this in the creation of the Boston Public Library in 1848, which was established as a pioneering public library when the number of Irish (Catholic) immigrants was surpassing the number of Protestant elites in the city. Library historian Harris used the BPL’s creation to suggest that libraries were agencies of social control, although other library historians criticized this assertion [10]. His leading critic Dain contested this claim with her research on the creation of the New York Public Library (NYPL), which was established five decades later than the BPL [6]. New York had even more immigrants, but the NYPL was created as a merger of several libraries, including some ethnic ones. The NYPL also appointed minorities on its governing board from an early age. While these two cities are perhaps the most iconic immigrant metropolises, public libraries in most communities – large and small -- made efforts to serve immigrant users.

Libraries “Americanizing” Immigrants

Public libraries in that era of free immigration (1876-1924), reflected the goals of other public institutions, seeing their mission as “Americanizing” newcomers. This meant aiding immigrants by teaching English and civics, as preparation for citizenship and employment. This was followed by an era of restricted immigration (1924-
1948), which was based on a blatantly racialized vision of who should have the chance to become an American. Although immigration in this era was both far less diverse, and significantly smaller in number, it was the golden age of public libraries’ “Americanization” efforts; focusing largely on adult education outreach programs directed towards early arrivals. Librarians coordinated their efforts through American Library Association’s (ALA) Committee on Work with the Foreign Born (CWFB). CWFB was run by a small cadre of urban librarians along with John Foster Carr, who ran the Immigrant Publication Society, a publisher of inexpensive guidebooks for new immigrants.

In some communities, librarians had a dual campaign to both “Americanize” foreign-born community members while also internationalizing America-born readers. Many of these American public librarians also became advocates for immigrant rights. By the twentieth century, public librarians pursued their duties of providing library materials and support for immigrant’s information needs, although many never fully respected immigrant cultural values. Librarians were hardly unique since the majority of commercially published books and novels largely saw the world through an Anglo-conformist lens. Other professions of that era applied the same lens, from social workers to social scientists, and even nutritionists who, as an example, told Italian immigrants to stop eating whole grain breads.

Public libraries even today largely continue to encourage assimilation into the dominant culture but remain celebratory, rather than critical multiculturalism [23, 14]. For example, many American libraries’ offer “foreign language” sections primarily featuring translations of American literature. While these works have value as language learning tools and as windows into American cultures, they should be offered on the same basis as classics and modern works in global languages. This shows that libraries were indeed providing materials in immigrant languages, but also communicated that the only use of those languages was as a path to Americanization. In other libraries the majority of works in languages other than English typically are a handful of non-immigrant languages that college-educated “American-born” readers were once expected to read, such as classical Greek, Latin, or European “masterpieces.” These differences became clearer as a result of “critical librarianship” scholarship and activism.

The American Library Association (ALA) on Serving Immigrants

In the last decade ALA has also been in the forefront of creating change through its “Equity, Diversity and Inclusion (EDI) initiatives. For example, at the most recent ALA Annual Conference in Washington, D.C [2], the ALA Office for Diversity, Literacy and Outreach Services (ODLOS) organized a panel on EDI, which deconstructed such terms as “diversity”, “people of color”, “social justice”, “power and privilege”, “identity”, “equity”, and “inclusion” and “decentering power” (ALA). It mirrors the antagonistic social environment surrounding immigrants, and librarians’ efforts to protect their human rights.

As a 501(c)(3) non-profit organization, ALA is somewhat limited legally in what it can do on the political front, but ALA Council still tries to voice its EDI concerns, such as criticizing the Trump Administration’s policy statement on the refugee family separation; condemning the government’s outrageous actions as unacceptable and unconscionable. In June 2018 in partnership with REFORMA, ODLOS declared support for action “against this zero-tolerance immigration policy” by providing and
sharing resources (ALA). ALA also provides guides, guidelines, toolkits, and other resources to support librarians’ philosophical stands and activities.

Libraries are being forced to demonstrate their commitment to intellectual freedom especially amid the Trump Administration’s crackdown on undocumented immigrants. Public libraries in cities with large immigrant populations, such as Baltimore’s Highlandtown neighborhood, face real threats of U.S. Immigration and Customs Enforcement (ICE) raids [19]. Librarians in those places are expected to develop political and legal acumen in order to be ready for anything. Such expectations for the profession go quite far beyond the traditional practice of providing collections and access, but also offer a legally sanctioned space for undocumented immigrants.

Nicanor Diaz, at the Denver Public Library, emphasizes the importance of establishing a good relationship with local governments. Such a partnership helps when libraries have to take risks to protect immigrants without “shutting down programs all the time.” He also wants to involve immigrants in the decision-making process regarding library programs to shape them to meet their needs [5]. Establishing policies at the levels of national and local governments is crucial to guaranteeing their financial and legal stability of library service to immigrants.

Reframing Library Service to Immigrants

While the United States and other countries spend a great deal of time and energy to craft systems determining qualifications for immigration, far less attention has gone into crafting policies or systems to help immigrants to become accepted and integrate into their new host society. What little attention is paid often goes to policies pertaining to governing labor and living conditions, health, education, and basic welfare. Much less attention is paid to the role and concerns of such cultural heritage institutions as public libraries, even though their operations are directly affected by those polices, in order to be ready to welcome new members of the society, and whether they are to be served in their native or adopted language – or both.

In this section we will examine national and local government policies on immigration in the United States. In particular, this paper look into the social structural readiness of how it accepts immigrants, with a clear emphasis on the question if public libraries were integrated into the policies. Furthermore, this paper explores whether these policies address the rights of immigrants to maintain their heritage language and cultural rights, which will justify and help normalize a more culturally inclusive model of library service to immigrants.

Minorities’ Linguistic Rights and the Philosophy of Librarianship

Librarians in the United States are usually educated for the profession on the basis of such national philosophical documents, as the ALA Code of Ethics and Library Bill of Rights. This is a valuable approach, as these codes are grounded in the federal government’s Bill of Rights, which extended constitutional protection for free speech. However, we would like to agree with McCook in 2006 that these should be placed in a wider international framework suggested by the Universal Declaration of Human Rights (UDHR) of 1948. This approach is important on several levels, but especially so in terms of this paper because library service for immigrants is closely associated with Article 27 of UN’s International Covenant on Civil and Political Rights, which
reads, “persons belonging to such minorities shall not be denied the right, ... to enjoy their own culture, to profess and practise their own religion, or to use their own language” (International Covenant on Civil and Political Rights). In librarianship, following the UDHR, protection of a minority’s linguistic rights is closely intertwined with our core professional beliefs. This is because language rights cover freedom of expression, the right to education, and encompass a minority’s cultural heritage rights (UN Report). Another aspect highlighting the importance of minority’s linguistic rights to our profession is a social inclusion of immigrants who in the past have been denied citizenship. It has been found that minorities deprived of citizenship are systematically deprived of their freedom, and basic rights (UN Human Rights), which often leads to exploitation. Language rights are often considered in the context of discrimination against ethnic, linguistic minorities, and also are compromised by forced demonstrations of absolute loyalty to a country during national or international conflicts. In addition to social, economic, political, and historical reasons that ethnic minorities exist, language rights have usually been sacrificed because language is one of the most important expressions of identity, culture, and heritage. Immigrants are often expected to quickly assimilate or acculturate to the new country by shedding their own culture and language, and even their names. Contrary to the stereotypical assumption, many studies suggest that language and cultural rights are not only bedrock requirements for linguistic and ethnic minorities to affirm their own identity, but also can be a vehicle for them to become participants in the host society.

Minorities’ language rights are protected by international covenants and regarded as “central to human nature and culture, and is one of the most important expressions of identity” (United Nations Special Rapporteur on Minority Issues). This offers a compelling explanation as to why heritage language and culture are especially significant to linguistic minority communities, who try to maintain distinct characteristics in their adopted country. In the following sections, we will clarify the relationship between minority language rights and the professional ethics of librarians. Then, we will explore policies regarding immigration and their social acceptance, followed by discussion on what librarians and LIS educators could do to advocate for immigrants’ rights to use library services and maintain their heritage language and culture.

**Calling for Librarians’ Participation in Shaping Immigrant Assistance Policies**

The United States has a highly convoluted system to regulate immigrants to enter, reside, and naturalize. However, beyond establishing regulations, there is no governmental agency charged with aiding immigrants to adjust into American society. All various supports for immigrants’ lives, such as providing public education are considered a local government’s jurisdiction. Public libraries are local government agencies and are recognized as part of the social infrastructure; however, librarians are often rarely directly involved with either local or national government planning or policymaking regarding immigrants. This, to some extent, is a catch-22 problem, explaining why libraries suffer from a lack of funding and unable to participate in shaping policies. More often than not, their chronically insufficient financial situation and limited human resources are used as excuses for not developing robust service to immigrants, and even claiming this is beyond a library’s core mission. We can see this clearly in the debate as to whether American libraries should provide service to undocumented residents. This became a central debate when anti-immigrant nativists campaigned for some communities to restrict local governments from serving undocumented residents even though they are also tax-paying community residents. Ser-
vices to immigrants are precarious not only due to such political pressure, but also because library administrators see such services as extracurricular offerings. Moreover, libraries are usually among the first victims of any local budget shortfall. This highlights the importance of passing legislation at both local and national levels to ensure that public libraries are legally recognized as active players in immigrant social support systems.

IFLA’s Library Services to Multicultural Populations Section organizes its members who are interested in serving cultural and linguistic minorities. Its vision for multicultural service focuses on ensuring “that every member in our global society has access to a full range of library and information services” (IFLA). This echoes the need to establish policies that guarantee minorities’ heritage rights and also grounding library service for the users. Bringing international dialogue to national and professional organizations should create a momentum to raise inclusive multilingual service to the next level and to appeal to local policymakers.

**Long Term Transformation to Immigrant Community Centers**

Public libraries are increasingly presenting themselves as community centers, where people gather and create safe places where one can learn, grow, and find recreational materials, while also developing a sense of being part of the community. This concept is a natural response to our need to transform from being seen as outdated book warehouses, and positioning ourselves to refocusing personal connections within our communities in what often seems like an impersonal online world. Applying this concept to the context of immigrant service, librarians can stretch what they traditionally have offered to new American users, such as teaching English, helping them find a job, and obtain citizenship to projects that are more innovative. This standpoint also will ease the pressure that librarians have been forced to choose their focus either on the majority or minority communities. The idea of becoming a community center also encourages development of many diverse communities. However, to succeed, we need strong active partnerships with supporting organizations and various stakeholders to bridge the two. Natural partners include public schools, ethnic language schools, and volunteers’ groups, which share common goals. While librarians can make a real difference, they should not feel they have the responsibility to address problems alone. Rather we should develop abilities to connect people, organizations, and advocacy groups, and facilitate collaboration. Fig. 1 illustrates a model of the relationships between libraries and partner organizations and government agencies. It also offers a visualization of how different levels of policies might interplay.

Working with community leaders, librarians could combine efforts to collaborate on major projects, like documenting the local history of the ethnic community, including conducting oral histories. Such projects help people to feel proud of their language and cultural heritage. This could also mean creating special collections of oral histories, cookbooks, local writers, and the like, which affirm the role of the ethnic or immigrant community as part of the wider community. The library should look for potential partners, and engage in listening meetings to find out what are the goals and interests of potential partners.

In the following section we will review some rather basic ways in which local public libraries can assist immigrants in terms of services, collections, programs, and more importantly creating a new mindset of community engagement partnerships with immigrant communities.
What Library and Information Science (LIS) Educators Can Do to Help Librarians Better Serving Immigrants

In this section, this paper will synthesize part of what we have learned about library service to immigrants in the United States and suggest what librarians could do to improve the service. Of course, there is no one-size-fits all model to serving immigrants, but the following aspects are some basic elements to build a foundation for the service. Although providing ideal library service is something that librarians will have to do in their own communities, it is important for us as LIS/iSchool educators to also think about what we can do to best prepare future librarians to carry out these activities.

Recruiting Minority Librarians

ALA views “equity, diversity, and inclusion” (EDI) as the fundamental values of the 21st century information professions; and regards “diversity” especially as one of its eight Key Action Areas for prioritizing budget allocations as investments for future development (ALA Equity, Diversity and Inclusion). This means investing in recruiting and retaining minority librarians through offering scholarships, such as ALA’s...
Spectrum Initiative. The emphasis of Spectrum has been on recruiting, retaining, mentoring, and teaching leadership skills to future librarians from underrepresented ethnic groups. This is a major advance in beginning to transforming a profession which certainly does not come anywhere close to representing the ethnic diversity of the United States. From our perspective of promoting heritage language preservation, it would be useful to place additional value on recruiting people from underrepresented ethno-linguistic groups who have cultural capital and ideally some community engagement experience along with sufficient heritage language skills. These future librarians are needed in order to assist current immigrants as community liaisons. They can plan effective service to an immigrant community, and build relevant collections. Their presence on library staff could help remove psychological, cultural, language barriers for immigrants. If he/she were recruited from the immigrant community, his/her understanding of the local culture and living circumstances will allow sensible and compassionate service, which would in turn nurture community trust in the library. The librarian would also empower “diverse populations for full participation in a democratic society” [1]. For library as an organization, minority librarians contribute to increasing institutional diversity, which will facilitate better organizational decision-making and problem-solving [27]. Librarians with diverse ethnic and minority language skills are needed in order to help create culturally and linguistically appropriate cataloging or metadata tags so they can be easily and accurately accessed by community members. There also is a need for librarians and archivists who have language skills and cultural capital in order to preserve a community’s immigrant experience. While our paper is focusing on service to immigrants, which naturally highlights ethnic and ethnolinguistic diversity; however, we should not forget that the search for diversity and inclusion should encompass such factors as age, sex, sexual orientation, and beliefs.

**Recruiting Minority Librarians – From the Perspective of LIS Educators**

LIS Programs / iSchools play a key role in either welcoming people into the profession or being a barrier to admission. Professional graduate schools in America have limited freedom in terms of who applies, especially since it requires an undergraduate degree as a perquisite. Unlike medicine, law, engineering, computer science or STEM fields, the salaries in librarianship tend to be significantly lower, so we should not be surprised that many immigrant parents are more likely to encourage their children to consider fields that are more remunerative.

Despite the challenge, LIS schools can certainly try to make sure that diverse future leaders are recruited or are at least aware of librarianship as a career, and how they can serve their community through the profession. LIS schools should try to focus recruitment on individuals who volunteer in library community service programs. LIS schools can also reach them by leaving brochures and fliers in library breakrooms, as well as developing programs that recruit, and mentor people with skills that libraries need. We can also try to search for potential candidates with language or cultural competences by promoting LIS degrees in relevant undergraduate programs. In Hawaii, for example, we reach out to Ethnic Studies, Asian Studies, American Studies, Pacific Island Studies, and Hawaiian Studies to recruit future leaders. We also partner with many of these units to offer dual degrees, so graduates will be able to have deeper skills and professional networks.
Individual schools should also take advantage of diverse recruiting efforts undertaken by such professional organizations as the ALA and its many sections. ALA has been involved in creating a multitude of committees, task forces, initiatives, caucuses, and focus groups to explore diversity in the library profession. We also should work with such national professional organizations that have programs to recruit minority librarians, by offering scholarship, many of which also include mentoring and leadership training. Another key potential partner is the U.S. Institute of Museum and Library Services (IMLS), which offers scholarships at the professional MA level, as well as Ph.D. programs designed to recruit faculty from underrepresented groups, who should help model inclusive practice and attract other diverse students to the profession.

**Supporting Language and Cultural Sustainability**

As examined above, minority language and cultural rights are recognized by international covenants and ratified by many countries. In the world of librarianship, the IFLA /UNESCO Multicultural Library Manifesto recognizes that “Cultural and linguistic diversity is the common heritage of humankind and should be cherished and preserved for the benefit of all…Therefore, libraries of all types should reflect, support and promote cultural and linguistic diversity at the international, national, and local levels, and thus work for cross-cultural dialogue and active citizenship” (International Federation of Library Associations and Institutions). Unfortunately, few public libraries in America do much to safeguard minority rights to maintain and pass down their language and culture. This suggests the importance of codifying immigrant rights, especially to guarantee support for cultural and language survival. Such legislation also would normalize library’s mission and activities supporting linguistic minorities. While there are exceptions, such as the Queens Borough Library, which has policies supporting its active collecting of materials in around 60 languages for its 62 branches. This effort is part of QBL’s New Americans Program, established in 1977, following “population shifts resulting from the 1965 immigration act, which significantly raised immigration from countries outside Europe.” [3]. Queens remains an exception and leader as one of the most linguistically diverse communities in America. Unfortunately, few American public libraries have taken the same level of initiative. LIS schools must do a better job of educating future librarians about such international covenants so that they will see library support for heritage language rights as core elements of their professional practice.

**Collecting Library Materials in the Global Languages**

Ideally, libraries should secure books, movies, magazines, newspapers, and e-resources to meet all users’ needs. Of course, this is a challenge since there are never enough funds even in one language, so how does one meet the diverse needs of many immigrant groups in one’s community? One answer can be using open access online information resources. For printed materials one answer for public librarians is to cooperate as part of a library consortium; dividing collecting areas. Such consortia allow librarians to develop specialties. They can share librarians with language skills who can catalog items and also find materials, locating reviews of items published overseas. Like academic libraries, specialists can curate collections, secure dona-
tions (fiscal and materials), develop ties with communities, and the variety of grey-
market publishers, small presses, and international book distributors.

Some public libraries form partnerships with communities to ensure that collec-
tions match community interests, and that items are quickly processed and added to
the library’s online catalog. In any partnership or collection, libraries need to work
with donors and volunteers to make sure they represent intellectual freedom and real
community interest rather than the interest of one group of donors. Immigrant com-
unities, like all communities, can be homes of passionate debate over political,
cultural, and religious values, so creating balance can be hard to achieve if one relies
primarily on donations or volunteers alone. This again shows the need for libraries to
actively fill these needs just as they would with other groups.

LIS/iSchools should help students to see such collections as norms and teach how
one goes about building these collections. For example, collection management
courses could explore how to develop multilingual collections, including the chal-
lenge of locating reviews of international materials, and bibliographic systems and
book distribution from an international perspective.

Offering Engaging and Diverse Programming

Librarians know that programming is key to successful library awareness and use.
Programs can be done inexpensively such as a series of English /global language /
bilingual storytimes. Book discussion clubs are also easy to offer, as are international
film screenings. We can use programming to nurture an ethnic community’s pride
and cultural heritage, and also raise awareness and appreciation of mutual under-
standing of both cultures. This could include establishing a cultural day, exhibition
space, and programs designed and executed by members of the ethnic community. Of
course, libraries have traditionally done outreach programs, such as promoting the
library’s collections and services at local ethnic community festivals. LIS/ iSchool
students interested in public librarianship should learn about programs in courses and
develop basic skills through internship experiences.

Creating Dynamic Public Relations Materials for Library Services

Library efforts to develop collections and offer services are meaningless unless librar-
ians can master some basic public relations to make sure community members come
to the library. New immigrants may have several barriers to learning about library
services, especially if they come from areas with poor library service, or where librar-
ies only offer monolingual services. New immigrants also might face problems secur-
ing a library card due to language, lack of stable address, or official photo ID. Librar-
ians can be creative and flexible about the regulations and help them with alternative
means. For example, the Enoch Pratt Library System in Baltimore, Maryland, re-
quires a valid photo ID but not proof of an address [19], while the Hawaii State Pub-
lic Library System doesn’t require valid ID for getting a provisional library card.
Once a new immigrant is a community user we need to make sure we can provide
them with accessible services, collections, online multilingual access, and program-
ming. New immigrant users’ happiness (or failure) will certainly make its way
through word of mouth in your community. Librarians should use our traditional
public relations tools, such as our website, publications, and social media, but can
also find other way of reaching them, which might mean advertising library services
in an ethnic newspaper or creating multilingual public service announcements for local radio or cable TV stations. Each group will have several different effective ways to bringing people into their library. In order to achieve real success, librarians should make sure that this communication is bilateral. Librarians need to hear the community’s voice(s) and do our best to meet their needs with appropriate library services, even if this means challenging hours or branch locations that may be barriers to use. LIS/iSchools should be sure to prepare students who can create multilingual and inclusive PR materials. Librarians should know how to create brochures, press releases, newsletters and some idea of how to create successful Public Service Announcements (PSAs).

**Meeting Immigrant Information Needs**

Libraries core mission is to meet information needs, so this should be our priority with all communities. We can imagine some typical needs of new immigrants, such as being able to assist people with reference questions like immigration law, social welfare, and schools. Many of these require very specific and professional knowledge areas, and probably experience, so it is essential for librarians to create networks and partnership with various organizations. Libraries in New Zealand, for example, often partner with Citizens Advice Bureaux, many of which are staffed by volunteers. We also need to be aware that within any immigrant community there will be different needs and user groups, and their needs will change over time. We need to research these needs in order to provide the most useful collections and services. For example, an immigrant community might need to develop multilingual children’s books, cookbooks, histories, and language textbooks to maintain cultural sustainability of second and later generations.

**Teaching about Immigrant Informational/ Recreational Needs**

LIS schools can do more to prepare future librarians about how to serve new immigrants. This can be an elective course or a module in a course on multicultural library services, but rather should be integrated into all elements of the LIS Curricula. Reference courses can teach about immigrant needs, and focus on multilingual reference tools. Courses on online resources and database searching should help librarians find shortcuts how they can search electronic resources for materials in languages they are unfamiliar with. Courses related to public librarianship, such as children’s literature or reader’s advisory services certainly could include international titles. Going beyond this, immigrant services certainly should be included along with discussions about the history of libraries and ethics. Language and culture complexities are also highly relevant in courses introducing metadata/ cataloging. Another recent trend in LIS education that is a natural ally is the move to incorporate community engagement into many aspects of courses/ program, or even creating a capstone service learning project along with a reflective scholarly journal.

Making information and recreation needs a research question and prioritizing the results rather than simply being passive consumers of traditional published output can push librarians to unique and creative solutions to real community needs. For example, one of our students found a problem with literacy levels of young Filipino immigrants in her community. Some research led her to challenge of parents with lower literacy levels and a dearth of picture books in the Philippine minority language spoken by the immigrant community. Her solution was to contact an ESL teacher, an
illustrator, and a local publisher. Together they created an illustrated primer with words in Ilocano, Tagalog and Hawai‘i’s official languages – English and Hawaiian. She and the publisher also secured grant funding so that one copy of each immigrant child in the state was able to receive a copy. It would be fascinating to see if this book helped to raise literacy and cultural pride on the Island. The point is that librarians can take a stronger role in creating content to meet immigrant needs.

**Developing Library Services with Empathy and Acceptance**

This is a state of mind and how you perceive immigrant users. Service to new immigrants often may require extra steps and work, and may sometimes require the help of interpreters, supporters, and sometimes government agencies. Cultural differences and miscommunications often create barriers for both librarians and the users. This could contribute librarian’s feelings of annoyance and extra burdens to deal with the user group. However, there are many examples to encourage and justify library services to immigrants. Kamakura’s study on Cambodian youth who grew up in a refugee camp demonstrates how people understand the world through their mother tongue and how this shapes their identities. These Cambodian-American children supposedly have no problems with using English to connect “outside” of their own community, but somehow slip through the cracks, and many of them came to the attention of authorities. Part of the problem is because many have communication problems with their parents, many of whom only speak Khmer. Communication is even more of a challenge since many refugee parents in that community have to work at night. Their children explain “we have the same color of eyes and skin with our parents, but don’t know about our native country, and where we came from, so don’t know where we are going”. The point here is that libraries have to understand that the lives of our users is complex, and that offering acculturation or “Americanization” type programming and services is far from the only need when it comes to immigrants and their offspring. Classes might also offer role plays to serve users with experience language barriers. In order to better understand this, students might be given the chance to try to get an answer to a reference question using a language other than his/her own.

**Fostering Proper Knowledge and Staff Training**

Working with new immigrants should not just be the work of one or two designated staff. All library staff and some volunteers may need training in terms of how to communicate with new immigrants. Staff, including security workers, need language skills or to have access to translators who can communicate with those with limited English-language ability. Library workers also need to have policies and training how to respond if the library is visited by immigration officers or police. Library ethics deal with providing privacy for patron information, such as addresses and patron records; however, users need to understand what is protected or not. Establishing policies, systems, and staff training are essential to maintaining the trust of our communities. LIS/iSchools must make sure that their graduates are fully ethical and engaged with trends in the field so they can apply situational ethics themselves as well as be able to train others in the workplace.
Engaging Community Members in Library Services

Many libraries have a volunteer group from the immigrant community to receive their support in cataloging, reference service (for language support), collection development, recruiting volunteers; especially young people who might spread a word and bring in their friends. Librarians also could work with volunteers to create announcement board, and exhibits, which fosters a feeling that “this is our library.” We need to be inclusive to all communities and create such opportunities for the library to be a true community center that is open to all. Few of the projects outlined above are possible in a meaningful way without research on community needs and partnerships.

The Challenge to Produce Librarians who can help Shape Policy

The first section of this paper highlighted the problem that few librarians seem to be involved at the table in discussions with local or national policymakers on issues related to serving immigrants. We need to make sure our graduates are able to become stronger leaders in our communities. By recruiting students with immigrant experience or family histories, we can hopefully find some who can become leaders on this issue, and ideally who can help shape national policies as well. Whether local or national, we need to do more to help our students better understand national and international covenants related to libraries, literacy, and cultural survival, including national protections, as well those guided by the UDHR and UNESCO.

We also need to equip them with some deeper understanding of governance, and how to lobby, craft legislation, and build coalitions. This could be offered in general LIS management courses, but obviously students would benefit from deeper study and preparation in a specialized elective seminar. Students could also secure some of these skills by taking graduate electives in a Law School or Political Science Departments or doing an independent study.

Preparing Archival Studies and iSchool Students

While most of this article is focusing on the need to prepare future librarians, we should also recognize that the same forces of migration and diversity are also challenging traditional norms in our sister fields of Information Science and Archival Studies. There are certainly parallel discussions in both fields, such as how do we ethically document immigrant experiences with proper cultural understanding? Some leaders in Archival studies educators, like Anne Gilliland have tried to apply archival approaches to meeting the needs of refugees escaping conflict areas, who need records for identification, property claims, and complex questions involving human rights, post-conflict justice and reconciliation.

More technology focused iSchools are probably less likely to focus on such traditional elements, but should explore information needs of immigrants and how one creates systems to fill those needs, including multilingual and multicultural HCI.

Conclusion

One needn’t be a genius or futurist to suggest the transnational and internal migrations will remain key trends of the 21st century. Global warming, political conflict, and poverty are potent forces that uplift people to suddenly become political or eco-
nomic migrants. Just a few decades ago one might have tolerated economic deprivation or political repression, but online videos or movies offer a simplistic and idealized image today suggesting success and happiness are only a trek or boat ride away. This determination to survive and prosper is a force so powerful that neither walls nor navies will make this disappear. Our attitudes will determine policies and access that determine whether migrants will be legal ones or if developed countries will become even more stratified societies with large groups of undocumented immigrants who are easy prey for exploitation. Unfortunately, in some countries, such as the United States, we are seeing a rising tide of nationalists who see immigrants not as new subscribers to the American dream, which fuels entrepreneurship and technological innovation, but rather simply as a burden on the social support system. What we are trying to say is that immigration is one of the largest crises or opportunities facing every country. The obvious challenge is how to help internationalize communities and offer help to immigrants. This help needs to include cultural and linguistic sustainability in a new country.

As this paper shows, libraries in many countries, such as America, have a long history of serving immigrant needs. Libraries in the 21st century need to recommit to this role, but also need to show more cultural understanding than our “Americanizing” pioneers. Librarians today need to be able to look at each community’s needs and see how we can create services, collection, and programs that will help immigrants to adapt, preserve heritage, and thrive. This paper outlines some of the steps that librarians in America are responding to these needs. Librarians need to continue to network through communities of practice in groups like IFLA and its IFLA Global Vision Ideas Store, and participate in blueprints for future development like A Library Manifesto for Europe and Libraries, Development and the United Nations 2030 Agenda to support library development that places inclusion of migrants and their offspring as key users.

Librarians and LIS educators alike can greatly learn from studying how different countries are dealing with diversity, multilingual collections, and inclusion. We need to see how different countries have dealt with balancing free expression at a time when hate speech often targets minorities and when different cultures disagree about cultural or political norms. Clearly, the challenges outlined in this paper are many, but we are confident that the key to successful transformation of libraries from increasingly undervalued book warehouses into truly dynamic community centers will depend on how well we can respond to short and long term needs of our increasingly diverse communities. And with so much a big role for libraries to serve immigrant needs, we hope this paper helps to offer a blueprint as to how LIS/iSchool faculty can serve on the vanguard of recruiting and educating diverse professionals for this future as well as can cooperate on research that examines case studies of successes and failures as libraries in many countries try to meet the needs of immigrants and refugees. And finally, we hope this paper helps LIS educators to extend our thinking from national documents to stress the role of international agreements, and helps nurture a future generation of professionals who don’t hesitate to solve international problems with translational and diasporic solutions using libraries, archives, and information systems.

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Librarians’ Conceptions of New Literacies

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Abstract. This paper provides an overview of how selected librarians understand new literacies. As librarians are expected to play an instructional role and to be prime movers in the arena of new literacies, it is important to first see how they understand the concept. The main goal of this research is to present articulation of the librarians’ new literacies, in the hope of uncovering what other literacy areas need to be further developed and strengthened. In order to gather responses, a focus-group discussion was conducted. Results show that the librarians who participated in this study are most confident in their media literacy skills, stemming from their training in library and information science. Also, based on their own assessment they indicated a need for more training in financial literacy. Findings also show that not only do participants personally benefit from their media literacy skills, they are also able to assist other people in situations needing media literacy expertise. Finally, it was gathered from the focus-group discussion that librarians view information literacy as the fundamental literacy because core skills related to it such as finding information and evaluating information can also be used when dealing with other literacies.

Keywords: Information Literacy, New Literacies, Librarians

Introduction

The conventional understanding of literacy equates the concept with skills involved in decoding and understanding text. Traditionally, basic literacy has always been understood as the ability to read and write. Discussions of literacy refer to the concept as a basic human right, in which it is characterized as a social mobility tool, it is recognized as an empowering tool to help a person survive.

However, this traditional understanding of literacy has evolved. Conceptions of literacy have changed due to digital technologies. In order to fully utilize available technologies, one must be familiar with how they work, this is where new literacies play its part. Innovative digital technologies have permeated in many aspects of life today. Academic activities can be performed using computers and the online resources; delivery of instruction is made easier by hybrid modes of instruction; entertainment is possible through streaming services. Searching for a concept online enables one to see a multitude of different answers to queries, all coming from different sources. In order to successfully navigate and survive in a world that offers an enormous amount of technological tools, one must master how these new technologies work and how they should be utilized. In libraries, new technologies have made available more carriers of information. Users need to navigate through these newer and more complex re-
sources, and librarians are expected to provide assistance to them. Assistance can be provided by librarians either by facilitating access, organizing information sources, or through instructional activities. New forms of literacies are required following these new kinds of technologies. Concepts like computer literacy, internet literacy, and media literacy are just some kinds of literacies librarians need to master, for them to successfully instruct and assist their clients. To successfully perform this task, librarians must first be experts themselves. Such is the aim of this paper, to provide an overview of how librarians understand new literacies.

Information Literacy

One important new literacy is information literacy, a concept coined by then the President of Information Industry Association, Paul Zurkowski in 1974. It refers to a newer form of literacy aimed particularly in using information to solve personal and professional concerns. Today, there is a newer definition for the concept from the Chartered Institute of Library and Information Professionals (CILIP):

> “Information literacy is the ability to think critically and make balanced judgments about any information we find and use. It empowers us as citizens to develop informed views and to engage fully with society.”[1]

This definition is an update to the previous definition developed in 2004. The change in definition was influenced by the understanding that information literacy is no longer a skill one needs to access and evaluate information resources—such a definition is grounded on the traditional understanding of information literacy as a library-only concept. Information literacy has been given a new contextualization, based on the understanding that it is a concept that affects five major aspects: everyday living, citizenship, education, the workplace, and health.

New Literacies

Aside from information literacy, other new literacy concepts are in existence, this is because even more advanced technologies are now available. These new technologies require people to be adept in how to manage and utilize them. Looking at the discussions of literacy in literature it is discoursed that as new digital technologies arrive, a need to learn and understand how they work also arises. These technologies are beyond the traditional: text can be carried not just by books, but by computers; communicating is no longer through mail, now it can be done electronically. These things require a newer set of skills, and this is where new literacies come in [2].

One way to discuss the definition of new literacies is using these two perspectives: the “paradigmatic” and “ontological” sense. The paradigmatic sense is concerned with studying and researching literacy in a new way, outside the realm of the conventional understanding of the concept. While the ontological sense discuss how new literacies are defined as having new “technical” and “ethos” stuff [3]. This perspective looks at literacy as having a different nature than the conventional literacies. For example, reading the text in a book could be considered conventional, while reading code on the screen could be considered new, because it makes use of a format different from the traditional paper. In this sense, digital technologies and the new ways of how users interact with content, are seen as key components of these new literacies.
Literature Review

Asselin discusses new literacies as unique ways of reading and writing through the use of technologies [4]. Putting this into context, it refers to reading and writing beyond paper-based or text-based content. Librarians, because of their instructional roles are seen as key players in educating the public regarding these new literacies. This paper partly highlights one of the key motivations behind this research. The adage: “you cannot give what you don’t have” seems to ring true when talking about new literacy instruction. Librarians must first be able to understand fully what these new literacies are, before they can teach these literacies to their clients. Asselin points out that school librarians, or teacher-librarians must imbue key aspects of these new literacies in school library media programs. Such action is accomplished through the creation and implementation of information literacy programs. Asselin further notes several steps teacher-librarians must take in order to promote new literacies in libraries. It should begin with them articulating and examining their own understanding of new literacies. Teacher-librarians should also incorporate major aspects of new literacies: locating, comprehending, and evaluating online information, and critical analysis of information, in library programs.

Stordy [2] evaluated the different literacy concepts and clustered them into six categories. New literacies were classified under the four of the six perspectives, although it was mentioned in the paper the fluid nature of these literacy concepts allow it to cross the boundaries of other perspectives. The first new literacy perspective according to Stordy is the autonomous-peripheral perspective; autonomous-paradigm perspective; ideological-peripheral perspective; and ideological-paradigm perspective. The autonomous-peripheral perspective discusses literacies concerned with being literate in relation to digital technologies. These literacies while related to innovative technologies, do not necessarily need novel cognitive abilities, meaning they can be achieved using conventional skills. Examples of this literacies include: digital literacy and media literacy, two concepts people often use interchangeably. The second perspective of new literacy discussed was the autonomous-paradigm perspective, where new literacies are described as those ‘claiming to reveal new ways of being literate’ following the opportunities presented by Web 2.0 technologies. Information literacy, and meta-literacy are examples of this. These two literacies enable users to interact with new information formats in a new way. For example, the creation of content without using traditional means of writing, but through programming.

The third perspective of new literacies: the ideological-peripheral perspective looks at literacy as embedded in social practice and digital technologies but are achieved through the use of conventional skills. Internet literacy is seen as part of this perspective. Finally, according to Stordy [2], the fourth new literacy perspective is the ideological-paradigm perspective. It stresses that literacy is a social practice and is achieved through novel skills associated with technologies. Trans-literacy or the ability to read, write, and communicate in different platforms, is described as part of the ideological-paradigm perspective. This could be illustrated with how one could use technologies not just in traditional social practices like academics, but also the use of social networking sites.

Using the framework [2] discussing the different literacy perspectives, the following forms of literacies could be classified as new literacies: Media literacy and digital literacy, both primarily concerned with the use of new technologies. Media literacy is a 21st century skill which provides a framework for creating, analyzing, and using messages in a variety of forms. These forms including traditional media like print
resources, and more modern media such as the internet and other online platforms. Digital literacy on the other hand refers to a wide range of skills that enable people to comprehend digital resources, this includes the ability to use digital technologies such as smartphones, internet resources, or create content through digital means such as vlogs. The following literacy concepts: meta-literacy, multimodal literacy, and trans-literacy all discuss novel ways of being literate. Related concepts such as health literacy, financial literacy, political literacy, and other applications of information literacy skills could also be classified as new literacies. They are concerned with the application of both skills and technologies in making life or societal decisions, and not necessarily using literacy skills or various technologies in answering academic concerns.

An article by Popp [5] in the Reference and User Services Quarterly talked about new literacies in the changing world. It discussed several new literacies librarians should be adept with. These new literacies include: graphic literacy, navigation literacy, context literacy, focus literacy, skepticism literacy, ethical literacy, and personal literacy. The paper also cited a list of skills that allow users to thrive in the cyberculture: the list of skill includes: focusing on what one is doing, ‘crap detection’, participation, effective ways to coordinate and collaborate, familiarity with how social networks work and the issues concerned with them. Looking at these listed skills, one could see how each particular skill could be traced back to information literacy. Skills in creating, assessing, and using information are highlighted. The simple act of questioning what one has read is an example of these new skills. Simply reading text is no longer enough, understanding the text, including the inherent subtext is also crucial.

Following the RUSA paper, it is evident that librarians play a role not just in facilitating access to information but also training users in the specific skills mentioned above. Librarians should be well-versed in these literacies for them to be able to teach it to their clients as well. This supports Assellin [4] in the thought that librarians should be able to articulate and assess their own literacies first before they could instruct others.

**Methodology**

This research takes on a different approach in discussing information literacy and new literacies, because while there exists local research on the topic evaluating the skills of high school or college students, or certain professions concerning information literacy and new literacies, this research focuses on how a selected group of library and information professionals understand not just information literacy, but the broader concept of new literacy. This is because they are the ones who would eventually have the primary responsibility of instructing users concerning these literacies in the library.

An open call for participants was made for this research. Initially, ten (10) respondents signed up, but on the day of the FGD only seven (7) participants showed up. All participants had bachelor’s degrees in library and information science and were all currently employed as librarians in different libraries in Metro Manila.

While this paper attempts to describe the conceptions of new literacies from the viewpoint of librarians, the main limitation of the paper is the small number of participants for the FGD.
Results and Discussion

The focus group discussion began with the facilitator inquiring about how LIS professionals define ‘new literacy’. The participants were quick to mention that from how they understood the concept, it has ties to technology and new media formats.

“I believe new literacies are related to the digital age, the format is associated with new media and how these new formats should be used.”

“As a school librarian, I believe new literacies are connected to media and information literacy. New literacies are always connected to technology.”

According to Stordy [2] technology has changed what it means to be literate. The same is evident with this paper’s respondents, when they described new literacies as a concept having a connection with technology. The responses echoes Lanskheear and Knobel [3] in their discussion of how new ‘technical’ stuff dictates the novelty of literacy.

The researcher probed more into the participants’ understanding of new literacies and asked them to share more about their experiences with it. Most of the respondents repeatedly mentioned financial literacy. Some of the concepts mentioned were about financial products like insurance, savings, and investments. The respondents also discussed personal experiences about being scammed, or being victims of questionable financial transactions, and pyramid schemes.

During the discussion, stories about failing to do research about certain investment opportunities were also mentioned as one respondent echoed her experience about not being able to do enough prior research about an investment product offered to her.

The respondents also discussed some form of consumer literacy, but interestingly they categorized it as financial literacy. One mentioned that in the pursuit of her hobby, which is make-up, she always refers to vlogs first before making any purchase.

“Before, I thought information literacy is the only form of new literacy, but lately I’ve been hearing a lot about financial literacy. I’ve been invited to attend financial literacy seminars, about investments, health insurance, and HMOs for example. Now, I believe financial literacy is also a form of new literacy.

“Financial too. I watch financial literacy vlogs and health literacy vlogs. Hearing about reviews affect my decision to purchase. For example, before I purchase skincare products I watch vlogs first, if it has good reviews, or high ratings, I purchase.”

“Attending financial literacy seminars – it affirms my understanding of my finances, I learn how to save and improve my spending.”

Some of the participants emphasized their experiences with fake news, and clickbait articles. They narrated that their information literacy skills enable them to judge which articles are true and which are not. In turn, because they have the requisite skills on information literacy, because of their background in LIS, they are also able to assist their families in figuring out the same.

“I think this is still related to financial literacy. In my family, for them to avoid getting scammed or falling victim to fake news. My parents ask me if stuff they see online is true.

“I am like my family’s human filter. Health information for example, I am not sure if it’s a thing with the older generation, that they would share health articles or clickbait. They can’t help it, they see these articles on Facebook.”
The participants were then made to self-assess their expertise in terms of new literacies. Media literacy came out as their strong suit, an area of expertise for them because of their prior LIS training. Also, during the discussion, financial literacy seemed to be the area they are most interested in, even though they also mentioned desiring more training on it.

“In terms of financial literacy, I think I am an expert. I’ve already had three meetings with three different insurance providers. This is because I believe I need to spend my money wisely.”

“Me too. I will only purchase an insurance policy if I see that most of my friends have it. I admit I am not an expert, I am guilty because if I see something online I tend to believe it easily.”

“I think I am an expert when it comes to the use of social media. Maybe because I have a degree in LIS, I always ask questions.”

The respondents were also asked to articulate their role as information professionals in promoting new literacies. The participants discussed specific roles such as leading people to the right resource, and assisting them with evaluating these resources.

“We play a role in leading our clients to the proper source.”

“As information professionals I think we play a huge role in teaching others how to evaluate sources.”

“Sometimes, even librarians need training about these new literacies.”

When asked to elaborate, one of the participants explained that there are instances when they come across social media posts from other librarians promoting beliefs or practices not grounded on science, or containing questionable content. This, according to them, is a cause for concern as librarians are expected to provide reliable information. Asselin [4] points to the same, librarians should be equipped in the requisite literacy skills for them to be able to teach their clients. It would be problematic if misinformation or disinformation comes from person expected to teach new literacies.

To conclude the FGD, the facilitator asked the participants which literacy they think is most relevant today. All the participants were in agreement that information literacy is the foundation of all other literacies as it encompasses all skills essential in using information, similar to [5].

“I think media and information literacy is the foundation of all these other literacies. I believe health, political, financial literacy would depend on how information literate an individual is. The only difference is that there is a specific subject area in these new literacies where you need to apply information literacy skills to.”

The consensus on new literacies is that they are literacies influenced by technology and digital media. Topics that prominently came up include financial literacy, and the involvement of the respondents in filtering information for other people, most notably older family members. When asked on the most relevant new literacy, the consensus was media and information literacy, since it was identified as the basis for other new literacies. Other literacies, such as cultural and political literacy were also identified as most important by some respondents, although the consensus that media and information literacy is the most important form of literacy was upheld.

Conclusion and Recommendations

Based on the feedback gathered from the focus-group discussion: it was revealed the participants perceived that while there exist now a multitude of literacies for various
contexts, information literacy is still seen as the fundamental literacy, the foundation of all other literacies. They expressed their confidence concerning media literacy and elaborated that their background in library and information science helps them better understand and decode information contained in various media. This perceived expertise on their end enables them to assist others in finding and evaluating information. In relation to this, when asked which kind of new literacy they are most interested in, they were in agreement with financial literacy. Some of them felt they already know aspects of financial literacy, but they still want to be trained more. In the end, it is evident that the training librarians receive particularly about finding and evaluating information helps them in their daily activities even when these skills mentioned are used not for academic purposes but for personal purposes.

For future researchers interested in the topic of new literacies, a bigger number of respondents could yield a more telling set of findings. Other specific literacies could also be the focus of future research. Furthermore, while the paper presents only an overview of the conceptions of a small group, professional associations and educational institutions could use the findings of this paper to design seminars or training programs for librarians in the identified aspects of literacy mentioned in the paper.

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Developing a Credit-Bearing Information Literacy Course for the Library and Information Science Curriculum

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Abstract. This paper discusses the development of a credit-bearing information literacy (IL) course at the School of Library and Information Studies, University of the Philippines Diliman (UP SLIS). Changes in the field of library and information science prompted the revision of the curriculum and the creation of new courses. This paper reports on the implementation of LIS 50 Information Literacy, including the topics and activities covered in the course. Student feedback and future considerations for the course are also included in the paper. In the end, this report could potentially be used as a guide for other LIS institutions intending to design a credit-bearing information literacy course that is not solely anchored to the understanding that information literacy is a library-specific activity. With its contents covering not just information literacy concepts but also related literacies, and pressing issues in IL, it is a helpful tool for others looking for a template of an IL course.

Keywords: Information Literacy, LIS Education, Information Literacy Education.

Introduction

In the Philippines, the entry-level degree for aspiring library and information science (LIS) practitioners is the Bachelor of Library and Information Science (BLIS). Nomenclature has since evolved to reflect the newer demands of the program. These demands are borne out of new principles and new technologies in the field. One of these newer concepts is information literacy (IL). While the concept has already been covered in the local LIS curriculum as part of reference and information service, a need for a more-focused approach in information literacy has been determined. One manifestation of such need is the course’s inclusion in the new BLIS curriculum released by the Commission of Higher Education (CHED) in 2015. In the curricular revision, commonly referred to as the CHED Memorandum Order No. 24, a separate course on information literacy is now required in all BLIS programs. While the University of the Philippines (UP) is an autonomous academic institution not strictly bound by the Memorandum Order, the implementation of the said order coincided with a curricular transition within the university. The General Education program of UP was revised and degree programs were revised and updated. During the curricular revision, the University of the Philippines School of Library and Information Studies (UP SLIS) updated its curricular offerings under the BLIS program by instituting six...
(6) new core courses. The revised BLIS curriculum was implemented beginning academic year (AY) 2018-2019.

This paper reports on the experience of UP SLIS in developing and implementing LIS 50 Information Literacy, a credit-bearing course on information literacy incorporated within the BLIS curriculum. LIS 50 is one of the six new BLIS core courses mentioned previously. The goal of this report is for other institutions to use it as a guide in the development of their own credit-bearing information literacy course, may it be for the BLIS or Master of Library and Information Science (MLIS) program, or for other degree programs. The nature and contents of LIS 50, which will be discussed further in the succeeding portions show a different approach in information literacy instruction, one that discusses the concept without referring to it as solely limited to libraries.

Information Literacy Instruction

There are different approaches in teaching IL: a more traditional approach is the instruction through library sessions performed by librarians. This kind of IL instruction is directed towards library users and focuses on the skills needed to navigate the library. Locally, such practice is conducted in school libraries, where school librarians schedule library classes and discuss information literacy in the context of library skills.

Daugman et al. [1] moved a step forward and developed an information literacy course targeted specifically for students of Humanities at Wake Forest University. The subject was developed and taught by members of the library staff and was geared towards training students how to navigate sources in the libraries, use databases, understand research processes, and evaluate information sources. Jardine et al. [2] wrote a paper on a similar activity in which a credit-bearing course on information literacy was developed for the Idaho State University Libraries. Both papers discuss the development and implementation of credit-bearing IL courses, however, this is still different from what UP SLIS is offering.

Prior to UP SLIS developing LIS 50, the discussion of information literacy was limited to it being mentioned as an aspect of reference service. However, as a new understanding of IL and its significance in society formed, borne out of concerns surrounding issues like fake news, misinformation and disinformation, the concept has evolved into one whose application is no longer limited to libraries solely. While there exists local research evaluating IL skills of high school or college students, or certain professions, this research takes on a different path as it focuses on how future library and information professionals learn and study it, as they are the ones who would eventually have the primary responsibility of teaching IL.

Information Literacy in UP SLIS

UP SLIS has been in existence since 1961. UP SLIS offers two degree programs in library and information science: BLIS and MLIS.

In the BLIS program, IL was first taught as part of the course LIS 71 Information Sources and Services I. LIS 71 is a subject focusing on reference sources and information services in libraries. In this subject, a 1.5 hour-session discussing the general concept of information literacy is included. The discussion of information literacy is
anchored in the topic “information services”. Before the CHED Memorandum No.24 was implemented, other schools offering BLIS also included IL as part of either Reference and Information Services, same as in UP SLIS; while other institutions include it as part of School Library Management.

In the MLIS program, the course LIS 240 Reference and Information Services covers IL. Similar to how LIS 71 covers the discussion of IL, LIS 240 also has a session dedicated to the topic. However, unlike the BLIS program where only one subject covers IL, another course in the MLIS program is focused on the concept and that is LIS 272. LIS 272 Seminar in Information Literacy is a seminar course on IL. Students who take seminar courses are required to conduct research related to the seminar topic. In the case of LIS 272, students are expected to conduct a semester-long research on the IL topic of their choosing. This follows the assumption that graduate students are capable of conducting a higher level of research on IL. However, even though LIS 272 is a course on IL, it does not discuss other related concepts such as IL skills or issues.

**Course Development**

It was in early 2016 when UP SLIS began to re-evaluate and redesign the BLIS curriculum. This was following the shift in the local basic education curriculum, which led to an additional two years of senior high school. It meant a change in the number of university courses students should take, since several general education courses were now covered in the senior high school curriculum. With this, the UP SLIS decided to institute six (6) new BLIS courses to adjust not only to the curriculum shift but also to the demands of the ever-evolving profession. One of these six courses include LIS 50 Information Literacy. It was agreed upon by the faculty members designing the curriculum that it is no longer enough to just have a 1.5 hour session on IL as part of another course. The UP SLIS wanted to have a course that would present a deeper, more comprehensive discussion of information literacy, which is not tied to the concept of reference and information service.

It was also during the curriculum revision when it was decided that the BLIS curriculum should begin with a course in IL. Prior to the development of the six new courses, the BLIS curriculum offered in UP SLIS began with LIS 51 Introduction to Library and Information Science. The faculty realized that all incoming BLIS freshmen should first be trained in IL skills so that the knowledge they could gain from the course be of assistance to them in all their other future courses, especially because courses in the tertiary level entail research skills. With this, the new course was assigned the course number LIS 50, to signal that it is indeed the fundamental BLIS course offering.

The course description of LIS 50 is as follows: “Information literacy, its relevance to lifelong learning, and its overall importance in society.” During the development of LIS 50, the course was envisioned to provide an introduction to the concept of IL without giving in to the notion that IL strictly applies to the library. A practical approach was desired, the goal was to provide students with an understanding of IL that reflects what students see in the real world. Such was the basis for the course description.

Furthermore, LIS 50 Information Literacy has five course outcomes. It is as follows: a) demonstrate understanding of the concept of information literacy; b) discuss the relevance of information literacy concepts to society, and its relationship with
other ‘literacies’; c) recognize the origin and history of the concept of information literacy, its instruction, and the creation of information literacy models; d) develop skills essential to be called information literate individuals: that is how to effectively recognize an information need; search, evaluate, and use information across all media format; e) design original information literacy projects relevant to specific settings.

These course outcomes were mapped to match not just the rationale of LIS 50 Information Literacy, but also the specific program outcomes expected from the BLIS program.

Course Content and Implementation

LIS 50 Information Literacy is designed as a 3.0 unit required core course in the BLIS program. It is offered every semester to all BLIS freshmen, shiftees, and transferees. The teacher who handles LIS 50 has a master’s degree and bachelor’s degree in Library and Information Science. She was directly involved in the development of the syllabus of LIS 50, beginning from the time it was proposed.

In the second semester of AY 2017-2018, the course was first offered as an elective, together with two other new courses. It was then called LIS 198 Special Topics in LIS: Information Literacy. The reason for its offering as an elective was for the course to undergo a test run first; to see which areas of the course should be further improved or strengthened. For the first semester of implementation, nineteen students enlisted in the course. Two out of the nineteen students were from the College of Mass Communication, while the rest were all BLIS students from the School of Library and Information Studies.

Starting AY 2018-2019, LIS 50 was offered as the required course, true to its real purpose. In the first semester of AY 2018-2019 all twenty-seven students who enrolled in LIS 50 were BLIS students, most of them were freshmen.

On the third semester of implementation, second semester AY 2018-2019, twenty-three BLIS students and two BA Philippine Studies students enrolled in LIS 50. It is important to note that the Philippine Studies students who enrolled in LIS 50 did so to enrich themselves in their thesis topic which was also related to information literacy.

In the succeeding paragraphs, the topics covered in LIS 50 are discussed. The first session of LIS 50 covers the course orientation. Class policies and course requirements are discussed. Also, to give the students an overview of the whole point of LIS 50, they are tasked to do a myth-busters-type of activity. Students are given a list of various websites pertaining to different topics: websites of medical journal, fake news websites, satire sites, websites of predatory conferences and journals, etc., and they are asked to quickly scan the sites and evaluate whether the site speaks of a legitimate issue, or whether it is a scam or deceitful. In the activity, students also need to articulate why they think a site is real or fake. The reason for doing this activity at the start of the semester is two-fold: first, this enables the students to appreciate the importance of information literacy; second, it gives the teacher an idea of which topics need more attention, depending on whether the students can correctly identify which sources are legitimate or problematic.

After the orientation session, the course officially begins with a discussion of the nature of information. LIS 50 is the first course all incoming freshmen take when they begin the BLIS program. This is also the reason why the concept of information is the first topic discussed in the course. The definition of information, according to different fields are covered. The whole discussion spans three sessions.
The second concept discussed in LIS 50 is dedicated to literacy. This includes a brief history of the concept. It is important to note that while traditional literacies such as reading and writing is covered, there is a dedicated discussion on old and new literacies. Four class sessions cover this topic. For the two sessions, a discussion on the general concept of literacy is presented. The history and definition of the concept is discussed, as well as other related topics such as functional literacy and critical literacy. For the next two sessions, new literacies are discussed. Newer literacy concepts such as media literacy, digital literacy are discussed, also included are topic-specific literacies such as health, political, financial, and environmental.

The third topic delves deeper into IL as the merging of the two concepts, “information” and “literacy” are discussed. This part of the course begins with the discussion of the origins of the concept. From Paul Zurkowski’s technical paper in 1974, up to the development of ALA’s Information Literacy Standards, and to the more recent release of UNESCO’s Five Laws of Media and Information Literacy. After discussing the history of IL, an overview of IL skills are examined. The following skills are discussed: a) identify, b) finding, c) evaluating, d) applying, e) acknowledging. Because there is a dedicated session for each of the five IL skills, only an overview is given here. Also part of this section is a discussion of the importance of IL. Its empowering nature: for school, work, and life in general, is discussed. This entire third part of the course takes about four sessions. Activities for this part of the course include: a small group discussion concerning the effects of illiteracy as applied to various aspects of human life, as well as a role-playing of the outcomes of the small-group discussion.

The fourth topic deals with IL and its relationship with lifelong learning. It is treated as an expanded continuation of the discussion of the importance of IL. This part of the course spans two sessions. For this part, students conduct a small group discussion of how IL empowers people in different contexts. The aspects discussed are: health, employment, financial, and personal scenarios.

Each of the five IL skills are allotted two sessions each. For each skill, the first session deals with a discussion of what each skill means, and the second session is dedicated to a discussion of the indicators of skill mastery. Part of the discussion of IL skills is an examination of the ways on how those skills can be reinforced: through classroom-based activities and discipline-based activities. Students are asked to pick a certain group (e.g., students, retirees, professionals) and are then required to think of ways/methods specific IL skills could be taught. So for this part, methods of IL instruction are also introduced.

IL standards are also discussed in LIS 50. The standards included are: ALA and ACRL’s Information Literacy, AASL and AECT Standards of Information Literacy and Independent Learning, Eisenberg’s Big 6 and Super 3 Standards, and UNESCO’s Five Laws of Media and Information Literacy. This part of the lesson covers four sessions. The importance of standards and their applicability and use for each age group is discussed. One activity conducted during this part of the course is an evaluation of the standards used in LIS theses submitted to UP SLIS.

Assessment tools in IL are also discussed in LIS 50. This is a continuation of the session on standards. After students examine the standards used in IL research submitted to the college, they are asked to note of the assessment tools used for each research. Two sessions are allotted for this topic.

Issues in IL comprise the last four sessions. For this, discussions on misinformation, disinformation, mal-information and other information disorders are covered. Issues in other literacies are also discussed: this includes predatory publishing, health hoaxes, astroturfing, among others. Here, the discussion is not just purely teacher-led,
students are encouraged to pick an IL issue of their interest and discuss it in class. In the most recent semester, topics ranging from political literacy during elections, and trolling were examined.

The final requirement for the course was also anchored to this last topic, and that was to propose a solution to the selected IL issues. After deciding on the final paper topic, a one-week research break is given to the students. During this period, students are expected to work on their final paper. During the previous semesters topics submitted as final papers include: a proposal for an information campaign teaching social media users how to discern content from internet trolls and fake accounts, a proposal to strengthen media literacy instruction in the secondary level, and a proposed voter education platform.

In terms of class activities, several are employed in LIS 50. Depending on the topics discussed each session, activities such as minute paper and small group discussions are conducted. In some topics, library days are also conducted, this is when students refer to published LIS research and look at the IL topics discussed, or IL assessment tools used in the identified research. All these previously mentioned activities are done apart from the scheduled examinations, reports and recitations.

Student Feedback

Since LIS 50 is a newly instituted course, one that has only been offered for the past three semesters, importance is placed on student feedback. Using the Student Evaluation of Teachers (SET)—the assessment tool UP students answer at the end of each semester; LIS 50 SET comments were evaluated at the end of each semester. The SET allows students to rate the course quantitatively (1 being the highest and 5, the lowest), while also allowing them to make qualitative comments about the course.

During the first semester of course implementation, the students primarily noted through the SET that more readings on the concepts of IL should be included and suggested that more hours should be allotted for the discussion of the definitions of information and literacy. In terms of quantitative feedback, the students gave the course a numerical rating of 1.66.

The concern regarding more readings was addressed in the second semester of implementation as more IL readings were added. The number of hours allotted for the introduction to IL topic was also increased. In their SET responses, the students expressed that they wished for more critical thinking examples. This semester an improvement in the numerical rating of the course was seen, the students who enrolled in LIS 50 in its second semester of implementation rated it 1.39.

On the third semester of implementation of the course the number of sessions allotted for issues in IL were increased from just two, to four. More topics on how to address real world issues in IL hence were added to the course. For this semester, the students gave the course yet another improved rating, 1.37. Also, after the third semester of implementation of the course, students commented that while they were satisfied with the implementation and course content, they wished for other non-LIS majors to also be able to take the subject. The students suggested that an equivalent general education course on IL should be made available to all students.

Take note that these comments come from different students, during different semesters. The course is continuously being improved and developed. Relevant issues are included in the discussion each semester to reflect current concerns in society. Each comment presented in the student evaluation is addressed and suggestions are
evaluated for inclusion the course. Looking at the numerical rating that the students give the course, it is evident that the course is improving.

**Future Considerations**

During the creation of the course LIS 50, the idea was to design it in a way that is not library-centric, but rather for IL to be discussed in a more general, practical sense. This is why topics and examples used in the LIS 50 course are more real-world based. LIS 50 was designed to be taken not just by LIS majors, but also non-LIS majors interested in IL studies and issues. In the previous semesters, a number of non-BLIS majors have enlisted in the course. Some decide on enlisting because while they are non-BLIS majors, information literacy is a significant part of their undergraduate thesis. In the coming semesters, LIS 50 is expected to be further strengthened and to be offered to more non-BLIS students. The aim of the constant improvement of LIS 50 is to show the empowering nature of information literacy.

Instituting courses in IL is a step towards the promotion of the concept, in the hopes that soon everyone will receive IL education, thereby enabling them to access and use information effectively. Offering an introductory course in IL helps ensure that enlisted students, particularly future librarians, have ample understanding of one important tool to survive in the information age: IL. While it is difficult to completely predict what new concepts or topics will be included in the course in the future, it will still, surely, reflect current issues concerning the use and abuse of information. The concepts covered in LIS 50 *Information Literacy* extend beyond the bounds of the library, it also gives students regardless of their background, an insight into how IL skills can be used and applied to their day to day activities.

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Potential Risks of Electronic Medical Records Implementation in Malaysian Public Hospitals

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Abstract. Using health information systems are rapidly growing as hospitals transition from conventional practices to the electronic documentation. Health information systems are cutting-edge products designed to improve the delivery of effective healthcare. While the adoption of electronic medical record (EMR) systems promises significance benefits, including better care, improve quality of documentation and record keeping, however unintended consequences from the implementation of these systems have emerged. Poor EMR system design and too complex can cause EMR-related errors that jeopardize the privacy, confidentiality and security of the information in the EMR, leading to major backlog in incorporating older paper medical records via electronic mode, impose expensive cost and lack of IT skills among the end users. These unintended risks also may increase hoax and mishandling and lead to serious legal implications. The purpose of this paper is to review the potential risks or/issues in implementing electronic medical records in hospitals. This literature review examines the impact of risks of the use of EMR systems on the quality of care and proposed solutions to address EMR-related errors. This analysis of the literature on EMR risks is intended to serve as catalyst for further research on these potential risks, their impact on safety and quality of patient care and strategies for decreasing them.

Keywords: electronic medical record, healthcare, risk

Introduction

New technology discovery in Information Technology (IT) has brought significant positives impact to daily human task. This impact implies to education, business, healthcare, manufacturing and retail industry and others too. The government had invested for IT projects since realizing IT is efficient and effective tool for managing healthcare system. Moreover, in the Eleven Malaysia Plan (11MP), the government declared to improve hospital services, facilities and infrastructures such as medical equipment and strengthen the integration of Information and Communication Technology (ICT) systems. This can help to improve the quality of health services to the community and establish our future healthcare in line with practice of Western country. Hence, Ministry of Health has started introduced Hospital Information System (HIS) in public hospital. Hospital Information System (HIS) is a comprehensive, integrated information system designed to manage the administrative, financial and clinical aspects of a hospital [18]. In history, Selayang Hospital is the first hospital in Ma-
Malaysia that implemented Total Hospital Information System (THIS) in 1999 [15]. The Ministry is changing the healthcare system in stages for transition from paper to digital record keeping in the future. The Electronic Medical Record System (EMR) is the core system to THIS [17].

In these millennial years, informatics and communication technology had developed rapidly. Internet usage had gained its popularity to ease access to social media coverage. In health perspectives, Internet access is widely used in most health facilities. The utilization of informatics and communication technology in the healthcare sector aims to make universal health coverage achievable. World Health Organization (WHO) promotes the enabling of environment for the use of informatics and communication technology in the effort to strengthen the surveillance and health information system to all populations including those patients who are located at remote areas or underserved community [5].

The EMR environment is complex and sophisticated environment where its foundation is the clinical data repository (CDR) that process database of patient clinical information for practitioners [14]. The EMR applications can be used in clinical documentation and computerized provider order entry (CPOE) for physician and pharmacy management [14]. It helps in improving patient safety and reduce medical errors. This EMR is one of component to build EHR and a success EHR depends on the EMR.

Most Malaysian government hospitals do not realize that they are at risk to litigation and loss of their electronic medical records. One of the most crucial problems facing organizations is that electronic systems are built not for records keeping [7]. The systems do not capture the contextual and structural information, which is essential to ensure effective identification, organization and control, retrieval and maintenance of electronic records. In addition, the electronic storage media deterioration and technology obsolescence, its accessibility and long-term access as well as the preservation of electronic records are at stake.

With the implementation of the Multimedia Super Corridor (MSC) Project under its flagship application, loads of vital information will be churned out electronically. The information has to be managed in an efficient and consistent manner to ensure their integrity and accessibility over time. However, regrettably records management is not a common practice in Malaysian organizations. The study conducted by the National Archives of Malaysia [5] revealed that government agencies do not have a formal policy on electronic records management program neither do they have any assigned responsibility of managing those records. The general acceptance of life cycle conceptual framework popularized by the Malaysian Archives is more of file management rather than an integrated approach to records management. Malaysian Government Hospitals must understand the risks posed by overlooking the importance and role of medical records in the electronic age. Without adequate legal and regulatory infrastructure to ensure the reliability and authenticity of that documentary evidence in the hospitals’ decisions and actions, tremendous impact of risk will be resulted in relation to hospitals administrative, legal and fiscal obligations. Thus, it will indirectly be disclosing the hospitals credibility and accountability.

**Electronic Medical Records**

There are many definitions of EMR given by the researchers based on their studies. As stated by Fisher [13], the word of EMR is evolving, begin with computer stored medical records followed by computerized patient record (CPR), computerized medi-
The use of electronic medical records has been applied to various developing countries nowadays and Malaysia has taken the opportunity as well as not to be left behind. At the present, there are a few hospitals in Malaysia who are using this said advanced technology. Ministry of Health have allocated a yearly budget to build on EMR as we are approaching the digital era. Although there is critic regarding high cost on building this, the good outcome to the patient, health care provider and government itself made this project continuous.

From healthcare professional perspectives, which involved the doctors, nurses, and pharmacist as well, the electronic medical records in Malaysia may be beneficial in terms of serving the patients and giving the best quality of care. As healthcare professional can view the complete medical history of the patient’s, it may help to reduce the time of waiting for the patient’s chart to be physically present, hence, reducing the waiting time of or patient and delivery of optimized consultation, diagnosis and treatment achieved. Electronic medical records are readily available to use 24 hours daily [2]. Health professionals may be able to increase productivity and manage patient better.

It may reduce medications errors as prescriptions for treatment is recorded and may alert healthcare professional when matters arise such as overdose treatment, contraindicated medications, duplication of prescriptions encountered [1]. The information in the electronic medical records can be accessed by healthcare professional outside the hospital such as health clinic centers for consultation or review of investigation when there are cases referred for the diagnosis and treatment of a patient. Another advantage for implementing electronic medical records is the benefit for space saving in an environment of digital records. With more admissions to the hospitals and increased birth rate yearly, the incidents will increase the numbers of attendances to health facilities, hence, but by going paperless not only it will create space, but it will reduce the chances of paper medical records to go missing or misplaced and physically destroyed in unforeseen circumstances such as in a fire or flood incidents [21]. Operational and labor cost for maintenance of record room and paper medical records will also be reduced significantly and this, in turn, will be economical and cost saving for administrative [4].
The ability to transfer data from one department to another may facilitate workflow and better quality of care as well with better integrations among healthcare professionals and improved information sharing [23]. Communications between health professionals can enhanced through coordinate workflows. Apart from healthcare professionals from various departments, it may be able to provide input through information sharing, administratively, streamlining patient’s health bills process can be done, electronically, which is quicker and advanced.

The health administrator can benefit from this, where they can easily create reports, organize clinical information and record filing, managing claim and ordering process going smoothly, reduce time for billing processes and importantly can serve a good customer service [26]. EMR can provide long term planning of healthcare and health resource allocation in the future. In a better way, quality of health services can be improved and reduce complaint from community. EMR can improve quality of documentation by typing the information into the database. Doctor’s handwriting is sometimes difficult to read and this make caused misunderstanding of the instructions. The information is clearer and better to understand, it can also educe mistakes as it was nicely typed [26]. The EMR also improve record keeping and reduces possibility of lost records where the database allows saving data in the server [26]. This will reduce misplaced of the documents due to human error and it support paperless environment. This data storage is safe from natural disaster and can save space tin keeping the physical file.

Besides that, EMR can enhanced the communication between patient provider [4]. Communication barrier usually arises between interdepartmental in treating patient with multiple medical problems. EMR can help to remove this barrier by allowing multiple accesses to document at one time and integrate the communication from different department in treating the patient [26]. It allows the physician to see the whole picture of patient and make proper planning of treatment that can be schedule for the patient. Tele-consultation from specialist in other place also are able through EMR where the data are available online and the specialist can provide advice on diagnosis and treatment of patient. This is possible in cases where the hospital does not have the specialty in that case and need to refer. Through these, the receiving specialist will be clear with description of patient and imaging film can be share, the decision to send the patient to tertiary center will be determine by the specialist.

**Potential risks in EMR Implementation**

The rapid informatics and communication technology development had affected the lives of many in Malaysia especially those who are located in the center of the city or towns. This includes the health sector aspect that many facets depend on this technology. As Malaysia is a developing country, Malaysia keeps going forward to endeavor the latest and newest innovation in ensuring that the country and her people will be one of the leading countries with advanced, innovational and creative citizens in this modern world. With the support of the Malaysian Government, the private hospitals are recommended to adopt the electronic medical record system and all public hospitals will be fully implemented in near future.

However, in implementing this technology through electronic medical records in health facilities, it should not be denied that there are risks and issues to overcome the problems. The implementation of electronic medical records is not an easy delegation as it involves a system, which is complex.
The first potential risk is the introduction of electronic medical records will cause a major backlog in incorporating older paper medical records via electronic mode. Copying information from the paper-based medical record into the system will take longer time and which would be costly on the service. Some paper medical records may include relevant documents that may or may not be possible for scanning into an electronic medical record. At the same, it will also not be practical to discard every document including those that are old or damaged as it is considered to be legal. On the other hand, if one were to recreate an existing patient with the paper-based medical record, it will lead to the duplication of entry.

Secondly, the implementation of electronic medical reports by all odds will impose a substantial amount of cost [12]. The maintenance of electronic medical records will also be costly. In the case of malfunction hardware, it need to be replaced. Apart from that, on a regular basis, software systems need to be updated [25]. When there is a system broke down, all electronic medical record must be reverted back to paper-based medical record to ensure a smooth process for data collection and storage is achievable.

Expensive cost is the most common risk and issue in implementing the EMR system. The EMR system are expensive because of the setup costs, additional hardware costs, and maintenance costs [16]. This is important for back up of the database and security and confidentiality of the data when the software is facing problem. The training costs also lead to the increasing cost in implementing EMR. The hospital will have to send the staff for training and paying the trainers to teach the users in the hospital [4]. The physician had to spend extra time to learn using and adapt to the system [19]. time are wasted as they need more time to see the patients.

In addition, power failure or instability of Internet network establishment is bound to happen. There could be possibility that some ongoing entries erased or unable to retrieve back in during which power failure took place. This may cause a major hindrance to the work process and cause health professional and staffs to revert back manually using paper record until the system is able to function back as usual. Any information pertaining to patient’s laboratory results, procedures and medication dosages may not be able to refer back within that period.

Thirdly, training is important to health professional and health administrators. Furthermore, refresher courses are necessary to keep up with updated electronic medical record systems. End users training are beneficial to strengthen the knowledge among end users. However, on-job training may disrupt the workflow of health workers. More time are taken up, from hours to days, resulting in loss of productivity for a temporary time among the health professional and staffs, which would eventually lead to the loss of revenue due to the implementation [25]. While there may be some health professionals and staffs who may not be keen to learn about IT, there are some who become too dependent to rely on the technology solely [19]. In both situations, health care professionals and staffs may be showing poor work performance and demotivated.

Another major risk of the implementation of electronic medical record is that the safety of the information exchanged. One of the barriers to adopting the electronic medical system is the issue of security and confidentiality of the data. Due to the open network among healthcare professionals, privacy and confidentiality may be breached easily as the information about a patient’s medical health can be accessed anytime. The unauthorized person will easily face legal issues concerning to patient’s privacy right, if the information is mishandled or manipulated.
The issues on privacy, confidentiality and security of the data usually are hot issues when implementing the EMR. The healthcare provider needs to protect patient information at the same time they implementing the EMR. Confidentiality of the data is worrisome since there is open access of network that can expose the data from multiple points. Security are also the barrier in implementing EMR system. To protect the security of the data, a good security plan is essential. Restricted health care personnel who are dealing with treatment of patient are authorized to access the patient’s data include modifying and verifying the data [26]. One should trust the staff that handle the data information and it need to comply with the health policy. This issue should be handled and document entry properly by the user to prevent legal suit in future. Back up for the data is essential in case of server or software broke down. In addition, the use of electronic medical record raises concerned on the feasibility of rural health centers population in the impediment issues regarding logistic and availability of a stable wireless connection in the rural area [20]. Hence, it is one of the risks to have an integrated electronic system leading to the problems of health professionals working in a silo.

Ethical issues heightened in implementing the electronic system. Security breached and healthcare professional and staffs’ integrity tested [27]. The using of electronic system as medium of communication will be seen as inadequate especially in doctor-patient relationship may not be enhanced and harmony. Fewer interactions seen between the two parties and inter-departments may also display less fundamental communication that could also be harmful to treat patients without having a proper interaction.

Another potential risk is regarding technology. There are two categories: Technical and non-technical issue. In non-technical issue, lack of computer, hardware is some of the common issue they facing. Distribution of the computer in the ward should be equal for the physician and nurses to do the data entry. Technical issues on interoperability occur when data exchange between the providers who use different health IT systems [26]. Within one system, the data are not combined. As an example, if the physician wants to order for blood investigation, the users have to log in another different software from the patient clinical data entry. This two different software are not integrated. Problems related to the software provided from different vendors remained unsolved since every vendor has its own expertise [26]. This variety of software system makes variation to the documentation system and lead to unstandardized form of document [26]. Ministry should design a system that is efficient in its functions, easy upgraded without extra cost, training local IT personnel and build up in house systems for whole Malaysia in applying the EMR at the hospital, a user friendly with practical and standardized system should be addressed. This system should be able to update later in the future when new technology applied. A customize templates in EMR system on certain specialty can be request with the vendor to meet the need of their usage. In term of software or server problem, technical support should standby and visit to the ground when he is needed. Ministries need to invest in information security management and provide a separated line for Hospital Information System (HIS).

Furthermore, the end user itself, the physician also considered as an issue and risk in implementing EMR system. The physicians need more time to learn and understand the system and their target to see more patient every day. Lacks of skilled in IT among the users contribute to this issue. User with IT background usually did not have problem in using EMR if compare to user with no IT background. In a study done by the researchers, they found the older physicians have less computer literacy are less interested to use the EMR system compare to the young physician [24]. In view of EMR system related to computer utilization, there is need to send a team from
Ministry for expertise training and they will come back to do in-house training at hospital.

Conclusion

Concisely, electronic medical records significantly bring advantages and affect positively towards the Malaysian healthcare settings. The adoption of this electronic system will not only be beneficial for the healthcare professional, staffs and providers but for the patients who may be at ease during the process of receiving treatment and consultation. The government should implement the electronic medical record widely and bridge the gap between healthcare providers, and professionals in optimizing the best care for the patient. However, one should be reminded that in endeavoring into this huge investment step, it may be difficult at the initial part of the implementation for patients and also healthcare professional and staffs.

The allocation must be planned properly especially for this particular budget, include higher cost for the maintenance of the system and the future updates of the system. Information technology (IT) application in healthcare industry has improved the healthcare quality and service. This allows the adoption of EMR system in Malaysia hospital by stages for efficient data management and optimizes the healthcare service. Despite the benefit from implementation of EMR system in hospital, the risks and issues within the implementation also need to be strengthened. To have a successful EMR, good support system, adequate training, a user-friendly system, cooperation and communication with provider and MOH staffs should be emphasized. It is hope that all public hospital in Malaysia able to implement EMR system and in future time, EMR will be able to adopt for convenience to staff and patient.

References

The Effect of Weather and the Days of the Week on the Number of Daily Circulations in Public Libraries

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Abstract. This study investigated the effect of weather and the days of the week on the number of daily circulations in public libraries. Library circulation data sets were collected from two libraries: one was in an urban area, and the other in a rural area. After the data was divided by rainy days and other days, holidays and workdays, and each day of the week, the presence or absence of significant differences in the number of circulations per day were analyzed. Automatic Linear Modeling was performed to analyze how weather, days of the week, and holidays affected the number of daily circulations. The results revealed that days of the week have a large impact on daily circulations in both libraries. However, the weather had a significant impact in urban areas only. Automatic Linear Modeling explained the circulations based on days of the week and holidays with 71.5% accuracy in a rural library and explained the number based on days of the week, holidays, and precipitation amount with 81% accuracy in an urban library.

Keywords: Library Output Indicator, Library Circulation, Library Use, Library service, Weather effect.

Introduction

This study investigated the effect of weather and the days of the week on the number of daily circulations in public libraries. Besides, we explored whether these effects varied according to a library’s location.

Although measuring library outcomes has drawn increasing attention such as “Project Outcome” by the American Library Association, output indicators including the number of library visitors and circulations remain essential. For example, output indicators are useful for monitoring library activities continuously and measuring the impact of an activity on an entire library, not just a single service or program.

In addition, various environmental factors such as the library’s location, transportation to a library, the situation of the (potential) user group (population dynamics, employment structure, educational background and economic situation), seasons, weather, and the days of the week have an impact on output indicators. However, the extent of the effect of environmental factors on library output indicators remains unclear.

In this study, we focused on the number of daily circulations as an output indicator, and the weather and day of the week as environmental factors. It was assumed that weather conditions and whether the day was a holiday or a weekday would have a great influence on library use, including circulations, but surprisingly, there have been few studies investigating these topics. Depending on the day of the week, people may
visit more often and borrow more books during holidays (Saturdays, Sundays and national holidays) than on workdays. Meanwhile, the weather may deter people from visiting on rainy days. It is also likely that the degree of influence would differ depending on users' transportation. If the library is in an urban area, where users come mostly by foot or public transport, it may be expensive to come to the library if it is raining. However, if a library is located in a regional city where users visit using private cars, they may not be deterred by rainy days. Clarification of these trends would explain the effects of some environmental factors on output indicators and take account of their effects when utilizing indicators.

Based on the above-mentioned issues, we analyzed data collected from two libraries in different types of locations. Our hypotheses were:

H1: Weather has an impact on circulation numbers. On rainy days, the number of circulations is fewer than on fine or cloudy days.

H1’: The impact of the weather on circulation numbers differs between urban areas and regional cities. The impact is more significant in urban areas than in regional cities.

H2: On Saturday, Sunday, or holidays the number of circulations is higher than workdays.

H3: On workdays, the day of the week affects the number of circulations.

Literature review

While there have been numerous studies of the number of circulations in libraries, surprisingly, no study has analyzed the relationship between the weather and library use, including visiting and circulations. Okada and Todo analyzed the relationship between the number of visitors to public facilities, including libraries, and the seasons. They found that although the number of users of outdoor facilities such as zoos had large seasonal fluctuations, in libraries, seasonal fluctuations were small [1]. Cuffe’s research on indoor public cultural facilities investigated the intraday effects of rain on museum visits. The study found that persistent rain substantially increases museum attendance in the morning, yet depresses it later in the day [2].

There are some studies about the effect of days of the week on library use. Tomie investigated the number of visitors and users staying in three public libraries during different days of the week at different hours. While he only compared Friday and Sunday, he found that there were more visitors on a Sunday than a Friday in all three libraries [3]. In a case study of an academic library, Ahmadi et al. developed a mathematical model that can be used to forecast the number of individuals who will enter the library as well as the number of patrons that will seek assistance at the reference desk. Their model used the days of the week as an important independent variable [4].

Methods

We obtained library circulation data from two public libraries; Koto City Library in Koto Special Ward, Tokyo Metropolis, Japan, and Tahara City Library in Tahara City, Aichi Prefecture, Japan. Koto City Library is the central library of the Koto Special Ward located on the waterfront of Tokyo Metropolis, which has a population density of 12,170 persons per square kilometer. It is approximately six minutes on foot from the nearest station to the library. The library does not have a parking lot.
The library is a typical example of a service located in an urban area, where users come mostly by foot or by public transport. Tahara City Library is the central library of the Tahara City located in southern Aichi Prefecture, which has a population density of 324 persons per square kilometer. It is approximately fifteen minutes on foot from the nearest station to the library. There is a public parking lot near the library. It is a good example of a library located in a rural, countryside town, where users visit mostly by car. We analyzed the circulation data from April 2016 to March 2017 with the opening and closing status of both libraries.

The weather data was obtained from the web site of the Japan Meteorological Agency. Although various data can be obtained, we acquired and analyzed precipitation data first because rain is thought to influence people’s intentions to visit a library. After accessing the data, we set three criteria for daily precipitation: 1) Rain flag 1 (precipitation > 0 mm) as a day when it did not rain at all or when it was just a little. 2) Rain flag 2 (precipitation >= 3 mm ) as a day when it rained a little heavily. 3) Rain flag 3 (precipitation >= 10 mm or not) as a day when it rained more heavily than other days. The impact of snow and hail was not considered because there was almost no snow or hail in the two cities.

In addition to the impact analysis of the weekdays, we divided the units into Saturday, Sunday and national holidays (SSH) and workdays in order to analyze the impact of different day-types.

SPSS version 25 for Windows was used to conduct a statistical analysis. According to rainy days and other days, holidays and workdays, and each day of the week, we analyzed the presence or absence of significant differences in the number of circulations per day. In addition to that, we also performed Automatic Linear Modeling to analyze how weather, days of the week, and holidays affect the number of daily circulations. Automatic Linear Modeling of SPSS 25 is a multiple linear regression model that assigns relative weights (importance) to predictive factors that have the strongest association with the outcome measure [5]. We entered the number of circulations as the objective variable. Meanwhile, holidays (SSH), precipitation amounts, rain flags (>0, >=3, >=10) and the days of the week were entered as independent variables. The software was run in the “AUTO DATA PREPARATION” mode. P<0.05 was considered statistically significant.

Results

The impact of weather

Fig. 1 shows the difference in circulation numbers between fine or cloudy days (precipitation amount = 0) and rainy days (precipitation amount > 0) in Koto City Library and Tahara City Library. Because there was no significant difference among the three precipitation criteria, only the comparison based on rain flag 1 is shown in the figure 1. In Koto City Library, the mean circulation numbers on fine or cloudy days was 2,168.7 (N = 192) and on rainy days was 1,824.5 (N = 99). If it was a slightly rainy day (precipitation amount >= 3), the mean circulation number was 1,750.3 (N = 67) and on heavy rainy days (precipitation amount >=10) it was 1,690.8 (N = 39). The Mann-Whitney U test showed that the difference between precipitation amounts and circulation numbers was significant by any standards (rain flag 1, U = 6,193.5, z = −4.868, p < 0.001; rain flag 2, U = 4,470.5, z = −5.020, p < 0.001; rain flag 3, U = 2,754.5, z = −4.416, p < 0.001). In Tahara City Library, the mean number of circula-
tions on fine or cloudy days (precipitation amount = 0) was 1,690.7 (N = 196) and on rainy days (precipitation amount > 0) was 1,618.3 (N = 94). If it was a slightly rainy day, the mean circulation number was 1,650.4 (N = 74) and on heavy rainy days it was 1,654.5 (N = 42). The Mann-Whitney U test showed that the difference between precipitation amounts and circulations was insignificant by any criteria (rain flag 1, U = 8,148.5, z = −1.591, p = 0.112; rain flag 2, U = 7,568.5, z = −0.680, p = 0.496; rain flag 3, U = 5,103.5, z = −0.208, p = 0.835).

The impact of holidays and days of the week

Fig. 2 shows the difference in circulation numbers between workdays and holidays (Saturdays, Sundays and national holidays) in Koto City Library and Tahara City Library. Unlike the weather, holiday effects showed similar trends in both libraries. In either of the two libraries, the number of circulations on holidays were higher than those on workdays. In Koto City Library, the mean number on workdays was 1,711.6 (N = 175) and on holidays was 2,564.4 (N = 116). In Tahara City Library, the mean number of circulations on workdays was 1,382.0 (N = 174) and on holidays was 2,095.0 (N = 116). The Mann-Whitney U test showed that the difference was significant in both libraries (In Koto, U = 19,181.5, z = 12.850, p < 0.001; in Tahara, U = 19,370.5, z = 13.262, p < 0.001).

Fig. 3 shows the difference in the number of circulations across the days of the week on workdays in both libraries. Most public libraries in Japan are closed on Monday, and both libraries are. In Koto City Library, the mean number of circulations on Tuesdays was 1,924.8 (N = 44,), on Wednesdays was 1,918.3 (N = 48), on Thursdays was 1,466.7 (N = 46) and on Fridays was 1,494.5 (N = 37). The Kruska-Wallis H test showed that the difference was significant (N = 175, H (3) =87.354, p < 0.001). In Tahara City Library, the mean number of circulations on Tuesdays was 1,505.0 (N = 44), on Wednesdays was 1,369.0 (N = 47), on Thursdays was 1,467.9 (N = 46) and on Fridays was 1,145.4 (N = 37). The Kruska-Wallis H test showed that the difference was significant (N = 174, H (3) =61.064, p < 0.001).

Fig. 1. The difference in circulation numbers between fine or cloudy days and rainy days.
Fig. 2. The difference in circulation numbers between workdays and holidays

Fig. 3. The difference in circulation numbers across the days of the week on workdays

**Automatic Linear Modeling to analyze how weather, days of the week, and holidays affect the number of daily circulations.**

Fig. 4 shows the results of Automatic Linear Modeling using the data from both libraries. The results of Koto City Library revealed that the days of the week, precipitation amounts, and the holiday flags were significant predictors. The day of the week was the most important (predictor importance = 0.78, p<0.001), precipitation amount was the second (predictor importance = 0.17, p<0.001), and holiday flags were the third (predictor importance = 0.05, p<0.001). A model consisting of these three factors explained the number of daily circulations with 81.0% accuracy. Unlike the results of Koto City Library, precipitation amount was an insignificant predictor in Tahara City Library. The results revealed that only the day of the week and holiday flags were significant predictors. The day of the week was the most important (predictor importance = 0.81, p<0.001) and holiday flags were the second (predictor importance = 0.19, p<0.001). A model consisting of these two factors explained the number of daily circulations with 71.5% accuracy.
The impact of weather

Our hypothesis 1 (H1: Weather has an impact on circulation numbers. On rainy days, the number of circulations is fewer than fine or cloudy days) was partially supported. In addition, H1’ (The impact of the weather on circulation number differs between urban areas and regional cities. The impact is bigger in urban areas than in regional cities) was strongly supported. The results of the comparative analysis of rainy days and other days revealed that the number of circulations on rainy days was significantly smaller than on other days in Koto City Library. On the other hand, in Tahara City, there were no significant differences. The Automatic Linear Modeling results also supported this tendency. Although precipitation amount was significant and the second most important predictor for the number of daily circulations in Koto City Library, it was an insignificant predictor in Tahara City Central Library. Rain is an obstacle to library use in urban areas, but not in rural areas.

The impact of days of the week and holidays

Our hypothesis 2 (H2: On Saturday, Sunday, or holidays the number of circulations is higher than workdays) and hypothesis 3 (H3: Even on workdays, the day of the week affects the number of circulations) was strongly supported. The results of the comparative analysis of holidays and workdays revealed that the number of circulations on holidays was significantly higher than on workdays. The analysis of workdays also revealed that there was a significant difference in the number of circulations even on workdays and the number was highest on Tuesdays. Unlike the weather analysis, the effects of the day of the week and holidays were observed in both urban and rural areas.

The Automatic Linear Modeling results also supported our hypothesis. The day of the week was the most important predictor of the number of daily circulations in both libraries. The contribution of days of the week to the prediction of circulations was unparalleled.
Conclusion and future research

We found that both days of the week and precipitation amounts impacted on the number of daily circulations in the rural library. On the other hand, only days of the week had an impact on the number of daily circulations in an urban area. In particular, the days of the week had a large impact on the number of circulations overall. It was suggested that this impact of days of the week must be noted when using the number of circulations as an output indicator.

While there were some useful findings, this research also had some limitations. In order to generalize our findings, we need data from many more libraries. Other environmental factors should also be considered. Seasons and temperatures may have an impact on library use. In Koto City Library, a model has been developed that can predict the number of daily circulations with an accuracy of 81% based on the days of the week, holidays, and weather data. Furthermore, including additional environmental factors may make it possible to build a more accurate model that could anticipate the number of daily circulations.

Acknowledgements

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References

Gamification in Library as an Effort to
Preserve Traditional Games

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Abstract. The library has a function to recreation. Visitors who come not only
to borrow or find information but also can to get relaxed in the library. One of
them is by creating a game center in the library. The majority of game center in
the library only provides modern games. Such a concept cannot be applied in In-
donesia. The game center can realize by combining modern games with tradi-
tional games. Its function to introducing traditional games and also to preserve
traditional games. The purpose of this paper is to provide ideas about gamifica-
tion in the library. The technique used documents to study. The library is one
of the institutions that is allow by law to preserve culture. Traditional games are
a form of cultural heritage. The Minister of Education and Culture in Indonesia
has made guidelines regarding the preservation of tradition. The guideline was
to provide a local government to carry out the preservation of traditions by their
authority. In conclusion, this game center can be used to preserve the dissemi-
nation of traditional games.

Keywords: Gamification in a library, traditional games, cultural preservation.

Introduction

Indonesia’s libraries have recreational functions as listed in Law number 43 of 2007.
The function of recreation is not the main function of a library. But, this function has
an important role, particularly in public libraries. One example of the recreational func-
tion is to create game center in the library. The game center is a place to everyone
can playing with various kinds of games. Playing is a fun activity to release satura-
tion.

A game center in public libraries is good to balance modern and traditional games.
The existence of traditional games in a game center is one form of an effort to pre-
serve because traditional games nowadays have rarely been played. Preserving tradi-
tional games is one form of national cultural preservation. Lately, traditional games
have be overshadowed by toys and games from abroad. This invasion caused the ex-
istence of traditional games to disappear. The library should save the existence of tradi-
tional games. It is also stated in Law No. 43 of 2007 which states that libraries are a
vehicle for the preservation of the nation’s wealth.

There are libraries in Indonesia that have not included the game in one of the ser-
services or facilities in it. The library is still focused on formal services that are book-
oriented or journal. Therefore, combining formal and fun elements can renewal and
redefinition library as the center of community. Moreover, children who are using
their devices. Most often harm children's growth and development.

This study aims to overview the formulation games center in the library. This paper
is expected that in the future, the library collection center and game preserver
have been redefine the library itself.

**Literature Review**

**Traditional Games**

Ahimsa-Putra in Dharmamulya [3] divides children's games into 4 perspectives,
namely: (1) Functional Perspective: playing as preparation for becoming an adult; (2)
Game perspective: playing as a game; (3) Psychological perspective: playing to ease
anxiety and anger; (4) Adaptation perspective: playing to support adaptation. These
perspectives are used to understand and explain the phenomenon of children's games.
The types of traditional games are categorized into 3 parts including [3]:

1. Playing and singing: Children's games with singing playing patterns are meant
when playing begins or interspersed with singing. The nature of the game is generally
recreational, interactive, social relations, guesswork and so forth. Games like this
train children to socialize, be responsive, communicate and refine the mind.

2. Playing and thinking: This type of game requires a lot of concentration of think-
ing, calmness, ingenuity, and strategy. In general, the nature of the game is individu-
ally competitive. This game is much loved by boys.

3. Playing and fighting dexterity: This type of game relies on endurance and physi-
cal strength and requires a simple tool. Like other types of games, the nature of this
game is competitive and much favored by boys.

**Cultural Preservation**

The term culture implies copyright, taste, and intention [11]. In the context of cultural
preservation, the meaning of cultural heritage cannot be limited only to printed works
and recorded works produced. Other forms of national culture also need to be pre-
served.

Efforts to preserve culture are fully supported by the government. The government
through Ministry of Education and Culture has set a guideline for cultural preserva-
tion. The guideline explains traditional preservation to protect, develop and utilize a
custom from a culture-supporting community group whose distribution and inher-
itage are passed down through generations. Besides, Law No. 43 of 2007 concerning
the library also states that the library functions as a vehicle for education, research,
preservation, information, and recreation to improve the intelligence and empower-
ment of the nation. Then the regional government as the organizer of the regional
library is required to develop a public library based on the specificity of the region as a
research center and reference to the cultural richness of the region in the region.

**Research Method**

This paper using literature studies. Data collection techniques use document study.
Document study is one method of collecting qualitative data by looking at or analyz-
ing documents made by the subject themselves or other people about the subject [4].
Observations made by collecting and analyzing documents that have relevance to gamification and cultural preservation.

Discussion

Application of gamification in the library
Buchanan and Elzen [2] stated that gaming has a place in the library. Many libraries around the world have provided gaming facilities. They provide Xbox, PS4 to VR gaming. Foreign librarians are already thinking that one way to counteract users can be by using gaming [2]. Libraries can also provide game direction which is good for users to play.

Such a concept has not be adopted in Indonesia. Almost libraries in Indonesia are still focused on books and manuscript collections. The concept of a library that has gaming facilities is not easy to bring to Indonesia. The Indonesians older generation who consider gaming to be negative. Although some studies show gaming has a positive impact. But, many think gaming will only interfere with children’s learning.

Playing games with duration ≤ 3 hours per day or duration ≤ 21 hours per week has a positive impact on children’s logical intelligence [8]. The development of logic is needed by the human brain. examples are grouping colors, recognizing numbers, recognizing geometric shapes, recognizing the size, recognizing the concept of space, recognizing the concept of time, recognizing various patterns, and others. Not only logic intelligence, but playing games also influence emotional intelligence. The research conducted by Andriyanto at SDN Experiment 2 Yogyakarta revealed that there was a difference in emotional intelligence between classes using multimedia games and classes using field games. Multimedia games can increase students’ curiosity and self-motivation to be active in learning [1]. Therefore, games can be used as a reference to improve emotional intelligence.

Gamification that is applicable in Indonesia is a combination of modern games with traditional games. The library provides a special place in which there are virtual games such as VR, Xbox and PS and traditional games so that facilities such as this can be accepted by the older generation.

Like gaming, several studies also show traditional games have a positive impact on children's development. According to Nirmala [6] traditional games can stimulate motoric, cognitive, social-emotional, language, moral-religious and artistic development. Nur [7] stated that traditional games are indeed different from video games, whether they are impressions, meanings and their effects on children. Re-storing traditional games as children's games can be an alternative to creating a generation that has character.

Library as a place to preserve national culture
Traditional games are a form of cultural heritage. During this time, we assume that inheritance is something that has a mere physical form, such as manuscripts, inscriptions or temples. Preservation in Indonesians is treating a physical form such as preserving library materials.

Hartono [5] explains that word preservation according to libraries, archives and museums is a preservation translation and meaningful conservation of activities to cut physical or chemical damage and prevent loss of information content.

The Ministry of Education and Culture has made guidelines on preserving tradition. The guideline to provide a local governments to carry out the preservation of tradi-
tions by their authority. Based on these guidelines traditional games are included in one of the objects of tradition preservation. The following are objects of traditional preservation: traditional ceremonies, folklore, folk games, traditional expressions, traditional medicine, traditional food and drinks, traditional architecture, traditional fabrics, living equipment, traditional weapons, and traditional social organizations. The guideline is also in line with Law number 43 of 2007 which states that libraries are a vehicle for the preservation of national wealth. In this case, the regional library demanded has a large role in cultural preservation by their respective regions.

Conclusion

Currently, libraries in Indonesia are still not familiar with gamification. Playing both modern games and traditional games have positive impacts on children development. But, it is still uncertain that this will emerge in the future. This game center can be used as a library to preserve the traditional games.

References

Library Development through Excellent Service, Cooperation and Branding Strategy in Sebelas Maret University Library

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Abstract. The purpose of this research is to find out whether Sebelas Maret University Library, Surakarta Central Java - Indonesia has applied excellent service and superior users, and to know how the strategy of library development based on strong cooperation and branding. The method used in this research is qualitative descriptive analysis, which aims to understand and facilitate the reader regarding the research material discussed. Analysis of the research data is based on primary and secondary data. Data from this research are derived from field observation, interview and literature studies. The results show that Sebelas Maret University Library Surakarta Central Java Indonesia has been implementing services to the service-based for excellent service and superior users. In addition, it also implements a strong strategy of cooperation and branding, assistance to librarians and library programs in a sustainable manner, as well as symbiosis mutualism, especially in the field of utilization and collection of library materials owned to support “Tri Dharma Perguruan Tinggi” which includes education, research, and community service. It is also necessary to improve several aspects such as human resources, facilities and infrastructure, funding, regulatory issues and bureaucratic procedures, and development policies related to library cooperation and branding. That the importance of building a network of even more closely related to institutional accreditation, campus development, library collection sharing, public relations strategy, and optimizing the mastery of information and communication technology. Cooperation is built also expected to occur a positive collaboration of the institutional and the access to information literacy as wide as possible, especially for various parties, so as to create a generation of smart, superior and competitive. In addition, with a new innovation associated with several business pilot programs developed, so as to provide strengthening entrepreneurship based library (entrepreneurship library) and provide income generating for the library. The existence of a business internship program and an academic internship is something new, so that the future can be adopted by other libraries. Going forward, Sebelas Maret University Library will continue to increase its potential and develop resources in an effort to establish cooperation with various parties so that it can continue to grow, benefit, and competitiveness.

Keywords: Library Development, Excellent Service, Cooperation, Branding
Introduction

Background

The existence of libraries such as public libraries, college libraries and school libraries, is a means to support the process of the formation of an intelligent society. The library has a strategic position in society because library is in charge of collecting, managing, and providing of recording knowledge to read and learn.

The notion of library societies require as service users, information society needs libraries to enrich and broaden thinking, as well as media information that can speed up and simplify the search and information retrieval, as well as update and streamline tasks library. That means, the library, the public and media information is the chain of the inseparable and are always inter-twined in an effort to build public opinion. Libraries need to build quality library services through the provision of information, organizing information, services and promote library materials owned by libraries.

The role of the library that is not less important is to build public opinion with the reverse engineer the technology and media information in the form of electronic and manual packaged in the form of the mascot, logo and tagline are presented more attractive [5].

Librarian profession is the challenges and opportunities in the information technology era. A librarian in the era of information technology is no longer just as a servant of the user to get the loaning or serve book and accept returns of books from the user. A librarian must have a soul to serve with excellence for the user and has the advantage that can be distributed to the user. Librarian rather than simply preparing, presenting, get, and received a reference book of user but a librarian should be able to present information and literacy experiences about science to the user with service excellence and superior.

Research Purposes

The purpose of this research is to know if the Library of Sebelas Maret University Surakarta, Central Java-Indonesia has implemented a service excellence and superior, and to find out how the library's development strategy based on cooperation and strong branding.

Materials and Methods

The method used in this research is qualitative descriptive analysis [12], which aims to understand and facilitate the reader regarding the research material discussed. Analysis of the research data is based on primary and secondary data. Data from this research are derived from field observation, interview and literature studies such as various journals, proceedings, and scientific articles related to librarians, library development, library service, cooperation and branding strategy, information technology, and university libraries.

Results and Discussion

Library Collections of Sebelas Maret University

The integration of the vision, mission, and goals with institutional performance librarians become advocates to bring about institutional vision, particularly the vision of the
institution short, medium, and long. A librarian should have the ability to pour ideas orally and in writing in a variety of academic context. This is in an effort to support the realization of the library as the center for learning resources and information that support the “Tri Dharma Perguruan Tinggi”. Librarians to provide commitment to service excellence and has various advantages in skilled knowledge with the literacy to read and write in a variety of fields, namely as a counselor for the user is a manifestation of the development and empowerment resources librarians as a profession that is challenging and highly contested in the future [9].

Sebelas Maret University Library, constitutes learning, research and resources center that functions very strategic in the academic activities of Sebelas Maret University Library, namely to support, facilitate and raise the quality of the implementation of the program of activities of the college through the information service covering aspects of information collection, information processing, utilization and dissemination of information, or the dissemination of information. The information in this case include intellectual and artistic products of man where the library as an institution that is engaged in the field of science and information are always growing hand in the development of thought and culture of the people. In Sebelas Maret University Library collections presented, and the services provided to the user, as described in the following:

**Printed Collection.** That collection is presented in the form of prints. Printed collection consists of public collections (circulation), collection of references to knowledge (reference), closed reserve collection (CR), collection of Java, foreign grant books, old book collection, collection of local content, and serial collection.

**Electronic Collection.** Electronic collection is a collection of electronic resources (e-resources). Electronic collection consists of electronic journals, electronic database, and electronic books.

**Types of Library Services of Sebelas Maret University**

Types of library services of Sebelas Maret University consists of: circulation services, reference service of knowledge, serial collection service, local content services, services holiday loan, SAT service (Self Access Terminal), photocopy service, SAKTI card service, extraordinary membership services, document delivery service, internship program service (professional, academic, and business), library museum, and museum of Sebelas Maret University. There are also some excellent services like:

**Reading Corner.** Is a great place in the neighborhood Library of Sebelas Maret University in cooperation with related agencies and institutions are enabled to discuss, read, write, and browse information that supports a culture of literacy and “Tri Dharma Perguruan Tinggi”, such as Bank Indonesia Corner, BNI Corner, Taiwan Corner, BKKBN Corner, Corner of SNI, Cultural Window Corner, Diffable Corner, Bank BNI Corner, Café Pustaka, Warung Pustaka, and Angkringan Pustaka Corner.

**Scientific Library Tour.** Form of information search services and scientific knowledge through the tourist activities based library, documentation, and information for educational purposes and research.

**Scriptorium Service.** The services that are enabled to do the writing/copying manuscripts/script in library, especially ancient manuscripts such as Java ancient manuscripts.

**Clinical Scientific Library Services.** The service that is given to not only the Sebelas Maret University staffs and students, both individually and in a group performing a
search of e-resources in web-based environment of Sebelas Maret University. The clinic also serves the scientific library consultation about the journals indexed in *Scopus*, *Turnitin* software utilization, and others about the utilization of learning resources. This service program launched in the framework of the acceleration and the empowerment of all subscriptions to journals and electronic books Library of Sebelas Maret University for all not only academic.

**Book Fair Promotion Event.** Information needs user is growing very fast, according to the development of science and technology in society, in order to meet the needs of the huge funds needed, one solution must be provided by the library, in the interest of not only academic in Sebelas Maret University especially. With the exhibition and book, the user can be expected to meet the needs of the information, or at least will propose the books they need to be provided to libraries, so that teaching and learning process can run smoothly. Budget constraints, a large number of books recently published and the emergence of a new science, is a challenge for the libraries. There are many ways that can be done to meet the needs of user information, for example by way of procurement or purchase of books by libraries, namely by means of propagating the catalog publishers to users as a tool in the library the procurement of the collection. The second, held an exhibition and a book exchange where user will select and buy books that they need. Where these activities are rated more effective and user more freely to choose and have the books they need, or at least proposed book titles to the library.

**The Users Satisfaction of Library Services**

The users satisfaction of library services of Sebelas Maret University Library in variably committed to develop the kinds of services that exist in the future, with the development of innovation and creativity. Expected through superior service and excellent support it can smooth the process of teaching and learning in universities, especially in Sebelas Maret University, introduces new students to the library, meet the needs of the information user to facilitate the process of teaching and learning, a good relationship between academic community and related stakeholders.

According to Rohmadi [9] that customer satisfaction/user depends also from the performance of a good librarian and always provide excellent service and superior. He said, "Start your work by using the runway "hard heart". Because of all the work will be easier to be carried out, although the work is very heavy. Similarly, if we begin a work from the heart, each individual will know the auth and its function, so there is no forced to in the run it".

Further thinks that there are 7 (seven) and strengthening of the example becomes human resources Sebelas Maret University Library and professional excellence: (1) responsibilities, (2) prepared to face the challenge and innovate, (3) want to learn and adapt, (4) dedicated and committed to serve with heart, (5) self-discipline and creativity, (6) build super team, instead of “superman”, (7) changing the mindset and want to change.

<p>| Table 1. Library User Satisfaction of Sebelas Maret University Library |
|-----------------------------|-----------------|                |</p>
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<th>Aspect</th>
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<tr>
<td>Staff Ethics and Attitude</td>
<td>3.57</td>
<td>Very good</td>
</tr>
<tr>
<td>Staff Competency and Information Technology Skills</td>
<td>3.43</td>
<td>Good</td>
</tr>
<tr>
<td>Clothing and Excellent of Staff Attributes</td>
<td>3.63</td>
<td>Very good</td>
</tr>
<tr>
<td>The Speed of Staff Service</td>
<td>3.52</td>
<td>Very good</td>
</tr>
</tbody>
</table>
Comfortable of Room and Collections 3.70 Very good
Clarity Excellent of Service Procedure 3.67 Very good

Average 3.58 Very good

Source: Library of Sebelas Maret University [2018].

Based on the research results of satisfaction of service of the respondent (visitors) over that in the Library of Sebelas Maret University Surakarta, to aspects of ethics and attitude of staff 3.57 (very good), aspects of staff competency and IT skills 3.43 (good), aspects of the clothing and staff attribute of 3.63 (very good), the speed of service staff of 3.52 (very good), the comfortable of room and collections of 3.70 and clarity of service procedures 3.67 (very good). So it was worth average 3.58 (very good). Competency and information technology skills has an important role for librarians, so this aspect needs to be improved. As information technology puts increasing percentages of relevant information resources on the scholar’s desk rather than on library shelves, the user’s expectations for other library services too will change [10]. Several researchers have come out with different models of service quality; Gronroos [4], Rust and Oliver [11], Dabholkar et al. [1], WebQUAL [7]. These models basically provide the constructs and form the conceptual framework of measurement tools used to assess service quality ranging from traditional face-to-face service to digital or web-based services [6].

Library Cooperation and Branding Strategy

That the importance of building a network that is more closely related to the accreditation of institutions, campus development, division of library collections, public relations strategies, and optimization the mastery of information technology and communications. Cooperation is also expected to be built going positive collaboration of literacy and access to institutional information widely, school libraries, district or city government libraries, provincial government libraries, public and private university libraries, national libraries, mass media, companies, and communities, particularly to various parties, so it created a generation of smart, superior and competitive.

In the era of technology disruption and industrial era 4.0 right now, Sebelas Maret University Library seeks to utilize existing information media, either through the website: library.uns.ac.id also social media like Instagram, Twitter and Facebook, as well as other information media such as WhatsApp and Telegram. The role of media information including mass media is a means of communication in the broadcast of information, ideas and attitudes to various communicator in great numbers. This shows the mass media is an important institution for the community. Media information in libraries is social media to interact with social communities that are expected between the community and the library has a value added (added value) [Ristiyono, 2018, Fatmawati, 2017, Fatmawati, 2018]. Community as service users get the added value of quality information as a form of entitlement to the information from the library, but rather a library has the service can utilized efforts with optimum while simultaneously building quality of library services. So the library is able to position as an institution that can provide information and organizing the information and applied to society at large.
Conclusion

Sebelas Maret University Library of Surakarta in Central Java – Indonesia has implemented a service-based service for service excellence and a superior user. Librarians must love and pride to his profession. As a capital base for realizing service excellence and serves a variety of advantages that are owned as a profession as well as the excellence of the library. Creativity is an excellent librarian and superior can be published over the web, paper, print, electronic media, books, monographs, and modules, various models of learning resources that can be enjoyed by all the user across Indonesia as a medium learning, recreational, and scientific creations.

In addition, he has also implemented a strategy of cooperation and a strong branding, help for librarians and library program on an ongoing basis, as well as a symbiosis of mutualism, especially in the areas of collection and utilization of the library materials belonging to support the “Tri Dharma Perguruan Tinggi” which include education, research, and public service. It is also necessary to improve some aspects such as human resources, facilities and infrastructure, funding, regulatory issues and procedures, bureaucracy and policy development related to cooperation and branding the library.

Also the importance of building a network that is more closely related to the accreditation of institutions, campus development, division of library collections, public relations strategies, and optimization the mastery of information technology and communications. Cooperation is also expected to be built going positive collaboration of literacy and access to institutional information widely, particularly to various parties, so it created a generation of smart, superior and competitive. In addition, with new innovations associated with some pilot program business developed, so as to provide the strengthening of entrepreneurship-based libraries (library entrepreneurship) and provide income for the library. The existence of the business internship program and academic internships are something new, so that in the future may be adopted by other libraries. In the future, the library of Sebelas Maret University will continue to increase its potential and developing resources in partnership with various parties so that it can continue to grow, useful, and powerful competitiveness.

References

Recognition of Thai Noi Characters in Palm Leaf Manuscripts using Convolutional Neural Network

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Abstract. This research intends to apply convolutional neural network models for recognizing characters written or inscribed on palm leaf manuscripts. The data were based on the manuscripts found in Loei province, Thailand by focusing on Thai Noi language inscription. Thai Noi language is an old language, which is no longer used for writing. The research started by collecting images of Thai Noi palm leaf manuscripts. After the preprocessing process, each handwriting character was segmented. There were 2,600 character images of 26 consonants in the dataset. Two convolutional neural network models: Inception-v3 and Inception-v4 were applied for training and testing based on a 10-fold cross validation design. The results from the experiment indicate that Inception-v3 and Inception-v4 yielded similar performance with the accuracy rates of 76.50% and 73.11% respectively. In future work, the research needs to improve the accuracy results by focusing on improving each step of the experiment and planning to train with more data from different sources. The training of vowels will be also carried out to cover all Thai Noi writing characters.

Keywords: Palm Leaf Manuscript, Thai Noi Character, Character Recognition, Pattern Recognition, Deep Learning, Convolutional Neural Network.

Introduction

Palm leaf manuscripts are commonly old documents created by writing or inscribing contents on dry palm leaves. The manuscripts have been found documenting important stories and knowledge of their time. In Thailand, valuable subjects have been discovered in the manuscripts, for example, pharmacopeia, astrology, law, Buddhism, folklore, and folk tale. These pieces of knowledge are not usually available for studying due to 2 reasons. Firstly, the manuscripts are written with old languages, which have no longer used for writing. Therefore, it becomes difficult to read or find someone who can read and convert them into the current languages. Secondly, since the manuscripts are normally old with at least 50 years old and the materials are palm leaves, which are fragile, they are stored and shown without touching allowance. Therefore, it is difficult to access and extract the contents of those manuscripts. Fig. 1 shows a palm leaf manuscript, which contains some pieces of palm leaves.
From Fig. 1, each piece of palm leaves is written with a Thai Noi language and punctured with two holes. To make the manuscript, palm leaves are bound together by passing a string through the holes. Due to the importance of the knowledge recorded in the manuscripts, there exist many studies investigated proper methods for automating the recognition of languages written in the manuscripts. For example, there is an attempt to implement character recognition methods for extracting text from Lanna Dharma palm leaf manuscripts in Thailand [14]. This research implemented different wavelet transform methods to extract features of characters and tested character classification by using a k-Nearest Neighbor algorithm. They found that the 2D, 1D wavelet transform and region property feature extraction achieved higher performance than other methods of the wavelet transform. Meanwhile, there are also some studies contributed to character recognition of other languages. For example, the study of the manuscripts in India [11] used a 3D depth-sensing approach for feature selection and applied a k-Nearest Neighbor algorithm for character classification. The experiment shows that the proposed methods could obtain high classification accuracy. Although many studies have been carried out, there are still various challenges of handwriting and language characteristics that require improved recognition methods.

This research intends to carry out an experiment of Thai Noi character recognition by using convolutional neural network (CNN) models. The sources of data were from palm leaf manuscripts collected in the Museum of Art and Culture of Loei. Two CNN models: Inception-v3 and Inception-v4; have been tested in the experiment with a 10-fold cross validation design. The accuracy of each model implementation was then carried out and reported.

**Related Work**

**Recognition of Hand Written Characters on Palm Leaf Manuscripts and old books**

There exist collections of ancient palm leaf manuscripts in many countries in Asia such as Thailand [8, 12, 13], India [9, 11], Cambodia [10], which documented local wisdom and knowledge. Much research has tried to extract the content written on the manuscripts. The common process applies image processing to identify text lines and recognize characters before turning them to text. The research by [8] attempted to
develop a system that could automate character and text line segmentation of Thai Noi and Tham languages written on palm leaf manuscripts. In their experiment, the partial projection method was applied for line segmentation, while a combination of the contour tracing algorithm and the trace of the background skeleton algorithm were used for character separation. Their results show that the performance of line segmentation was still not high, but the performance of character segmentation achieved satisfying results.

Another research also reports line and character segmentation of palm leaf manuscripts found in the North-Eastern part of Thailand [2]. They applied a projection profile method for line segmentation and a threshold value on the length of the space between characters. Their experiment achieved 82.5% accuracy on average on line segmentation. Lanna Dharma language has also received high attention. Chueaphun, et al.[1], tried to solve the problem of classification confusion due to the similarities of some characters. They implemented a k-Nearest Neighbor method to first classify the classes of characters. Then these classes were reclassified by the conditional random fields. With these two methods, they achieve higher accuracy of character classification than prior methods. The research of Lanna Dharma recognition carried out by Inkeaw, et al. [13] also applied a k-Nearest Neighbor method combined with the proposed method called LDIMS to classify the characters. The results suggest that this approach achieved high accuracy and is recommended for using with other languages.

Inception-v3 and Inception-v4

One of the well-known Convolutional Neural Network (CNN) architectures is Inception. It was created by Szegedy et al. in 2014 [4], which was first called GoogLeNet or Inception-v1. The Inception-v1 was designed to overcome the problems of location variation of information in the images and the very deep networks, which could cause an overfitting problem. To solve these problems, a 1 x 1 convolution is added before every 3 x 3 and 5 x 5 convolutions as shown in Fig. 2.

![Inception modules in Inception-v1](image)

Inception-v1 contains 9 inception modules as shown in Fig. 2, which make 22 layers deep and pooling layers. Inception-v3, an improved version of the Inception, was
carried out by Szegedy et al. [5]. In this version, the factorization methods were implemented to reduce the computation by factorizing of n x n filter size to a combination of 1 x n and n x 1 convolutions as shown in Fig. 3.

![Factorization of n x n convolutions in Inception-v3](image-url)

**Fig. 3.** Example of the factorization of the n x n convolutions in Inception-v3 [5].

The recent version of Inception was introduced in 2016 [6]. This version modified the prior versions to have a more uniform simplified architecture and add more inception modules. From the experiment, Inception-v4 achieved higher performance than Inception-v3. In prior literature, Inception-v1-v4 have been widely employed in various fields, for example, Inception-v3 and Inception-v4 have been applied for recognition of weaving patterns of traditional hand woven fabrics [3,7].

**Research Methodology**

**Research Design**

This research has been carried out in 3 main steps: (1) palm leaf manuscript image collection and preprocessing, (2) segmentation of Thai Noi character, (3) training based on two convolutional neural network models and testing of trained models.

**Palm leaf manuscript image collection and preprocessing.**

Palm leaf manuscripts were collected from in the Museum of Art and Culture of Loei, in Loei province, Thailand. The images of palm leaves were scanned and numbered. The selection of palm leaves was on the varied handwriting basis in order to collect handwriting as different as possible. Due to the length of the leaf, each leaf had to be scanned two times to cover the whole leaf. In total, 474 images of palm leaves were collected and converted to grayscale as shown in Fig. 4.
Fig. 4. Example of grayscale image conversion.

Segmentation of Thai Noi characters.
Handwritten Thai Noi characters on grayscale images of palm leaves were segmented. In this process, the segmentation was based on the consonants of Thai Noi language, which contained 26 characters. Fig. 5. illustrates all 26 Thai Noi consonants comparing with consonants of Thai language. The total of 100 handwriting images of each consonant was segmented from the manuscripts. Therefore, there were 2,600 images of 26 handwriting consonants in the dataset.

Training and testing of trained models based on two convolutional neural network models.
In the experiment, the training and testing of character recognition were carried out based on a 10-fold cross validation design. To accomplish this, the consonant images were organized into 10 folds where each folder contained 260 images. The training and testing were conducted with Inception-v3 and Inception-v4 models. From this process, the accuracy was then calculated and compared.

Fig. 5. Thai Noi consonants comparing with consonants of Thai language.
Results

The research has conducted an experiment of Thai Noi character recognition. The images of palm leaf manuscripts were collected from the Museum of Art and Culture of Loei, in Loei province, Thailand by using scanners. In this data collection, 474 images of palm leaves were collected and converted to grayscale. Images of handwriting were segmented. There were 2,600 images of 26 handwriting consonants in the dataset. The experiment of character recognition was conducted with Inception-v3 and Inception-v4 models. The experiment was designed based on a 10-fold cross-validation approach. In each folder, the training was carried out with 2,340 images and then the trained model was tested with 260 images. Table 1 shows the accuracy results of Inception-v3.

<table>
<thead>
<tr>
<th>Folder</th>
<th>Trained Images</th>
<th>Tested Images</th>
<th>Correct</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fold0</td>
<td>2,340</td>
<td>260</td>
<td>206</td>
<td>79.23%</td>
</tr>
<tr>
<td>Fold1</td>
<td>2,340</td>
<td>260</td>
<td>213</td>
<td>81.92%</td>
</tr>
<tr>
<td>Fold2</td>
<td>2,340</td>
<td>260</td>
<td>214</td>
<td>82.30%</td>
</tr>
<tr>
<td>Fold3</td>
<td>2,340</td>
<td>260</td>
<td>199</td>
<td>76.53%</td>
</tr>
<tr>
<td>Fold4</td>
<td>2,340</td>
<td>260</td>
<td>183</td>
<td>70.38%</td>
</tr>
<tr>
<td>Fold5</td>
<td>2,340</td>
<td>260</td>
<td>186</td>
<td>71.53%</td>
</tr>
<tr>
<td>Fold6</td>
<td>2,340</td>
<td>260</td>
<td>194</td>
<td>74.61%</td>
</tr>
<tr>
<td>Fold7</td>
<td>2,340</td>
<td>260</td>
<td>195</td>
<td>75.00%</td>
</tr>
<tr>
<td>Fold8</td>
<td>2,340</td>
<td>260</td>
<td>192</td>
<td>73.84%</td>
</tr>
<tr>
<td>Fold9</td>
<td>2,340</td>
<td>260</td>
<td>207</td>
<td>79.61%</td>
</tr>
<tr>
<td>Total</td>
<td>2,600</td>
<td>1,989</td>
<td></td>
<td>76.50%</td>
</tr>
</tbody>
</table>

In Table 1, the accuracy of Thai Noi character recognition based on an Inception-v3 experiment is illustrated. In total, the accuracy rate of all 10 folder testing is 76.50%. Table 2 reports the results of an Inception-v4 experiment. The accuracy rate of Inception-v4 is 73.11%, while is not much different from Inception-v3.

<table>
<thead>
<tr>
<th>Folder</th>
<th>Trained Images</th>
<th>Tested Images</th>
<th>Correct</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fold0</td>
<td>2,340</td>
<td>260</td>
<td>215</td>
<td>82.69%</td>
</tr>
<tr>
<td>Fold1</td>
<td>2,340</td>
<td>260</td>
<td>204</td>
<td>78.46%</td>
</tr>
<tr>
<td>Fold2</td>
<td>2,340</td>
<td>260</td>
<td>197</td>
<td>75.76%</td>
</tr>
<tr>
<td>Fold3</td>
<td>2,340</td>
<td>260</td>
<td>191</td>
<td>73.46%</td>
</tr>
<tr>
<td>Fold4</td>
<td>2,340</td>
<td>260</td>
<td>169</td>
<td>65.00%</td>
</tr>
<tr>
<td>Fold5</td>
<td>2,340</td>
<td>260</td>
<td>167</td>
<td>64.23%</td>
</tr>
<tr>
<td>Fold6</td>
<td>2,340</td>
<td>260</td>
<td>195</td>
<td>75.00%</td>
</tr>
<tr>
<td>Fold7</td>
<td>2,340</td>
<td>260</td>
<td>185</td>
<td>71.15%</td>
</tr>
<tr>
<td>Fold8</td>
<td>2,340</td>
<td>260</td>
<td>184</td>
<td>70.76%</td>
</tr>
<tr>
<td>Fold9</td>
<td>2,340</td>
<td>260</td>
<td>194</td>
<td>74.61%</td>
</tr>
<tr>
<td>Total</td>
<td>2,600</td>
<td>1,901</td>
<td></td>
<td>73.11%</td>
</tr>
</tbody>
</table>
Conclusion

Ancient palm leaf manuscripts in Thailand contain invaluable knowledge in various fields covering contents about medicine, medical treatment method, culture, Buddhism, law, folklore, folk tales, and etc. Most manuscript collections have been presented or kept in the museums as they are. Some manuscripts have been digitized to keep the contents before losing them due to their prone to weathering conditions. However, the contents are not usually extracted and translated to other current languages to make them available for study. This research intends to automate the recognition of Thai Noi characters written in palm leaf manuscripts by using convolutional neural network models. The research started by collecting images of palm leaf manuscripts by scanning or photo taking depending on the size of the manuscripts. The collected images were preprocessed by converting to grayscale images. After that each handwriting image of all 26 consonants was segmented. There were 100 images for each handwriting character and 2,600 images of characters in total in the dataset. The experiment was carried out with two convolutional neural network models: Inception-v3 and Inception-v4 using a 10-fold cross validation design. The preliminary results of the experiment indicate that the Inception-v3 and Inception-v4 yielded similar performance with lower than 80% accuracy rates. Inception-v3 and Inception-v4 achieved accuracy rates of 76.50% and 73.11% respectively. Comparing to prior studies in recognition of Lanna Dhamma characters carried out by using k-NN and CRF [1] and LDIMS [13], the accuracy of both studies is higher than 80%. This suggests that there is still a need for accuracy improvement in this research by considering surrounded factors such as the image quality, the experiment, and the selection of CNN models.

In future work, some further experimentation is planned to carry out. Firstly, since the research involves the recognition of handwriting characters, the experiment has to be conducted with more data training to cover local writing styles as many as possible. This can be done by collecting more palm leaf manuscripts from various sources in the province. Secondly, the research needs to carry out more training on Thai Noi vowels. Some vowels are able to be written on one line; however, some vowels use two or more lines when writing. Thirdly, the research will conduct an experiment with other convolutional neural network models in order to find the models that have high performance for recognizing Thai Noi characters. The models will be further implemented in the application. Finally, the research will carry out a further study on natural language procession where Thai Noi word segmentation techniques are required to make it possible to automate Thai Noi palm leaf manuscript translation.

References


Building a GLAM Class with a Participatory Approach

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Abstract. This article is a reflection on teaching a newly opened GLAM (Galleries, Libraries, Archives and Museums) course for undergraduate students as a general education course. Influenced by participatory approaches in current GLAM institutions, the course content and study experience were gradually shaped by students’ engaging with, interpreting, and participation in course activities, to the level of co-creating content for the course. Other conditions encouraged by the university also supported activities and project-based learning (e.g. pass/fail assessment method, expectations for learners, active learning and technology support). This all resulted in students being able to bring their expertise into the class, yielding fruitful integration of views. Students relied on their familiarity with online tools, which enabled them to seek information and create innovative work. However, this approach of participatory, student-led course design did prove to have some pitfalls, such as amateur errors, lack of basic research skills in selecting information, and weak references. It is thus the role of the educational institution to further strengthen students’ skills while guiding them to achieve more specialized expertise—mirroring the function of GLAM institutions that facilitate user development and give the public trusted information.

Keywords: GLAM, Participatory, GLAM education

Introduction

Participatory approaches are currently ubiquitous in GLAM (Galleries, Libraries, Archives and Museums) institutions. Technological advancements have enabled users to be more active in a wide range of activities, such as access, description (commenting, tagging), even to the level of creation of content presented in cultural heritage websites [1,2,3]. Engaging with digital heritage is not just a new way of communicating heritage but adds layers of meaning and interpretation through user participation [4]. While user roles are expanding, the roles of practitioners have changed as well. Post-custodial librarians, archivists, and curators now devote much more effort to tasks other than being guardians of their materials—in other words, they have become facilitators of today’s users and collaborators. This change is ongoing and has significantly altered the mindset and approach in information practices. It also shifts the relationship between practitioners and users. Nevertheless, in the area of educa-
toration, how effective is a participatory approach, or what role should it play? This might require turning attention to the objectives of the course in each context.

In 2018, Chulalongkorn University offered a GLAM course for the first time as a general education course called Creative Learning Spaces. This course was offered to undergraduate students from all faculties other than the Faculty of Arts. The course was organized by the Department of Library Science, where librarianship and archival studies courses already offered give the viewpoint of practitioners, with the aim of training information studies students to be information professionals. This was the first time instructors in the department applied their expertise to teach GLAM users.

The course aimed to give students the tools to explore institutions and to be able to use them effectively. This gave instructors a lot of room to experimentation but also introduced challenges of communicating to different perspectives. The course was to have S/U\(^1\) assessment results for all students, a condition that was one of the main factors influencing the learning model and how the class would be run.

With the course content and certain conditions of the course and the students, this course, opened for the first time in the second semester of the 2018–2019 academic year, naturally turned to a participatory, student-oriented model.

**Participatory GLAM: from Institutions to Class**

Due to advancement in technology, cultural heritage institutions have altered the ways they manage collections, choosing to adopt a more participatory approach. Participatory culture is defined by Jenkins et al. [5] as having low barriers for expression or engagement, support for sharing, informal mentorship from experts to amateurs, believing in value of contribution and having social connection. The word “participatory” has been defined in relation to GLAM institutions as a user-oriented approach. Participatory models have been identified, in archives, as “decentralised curation, radical user orientation, and broader contextualisation of both records and the archival process” [6]

Considering meanings of participatory approaches in GLAM institutions, the shift affects two sides of GLAM management: (1) working priority and process and (2) roles of people in them.

**Process, Not Content, Based**

This participatory shift is quite a radical change in the ways these institutions make, disseminate, access, and consume cultural heritage. It is notable that GLAM practitioners (librarians, archivists, curators) used to start from their collections, and then the collections brought in visitors and users. After this, emphasis was placed on maintaining easily accessible digitized collections, and now it is much more on engagement and building users’ experiences [7]. Proctor [8] also categorized such approaches as watching, sharing, commenting, producing, and curating. However it is described, it is clear that user participation can cover a wide range of actions. The focus of GLAM institutions is on creating these actions in their spaces.

As for the GLAM class in this case study, the initial steps in designing the course were based on considering the experience and skills the students would need. The fact that the class focuses on ways to learn started from the beginning of course and became increasingly intertwined in the teaching methods for the class. The course syllabus was divided into 12 weeks, broken into 4 parts covering the 4 types of GLAM.

\(^1\) S/U refers to Satisfactory or Unsatisfactory.
institutions. The first two classes in each part were in-class sessions, with the first covering getting to know and use each kind of institution, and the second class getting into more creative applications in using the institutions resources. The last session was dedicated to visits to institutions. Two kinds of institutions, libraries and archives, were led by staff of the Department of Library Science, while the other two (museums and galleries) were led by invited speakers who have expertise in those areas.

Judging from the students’ behavior and output, it would appear that they did not learn the most from lectures, which might have been from the fact that they did not have exams on details of the subject and would have to only achieve a passing score rather than be able to demonstrate a detailed command of the lecture content. Instead, they appeared to learn most from activities in classes and assignments that they had to research in GLAM institutions, physically or digitally. For example, they were assigned to find what they consider to be archives and present their findings in class. They were also asked to create media about library-related love stories. And for museums, they were tasked with designing their own children’s museums after visiting a museum in the university.

The activities and discussion-based classes were fruitful. The students had lots of room to bring knowledge from their major to be their lens for using GLAM institutions. Because they came from different faculties in the university, discussions led to an integration of knowledge that could be hard to achieve in other circumstances. For example, the students wrote their thoughts and questions about the practice in GLAMs after their visits of the institutions. They also made some recommendations related to their fields of study (e.g. building design advice from architect students, financial content presentation regarding the Bank of Thailand learning center from economics students, etc).

The drawbacks of the participatory approach in the course seem to be similar to the ones in the GLAM institutions themselves. The approach opens opportunities for students to use creativity but can vary widely depending on students’ attentiveness and dedication to the class. Although some work showed interesting opinions, other showed lack of research skills and experience, which may be the same mistakes seen in the crowdsourcing experience for GLAM institutions. This might also show the pitfalls of new ways of learning and opens the door to the counterargument that new ways of learning cannot be taken without first attaining the required skills and knowledge. This goes back to the point that people in the participatory world still need some requisite sets of knowledge.

While the EU Commission claims that heritage can be a key component of sustainable growth for citizens [9], GLAM institutions need to be reminded that they have roles to give long-term education to people, and they should be supported in this work in addition to simply offering their valuable materials.

Roles of People in GLAM
The changing roles of participants in participatory culture can range from curatorial to interpretative to inventive [10]. Users have much more important roles than before. The phenomenon replaced traditional staff roles in GLAM by roles of advising and facilitating. Similarly, in the GLAM class, teachers were guides to the subject and to using the materials, while students were explorers and interpreters. Students were also participants by creating their own content in their final projects for the course. They were able to apply their creativity to produce their own work on the topic of their interest, with the guidance of the instructors. There were many points of GLAM insti-
tutional work that were new to the students, and they could find solutions through the guidance of the instructors. These relationships are demonstrated in Fig. 1.

It is important to note that not all aspects of GLAM institutions and the GLAM course resembled one another. Each kind of institution has its own way of operating its collections [11]. Thus, experts from each field are still crucial to truly understand GLAM institutions.

Education at the university discussed how the current generation of students has new ways of learning, preferring engagement and interactive activities in classes. The university offers courses that help their lecturers to understand and adopt alternative ways of teaching, such as blended learning, flipped classroom, and so on to respond young learners’ needs.

**Today’s and future learners**

The university’s expectations of learners’ attributes and outcomes is another indicator that shaped the course. The GLAM course was taught in accordance with a grouping Chulalongkorn University calls 21st Century Courses. These courses aim to encourage citizenship and the capacity for lifelong learning. All courses in this group thus have as a foundational concept the aim of helping students not worry about their grades but be encouraged to pursue long-term learning. This has led to courses that attempt to teach “how to learn” rather than “what to learn.”

Educators at the university discussed how the current generation of students has new ways of learning, preferring engagement and interactive activities in classes. The university offers courses that help their lecturers to understand and adopt alternative ways of teaching, such as blended learning, flipped classroom, and so on to respond young learners’ needs.

**Learners in a networked society.** Learners in the new generation are sometimes called digital natives [12] because they grew up using technology and are comfortable with finding information via digital tools. Jenkins et al. [13] said that the new generation resorts to the online world to find and connect to people with mutual interests, whereas this would be more difficult offline. This tendency to rely on digital tools is applicable in the area of cultural heritage in the GLAM class. GLAM students were eager to incorporate their digital skills into creating their work. For their final projects at the end of the course, most groups used online tools in creating their work, in connection with their topics of interest, doing things such as creating a public Instagram account to promote libraries, making Facebook pages to disseminate tips they learned.
from GLAM institutions, using apps and creating games to campaign against online bullying, and so on. Their digital fluency helped enable them to communicate with those outside the class and share what they learned with the public.

**Gaps of the new learning** Though some work using student-led approach was successful, other student output did display some lack of digital literacy and skills. Some did not know how to select reliable information. Some early assignments used an incorrect referencing system, and a few were caught plagiarizing work from the internet. This shows that self-led learning or knowledge co-creation in a participatory approach can be problematic when learners do not have basic research skills. It corresponds with much of the literature addressing the misconception that digital natives, who have technical skills, automatically have digital literacy [14, 15, 16]. As stated, the students were from various backgrounds of study, so they had different levels of awareness of referencing or selecting content in the humanities. It became the duty of the instructors to give them guidance and feedback to help them improve in these areas. Many showed improvement in their work after receiving teachers’ feedback.

This development demonstrated that the role of educators as guides is still crucial in the new learning environment. It can again be compared with the roles of GLAM institutions today. That is, despite freedom of users to lead and join the conversation, these institutions have the role of guiding and facilitating their activities in the areas less known to users. They also have a significant duty to provide trusted information to society and help make the most out of amateurs’ work. In the GLAM class, lecturers and invited speakers gave insights, but many times students brought knowledge from very different perspectives that the teaching team was able learn from. These relationships—amateur-expert in GLAM institutions and student-teacher in class—are comparable in that both sides can learn from each other, as shown earlier in Fig. 1.

**The unexpected** As stated above, students learned skills they lacked but were also surprised by things they did not expect; some discovered things they would not have been able to find on their own. As explained earlier, the students were required to join four field trips—one for each type of GLAM institution. After the visit, they had to write reflections, which allowed them to ponder their experiences and feelings. The students also had a chance to see “behind the scenes” work of many institutions.

The visit to the National Archives of Thailand raised a number of unexpected issues for many students. Meeting with archivists and conservators was a highlight for them. They were impressed by the staff’s love of their work. A conservator who had worked there for 30 years and was pleased with her career showed students the value of the archives and told them about her work to preserve them, which many students found very touching. Another student said that the information provided by staff on archival use opened his perspective about archives as tools to support citizens’ rights.

**Discussion**

After describing how the educational approach in the GLAM class naturally developed toward a participatory approach, the discussion below now turns back to the paper’s question about how effective this approach is in teaching a GLAM class.

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2 General perceptions about archives in Thai society are that they are cultural and historical.
First of all, it was remarkable that every teacher and invited speaker reflected trends seen in GLAM institutions themselves, leading automatically to a participatory approach. This does not mean that curriculum in GLAM can have weak content or that it is unimportant, but that the curriculum will likely succeed if it can encourage people to discover for themselves effectively. If this occurs, the class should help them to develop their skills for lifelong learning by guiding them to develop and enrich their creativity. GLAM institutions can collaborate with schools to be spaces for youth to connect with others. For instance, museums can give children opportunities to connect to elders and to objects in the museum, finally creating their own their digital heritage production [17]. Participatory classes can likewise empower people. A study shows that it helps people to overcome daily life problems [18].

Secondly, the effectiveness of a participatory approach needs to be audited more closely when it comes to the classroom. This GLAM class’s assessment system from the first semester was not adequately rigorous, making students’ standards vary widely depending on individual attentiveness. Some figured that their points were already enough to pass the course, so their attention dropped. In one way, a pass and non-pass system can help students not to worry, but at the same time it needs to ensure that it will not diminish students’ capacity to learn.

Thirdly, some literature that discusses youth and digital tools proved true. Students may be comfortable with online tools, but they can falter when it comes to using these tools ethically and with quality. These skills are essential in the new education.

Lastly, the concurrent orientation of GLAM institutional service and GLAM education is not too surprising or intimidating but calls on GLAM educators and practitioners to find the right balance in engaging students and users in participating in cultural heritage at different levels.

To conclude, the experience of building a GLAM class at Chulalongkorn University shows that a participatory approach is an effective new way in producing lifelong learners, with the condition that the learners have research skills and ethics. GLAM class can be a good start for learners to make the most of cultural heritage throughout their lives in this networked era.

References

Content Analysis of Library Use on Twitter:
Pre-Coding Results

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Abstract. Today people commonly use social network services (SNSs), such as Twitter, to announce their thoughts and share their opinions freely. An analysis of content posted on SNSs may generate insights that differ from those which the existing methods like interviewing or administering questionnaire surveys can obtain. In this research, Twitter was chosen as the focus because it is the most popular open SNS. The goal of the research is to enhance library services and propose new services to meet user expectations. In this paper, 123 tweets containing the word “library” were collected, as a sample data set. Then, open coding was conducted to identify labels for a “library use” coding frame. The coders on the team discussed the identified labels and assigned labels to each tweet over the course of five meetings. In total, 13 labels were identified, including: studying, browsing materials, reading, facility, events participation (intention), collecting information, and public relations.

Keywords: Content Analysis, Library Use, Microblog, Open Coding.

Introduction

Various social network services (SNSs), such as Twitter, Facebook, and Instagram, now permeate people’s everyday lives. They are used for advertising and reviewing products, promoting political opinions, spreading influential content, and so on [1]. People can post their views and feelings freely and share them with others easily on SNSs. The analysis of posted textual content may result in insights that existing methods like interviewing or administering questionnaire surveys cannot produce.

The survey conducted by the Ministry of Internal Affairs and Communications in 2017 reported the following SNSs had high usage rates by all generations on average: LINE (75.8%), YouTube (72.2%), Facebook (31.9%), Twitter (31.1%), and Instagram (25.1%). Among teenagers and young adults in their twenties, Twitter (67.6% and 70.4%, respectively) has proven more popular than Facebook (21.6% and 52.3%) or Instagram (37.4% and 52.8%) [2].

A 2018 survey by ICT Research & Consulting on SNS usage trends found that roughly 75% of internet users in Japan rely on SNSs and that the usage rate ranking of major SNSs in Japan is LINE (80.8%), Twitter (42.8%), Instagram (35.8%), and Facebook (31.2%) [3].

While LINE is the most popular SNS in Japan, it is a closed communication tool. Twitter is the most often used open communication tool; it allows anyone to browse anyone else’s posts. Also, Twitter is well suited for textual analysis because tweets mainly include textual information.
In this study, we explore the sentiments toward and the uses and values of a library by analyzing tweets mentioning a library. We focus on aspects of the usage, values, and sentiments people have for libraries. It is possible to compare users’ usage with the available library services, by identifying how users use library from their tweets. Values refer to users’ thoughts on an image or significance of a library, such as “comfortable,” “peaceful,” or “closed.” Since users’ values contain implicit opinions and needs, it helps to understand users’ needs by examining them. As for sentiments, posts about library usage or values are assigned as positive, negative, or neutral. Analyzing the relationships among the uses, values, and sentiments people have for libraries makes it possible to assess current library services and explore users’ potential library needs.

In this paper, we focus on constructing a coding frame of “library use”. We collected tweets containing the word “library” and assigned labels to each one. Section 2 introduces the literature on microblog analysis. Section 3 explains our research methods, and Section 4 shows the labels we identified. Finally, Section 5 describes our conclusions and plans for this research.

The Literature on Microblog Analysis

Many researchers have analyzed microblogs to various ends. There have been analyses of tweets about e-cigarettes [4] and political discussion [5]. Kim et al. [4] collected tweets that contained general terms, specific brand names, and usage wording in relation to e-cigarettes and gained insights into (1) marketing trends for selling and promoting e-cigarettes and (2) where people use e-cigarettes. They randomly selected a subset of tweets, manually coded each one as advertising or non-advertising, and used that subset to train classifiers. Then, the trained classifiers assigned codes to the remaining data. They found the majority of the tweets were advertising. From 2009 to 2010, tweets about e-cigarettes increased by more than tenfold. This result indicated a rapid increase in the popularity of e-cigarettes and the marketing effort. Of the 471 e-cigarette tweets mentioning a specific place, most referred to school (39.1%), followed by home/room/bed (12.5%), in public (8.7%), the bathroom (5.7%), and at work (4.6%). The findings revealed that people are smoking e-cigarettes in public places.

There have also been sentiment analyses of tweets to determine if they were positive or negative. For example, Öztürk and Ayvaz [6] used tweets to investigate the public opinions and sentiments toward Syrian refugees. They collected relevant tweets in two languages (Turkish and English). For the sentiment analysis of English tweets, they used RSentiment, a package in R, which is designed for sentiment analysis in the English language. For Turkish tweets, they developed a sentiment lexicon for their study. The sentiments of the tweets were grouped into five categories: very negative, negative, neutral, positive, and very positive. They found that the feelings of the Turkish tweets differed significantly from the sentiments of the English ones. They revealed that there were more positive sentiments in the Turkish tweets about Syrians and refugees than in the English tweets.

Researchers who have analyzed microblogs mentioning libraries have focused on contents posted by libraries. Zou et al. [7] studied the role of Twitter to engage library users. They collected over 10,000 tweets from the Twitter accounts of ten public libraries in the United States. They used the topic-modeling tool, MALLET, which is based on Latent Dirichlet Allocation (LDA), to classify library user engagement strat-
egies into four categories – literature exhibits, engaging topic, community building, and library showcasing.

Al-Daihani and Abrahams [8] collected 23,707 tweets from the Twitter accounts of 10 academic libraries in the United States through an archiving service (twimemachin.com) in December 2014. They investigated the frequency of the words that appeared in the tweets using PamTAT, a text-mining tool; they conducted a sentiment analysis to categorize the tweets into eight categories by content. The most frequent word was “open,” which the academic libraries used in a variety of contexts. The most frequent bi-gram (two-word sequence) in the aggregated tweets was “special collections.” The most frequent tri-gram (three-word sequence) was “save the date.” The most common tweet category was “resources” at all ten academic libraries. Al-Daihani and Abrahams highlighted the importance of using data- and text-mining approaches to understand the aggregate social data of academic libraries and support their decision-making and strategic planning for user outreach and the marketing of services.

Stvilia and Gibradze [9] explored the Twitter usage of six large U.S. university libraries, focusing on original tweets to examine what libraries tweet about and what makes library tweets useful. They collected 752 tweets from the six libraries’ Twitter accounts and analyzed the tweet content for topics using the open-coding approach. The authors examined the coding schemes and merged them into nine general categories: event, resource, community building, operations update, study support, Q&A, survey, staff, and club. They also studied the utility of the tweets and Twitter user characteristics, as measured by the number of retweets and favorites received. The content analysis of the library tweets revealed that the event and resource categories were the most frequently occurring. The findings also showed that tweets related to study support services and building and maintaining connections with the library community were the most commonly retweeted and selected as favorites.

Many libraries use SNSs as marketing tools, and researchers have analyzed libraries’ posts. However, they have not shed light on users’ posts about libraries. In this study, we focus on tweets that mention a library. Performing content and sentiment analysis, we aim to understand the actual use and values of libraries to enhance the services they provide. The first step of our research was conducting an open coding of tweets.

**Methodology**

**Outline of content analysis**

We conducted this study following the typical procedure for content analysis, which according to Elo and Kyngäs [10], is a method that can be used with qualitative or quantitative data in inductive and deductive ways. Its procedure has three main phases: preparation, organization, and reporting. In the preparation phase, it is necessary to set the purpose of the analysis and then collect a sample of suitable texts for the study.

We organized the data by open coding, creating labels, and abstracting information for our qualitative analysis. In the open-coding step, the coders read sample texts and wrote as many labels to describe the tweets as possible. Then, we grouped the identified labels into broader categories.
Data collection

We used the softwareツイポート/twport [11] to collect 123 tweets containing the word “図書館” (library) that were posted from 8:56 am to 9:11 am on June 8th, 2019. We considered the 123 tweets a sufficient sample data set because they exceeded 100. We collected each tweet’s content, posting date and time, and ID, the user’s ID, name, and screen name, and the URL of the profile image and source.

Pre-coding process

In the open-coding step, nine coders (A to I) thought of labels to describe the library usage mentioned in the collected 123 posts. We met five times in total. At the first meeting, 11 participants, including two researchers who were not coders, discussed and decided the labels for 29 posts and made the coding guideline. Then, each coder coded 100 posts, including the previous 29 posts based on the coding guideline. At the second meeting, we discussed the labels of the 29 posts again. We repeated the coding and discussion process until we had completed 100 posts. At the fifth meeting, we discussed the final 23 posts. Table 1 shows the dates, number of discussed posts, and participants at each meeting. The number of participants differed at each session because all the participants could not attend all of them.

<table>
<thead>
<tr>
<th>Round</th>
<th>Date</th>
<th># discussed Posts</th>
<th>#participants (coders)</th>
<th>#participants (not coders)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>June 14, 2019</td>
<td>29</td>
<td>9 (A, B, C, D, E, F, G, H, I)</td>
<td>2 (J, K)</td>
</tr>
<tr>
<td>2</td>
<td>June 28, 2019</td>
<td>29</td>
<td>7 (B, D, E, F, G, H, I)</td>
<td>3 (J, K, L)</td>
</tr>
<tr>
<td>3</td>
<td>July 05, 2019</td>
<td>10</td>
<td>7 (A, B, D, E, F, H, I)</td>
<td>3 (C, J, K)</td>
</tr>
<tr>
<td>4</td>
<td>July 12, 2019</td>
<td>40</td>
<td>7 (A, B, E, F, G, H, I)</td>
<td>4 (C, J, K, L)</td>
</tr>
<tr>
<td>5</td>
<td>July 19, 2019</td>
<td>44</td>
<td>8 (A, B, C, D, E, F, H, I)</td>
<td>3 (J, K, L)</td>
</tr>
</tbody>
</table>

Open Coding Results

Table 2 shows the labels, definitions of labels, number of tweets, and simplified examples; the original tweets were in Japanese, and the authors translated them to English. The labels were categorized into three groups: library use, not a library use, and not applicable. The first group consists of tweets mentioning library use. We labeled them based on purpose: studying, borrowing, reading, and so on. We could not identify the specific purpose of some tweets, in which case we labeled them “general use (details unknown)” and “visiting the library.” We did not consider whether the library usage referred to the past, present, or future.

The second group consists of tweets that did not mention the library. For example, it includes tweets posted by libraries for public relations and tweets mentioning a library as a motif in a game or comic.

The third group consists of retweets and Tweetbot. Replies that did not contain the word “library” were also categorized into this group. We identified Tweetbot by checking the posts’ sources.
Conclusion and Future Works

The purpose of this research is to enhance current library services and propose new services to meet users’ expectations. We analyzed uses for libraries based on their tweets. We gathered 123 tweets that included the word “library,” identified 13 labels, and constructed a coding frame for library usage; we identified activities, such as studying, borrowing, and reading.

Our open coding was limited to a small sample. To further this research, we plan to identify other labels with more samples. We will compute inter-coder agreement scores to confirm the coding frame for library use. We will also conduct analyses to explore the values and sentiments individuals post in relation to their library usage.

Table 2. Identified potential labels of library use.

<table>
<thead>
<tr>
<th>Labels</th>
<th># tweets</th>
<th>Definition</th>
<th>Simplified Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Library Use</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Visiting the library</td>
<td>16</td>
<td>Having visited or planning to visit the library.</td>
<td>It has been a long time since I visited Sengoku Library.</td>
</tr>
<tr>
<td>Studying</td>
<td>8</td>
<td>Studying or learning in the library.</td>
<td>I am going to study in the library.</td>
</tr>
<tr>
<td>Borrowing</td>
<td>7</td>
<td>Borrowing something from the library.</td>
<td>My daughter is borrowing the series “Komatta-san” from the library.</td>
</tr>
<tr>
<td>Reading</td>
<td>5</td>
<td>Reading books in the library.</td>
<td>When I was in elementary school, I read “Kaiketsu-zorori” so many times.</td>
</tr>
<tr>
<td>Facility</td>
<td>3</td>
<td>About library facilities.</td>
<td>I got a private room in the university library.</td>
</tr>
<tr>
<td>General use (details unknown)</td>
<td>2</td>
<td>Visitors are doing something in the library, though we can’t identify what it is.</td>
<td>I saw the cover of that book at the library, and I thought “How beautiful!”</td>
</tr>
<tr>
<td>Browsing materials</td>
<td>1</td>
<td>Viewing materials in the library.</td>
<td>If the library has historical material and we can view it, then I’ll recommend that you visit library.</td>
</tr>
<tr>
<td>Collecting information</td>
<td>1</td>
<td>Obtaining specific information in the library.</td>
<td>I loved “Little House on the Prairie,” I collected information from the library.</td>
</tr>
<tr>
<td>Events participation (intention)</td>
<td>1</td>
<td>Participating in events at the library.</td>
<td>The poetry reading will begin at 1:30 PM.</td>
</tr>
<tr>
<td>Other</td>
<td>2</td>
<td></td>
<td>As for me, I have free access to the university library that I graduated from; I’ll write my entrance mission statement at the library.</td>
</tr>
<tr>
<td><strong>Not a Library Use</strong></td>
<td>35</td>
<td>“Library” as a motif in games and comics; actually, the posters do not use libraries.</td>
<td>I recommend the movie <em>New York Public Library</em>.</td>
</tr>
</tbody>
</table>
Public relations 14 Public relations for events and services posted by libraries.
We’ll have a storytelling event in the children’s room at the Central Library.

Not applicable 28 Tweetbot, retweets, and replies that are unrelated to libraries.
Poster of Harvard University Library.

Acknowledgments

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Cloud Based Services in Library – Boon or Curse?

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Abstract. Cloud computing is a new form of computing technology and functions on web server, managed remotely and focuses on service. This technology is mainly responsible for providing infrastructure as a service (IaaS), platform as a service (PaaS) and software as a service (SaaS) to others and ensures all infrastructure and software applications are flexible, dynamic and usable for others. The cloud may deal with different services and applications such as web hosting, institutional repository, email, mail server, data storage, online meetings & web conferences, and many more. Libraries throughout the world has also started using cloud computing for managing e-resources access, web application hosting, online public access catalogue, managing digital libraries, hosting different statistical software and data sets etc. This technology may help to reduce the involvement of huge cost, save manpower efforts, provide platform to library users to browse resources with ease and utilize different library services online. This study has been carried out to analyse the impact of cloud based services in library and to understand whether cloud computing is being considered as a curse or boon. This study will help to know about cloud computing and it is relevant to libraries in order to implement the cloud technology and benefit the institutions.

Keywords: Library, Cloud Computing, Cloud Services in Library, Library Automation, Digitization

Introduction

A library has always been a heart of any institute where different types of collection are preserved. These curated collections are major sources of information selected by a group of experts in different domains and further made accessible to the academic community for borrowing or reference. The library also provides physical access or even digital access these days to the users. The collection comprises of books, e-books, periodicals, maps, atlas, manuscripts, documents, audio visuals, audio books, databases, newspapers etc. and other formats. The basic motto of any library is to provide organized collection to its users. In addition to provide documents, library also provide different services such as online public access catalogue, current awareness services, different alert services based on charging/discharging of documents, access to online electronic resources over the Internet. Libraries these days are being re-defined as a place to get unrestricted access to maximum information in different formats through various sources and ensure that services are extended to end users beyond the physical boundaries and assist the users to find and process information from different digital resources. Moreover, libraries these days involve in
helping the community and have become centre where programs are scheduled, lecture is delivered and users involve them in learning. Technology in this regard has been playing a major role and cloud computing is one of them.

Cloud technology helps to share resources, services and applications with others without having such resources on their own infrastructures / servers and is known as one of computing technology. In ICT domain, the cloud comprises of network, connections, servers, applications and resources. This technology is based on pay as you use or utility model where resources are provided based on demand same as mobile technology [1].

**Deployment Models:**

There are four (4) different types of access defined by deployment model.

- **Public Cloud Model** which permits the access of system and service by the open public. In this type of access, the control of infrastructure is managed by third parties such as, Amazon, Microsoft cloud services over the internet, Google.
- **Private Cloud Model** is maintained within an organization and allows system and services within the premises. In general, it does not allow the access of services and system for outsiders. However, this type of cloud can be managed by third parties internally with more security with internal firewall.
- **Hybrid Cloud Model** comprises of private and public model. Many organizations use this type of cloud in which public cloud services is implemented along with its own cloud to perform different applications internally.
- **Community Cloud Model** is used by maximum group of organization where system and services are accessed by many at the same time and third parties can be given responsibility to manage the cloud to share the services and infrastructure with other organization.

**Service model:**

There are three (3) service models identified and are as follows:

- **Infrastructure as a Service (IaaS)** is responsible for providing access to fundamental resources such as online storage, virtual systems, physical computers etc. Different software, applications or even operation systems are developed by the customer itself and the resources are made accessible to end users via server virtualization.
- **Platform as a Service (PaaS)** allows development and deployment tools to develop applications quickly and efficiently.
- **Software as a Service (SaaS)** allows software applications as a service to the users. The software is hosted on cloud and is made available to the end users over internet. There are many SaaS applications such as building invoice system, CRM applications, Helpdesk applications, Human Resource applications and many more. This is mostly used model and rapidly growing in the market.

**Need of Cloud Computing:**

Cloud computing is very popular these days and being used in libraries around the world. The libraries prefer to host automation system, website, digital libraries, e-resources and other resources on cloud based servers. The need for cloud services emerged due to the involvement of huge infrastructure in different activities and services by institutions. Maintaining the different services with infrastructure for different purposes are very costly in nature and very difficult for any organization / institution to procure for self. To overcome this, cloud computing seems good solution and helps a lot. Libraries or institutions face a difficulty when there is data loss or hardware failure. It becomes challenging task to recover the data or restore the system with ease. In this situation, cloud computing be-
comes helpful and data are restored easily in which server is kept separately and many computers are connected with it for data input and pulling the data out. In libraries, cloud computing is more helpful to execute the housekeeping operations such as acquisitions, cataloguing, circulation, serial management, digital object management etc. and also supports different international standards such as z39.50, MARC21 etc.

Objective of the Study

This study has been carried out with following objectives.

- To find out the awareness among library professionals about cloud computing
- To understand different advantages of cloud computing in different libraries
- To identify the satisfaction level of different libraries in using cloud services
- To analyse the different problems and challenges in using cloud services

Applications of Cloud Computing in Libraries

Based on the data collected through survey, Indian libraries have not fully accepted the cloud computing technologies. However, they are engaging themselves to implement cloud in the library and provide services also. The challenges in implementation are many such as lack of good service providers, sound technical skilled library professionals to enhance library managed with latest technologies, management support etc. But services such as library automation, web applications, digital libraries, use of web 2.0 features etc. are successfully functional. Different google based cloud services, OCLC services like WorldCat, DuraSpace are some of the good examples of successful cloud based services for libraries. Slowly, libraries are shifting services involving cloud and providing facilities to its users. The cloud services can be implemented on the following identified areas [1].

a. Library automation
b. Institutional repositories
c. Searching library resources such as e-journals, e-books, databases, etc.
d. Hosting the website
e. Search for scholarly content for better academic output
f. Storage of files
g. Building community relations via different social media (facebook, twitter, etc.)

Literature Review

Many studies have been conducted on cloud computing and issues related to libraries with cloud. Khan [2] explained the meaning of cloud computing and suggested on use of cloud computing in to benefit its users. Pandey [3] based on SWOT analysis briefed about different implications of cloud computing in libraries and mentioned in his study that how SWOT (strengths, weaknesses, opportunities, and threats) are directly involved in cloud computing and also in libraries. Goldner [4] explained in his study about how the cloud computing is different from other computing technologies. He also expressed in his study about the advantages of cloud computing in libraries in technology, community and data. Srivastava [5] has mentioned in his study...
about the vision of cloud computing. He has also explained about the availability of different cloud based commercial services for the community and libraries and express that this technology is helpful in changing the way for the development of web based services. Murley [6] studied about law libraries and express his views about cloud computing including the resources and services may involve with it. Sasikala [7] discussed about different perspectives of cloud computing, its standards, use in public and private sector and also its use in higher education with challenges, opportunities and different implications in library. Goya [8] explained the different merits and demerits of cloud computing and also compared the services based on price, limit, and security of data, backup. Jordan [9] explained about cloud computing and its association with different library and web scale services. OCLC services functional on cloud is the best example, he mentioned in his study. Wang [10] expressed in his study about significance of cloud computing with different implications. In addition to this, he also mentioned about different trends.

Methodology

To meet the basic objective of the study, quantitative research methodology along with a comprehensive literature review was employed. The study population comprised on library professionals working in Indian libraries. To collect the data, structured questionnaire was circulated among professionals working in India via social media, forum, WhatsApp groups and personal email IDs. Based on statistics received total 167 professionals viewed the survey and responded. The questionnaire was prepared using the online Google form.

Data Analysis

This study targeted the libraries to find out their opinion about cloud computing as curse or boon in order to provide library services. The structured questionnaire was distributed through email, forum, different WhatsApp groups, social media and posting on self-site i.e. www.dptripathi.in. Total 157 respondents attempted to answer the questions and submitted their opinions through online google form. Out of which 152 (96.8) respondents participated in the survey from India and remaining 5 (3.2%) from other countries such as Pakistan, Papua New Guinea, Bangladesh, Ethiopia and Nigeria.

Nature of Institutes Responded

Total 157 respondents from different institutes participated in the survey and out of which 82 (52.2%) institutes are government institutes, 64 (40.8%) institutes are private and remaining 11 (7%) institutes are others such as deemed university, autonomous etc.
Use of Software for Data Management in Library

Only 153 respondents responded out of 157 in which 87 (56.9%) institutes are using Koha open source software for library data management, 56 (36.6%) are using DSpace for Institutional Repository, 12 (7.8%) are using EPrints for IR, 5 (3.3%) are using Greenstone for IR, 15 (9.8%) institutes are using Joomla for content management, 25 (16.3%) are using WordPress for content management for managing web applications, 9 (5.9%) institutes are using Subject Plus for managing library guide in the library and similarly the other software like VTLS, Drupal, Librarian, SOUL, E-Granthalaya SHARP, Easylib, TLSS etc. are also being used by different institutes.

Management of Software for Library

Different libraries are managing the software either off-line (self-server) or through cloud service providers. Based on survey, 106 (67.5%) libraries are managing their data management / library software off-line means having their own server. Only 51 (32.5%) libraries are using cloud service for the management of software on cloud.
Kinds of Data Shared with Public

Different libraries shared their different data with public. Out of 157 libraries, 48 (30.6%) libraries share their research data with public, 133 (84.7%) share bibliographic data of documents through online public access catalogue and 43 (27.4%) share other types of data also.

![Graph showing data types shared by libraries](image)

**Fig 3. Kinds of Data Shared with Public**

**Which one is better for managing the data/content of library?**

Libraries shared their mixed opinions in order to manage the data/content of library. 80 (51%) libraries mentioned that both cloud and off-line service are better for data management. However, 19 (12.1%) libraries have been in favour of using off-line (self-server) and remaining 58 (36.9%) have been in favour of using cloud services for data management.

![Pie chart showing preferences for data management](image)

**Fig. 4. Which one is better for Data Management**

**Is share bibliographic data safe on Cloud?**

Data safety is more important when libraries share their data in public as libraries share research and original data. In this regard, different libraries have different opinions about use of cloud services. Out of 157, 76 (48.7%) libraries think that the shared is safe and not safe means they are in doubtful situation and don’t have clarity about sharing the data on cloud. 60 (38.5%) libraries are having positive opinion.
about using of cloud service and say that shared data is safe on cloud and rest 20 (12.8\%) libraries are having negative opinion and say it is not safe to share data publicly on cloud.

Fig. 5. Is shared data safe on cloud?

Challenges faced while using Cloud Services

Using cloud services for libraries will never be easy as the technology is new and having faith in sharing data and also getting the management support is challenging. Based on survey, different libraries have different opinions. 62 (40.3\%) have mentioned that cloud based services are very expensive in nature and managing the limited budget is difficult. 55 (35.7\%) libraries only get management support for setting up the infrastructure. However, 51 (33.1\%) libraries say that renewal of cloud service is required every year and consider this as a challenge for libraries. 69 (44.8\%) out of 157 libraries mention that technical staff is required for smooth functioning of the services. If the staff does not have technical skill, it will become challenging to manage cloud based services. And the most challenging feedback was dependency on service provider for installation of add-on software on server by 81 (52.6\%) libraries. At the same time, few libraries submitted their different feedback such as cloud services are costly, high speed internet is required, data is not safe and regular interaction with service provider is required.
Fig. 6. Challenges faced while using Cloud Services

Advantages of Cloud Services in Library

With challenges, different advantages were also noticed by different libraries. 66 (43.1%) out of 157 says that hardware is not required for installation of software. This seems quite good for libraries as procurement of hardware involves huge cost. 69 (45.1%) libraries say that there is no issue of installation of software. The service provider installs the software and provide the platform. 74 (48.4%) mentions that libraries do not required technical manpower for day to day operations of cloud based services. 76 (49.7) are in the opinion that maintaining data is quite easy for libraries. The most important is access of the information in very quick and available all the time and 83 (54.2%) libraries are having positive opinion about cloud based services. 44 (28.8%) libraries mention that cloud service providers assist on for additional add-on, if required. 34 out of 157 (22.2%) submitted their opinion about charges which are manageable and not very high. Libraries can easily afford the charges. And, further the most important is data safety and 77 (50.3%) mention that cloud service provider ensures data backup on a regular basis and there is no fear of data loss in any case.
Outcome and Conclusion

Undoubtedly the cloud computing has left major impact on different services provided by institutes or libraries. This technology has created an opportunity for libraries and institutions to serve without fear of data loss and involvement of huge cost in building the infrastructure and it leads towards service oriented architecture with high flexibility and many other things. The libraries are more comfortable in using cloud computing as it allows for resource sharing such as hardware, software and data as well which lowers the total cost involvement in managing the library activities effectively. The most impressive advantage is to have libraries on the internet and provide global access to resources. Though the implementation is bit expensive but libraries are moving slowly towards cloud computing and being treated in libraries as boon in digital era undoubtedly.

References

Rural Library as the Driver of Socio-Economic Development in Malang District

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Abstract. Rural library independently managed by local government in rural society. Gampingan Village is one of the villages that operate rural library in the Pagak sub-district, Malang District. The Gampingan village was formerly classified as a village that was left behind and underestimated by other regional communities. With the presence of the Gampingan Gemar Membaca Rural Library, Gampingan Village is not only becomes more popular in Indonesia but also be a developed-village in term of socio-economic. This study mainly discuss about the programs and the roles of Gampingan Gemar Membaca Rural Library. The research method used in this paper was descriptive with qualitative approach, using purposive sampling to collect the data. The sampling is five participants. Gampingan Gemar Membaca Rural Library has several programs that have been running regularly and effectively, such as creative women, catfish cultivation, farmer groups, waste banks and innovative literacy-based tourism. Moreover, this library has a big role as education, information, and entertainment provider agency.

Keywords: Rural library, social development, economic development, socio-economic development, literacy

Introduction

Indonesia, as a big country, has 66,048 villages in 2019 [1] and they have their own government. Village government is the lowest organizational unit in Indonesian government hierarchy. The village, as a government and community driver, needs to be equipped, be facilitated and be supported by public services institutions that can support the welfare of the community. One of important institutions that can support the needs is rural library in each village because the purpose of the existence of rural library is to be lifelong learning institutions that can provide information for the community and contribute the knowledge to the nation. This is in accordance with the Law of the Republic of Indonesia Number 43 Year 2007 article 22 paragraph 2 [2] which written, “The provincial government and district/city government organizes regional public libraries which the collections support the preservation of their respective cultural products and facilitate the realization of lifelong learning communities.” This law is confirmed by the Minister of Home Affairs and Regional Autonomy Decree Number 3 Year 2001 [3], “Rural Libraries are community libraries as a facility/media to improve and support the education activities of rural communities, which are integral parts of village development activities.”

Rural library from common point of view is a library that is managed independently by village government and is located amongst villagers. Rural library is mentioned in Indonesian Act Number 43 Year 2007 about Library. It also explained in Regulation
of The Head of National Library of Indonesia Number 6 Year 2017 about National Standard of Rural Library [4]. That regulation defines rural library as a library that is managed by village government and has core functions, to develop library in the village and to provide library service for the community regardless of their age, race, religion, socio-economic status, and gender.

Sutarno in Khumairo [5] explained further about the definition of rural library as a public service institution located in the village, a service unit developed from, by and for the community. The aim is to provide services and meet the needs of the community related to information, science, education and recreation to all of community member. From those definitions, there are several keywords to understand rural library better [6]:

a. Community library
b. Functioned as facility or media
c. Improving and supporting education
d. An integral part of the development of rural communities.

From those keywords mentioned above, rural library is a library that was developed and established from the initiative and the responsibility of the village government and is used as a facility to support informal education in the community. The main function of rural library is being a facility that provides library materials and information to the community for education, information, and entertainment purposes.

Rural library cannot be separated from village development programs. Thus the existence of a rural library is one of the nodes of rural community development through the provision of readings that are in accordance with the characteristics of the village community. This explanation is supported by Kumbar, Lamani & Talawar [7] that wrote about the role of public library as community information centre, to contribute towards community development by fulfilling the information requirement of community.

Today's village communities generally have been touched by the information development, even though it has not been evenly distributed in Indonesia. A village cannot be isolated, shut itself down from the development of information and technology. For that reason, village government has to be concern about the condition of its community. One of their way to show their concern is to build rural library in their village.

Gampingan Village is one of the villages that operate rural library in the Pagak sub-district, Malang District. The Gampingan village community, before the presence of its rural library, did not consider that this information institution is important and the reading literacy rate of the community is also low. The Gampingan village was formerly classified as a village that was left behind and underestimated by other regional communities because the majority of its nature is limestone mountain and is difficult to get clean water. With the presence of the Gampingan village library, which was initiated by literacy activists in the village, it makes the Gampingan community open their eyes to the importance of an information institution, especially rural library.

The name of Gampingan rural library is Gampingan Gemar Membaca Rural Library. In 2018, it achieved extraordinary achievement, The Best Rural Library in Cluster A of rural library in Indonesia [8]. That achievement is the result of the community's participation, the hard work of the library’s staffs and moral assistance of Gampingan Village government. The empowerment of this rural library makes Gampingan Village not only becomes more advance, but also it becomes one of the factors of socio-economic growth in this village.
From the prior explanation, we interested make deeper discussion about the programs and the roles that have been carried out by the Gampingan Gemar Membaca Rural Library in supporting socio-economic development of the local community.

Research Method

The research method used in this paper was descriptive with qualitative approach. Descriptive qualitative research was used for studies which are descriptive in nature. The purpose of using descriptive with qualitative approach was to gain a better understanding about the programs of the Gampingan Gemar Membaca to develop the community socio-economic condition. The focus of this study was the programs and the roles of Gampingan Gemar Membaca Rural Library to develop its community socio-economic condition.

In qualitative research, the sampling adequacy of the data was determined, not by the number of participants, but by the appropriateness of the data [9]. The sampling method of choosing the participants was purposive with some criterias: the community members that participate in the Gampingan Gemar Membaca programs, the community members that get the effects of the Gampingan Gemar Membaca programs. The number of participants in this research was 5. The participants of this research were the village head, head of the rural library, library staff, and two society members. The data was collected by face to face interview. After collecting the data, the next steps in data analysis were coding the data, data display, and making the conclusion.

Results and Discussion

Gampingan Gemar Membaca Rural Library Socio-Economic Development Programs

Creative Women Group

The majority of the males jobs in Gampingan village are farm laborers and limestone burners which are the produces of the village. There are also those who work as merchants and paper factory employees at Ekamas Fortuna, Inc. Meanwhile the female villagers work as merchants, immigrant workers and housewives. Looking these conditions, Gampingan Gemar Membaca Rural Library has a program for developing rural communities there. One of the programs is creating creative women group, they are taught to make knitted handicrafts. The knitted handicrafts are sold by Gampingan Gemar Membaca Rural Library by participating exhibitions and promoting it through Facebook. The sales revenue is given back to the villagers that are involved in handicrafts making. Through this activity, Gampingan villagers, especially women can fill their free time with activities that produce economic value. This activity is conducted once a month or depends on the demands of the community.

Catfish Cultivation

Catfish cultivation is the second program held by the Gampingan Gampingan Gemar Membaca Rural Library. This activity is carried out in accordance with the needs of the local community. The community is given a training on how to cultivate catfish well and correctly so they can produce superior catfish seeds. The yield of the catfish is processed to be variety of dishes and is sold to the local community, besides that,
the fresh catfishes are also sold directly to the market and to the community in Gampingan.

**Management of Waste Banks**
Waste bank management is the next program owned by Gampingan Gemar Membaca Rural Library in developing villagers economic condition. This activity aims to manage the community waste and generate economic value for the community.

The library buys the villager’s dry waste and teach the villagers to save their money in the bank. In that case, Gampingan Gemar Membaca Rural Library collaborate with government’s banks, Bank Nasional Indonesia 46 (BNI46) and Bank Rakyat Indonesia (BRI). The collected dry waste is recycled to be handicrafts and this activity is held almost every day, considering that they produce waste every day.

**Farmers Group**
Gampingan Gemar Membaca Rural Library has a program that can also develop economic condition and skill of Gampingan villagers, that program is named Farmer Groups. The activities of Farmers Group focus on the way the community uses agricultural products to be processed into various types of snacks, such as cassava chips, banana chips, etc. Those kinds of snacks are sold and consumed by Gampingan villagers and people outside the village.

**Literacy-Based Tourism**
In addition to the development activities previously described, there is literacy program developed by providing reading corners in every corner of the village. The concept of literacy is also combined with potential tourism places in the Gampingan Village. Lembah Kera (Ape’s Valley) is one of the potential tourism attraction in the village. On that valley, there is a building that contains book collections from the Gampingan Gemar Membaca Rural Library known as Literacy Valley. While enjoying the scenery in the valley, visitors can increase their knowledge by reading the books provided there.

Besides Literacy Valley there is also a reading room in Dempok tourism place. Initially, this place only provides fishing grounds and family dining, but then they built reading corner there to increase knowledge and reading ability of visitors and the surrounding community. This literacy-based tourism is an innovation that makes this library is different from other library’s program. This program brought Gampingan Gemar Membaca Rural Library to be the national champion of rural library competition in Indonesia.

**The difficulties of Gampingan Gemar Membaca Rural Library Socio-Economic Development Programs**
Every programs in every organization must ever face problems and difficulties. The successful of the Gampingan Gemar Membaca do not make it free from difficulties. The Gampingan Gemar Membaca development programs face several problems, such as human resource and financial problems.

All of the administrators of the library are paid volunteer, but even is they are paid, not much of the village members want to actively participate in the programs of the library as administrators. This problem can be solved with doing more socialization about the function and the advantages of being library administrator. The purpose of this activity is to attract village member and improve their awareness of the importance of working together to develop the village by being the library administrator.

Another problem arise is the financial problem. The Gampingan Gemar Membaca do not have a financial source to improve their collections. The solutions is open do-
nation for book collection from village members, individual donation, and donation from another organizations.

**The Role of the Gampingan Gemar Membaca Rural Library towards Gampingan Village**

The role of Gampingan Gemar Membaca Rural Village can not be separated from library functions and its vision and mission. The main function of rural library is being a facility that provides library materials and information to the community for education, information, and entertainment purposes.

Creative women groups teach women in the village to knit and sell their handicrafts, this program is in accordance with library functions as an education provider. This program teaches the women in the village to create handicraft which is to improve their skill so they can obtain their own money by selling their handicraft. The library helps them to sell it in the exhibition in the library and exhibition event outside their village. Knitting can also be entertainment activity for some housewives that have a lot of free time.

Catfish cultivation and farmers group are taught to cultivate their natural resources to be something that has added value on it. The community is taught to process the catfish and farm produce to be various foods and snacks and sold them within or outside the village. This program supports the education and information purpose of the library.

The management of waste banks program teaches the community to separate their waste, to save their money in the bank and to make handicraft from dry waste. This program supports the functions of Gampingan Gemar Membaca Rural Library as information and education provider. The library staffs took various ideas from books written by experts from various fields and teach what they have learnt to the community. The library staffs also got training from related agencies to improve their skills.

Meanwhile, the literacy-based tourism provides knowledge and entertainment for the tourists who come to Literacy Valley. The tourists can enjoy the beauty of the tourism places while reading a good book that is provided there.

This result of this study is contrary to District Central Library of Dharwad [7] that failed to provide information service to members of the district, not only failed to provide information service, but the resources of this library is not adequate to fulfill the information needs of the different groups in the community.

**Conclusion**

The Gampingan Gemar Membaca helps the community members to open their mind that learning can be done in library. By reading books, it helps them to improve their knowledge and skills in life. The Gampingan Gemar Membaca Rural Library has several programs that have been running regularly and effectively to develop socio-economic condition of the community members, such as creative women, catfish cultivation, farmer groups, waste banks and innovative literacy-based tourism. Those programs have big impacts on the Gampingan villager by improving their socio-economic condition by learning to utilize the resources in the village.

From this study, the recommendation can be given is that The Gampingan Gemar Membaca Rural Library has to maintain the continuation of the programs. Not only they have to make a robust relationship with village government and another departments to make their, but also to make a rigid plans to improve the development of the community and library itself.
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Transparency of A Public Agent in Disseminating Information of The 2019 Election to The Community of Pertuni in The Representative Area of Malang City

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Abstract. Dissemination of public information to the public in the era of information disclosure is very necessary to be done especially for people with disabilities. In this case the public agent has a significant role in spreading the information. The purpose of this study was to analyze how information dissemination related to the 2019 Election by public agents to the Pertuni DPW Malang community. This research uses a qualitative approach with a case study method. Data collection techniques were carried out through interviews with public agents and members of the Pertuni community, observation, and document review. Data analysis technique is done by making a category from the data that has been collected. Furthermore, the patterns of the categorization results are described, analyzed, and interpreted. The results showed that public agents were still not transparent in disseminating information related to the 2019 elections to the Pertuni community. This is not in accordance with the objectives of Law No. 14 of 2008 concerning Public Information Openness. Transparency of information dissemination by public agents when viewed from the dimensions of participation, substantive information, accountability, and confidentiality has not been optimally fulfilled.

Keywords: transparency, information dissemination, public agent, Pertuni community

Introduction

Public agents have a significant role in disseminating information to the wider community, including people with disabilities such as the visually impaired. In the era of information disclosure, all institutions including public agents are required to implement good governance in accordance with the principles of accountability, transparency, and public participation in every process of public policy. Transparency is a crucial aspect for public agents because it is very closely related to the right of citizens to obtain public information.

The right to obtain information contained in the 1945 Constitution of the Republic of Indonesia Article 28 F states that: “Everyone has the right to communicate and obtain information to develop his personal and social environment, and has the right to seek, obtain, possess and store information with use all types of available channels.
Based on the provisions of article 28 letter F, it has inspired the making of Law No. 14 of 2008 concerning Public Information Openness.

The issuance of Law No. 14 of 2008 concerning Public Information Openness implies that all institutions including public agents must open access to public information to the wider community. The regulation includes the right of everyone to obtain information and the obligations of public bodies to provide and service requests for information quickly and on time, at a low cost, and to improve the documentation and information service system for the public, including the blind community.

But the fact that occurred at the 2014 Presidential Election there were six communities representing the visually impaired in Indonesia holding a conference at the Indonesian Plaintiff Building, Bandung. The conference discussed the discrimination of blind people related to the lack of information and socialization at the 2014 Presidential Election. At the conference community representatives signed a petition to abstain in the 2014 election because their demands about the availability of information were not met, so they lost their voting rights. This shows the lack of transparency in the dissemination of information related to the 2014 general election for the visually impaired.

Based on this, this study was conducted to identify how transparency of information dissemination in the application of 2019 election information disclosure by public agents to the DPW Pertuni community in Malang which has implications for the participation of the blind people related to the 2019 Election in exercising their rights as citizens.

**Literature Review**

**Openness of Public Information**

At present the disclosure of public information is crucial for the community. In Indonesia there is a legal umbrella related to information disclosure, namely Law No. 14 of 2008 concerning Openness of Public Information which contains 64 articles. As stated in article 3, this Law aims to:

1. guaranteeing the right of citizens to know the plans for making public policies, public policy programs, and public decision-making processes, and the reasons for making public decisions;
2. encouraging community participation in the process of making public policies;
3. enhance the active role of the community in public policy making and good management of public bodies;
4. realizing good state administration, which is transparent, effective and efficient, accountable and can be accounted for;
5. know the reasons for public policies that affect the lives of many people;
6. developing science and educating the life of the nation; and / or
7. improve information management and services within the Public Agency to produce quality information services.

**Information Dissemination**

Information dissemination is the dissemination of information that can be done through various types of activities both through meetings, outreach, and media such as books, magazines, newspapers, film, television, radio, and so on. Information dissemination is aimed at groups and individuals so that they obtain information, receive, raise awareness, and utilize the information.

Sastropoetra [8] states that the dissemination of information is the dissemination of messages that contain facts so as to create correct and clear explanations and foster
the same understanding of messages disseminated. Sastropoeta also explained that information dissemination would be effective if it met the following criteria:
1. The message that is spread must be arranged clearly, firmly, and briefly so that it is easy to understand.
2. The symbols used must be understood by those who are targeted.
3. The message delivered should be able to generate interest, attention, and desire in the recipient of the message to do something.
4. The message conveyed should give rise to the desire to solve the problem.

In addition, the dissemination of information is also determined by the media used as its channel, both directly through face-to-face and technology-mediated communication.

**Transparency in Information Dissemination**

Public agent transparency in public information disclosure is very much needed especially for the visually impaired who have special needs related to information. Cotterrell [2] states that transparency is the availability of information on matters of public concern, the ability of people to participate in political decisions, and government accountability for public opinion. Information about elections is clearly a public concern, because the democratic party which is held every five years involves the public to participate in channeling votes for the future of the nation and state.

There are three objectives of transparency namely providing important information to the public, increasing public participation, and making the organization accountable. In transparency what is needed is trust that is useful for growing reciprocal relationships in information responsibility.

Transparency plays an important role for the ability of organizations to gain and maintain public trust [1]. In addition to being open in sharing information, transparency also requires organizations that are able to understand and be responsive to public needs.

According to Rawlin [7] transparency is a deliberate attempt to provide public information that has a positive and negative legal force with accurate, timely, balanced and decisive characteristics aimed at increasing the ability of public reasoning and accountability related to activities, policies, and practice. Rawlin developed a transparency model consisting of four dimensions, namely:

a. Dimension of participation. Participation is defined as active participation in acquiring, distributing, and creating knowledge. The dimensions of participation include statements about active engagement, feedback, detailed information and easy access to information.

b. The substantive information dimension in which stakeholders must be given access both internal and external in order to obtain useful information not just symbolic information. This dimension has indicators of relevant information, clarity, completeness, accuracy, reliability and legality of information.

c. The accountability dimension is defined by the State Administration Agency (2001: 22-23) as something that is needed to provide an explanation of what has been done. The demand for accountability is the obligation to provide accountability or explain the performance of the actions of a person or legal entity or leader of an organization to those who have the right to request information or accountability.

d. Dimensions of confidentiality include statements that reflect the level of disclosure or confidentiality, the level of information bias in the use of language by people and the level of information disclosure related to organizational needs. In this case the public agent is obliged to maintain
public access to information, increase awareness of public policies and the process itself, facilitate feedback and two-way communication with the public, and use that information as part of improving the performance and accountability of institutions [4].

Method

This research uses a qualitative approach with a case study method. The qualitative approach was chosen because the purpose of this study was to gain a thorough and in-depth understanding of public agent transparency in disseminating information to the Pertuni DPW Malang community in accordance with its natural setting. Based on this, the aim of this study is a deep understanding and analysis of transparency in terms of four dimensions.

This research was conducted on public agents such as KPU, MCW, and RSBN, as well as the DPW Malang Community Community, located in Malang with different addresses. KPU on Jl. Bantaran No.6, Purwantoro, Kec. Blimbing, Kota Malang, East Java 65126. MCW on Jl. Joyosuko Metro No.42a, Merjosari, Kec. Lowokwaru, Kota Malang, East Java 65144. RSBN on Jl. Beringin No.13, Bandungrejosari, Kec. Sukun, Malang City, East Java 65117. The DPW Malang Community Pertuni located on Jalan Bunga Sri Gading No.16 Rt. 01 Rw. 02, Kelurahan Lowokwaru, Kota Malang. The time span of the study is from November 2018 to October 2019.

Data from this research are in the form of public agent transparency related to public information disclosure in the 2019 election and participation of members of the Pertuni community. Data sources in this study were from the KPU, MCW, RSBN, and active members of the Pertuni community aged 17 years and over, as well as related documents.

Data collection techniques used in this study were in-depth interviews, observation and document analysis.

Data analysis was performed by collecting data from various data collection techniques namely observation, interviews, and document analysis. From the data set obtained by the researcher, the technical examination is carried out until the data obtained is saturated or no new data is generated or found. The next step is to categorize the data based on the code (the theory used). The patterns from the categorization results are then described, analyzed, and interpreted to produce a research findings. The findings will be presented in narrative form and interpreted in accordance with the results of research on public agent transparency in disseminating information about the 2019 Elections to the Pertuni DPW Malang community.

Findings

Information Dissemination of the Election 2019 by Public Agent

In this study there were three public agents who collaborated by providing and disseminating information for members of the Pertuni community. The information dissemination is carried out through several activities such as holding meetings, outreach and through media such as websites to disseminate information related to the 2019 Election so that it can be accessed by the wider community. Public agents include:

a. KPU (General Election Commission)

Dissemination of 2019 election information by the KPU is carried out in three ways:
1) Disability Community Meeting Forum

KPU provided information related to the 2019 Election by holding a meeting forum with representatives from each community with disabilities both blind, deaf, and deaf. Based on interviews with the KPU, the KPU has conducted face-to-face meetings through a meeting forum with representatives from each community with disabilities consisting of 25 to 50 representatives per type of disability. According to AA, all community representatives who were invited and present at the meeting held by the KPU turned out to have a high level of interest and curiosity regarding the 2019 Election information, especially representatives from the blind community. The following are the interview excerpts:

"We have organized a meeting forum for all people with disabilities whether they are blind, deaf, or deaf. All of us invited, each community with disabilities was represented by 25 to 50 people. Those present had an extraordinary enthusiasm to obtain information regarding the presidential and vice presidential candidates, their vision and mission, the procedures for elections, and the background of political parties. "(AA)

The meeting forum was held in a restaurant with free lunch and transportation money.

Representatives of community members listened carefully to the information provided by the KPU. The purpose of this meeting forum is to simplify the voting process. This meeting forum was still not optimal because the meeting was only held once so the information submitted was incomplete because after the meeting there was no follow up at all.

2) Socialization

Next, information dissemination was carried out through socialization, but in the 2019 Election the information was not carried out by the KPU on the grounds of delays in the ballot paper template. The following are excerpts of interviews with the KPU about the lack of socialization related to the 2019 Election, which was confirmed by the results of interviews from members of the Pertuni community.

"We did not hold a socialization for the 2019 election, because the ballot template arrived late from the printing press, the H-2 was only sent here." (AA).

"There is absolutely no socialization to us about the 2019 elections, both from the KPU, the Social Service, and other public institutions ... passive. If MCW promises to hold socialization, it will always not." (SP)

From this phenomenon it can be analyzed that the dissemination of information by the KPU is still not effective and not in accordance with the objectives of public information disclosure. Because one of the goals of public information disclosure is to improve management and information services within the Public Agency to produce quality information services.

3) Website

In addition to meeting and outreach forums, the KPU also disseminates information related to the 2019 Election through the website https://kpu-dmalangkota.go.id/ The website contains textual and video information related to the presidential and vice presidential elections, and the selection of legislative candidates in the general election before 2019. However, the information presented has not been able to accommodate the information needs of Pertuni community members who have 'special information needs' that are different from the general public. Although there is information presented via video but it has not been able to accommodate the information needs of the visually impaired regarding election procedures and so on. The
video only shows information that is less needed by community members, such as the KPU profile and information about the elections not about the election. In making the website, KPU still ignores the concept of 'diffable friendly' for blind citizens who have 'special information needs.'

b. MCW (Malang Corruption Watch)

MCW is an organization that moves outside the political structure or referred to as an NGO (Non Government Organization). MCW is an NGO engaged in the field of inclusive community empowerment. It has been three years that MCW has collaborated on advocacy with the Pertuni community. Regarding information dissemination, MCW has conducted socialization about literacy of political information for the Pertuni Malang community. This socialization aims to accommodate their information needs around the 2019 elections.

"We, from the MCW, have conducted socialization regarding political participation in the 2019 Election for the Pertuni Malang community. They are very critical, many questions are asked, especially related to the election procedures and their political information needs "(RA)

In this study found contradictions related to what was conveyed by MCW with what was conveyed by members of the Pertuni community as follows:

"There is no socialization at all, MCW has been passive. We invited the MCW every time there was a regular meeting in Pertuni but several times were absent. Once they came and invited us to socialize about the presidential nomination, but they did not invite directly ... through FOMI (Malang Inclusion Forum). I was doubtful because I did not feel that I was establishing, so finally we sent 10 people to take part in the socialization. "(AB)

Based on the results of the interview, it turns out that there is an unsynchronization between what was conveyed by MCW and what was conveyed by members of Pertuni. This phenomenon shows the 'disability' of transparency in the dissemination of information by MCW. The attitude of the MCW, which was often absent at the Pertuni meeting forum, showed that MCW lacked understanding and was not responsive to the dissemination of information to meet the needs of Pertuni members. If this is done with frequent intensity, it can gradually erode the Pertuni community's trust in the accountability of the MCW and can disrupt the reciprocal relationship between Pertuni and the MCW.

c. RSBN (Bina Netra Social Rehabilitation)

RSBN is a blind education center that educates and trains the blind to live independently in the community. There are 105 blind people in RSBN consisting of 72 men and 33 women. In RSBN they learn how to be adaptive in life like normal humans.

RSBN does not have a website for information dissemination. Even though in this era of information disclosure, there is a need for media that can be accessed by everyone. RSBN should provide an audio-based website that can be accessed by blind people so that information dissemination is not only limited to internal circles but can penetrate externally. It is intended that the blind can obtain and receive the information they need and utilize that information according to their needs.

Information dissemination in RSBN is limited to internal circles through classroom learning. In their educational curriculum there are five classes namely preparation class A, preparation class B, basic class, vocational class, and practical class. Class A is a two-year preparation class in which learning activities include braille reading and writing materials, self-management, physical development, mobility orientation, mental religious development and character.

In preparation class B, the blind were given material that was not much different from the preparation class A plus braille type materials and handicrafts. After graduat-
ing from preparatory class B, students can proceed to the base class with massage learning, reflexology, and shiatshu learning materials. They are also taught theoretical and practical phiaiology, anatomy and pathology.

In their education curriculum, they are not taught anything related to politics, they are more likely to learn about material skills as provisions for social life. Therefore, the dissemination of information related to the 2019 elections was barely conveyed. However, the blind community in RSBN continued to take the initiative to channel their rights as citizens by participating in the 2019 elections. Although in the end they did not use their voting rights due to administrative problems and the KPU did not provide polling stations in the RSBN.

**Transparency in Information Dissemination**

Transparency in disseminating information about the 2019 elections to the Pertuni community is an important thing to do because after all their voices cannot be ignored. They have the same political participation rights as other communities in general to channel their votes. Here are four dimensions:

**a. Dimension of Participation**

The results of the research related to the participation dimension showed that the participation of public agents both KPU, MCW and RSBN appeared to be passive and not too active in distributing information related to the 2019 Election. The lack of meeting forums and the lack of socialization about how the procedures for participating in elections make information not well distributed. Pertuni community members have difficulty accessing and obtaining detailed information about the General Election. This fact shows that there is no active involvement of Pertuni members by public agents regarding their participation in channeling their right to vote in the General Election. Although representatives of the Pertuni community were sent to inquire about the holding of election information campaigns to the public agent, they did not get any feedback from them. The public agent promised to hold a socialization but the reality was always to be postponed until the election had not been realized. The attitude of the public agent shows a lack of transparency in the distribution of information when viewed from the participation dimension. The implication is that it can reduce the level of trust of the Pertuni community to the public agent and can reduce the participation of the Pertuni community using their voting rights in the 2019 elections.

**b. Dimensions of Substantive Information**

Regarding transparency, in terms of the dimensions of substantive information, it shows that public agents do not provide access to information both internally and externally to Pertuni community members so that community members are confused by symbolic biased information. The information provided is not yet relevant to Pertuni's community information needs related to the background of legislative candidates, the general election procedures for the visually impaired, and information about election socialization. In addition, the information provided by public agents is also incomplete only globally. This explanation shows that the 2019 Election information provided by public agents still does not meet the criteria for the substantive information dimension which includes the relevance, clarity, completeness, accuracy, reliability, and legality of information.

**c. The Accountability Dimension**

If viewed from the accountability dimension, the public agent has not provided the information needed by members of the Pertuni community clearly and transparently. This is in accordance with statements from members of the Pertuni community that there was no explanation of what would be done to collaborate between the public agent and the Pertuni community. The demand for accountability, namely the obliga-
tion to provide accountability or explain the performance of public agent actions to the Pertuni party who has the right to request information or accountability has not been carried out optimally.

d. Dimensions of Confidentiality

The level of information disclosure conveyed by public agents to members of the Pertuni community is still low because not all information needed by members of the Pertuni community related to the 2019 election is conveyed transparently. Whereas transparency in the dimension of confidentiality reflects the level of openness or confidentiality, the level of information bias in the use of language by people and the level of information disclosure is related to the needs of members of the Pertuni Community. In this case the public agent should be obliged to maintain public access to information to the public including the blind community, increase their awareness of public policies and the process of access and dissemination of information. It also facilitates feedback and two-way communication with the Pertuni community, so that it gets feedback and utilizes the information as part of improving the performance and accountability of public agency agencies. But all that has not been realized optimally with a variety of biased reasons.

References

An Investigation of the Relationship Between Roles of School Resource Centre and Student Motivation towards Student Performance in Malaysian Secondary School

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Abstract. School Resource Centre (SRC) also known as a knowledge hub and responsible to equip students with 21st century learning skills. In Malaysia, it is a compulsory that all schools must have a SRC. However, studies found that SRC still lacking providing sufficient services and there is no study investigate the relationship between SRC and student motivation in Malaysia. Therefore, this paper aim to investigate the relationship between roles of SRC and student’s motivation towards student performance. The quantitative method approach was used by the questionnaires distribution among Form 4 students in Klang Valley. The Statistical Package analyzed the questionnaires for Social Sciences (SPSS) software package (Version 25). Findings show that SRC offer collections, programs, technology, Library Media Teacher competencies and environment to boost student’s motivation in 21st century learning. Further analysis also show result of 0.699, which shows strong relationship and gives evidence to prove that, students’ motivation level at school is strongly connected with their performance. It is hope that this study can contribute to an empirical-based framework to measure the relationship between SRC and student motivation towards student performance.

Keywords: School Resource Centre, Student Motivation, Student Performance.

Introduction

International Federation of Library Associations and Institutions (IFLA) have defined the school library (SL) as a digital learning space and a school’s physical where students can read, think, do research, make inquiry in order to acquire knowledge to grow their personal, cultural and social capacity [10]. IFLA lists out the roles of SL as resource-based capabilities, thinking-based capabilities, knowledge-based capabilities and learning management capabilities. There are various terms used by other organizations such as: school resource centre, school library, resource centre, school media centre. In Malaysia, school library known as School Resource Centre (SRC). SRC provide as the role of all these curricula is to provide information for students and assist with gaining knowledge (Malaysian School Resource Centre Management Guidelines, [5]). Garba, Byabazaire, and Busthami [6], stated that, as SRC in 21st century, it is expected that SRC transform into learning commons whereby knowledge
creation and knowledge consumption can be equally provided. In the new age of technology and innovation, the needs of students are going beyond school desks and traditional way of receiving the knowledge. Therefore, every school is responsible of establishing SRC, where students can reach out to the latest information, learn about using different methods of research and equip them with the skills of the 21st century. The role of well-structured SRC is enormous and it requires a lot of factors to consider, especially when SRC is become a knowledge hub and students need to use SRC to complete their task given by the teacher. In 2014, PMR (Penilaian Menengah Rendah) Assessment for Lower Level Secondary Examination for Form 3 has been replaced with PT3 (Pentaksiran Tingkatan 3) Assessment. Two subjects’ format which are Geography and History, has been totally changed from examination based to coursework. Students struggling to search for the right information and sources to complete their coursework with limited time. The role of well-structured SRC is enormous and it requires a lot of factors to consider, especially when SRC is become a knowledge hub and students need to use SRC to complete their task given by the teacher. Therefore, this study aims to investigate the relationship between the roles of SRC and student motivation towards student performance.

Literature Review

The main role of SRC is to support the teaching and learning in school setting. Previous study [15, 23, 8] found that SRC provide services such as collections, technology and programs to support students and teachers. However, previous study, Yusuf [23] found that due to lack quality library service, lack of reference material and skills in accessing information resources by students contributed to poor academic performance. Mansor and Nor [13] stated that, due to lack of programs cause the low utilization of SRC. There also very limited research conducted in Malaysia regarding the level of usage and the perception of teachers towards the programs and services provided by SRC. Based on Wardana, Prihatin, and Purwanti, [19], it shows SRC is not equipped with Internet facilities that can be utilized by students to seek information and students’ learning resources. These conditions have a direct effect on less than optimal learning achievement. Users feel reluctant to favor a SRC due to poor internal and external environment [7].

According to Carello [2], media centre collection can be defined as a group of information sources either in printed form, non-printed or electronic selected by media specialist for defined user community. Collins and Doll [3] agreed that, the current and adequate collections in SRC will meet the needs of users and support the curriculum. They also stated that the role of the SRC is to support the classroom teachers and curricula. Therefore, the collective information has to be oriented according to the preference and needs as well taking into consideration such factors as: gender, age group, culture, religion. It would give a broad field for accessing to any kind of information.

SRC offer various programs for students worldwide. In Malaysia, based on Malaysian School Resource Centre Management Guideline, SRC should offer Nadi Ilmu Amalan Memahau (NILAM) or reading program to inculcate reading cultural among students and information literacy program. As point out by Rajaendram [14] initiative has been implemented in 1999 by Malaysian Ministry of Education to which students needed to jot down the synopsis or mind map of the books, the author of books, and number of pages of the books into the NILAM book setting. In general, programs
conducted by SRC helped students equipped themselves with learning skills that related to classroom and assignment.

![SRC Roles Diagram](image)

**Fig. 1. Research framework**

IFLA [10] emphasize that SRC should operate as a physical and digital space in a school that is open and accessible to all. In additional to that, SRC as a safe space where students can learn and explore various resources in privacy and safety. Todd, Gordon and Lu [17] stated that environment plays an essential role in improving students learning by providing students with the learning space. SRC is a multidisciplinary and equitable learning space where all the subjects and related materials are presented. Equipping the SRC with sufficient storage, well-organized furniture setting and available necessary services in place such as: photocopying machine, water dispenser, organized book shelves with the books in order will positively influence users’ productivity and awaken motivation towards assignment and project completion. Hisle 2005 in Ida [9], stated that environment of the SRC plays an important role to motivate students to stay in SRC to do assignments, reading or search for information and to satisfy the need for environment that cultivates student collaboration and peer learning.

Motivation can be defined as the attribute that moves us to do or not to do something and it involves a constellation of beliefs, perceptions, values, interests, and actions that are all closely related [1, 11, 20, 21] believed that SRC can increase the motivation level among students. They receive positive attitude and enthusiasm once they know the right way to search for the information effectively. Stephen [16] proved that research consistently shows that when children have an access to good SRC with plenty of good books and with adequate staffing, they read more, and thus do better on reading tests. Thus, the performance of the students is largely depending not just on the resources like books and media, but the appropriate support from the subject teachers and resources centre teacher’s guidance. The research framework as figure 1 consists of five dimensions of SRC roles: collections development, conducting quality program and activities, promoting LMT guidance, offer latest technology tools and provide conducive environment to be tested the relationship with Student Motivation. Further investigation to identify the relationship between Student Motivation and Student Performance:
**Methodology**

This study used the quantitative approach whereby questionnaires were distributed among Form 4 students who have experience doing the History and Geography in PT3 assessment from 5-star rated schools in Klang Valley. About 400 questionnaires and a total of 350 (88%) were returned. The gathered data then were analysis by using Statistical Package for Social Sciences (SPSS) software package (Version 25). Correlation testing is one of the essential parts of the analysis to measure the possible relationships among Independent and Dependent variables.

**Findings**

In this study, the researcher investigates the relationship between roles of SRC: Programs, Collections, Library Media Teacher competencies, Technology and Environment and Student Motivation towards Student Performance. Findings can be shown as Table 1 and Table 2 below:

<table>
<thead>
<tr>
<th>Table 1. Summary of survey results</th>
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<tr>
<td>Independent Variables</td>
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<td>Collections</td>
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<td>Sig. (2-tailed)</td>
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<tr>
<td>Programs</td>
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<tr>
<td>Sig. (2-tailed)</td>
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<tr>
<td>LMT Competencies</td>
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<tr>
<td>Technology</td>
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<td>Sig. (2-tailed)</td>
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<tr>
<td>Environment</td>
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<td>Sig. (2-tailed)</td>
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<td>N</td>
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</table>

Based on Table 1, in terms of strength contributions of identified components, the highest significance relationships between SRC and Student Motivation is Program as its contribution on Student Motivation with mean value is 0.618, followed by the factor LMT Competencies which has indication of 0.605 based on Pearson correlation testing. The moderate value carries Environment and Collections (0.573, 0.511) and the least important but still significant factor is Technology that shows the 0.483 value of contribution.
Table 2. Summary of the correlation between motivation and students’ performance

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<tr>
<td>Students’ Motivation Pearson Correlation</td>
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<td></td>
<td>Sig. (2-tailed)</td>
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<tr>
<td>Students’ Performance Pearson Correlation</td>
<td>.699**</td>
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**. Correlation is significant at the 0.01 level (2-tailed).

Table 2 show the relationship between Student Motivation and Students Performance. The contribution of the factors is 0.699, which shows strong positive relationship and gives evidence to prove that, students’ motivation level at school is strongly connected with their performance.

**Discussion**

This study presents an investigation the relationship between roles of SRC and student motivation. From the literature reviews the main roles of SRC: Collections, Programs, LMT competencies, Technology and Environment. From the findings, it shows that the result achieved identified that the SRC roles is directly related with student motivation that contribute to student performance consistent with study conducted by Wardana, Prihatin, and Purwanti [19]. Supported by Ida [9] revealed positive effects of SRC services usage on the student performance.

Further investigation this study is mainly focused on the Student Motivation contributing towards improving student performance. As illustrated in Table 2, it shows result of 0.699, which shows strong relationship and gives evidence to prove that, student motivation level at school is strongly connected with their performance.

In addition, as recommendations for school management and Ministry of Education for organizing activities and training related to students’ skill development. Apart from that, to improve SRC in Malaysia in terms of collections, programs, technology, environment and appointment of qualified LMT. This is supported by Lonsdale [12], due to the abundance of information provided especially in digital resources; it highlights the most significant factor that affects the role of SRC and LMT on student performance.

The authors also suggest that SRC should create students to be a lifelong learners by offering a quality program such as conducting digital literacy workshop. This workshop will teach and guide students on how to use digital tools and managing information to complete their assignments responsibly and ethically.
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Digital Media Access: Folklore Learning for Cultivating Love Indonesian Culture Character

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Abstract. Growing the character of love traditional culture needs to be done from the early age, in the midst of the development of technology and the global culture which have allegedly shifted traditional culture. Learning activities at primary education must provide easy access to continue to love and realize the ownership of the wealth of traditional culture, which can be pursued through the use of technology. The problems of this research are, first, whether teachers could determine the subject, basic competencies, and indicators that taught about literary works to introduce culture and character; and second, what learning media was widely used by teachers in teaching literary works especially folklore. An online survey was conducted on 15 teachers teaching at primary level in West Java Province, which include Majalengka, Tasikmalaya, Garut, Ciamis, Cirebon, West Bandung, Bandung, and Sukabumi regions. This research found that first, basic competencies indicators for folklore materials in the curriculum of Bahasa Indonesia subject at elementary school/madrasa had already been included at every grade level. Second, the basic competencies were included in Bahasa Indonesia, English, Sundanese, and Cultural Arts subjects at junior secondary/Islami junior school level of grade 7, 8, and 9. Third, the learning media supporting folklore consisted of digital media (46.7%) and printed media (86.7%) which indicated that the learning media that was often accessed for the achievement of basic competencies at each grade level to cultivate the character of love Indonesian culture was printed media.

Keywords: digital media, basic competencies, love culture, folklore

Introduction
The education system has components that constantly evolving and a massive process of review, revision and even reshuffle is often needed. The curriculum components become a concern every time an update occurs in the education system. The curriculum is a set of plans and arrangements regarding the objectives, content, learning materials, and the methods used acting as a guideline for organizing learning activities to achieve certain educational goals (Law No. 20 of 2003 on the National Education System). Mapping curriculum components concerns with how educational goals can be presented in the learning process that fosters all aspects of abilities of every student. “Curriculum today is more of a desired goal or set of values that can be activated through a development process, culminating in experiences for learners” [33].

Unraveling curriculum implementation in learning in the digital era, it is important to consider the context of access to learning resources that uses digital tech-
nology. This is inseparable from the advancement of technology that has been developing in society which also influences the education world, especially learning media [8]. Learning media are all things that can be used to stimulate thoughts, feelings, attention, and interests of students to create an effective learning process.

The government of Indonesia implements the 2013 Curriculum in the hope that teachers can innovate and use a variety of learning media so as to support the success of the learning process. The use of digital learning media has also been shown to increase student creativity and cognitive performance and motivation compared to traditional learning media [31].

The teaching of Bahasa Indonesia at the primary level aims to develop students’ ability to communicate properly and correctly and to foster an appreciation of literary works such as poetry, short stories, folklore, fairy tales, and legends. As stated by Endaswara [6], folklore is a part of a collective culture, which is spread and passed down from generation to generation, between any type of collective, traditionally in different versions, both in the form of oral works and examples accompanied by gestures or reminder assistive tools.

To date, we have known a lot of folklore in various regions in Indonesia through various media which can be in the form of direct narrative or in the form of performances in traditional ceremonies. We can also enjoy folklore through live shows from television and the internet. The use of digital media in the field of literature is effective to help students construct meaning and reconstruct literary learning through extensive background, experience, and skills in understanding the problems they face [7], which cannot be separated from the design of instructional media itself. A form of literary appreciation in language learning enables students to foster love and respect for literature. Sumayana [27] revealed that literary appreciation was suggested to be taught in Indonesian language and literature subject at primary level, which aimed to improve students’ ability to understand literary works.

![Fig. 1. Number Of Folklore By Type in Indonesia](source: Cultural Statistics Data 2019, Center for Educational and Cultural Data and Statistics, Ministry of Education and Culture, Republic of Indonesia.)

The 2019 Cultural Statistics was compiled by the Center for Data and Statistics of Education and Culture, Secretariat General, Ministry of Education and Culture. The data presented in these statistics include both tangible and intangible cultural inheritance. Tangible cultural inheritance includes museums and cultural heritage while intangible cultural inheritance includes art, history, beliefs and traditions. Data regarding artists and studios covered only 9-10 regencies/municipalities in Indonesia. West Java is one of the provinces which is rich in art and culture that must be preserved.
As detected by the Ministry of Education and Culture, there are 14 folklore in West Java consisting of 6 fables and 8 legends.

One way to maintain this cultural inheritance is by utilizing these folklore in learning. Literary appreciation in language learning enables students to foster love and respect for literature. Sumayana [27] states that literary appreciation in Indonesian language and literature learning is directed to be taught at primary level to improve students’ abilities in understanding literary works.

Learning media function to improve teaching and learning process [28]. The media is used to stimulate thoughts, feelings, attention, and interests so that learning process can be performed. Learning interaction is a cycle where teacher conveys the message of learning materials to obtain the expected changes.

It is necessary to examine whether the teacher can identify the subjects, basic competencies and indicators related to literary works that introduce culture and characters. Also, what learning media used by teachers in studying learning materials about literature especially folklore. Learning that leads to the development of character and culture in schools still need to be identified through the implementation of curriculum in learning. The form of appropriate and facilitating medium in learning literary works should become the basis for the cultivation of culture and character in society.

**Literature Review**

**Indonesian Curriculum**

The development of national culture and character can only be conducted in an educational process that does not separate students from the social environment, community culture, and national culture [21]. The development of national culture and character is not included as a topic but is integrated into the subjects, self development, and school culture. Thus, teachers and schools need to integrate the values developed in cultural education and national character into the existing curriculum, syllabus and lesson plans.

The 2013 Curriculum is currently a reference in developing learning aimed at preparing Indonesian people to have the ability to live as individuals and citizens who are faithful, productive, creative, innovative, effective, and are able to contribute to the life of society, nation, state, and world civilization (Regulation of the Minister of Education and Culture No. 67 of 2013). The 2013 Curriculum mandates the essences of a scientific approach to learning, which is believed to be a golden bridge for the development of students’ attitudes, skills, and knowledge.

Curriculum in particular refers to a planned sequence of instructions or to a view of the student's experiences in terms of the educator's or school's instructional goals, elements such as objectives, teaching contents, methods, assessment and learning resources [4]. High-quality curriculum is an essential issue of formal education, determining education quality [30]. This is also the feature that makes the model different from those of conventional education models where learners usually play a less active role than education providers in curriculum development [4].

Competency is a set of attitudes, knowledge, and skills that must be possessed, internalized, and mastered by students after learning a content, completing a program, or finishing certain educational units. Regulation of the Ministry of Education and Culture Number 20 Year 2016 stipulates the Competency Standards for Primary and Secondary Education Graduates to be used as the main reference for the development
of content standards, process standards, educational assessment standards, facilities and infrastructure standards, management standards, and financing standards. While Graduate Competency Standards refers to a criterion of graduates’ abilities which include attitudes, knowledge, and skills.

Regulation of the Minister of Education and Culture Number 24 Year 2016 emphasizes that the core competencies in the 2013 Curriculum are the level of ability to achieve the graduate competency standards that must be possessed by a student at each grade level. Furthermore, core competencies consist of: core competencies, spiritual attitude, core competencies for social attitudes, core knowledge competencies, and core competency skills. The basic competencies in 2013 Curriculum contain the abilities and learning materials that must be achieved by students for a subject in each educational unit that refers to core competencies.

The implementation of learning in Elementary School/Islamic Primary School (SD/MI) is carried out with a thematic-integrated learning approach, except for Mathematics and Physical Sports and Health Education (PJOK) which act as stand-alone subjects for grade 4, 5, and 6. Learning implementation in Junior High School/Islamic Junior High School (SMP/MTs), Senior High School/Islamic Senior High School (SMA/MA), and Vocational High School/Islamic Vocational High School (SMK/MAK) is carried out with subject-separated approach.

Learning Media

The ability that must be possessed by teacher to support the successful implementation of the curriculum is to use methods, media, and varied learning resources in the learning process to develop student competencies. Learning resources can be obtained from any objects from the surrounding environment, including from learning media.

Learning media is one of the important components in the learning process because it can clarify the message or information delivered, increase learning motivation, and learning outcomes [26]. Learning media can also refer to various types of components in the surrounding environment that can stimulate students to learn. Author suggested that there were two approaches in the process of selecting learning media: the closed selection model and the open selection model. Closed selection occurs when alternative media has been determined “from above” (for example by the Office of Education) so that it is inevitably used.

Learning media has eight important roles: (1) allow the learning to be passed on to be more standard; (2) learning can be more interesting; (3) to learn could be more interactive; (4) time required for learning is possible to be shortened; (5) quality of learning can be improved; (6) learning may be executed once wanted or needed; (7) positive attitude of students towards learning and its process should be able to be enhanced; (8) teachers who teach by using media can bring positive changes [16].

Some authors argues that learning media is any tool or physical that can present the message and stimulate students to learn, such as books, movies, videos, and so on. The importance of learning media is in line with technological advances because it can be used as a graphic, photographic, or electronic tool to capture, process, and organize visual or verbal information in the classroom [3]. Based on the findings above, the school needs a media that can motivate students to continue learning, both at school and outside of school because one of the efforts to improve student learning motives is to use E-learning based learning media [29]. Regarded digital learning as delivery with digital forms of media (e.g. texts or pictures) through the Internet; and, the provided learning contents and teaching methods were to enhance learners’ learn-
Digital learning aimed to improve teaching effectiveness or promote personal knowledge and skills [11]. Digital learning as a digital tool to acquire digital teaching materials for online or offline learning activity through wire or wireless networks [10]. Digital learning can be divided into four parts [13]:

1. Digital teaching materials: This emphasizes that students can learn by extracting some digital teaching materials which refers to electronic books, digital data, or contents presented by other digital methods.
2. Digital tools: The use of digital tools allow students to continue learning activities through digital devices, such as desktop computers, notebook computers, tablet computers, and smartphones.
3. Digital delivery: Learning activities can be delivered digitally, e.g. intranet, internet and satellite broadcast.
4. Autonomous learning: Focusing on students involved in online or offline individual digital learning. This emphasizes personal autonomous learning and requires student active participation to initiate learning activities.

Method

This research is the part of a research entitled “The Development of Web based Creative Writing Reading Sharing in Building Literacy Character and Culture”. This research employed online questionnaire distributed to 15 teachers at Elementary School/Islamic Elementary School and Junior High School/Islamic Junior High School in West Java covering Majalengka, Tasikmalaya, Garut, Ciamis, Cirebon, Bandung Barat, Bandung, Cianjur, and Sukabumi. Survey research generally refers to the systematic collection of self-report data from a sample of a larger population. When survey methodology is employed, a central goal is to obtain valid data that accurately represent a predetermined population [25].

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<tr>
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<td>Cianjur</td>
<td>SDN Cikaret 1 Cianjur</td>
<td>2</td>
<td></td>
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<td></td>
<td>SDN Ibu Jenab 1 Cianjur</td>
<td></td>
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<tr>
<td>Sukabumi</td>
<td>SDIT Adzkia 1 Sukabumi</td>
<td>2</td>
<td></td>
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<tr>
<td><strong>Jumlah</strong></td>
<td></td>
<td><strong>6</strong></td>
<td><strong>9</strong></td>
</tr>
</tbody>
</table>

Source: Research data collection 2019
Result and Discussion

General knowledge related to elementary school competencies about folklore

Basic Competencies / Indicators for elementary school

Detected learning competencies of literary works in the form of folklore at primary level, as revealed by teachers, is given in Fig. 2.

Fig. 2. Basic Competencies / Indicators for elementary school related to the knowledge of folklore and taught by the teachers

The figure above shows that the basic competencies in meeting the needs of folklore at primary level was 20% for grade 1, 2 and 3; 40% for grade 4 and 5; and 60% for grade 6. Every student at primary level is introduced to 6 types of literary works such as children poetry, children stories, children drama, and fairy tales or folklore. Students are expected to be able to appreciate literary work because literary learning directs students to appreciate the nation’s literature as well as regional literature, besides recognizing and understanding the values contained in the literary work itself. Literary work is expected to find the noble values of the nation and the regions so as to increase the sense of love for the motherland and its people [9].

Elementary school teacher respondents revealed that discussions about literary works such as folklore were found in themes related to Bahasa Indonesia studies. The description of basic competencies contained in Bahasa Indonesia subject at each grade level is explained in Table 2.

Table 2. Basic Competencies/Indicators for folklore in Bahasa Indonesia subject in Elementary School/Islamic Elementary School in the education curriculum of Indonesia

<table>
<thead>
<tr>
<th>Grade</th>
<th>Basic Competencies</th>
<th>Learning Outcomes</th>
<th>Indicators</th>
<th>Main Material</th>
</tr>
</thead>
</table>
| 1     | Listening to fairy tales | Listening to fairy tale and retelling it | • Answering questions and explaining the content of fairy tale  
• Retelling the story of fairy tale using one’s own words | Fairy tales |
| 2     | Listening to fairy tales | Explaining the content of the fairy tale listened and asking questions. | • Answering questions about the content of fairy tale  
• Explaining the content  
• Asking questions to teacher about fairy tale | Fairy tales |
|       | Retelling | Retelling story | • Answering questions about the | Children |
| 3 | **Listening to story reading and responding to main characters** | **Responding to main characters in the story and listening to story reading** | • Explaining the sequence of causes and effects experienced by the character.  
• Giving response to characters' disposition in the story. | **Story text (which contains dispositions of several characters)** |
|---|---|---|---|---|
| 4 | **Listening to children short stories.** | **Responding to children short stories from various aspects.** | • Asking questions about the content of the short stories.  
• Answering questions asked by friends.  
• Writing the plot of the stories.  
• Explaining the lesson contained in the short stories. | **Children short stories** |
| 5 | **Listening to folklore.** | **Responding to the contents of fairy tales from various aspects.** | • Listing character names and writing their dispositions (in brief)  
• Retelling stories in writing with coherent and easy to understand sentences.  
• Writing the background of the stories.  
• Writing the responses to the folklore. | **Folklore texts** |
| 6 | **Listening to children stories.** | **Understanding the stories from different sides.** | • Explaining the characters and their attributes.  
• Linking the events experienced by the characters with personal experiences. | **Children stories** |
Basic Competencies / Indicators for junior high school

As for teacher respondents from Junior High School, detected basic competencies related to folklore is illustrated in Fig. 3.

![Fig. 3. Basic competencies related to folklore in junior high school](image)

Basic competencies/indicators related to folklore was detected at Grade 7 (50%) and Grade 9 (50%) while at Grade 8 there was no competencies detected. Subjects containing folklore materials at Junior High level is given in Fig. 4.

![Fig. 4. Subjects containing basic competencies/indicators related to folklore](image)
Figure 4 indicates that there were several subjects that contained basic competencies related to folklore, among others Bahasa Indonesia subject (60%), English Language subject (60%), Sundanese Language subject (20%), Social Science subject (10%), and Art and Culture (10%).

The mapping of basic competencies related to folklore contained in each subject is described in Table 3.

Table 3. Basic Competencies for folklore in Junior High School (SMP/MTs)

<table>
<thead>
<tr>
<th>Subjects</th>
<th>Grade</th>
<th>Basic Competencies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bahasa Indonesia</td>
<td>7</td>
<td>Distinguish, compile, examine and revise the text resulted from observation, descriptive responses, exposition, explanations, and short stories both through oral and written.</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>Understand, distinguish, classify, identify disadvantages, capture meaning, compile, examine and revise, summarize text of moral/fable stories, reviews, procedural stories, and biographical stories both through oral and written.</td>
</tr>
</tbody>
</table>
| English Language     | 9     | • Compare social functions, text structure, and linguistic elements of several oral and written narrative texts by giving and asking for information related to fairy tales, short and simple, in accordance with the context of their use.  
• Understand meaning contextually related to social functions, text structure, and linguistic elements of narrative, oral, and written texts, which is very short and simple, related to fairy tales.  
• Understand the meaning of narrative texts, oral and written, in the form of short and simple folklore. |
| Sundanese Language   | 7 & 9 | • Identify, understand, and analyze fairy tales according to the rules.  
• Interpret, respond to, and present the content and values and contained in fairy tales in accordance with the rules orally and in writing.  
• Show honest behavior and is confident in using Sundanese to understand and write short stories. |
| Art and Culture      | 7     | • Identify theater stories from traditional cultural sources. |

The types of folklore that are often read by teachers in elementary and junior high schools in meeting these basic competencies are legend and fable. Folklore is a reflection of the life of the old society, both in the form of fairy tales, myths, sage (stories that tell the greatness or heroism of someone), as well as legends. Stories that are often given to students are presented in Table 4.

Tabel 4. Folklore of West Java

<table>
<thead>
<tr>
<th>Folklore in West Java</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sangkuriang</td>
</tr>
<tr>
<td>Kuda Kosong</td>
</tr>
<tr>
<td>Lutung Kasarung</td>
</tr>
<tr>
<td>Sesama Saudara Harus</td>
</tr>
<tr>
<td>Berbagi</td>
</tr>
<tr>
<td>Situ Sanghiyang</td>
</tr>
</tbody>
</table>
Media used to obtain folklore

Teachers often use certain learning media to meet basic competencies. The research found that digital media counts for 46.7% while printed media counts for 86.7%, as shown in Fig. 5.

![Fig. 5. Media used to Introduce Folklore](image)

As shown in Fig. 5, printed media is more often used in introducing folklore to meet basic competencies in elementary and junior high schools. This is because unlike digital materials, printed books are readily available at school. Assimonye [2] posited that the print media is an important tool for learning. This includes textbooks in all subjects taught in class, as well as novels, magazines and newspapers which offer information and entertainments in all spheres of life, in their independent studies on the reading regularities of preferred text type among students. The studies all agreed that students learn equally well with print visuals that are engaging, presented through newspapers, magazines and novels [12].

![Fig. 6. Kind of printed media is often used to introduce folklore](image)

Figure 6 shows that printed media that is used to study folklore were mostly books (86.7%) while other forms of story books were about 53%. Studies of folklore is highly required so that selection and publication of children story books could be more selective. This is due to the fact that children story books will subsequently affect the outlook and attitude of children [1]. As a medium for the transformation and dissemination of knowledge, books are also used as knowledge so that they can be communicated and used quickly [24].

Digital media, drawing on semiotic resources such as audio, visual, and spatial have been shown to play a major role in communicating ideas [17]. Achieving effective learning via digital media continues to be a major concern in contemporary education. Learning with digital media and technology engages with the process of learning and encourages students to share their learning with modern society. In essence,
this means learning to be confident individuals, living in a technology-rich world [19]. In modern society, people use digital media daily and seamlessly, and educators need to consider the integration of digital media today and for the future.

Although printed media is more accessible for teaching folklore, digital media is also widely used.

![Digital media are often to introduce folklore](image)

Fig. 7. Digital media are often to introduce folklore

The above figure shows that the types of alternative digital media used in learning folklore include the internet (53%), YouTube channel of “Dongeng Yuk” (6.7%), naracerita.com (26.7%), rumah belajar (13.3%), and Wordpress (6.7%).

YouTube is very potential to be used as a learning medium. Compared to other platforms, YouTube and Vimeo are excellent resources for online videos. The sites offer various features to upload videos such as the length of the video, the audience, and the available tools. Both provide open access streaming resources video for teaching, learning and research and also provide large online video collections in various categories and topics.

In 2018 the channel of “Ayo Dongeng Indonesia” created fairy tales and folklore contents from 34 provinces to be re-introduced to the young generation, as an effort to preserve Indonesian cultural inheritance by digitizing Indonesian unique stories through YouTube platform. The channel also focuses on the world of fairy tales including traditional Indonesian fairy tales and regularly holds Indonesian Fairy Tales Festivals [20].

**Conclusion**

Based on an online survey conducted on 15 elementary school teachers in West Java, it was found that the basic competencies/indicators for folk stories in Bahasa Indonesia subject in Indonesian curriculum exist in every grade. While in junior high school, the basic competencies can be found in Bahasa Indonesia, English Language, Sundanese Language, and Art and Culture subjects in Grade 7, 8, and 9. Moreover, the learning media used for teaching folklore was dominated by printed media (86.7%). Digital media only accounted for 46.7%, which indicated that the learning media mostly used to achieve the competencies in every grade and develop the love Indonesian culture character was printed media.

**Acknowledgement**

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An Integrated Catalog or a Meta-Search System for Humanities and Social Science Databases: A Need Assessment and its Implementation

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Abstract. Background. A wide variety of resources in databases are essential for scholars to conduct high-quality studies. However, there is no comprehensive one-stop shopping site for scholars to explore or identify databases that could be of help. Developing an integrated catalog or a meta-search system for databases could be two potential solutions. Nevertheless, these two solutions are both highly costly. It is crucial to conduct need assessment prior to its implementation. Objectives. The current study aims to assess humanities and social science scholars’ needs for an integrated catalog or a meta-search system for databases, and to identify a feasible and helpful approach. This study also aims to develop a prototype system based on the need assessment. Methods. A web survey with 215 scholars and two follow-up focus group interviews were conducted. Questions regarding scholars’ database use preferences and their thoughts on databases catalog and meta-search system were asked. Results. While scholars agreed that a selective meta-search system could be helpful, they all concerned its feasibility. By contrast, all scholars believed a browsable and searchable databases catalog could fulfill their primary research needs. Contributions. Based on results of the need assessment, a catalog with nearly 1,000 databases and their metadata were developed as a live prototype system at http://140.112.180.236/. The system helps scholars easily explore and identify relevant databases of interest, and thus helps expand and deepen potential interdisciplinary studies.

Introduction

In order to conduct high-quality studies, scholars have to identify all relevant resources, and databases are especially essential to meet their research needs. As the development of digital libraries around the world, research institutions in Taiwan have also been devoted to developing a wide variety of databases since the 2000s. Through digitizing primary sources, consolidating nationwide statistics, and gathering local publications, these databases contain all different types of academic resources. However, there is no comprehensive one-stop shopping site for scholars to explore or identify databases that could be of help. Developing an integrated catalog or a meta-search system for various databases could be two possible solutions. Nevertheless, the former approach is time-consuming and labor-intensive; the latter approach is highly expensive, requires technical skills, and have to commit well administrative supports in the long run. Therefore, it is important to assess the needs of scholars before comprehensive implementation plan. The current study aims to assess the needs of scholars in humanities and social science and to evaluate whether developing a databases catalog or meta-search system is more feasible and helpful. Based on results of the need assessment, this study also aims to develop a prototype system with real contents through surveying existent databases in Taiwan.
Method

The research procedure is depicted in Fig. 1. A mixed-methods need assessment design include a web survey with 215 scholars from the humanities and social science and two follow-up focus group interviews. Questions regarding scholars’ database use preferences and their thoughts on databases catalog and meta-search system were asked. Based on the need assessment results, the Humanities and Social Science Database Catalog (HUSSCat) developing team was formed to systematically survey existent databases initiated in Taiwan. Nearly 1,000 databases have been identified and described with a metadata scheme of 21 fields. The databases were registered in a live prototype databases catalog system at http://140.112.180.236/.

Findings

According to the survey results, most scholars (72.09%) thought a meta-search system may be helpful but concerned with its feasibility. Over 90% of the scholars across different disciplines identified their needs for databases containing textual data and with both simple search (92.55%) and advanced search (88.84%). Most humanities scholars also expressed the needs for databases containing digitized images (64.71%) and maps (48.24%); social science scholars especially expressed the needs for databases containing statistics (93.39%). Two focus group interviews further identified that although a meta-search system may be helpful, it is neither feasible nor cost-effective due to their diversity in data types, user interfaces, and features. Participants believe it is not necessary to include all existent databases in a meta-search system since they typically only need to identify potentially relevant databases. And given different research areas or topics, they may need totally different inclusion of databases in a meta-search. Overall, the participants all agreed that instead of developing a meta-search system, their primary research needs could be fulfilled with a browsable and searchable databases catalog that include descriptive metadata of each database.
Conclusion

The HUSSCat was developed based on results of the need assessment. It helps scholars easily explore and identify relevant databases of interest and thus helps expand and deepen potentially innovative and interdisciplinary studies. The next step is to improve the HUSSCat design and promote the use and application of it. As a result, HUSSCat can not only serve local scholars but also serves as a databases catalog exemplar to the international research communities.
A framework for sharing learner generated contents in collaborative learning

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Abstract. Background: It is important to incorporate students’/learners’ viewpoints into the process of education improvement. Especially, the methodology to share the learners’ ways of understanding yielded in the self-learning process is required to enhance the efficiency of education in collaborative learning. Objectives: As a novel functionality of future university libraries, our aim is to collect, index, and sharing the understanding-related contents such as a note generated by learners, referred to as learner generated contents (LGC), so that the learners can exchange their understanding methodologies efficiently. Such contents indicate the essential or confusing points of lectures, and are helpful for both learners and lecturers. Methods: Our framework is designed based on one of our online services that provides useful resources compiled by the librarians in the university. First, learners post LGC. Next, lecturers check LGC to guarantee the quality and reliability. Then, LGC are indexed by criteria such as lecture names and keywords, and finally are published on the web. Results: A prototype system is developed, and a protocol to collect LGC from the learners is designed. Contributions: A framework for sharing LGC is proposed as a way of enhancing education quality by university libraries. With the framework, learners can proactively share LGC, which are not shared before, to reflect and to overcome their weaknesses with collaborative learning. Also, lecturers can understand the depth of learners’ understanding by analysing LGC. Both learners and lecturers can benefit from the proposed framework. Keywords. Knowledge Sharing, Learner Generated Contents (LGC), Learning Analytics
Background

In the field of learning analytics, one of the major issues is to build a platform to support diversified learning methodologies with information technologies for sustainable and active learning. Especially, it is important to incorporate students’/learners’ viewpoints into the process of education improvement. To achieve this, we tackle three issues from the following aspects.

1. Development of learning analytics technologies that support learners to reflect and to overcome their weakness
2. Development of learning analytics tools that support data scientists to investigate education-related data for education improvement
3. Design of a university library as a novel hub/interface to support collaborative learning for learners and lecturers

For these issues, we propose to update the functionality of university libraries by providing a novel service to share learners’ ways of understanding yielded in the self-learning process.

Objective & Proposal & Perspective

While taking a lecture, learners generally take a note of the essential points to do homework or review it for examinations. After the lecture, they borrow and lend the note each other to support their understanding. Obviously, the note of a student can be a learning material for other students, and is an important medium in the process of collaborative learning. Since the note is generated by the learners themselves, we term it as learner generated contents (LGC). In addition, it is worth analysing LGC for lecturers because LGC represent the process of learners’ understanding. LGC can support lecturers to improve the lecture from learners’ point of view. By sharing LGC in the university, the efficiency of education can be enhanced for both learners and lecturers. In the existing approaches, one was to use common SNS (Eid, 2016). Since SNS is generally designed for communication purposes, it is not always suitable for sharing LGC. In this paper, we propose a framework for collecting, indexing and sharing LGC, as a novel functionality of future university libraries. The framework design is based on one of our services that shares useful resources compiled by librarians in the library. In our framework, a blog-type interface is used to post and browse LGC on the web. To guarantee the quality and reliability of LGC, the process of interactive reviewing by lecturers is incorporated. After collecting LGC, they are indexed by criteria such as lecture names and keywords. The indexing ways will be further investigated. Finally, they are published on the web. After starting our service, we plan to analyse LGC from various aspects. For instance, meta-level knowledge or methodology representing how learners understand lectures in a step-by-step manner can be derived because LGC can contain the intermediate process of understanding. Also, the contribution of a student to other students in collaborative learning can be clarified by measuring the skills of learning and teaching from LGC.
Acknowledgements

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A Typology of Access Points in Chinese Internet Fiction Web Sites

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Introduction
Fiction search has rarely been studied in the existing library and information literatures. However, fiction and novels constituted a very large pleasure reading resource and many people actively seek new works to read. Libraries and existing indexing services offer very limited support for fiction search. Aside from titles, author names, classification numbers, and maybe fiction genres, very few access points based on content characteristics are offered to fiction seekers.

In contrast, the emerging Internet fiction Web sites now offer new and innovative search criteria for fiction search. In the last two decades, Internet novels composed by amateur and professional writers and shared openly on the Web have become an important source for pleasure reading especially for the younger readers. In China, a good number of Internet fiction sites have become the hubs that bring Chinese-speaking writers and readers together, including those from Taiwan, Hong Kong, Macau, and other regions in the world. In those Web sites, fiction search interfaces are offered to readers to browse or tick on a wide array of content tags to explore and discover potentially interesting works. Content tags are descriptors, or access points, that feature different work attributes that may appeal to readers. The goal of this study is to examine the existing content tags in the popular Internet fiction sites and construct a typology of search criteria now offered to fiction readers. The typology will show the multi-faceted nature of fiction description and the various ways by which a reader may approach a potentially interesting work. The typology may also serve as a fundamental structure for developing a richer repertoire of fiction descriptors that will better serve the highly diverse and versatile expectations of readers.

Methodology
We examined a total of nine well-known and large-scaled Chinese fiction Web sites. Most of the works hosted in those Web sites were popular fictions including long, short, and serialized work in progress. The stories were of a wide array of genres. To construct the typology of content descriptor, we identified the browse page and/or the content-search page in those Web sites and carefully recorded all of the content tags. Many tags are Internet vocabulary that is distinct from traditional literary descriptors. We thus reviewed tags and their linked content to verify the denotation and connotation of each tags and determined which aspect of works a tag attempts to represent.
Based on the classification of the 1,651 tags collected from the nine sites, we developed the following typology of fiction attributes that shows how Chinese Internet fiction Web sites introduce their hosted works to the potential readers.

**Results**

The typology comprises of four facets: content characteristics, physical characteristics, reader response, and author information. Each facet comprises of further subcategories. The content characteristics facet is the largest and most sophisticated facet for content description. In our poster we will offer a visualization of the typology and definition for certain major categories that host the most tags.

1. **Content characteristics**

   (1) Story genres: including (a) single genre and (b) composite genre (i.e., a genre showing the features of two single genres)

   (2) Leading characters: including (a) job/profession/identity; (b) personalities; (c) sexual orientation (d) magical powers; (e) story narrators (from whose perspective); (f) non-human characters

   (3) Levels of sexual description

   (4) Story settings: including (a) time; (b) space; (c) time-space

   (5) Subject topics

   (6) Writing styles: including (a) tones and moods and (b) ending (e.g. how the story is ended).

   (7) Adaptation and recreation (i.e. for describing stories that are adapted or recreated from a previous popular work): including (a) adaptation approach and (b) derived from (i.e., the previous work from which the story is based)

   (8) Intended readers

2. **Physical characteristics**

   (1) Story length: including (a) word count and (b) length category

   (2) Serialization: including (a) update frequency and (b) work in progress status

   (3) Release time

   (4) Accessibility (i.e., freely accessible or accessible by qualification)

3. **Reader response**

   Currently this facet contains only one category, i.e. “popularity measures”.

4. **Author information**
Currently this facet contains only one category, i.e. “author’s country/region”.

**Discussion and Conclusion**

In recent years, a few fiction search services have introduced appeal factor-based search, e.g., EBSCO’s NoveList [3]. Appeal factors are what trigger people’s reading interest and/or what readers find favourable in a text [1,2]. Appeal factors are multi-faceted. the characteristics of the storylines, pace of narratives, personalities of the book characters, story settings, moods and writing styles are all examples of appeal factors [5]; genres and subject matters are also appeal factors by which readers look for potentially enjoyable titles to read [4]. However, the services are all for offline, tangible books.

While currently no such appeal-based fiction search service exists in the Chinese-speaking world, the access points now offered in the Internet fiction Web sites are consonant to appeal factors. The typology indicates that a fictional work may be described from multiple angles, and it may shed lights on the development of multi-faceted access for online or offline fiction collections that may offer readers better discovery and search experiences.

**References**

The Information Seeking Behavior of Taiwanese Romance Readers: Some Preliminary Results

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Introduction

Romance is a popular fiction genre for female readers. In Taiwan, romance has always been a top genre in book sales or library circulation. Romance publishing boomed in the late 80s, following the lift of martial laws and censorship on publishing. Large and specialized romance publishers emerged. They systematically introduced Western romance works into Taiwan as well as cultivated a strong force of local writers. The emergence of Internet ushered in another wave of online romance production and consumption. Amateur writers share their works openly in their personal pages, forums, or Internet fiction Web sites, and the Internet fiction soon became a major source of romance works for the millennials. Today, romance readers in Taiwan, mostly female, consume love stories online and in book format.

The goal of this study is to examine the information seeking behaviour of romance readers. We followed T.D. Wilson’s [1] definition and defined information seeking behaviour as action as motivated by particular information needs and taken in a natural setting, not constrained in particular information channels. Fiction reading is an experiential consumption activity [2], and that means a reader will not know if she really enjoys a book unless she really reads it. So information seeking prior to the reading of a new book involves the discovery and exploration of the unread works and the seeker’s predictive assessment on whether a chosen work may meet one’s expectation or bring joys of reading. Hence we examined particularly the search strategies for discovery potentially interesting unread works as well as types of information sought to assist book selection.

Methodology

We employed a grounded theory approach by Glaser and Strauss [3] to study the research questions. In-depth interviewing with romance readers was the sole method for data collection. Purposive sampling and theoretical sampling were both used to recruit study participants. At the beginning of our investigation, we recruited adult female readers by posting ads in online forums and social networking sites for romance readers. We actively sought participants whose reading preferences may show diversity either in fiction types (i.e., Chinese romance versus Western romance) and text sources (paper vs. Internet). Theoretical sampling was used to enhance the diversity of participants; for example, varying background and tastes for story topics/themes/roles.

Between January and August, 2019, the first author of this study has interviewed ten
engaged romance readers. Each interview lasted 1-2 hours. All interviews were transcribed verbatim for further analysis.

**Preliminary Analysis Results**

While this study is a work in progress, the constant comparison approach that we used has generated some results that are firmly grounded in empirical data. For the search strategies that are used to discover new, unread works, romance readers use specific tracing strategies to ensure a pleasurable reading experience. Author tracing and translator tracing were common, and their goals were obvious: if a reader has enjoyed an author/translator’s previous work, she might also enjoy the next. Book series or story series tracing was another tracing strategy. Series tracing is not about a serialized story, but the identification of stand-alone stories that are interconnected in some ways, e.g., by story characters, events, or an imagined universe.

Beyond the tracing of the familiar, romance readers employ various information channels and sources to obtain information about new, unread works. Internet forums, book ads, promotional texts, peer recommendation were all frequently consulted information sources. Description about the story genres, topics, or subject matters is commonly sought information, and the purpose was obvious. However, participants also look for the following information to assist their book selection for certain reasons.

1. **Information about the story ending:** for romance readers, whether the story has a good ending or bad ending constituted very importance selection criteria. Some participants were strongly against stories with bad ending and they absolutely avoided them. For some participants, knowing a story ends well a priori also helps them survive the frustration and plights in the storyline.

2. **Book/story titles:** some participants considered the book/story titles as an effective criterion because the wording used in a title or the way a title is composed can show the styles and tastes of the author. Usually, this information is used to avoid works that do not meet a reader’s expectation and taste.

3. **Cover arts:** in romance reading, the design and the aesthetic of the cover arts may significantly influence a reader’s desire to read because it visualizes the imagined story characters or themes. An appealing cover art may attract a reader who previously possesses only limited interest to the work. Some participants actually select based on cover arts.

4. **Work formats:** some participants avoided the more innovative story formats such as interactive stories that are popular in Internet. Other participants examined the way a book or Internet text is formatted to determine if it will be pleasurable for the eyes.

5. **Popularity and story quality:** evidence of popularity of a work does reinforce a reader’s possible selection such as recommendations from trusted peers and/or by many readers. In contrast, information showing problematic or bad quality of a story such as unreasonable story development, ill ending, and distasteful characters may put off the selection.

We will continue to interview more readers with diverse tastes and reading interest to uncover more search strategies and information types that are used in their information seeking.
References

“Encourage YOUR Research!”: The Development of a Concept and Support Programs for Graduate Students in Chiba University

Chiiro KUNIMOTO, Sayuri KUBOTA, Yudai ANEGAWA, Shigeo FUJIMOTO, Satoshi OKADA, Yasuhiro HIGAKI, Hiroya TAKEUCHI, Yuta KOBAYASHI, Miyuki SHUKUYA, Yui ISHIDA, Tomoya SHIOTA, Mariko TAKEUCHI, Hideaki NODA, Yoriko IKEJIRI, Naoko YONEDA, Ako Izuka, Teruyuki AYABE

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Abstract. Academic Link Center (ALC) and Chiba University Library started a wide range of learning and research support programs named Encourage YOUR research! in 2019. The basic concept of this is for graduate students themselves to be aware of their necessary / insufficient abilities and “fill in pieces” like a patchwork. In order to complete this concept, a step-by-step support program consisting of four steps to encourage them is being developed.

Introduction

The importance of learning support has strongly recognized by university libraries in Japan. As a result, the installation rate of learning commons reached up to 67.8% in 2018 [1]. Research support for graduate students is, however, still out of main concerns for many Japanese university libraries. Under such circumstances that the improvement of Japanese research power and productivity is strongly required [2], it is urgently needed to support them.

Our Concept and Programs

ALC and Chiba University Library has developed a concept since 2017 and started a wide range of learning and research support programs named Encourage YOUR Research! in 2019. It is intended to cooperate with “transverse courses” across all the graduate schools in Chiba University, which are to cultivate the “three abilities”, being related to 1) basic research, 2) leadership/education, and 3) highly skilled professionals, which graduate students should acquire. ALC/Chiba University Library developed the concept and their programs based on various interviews with faculty members and graduate students. The ultimate goal of the concept is for graduate students themselves to be aware of their necessary / insufficient abilities and “fill in
Features of “Encourage Your Research!”

We are going to achieve our goals with the following three elements: 1) building a step-by-step program consisting of four steps, 2) conducting a thorough needs survey and discussions among supporters beyond departments, 3) becoming a connection point among resources, support and systems inside and outside the university.

Building a step-by-step program consisting of four steps

The focus of this program is to support the practical acquisition of abilities required for graduate students. In order to complete this, there needs to be a mechanism that encourages students to “do it themselves”. We have built therefore a step-by-step support program consisting of four steps to encourage their research.

• **STEP 1**: Guidance to take the first step (one-way and multi-person lecture)

• **STEP 2**: Drop-in sessions to try and use new knowledge, Literacy, and Skills (interactive and small group training)

• **STEP 3**: Consultation based on assignments (one-on-one consultation)

• **STEP 4**: Self-learning system with LMS for graduate students seeking applied knowledge

These four steps are based on the “actual behaviours” of the students of Chiba University, as revealed by qualitative user surveys and institutional researches.

Conducting a user survey and discussions among supporters beyond departments

The actual program construction work has carried out in the following three stages since 2017.

• **STAGE 1**: Needs surveys; conducted Focus Group Interview (FGI) for graduate students, personal interviews with teachers, IR and various on-campus surveys, and integrated analysis of the results

• **STAGE 2**: Case studies; conducted literature surveys and study visits in Asia and the Pacific.

• **STAGE 3**: Supporters discussion; conducted FGI with peer supporters (graduate students), participated in Faculty Development of graduate school, shared information with University Research Administrator, and exchanged opinions with University Learning Advisor.

Becoming a connection point between resources, support and systems

From the needs surveys and discussions, we understood in-campus support system
is strongly compatible with different customs and systems in each research community, and support implementation and information dissemination are being carried out “separately”. The situations, such as the absence of “organization and concentration of information”, confuses students and hinders their research. In order to flexibly cope with various “differences” that exist in each research community, it is important that more people in the university collaborate. With this in mind, ALC / Libraries will roll out various programs for both online and offline in order to function as “information organizers and concentrators”. In our poster, we would like to introduce the new service model and the actual contents, issues and ideas.

References


Photovoice for Student Out-of-Class Learning

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Abstract. Background. In recent years, active learning has been introduced in higher education in Japan. Students are also expected to learn actively out of class. In universities, different departments and institutions have been providing support services for student out-of-class learning. However, student out of class learning is considered to be diverse, unlike learning in the classroom. Thus, it is difficult to assess whether the support services are useful and effective for out-of-class learning. Objectives. The purpose of this research is to investigate the actual situation of student learning out of class on a large scale and understand what students consider as learning and how they are learning. Methods. A photovoice survey will be employed for collecting students’ actual learning situations. This qualitative method is used to capture actual situations with photos as objective information. On the other hand, it is an unsuitable method for collecting large-scale data. In this study, we will introduce a system for analyzing a large quantity of photos and information. Contributions. The results of the survey will contribute to discussions about improvements in existing learning support services and the development of new ones.

Introduction

In recent years, active learning has been introduced in higher education in Japan. Students are also expected to learn actively out of class. In universities, different departments and institutions have been providing support services for students, and libraries provide physical learning space and support for students learning out of class. Thus, it is important to discuss the role of libraries in student learning.

To provide appropriate learning support, it is necessary to know the actual situation of university students who are learning outside the university classroom. The final goal of this research is to propose effective learning support based on the actual situation. As the first step of this research, we plan to conduct a survey to understand the actual out-of-class learning situations of students. There are several methods for comprehending the actual situations, such as survey questionnaires, interviews, and observational studies. However, students learn in various places and on various occasions, so it is very difficult to collect precise information on each learning session using these methods. In this research, we will employ a photovoice survey to collect learning records.
The Photovoice Survey

Photovoice is a process by which people can identify, represent, and enhance their community through a specific photographic technique developed and articulated by Wang and Burris [3] in the 1990s. Tewell [2] stated that photovoice is a qualitative method that combines visuals and narratives in exploring community issues. Participants take photos in response to a prompt, and generally the researcher conducts interviews or focus groups with the photos as a focus and way of eliciting responses [2]. We can clearly comprehend the actual situation about the university learning environment using photovoice; this includes what students consider as learning or the tools and materials they use for learning.

In Japan, research cases using a photovoice survey have focused on the out-of-class learning content and environment for students affiliated with Chiba University, Yamaguchi University, and Doshisha University. For example, Chiba University conducted a photovoice survey of nine undergraduate students regarding their learning situations inside and outside the library, specifically analyzing learning outside the library. It was found that most participants recognized various contents learned outside of class as learning and spent time outside the library [1]. Photo selection and interviews were conducted according to the general photovoice survey method. However, because of the time-consuming requirements for categorization and analyses of photos and interviews, the number of participants was small.

For obtaining an overview of the student out-of-class learning experience, we need to conduct a survey with a large number of people. We intend to employ a system for analyzing a large quantity of photos and information, asking participants to take photos of their learning environment (e.g., materials, tools, equipment, and surrounding conditions) and assign tags to explain the photos they upload. We will analyze these photos and the assigned tags, and in some cases, we will conduct interviews to fill in gaps in the information obtained.

Next Step

As stated previously, we plan to conduct a photovoice survey that will include a large number of participants. From responses to this survey, we will be able to understand the student out-of-class learning situation. In the future, we will assess learning support services provided as well as those needed.

Acknowledgement

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References


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Imagination in Library…Takes You Everywhere, Maker Studio… Inside The Library

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Abstract. It appears that imagination is a uniquely human capacity that empowers us to develop our surroundings in generating and creating new ideas. Imagination lets our children to think beyond all possibilities and be more creative. Indeed, it has a significant impact their learning. Libraries are about much more than books-and they always have been. Nowadays, hands on activities are being carried in libraries in order to provide us with more knowledge. Libraries now become a comprehensive space for a variety of learning processes that does not only limit to reading but people can also look at, listen to and try new things in a fun and creative way. With the joint collaboration with Petrosains the discovery centre, Kuala Lumpur, a Maker Studio was set up by Petrosains in Johor Public Library. Providing a perfect place for visitors to engage in STEM (Science, Technology, Engineering and Mathematics) while they invent, build and innovate. All materials and toolset were given with no charges.
Read Too Easy (COBRATE)

Norlina Binti Haji Ahmad, Nor Hayati binti Yusof, Nuraisyah Hajjar Binti Ismail, Muhamad Azim Bin A’nsori, Ismail Bin Ahmad
Perbadanan Perpustakaan Awam Pulau Pinang

Abstract. The uniqueness of COBRATE published by Penang Public Library Corporation (PPLC) is to ensure that there will be no discrimination between the normal and the special needs (Blind category), and can attract multiracial people to bring their family members to read together. The COBRATE collection recently has 1,337 units since 2015 and a loan of 2,690 units. COBRATE is also available in various genres such as fiction, religion, family, hobbies, and many more are offered to the special needs (blind category). PPLC has highlighted an innovation, a special form of printed material (Braille) combined with a book (text) to be introduced (COBRATE) to the special needs (blind category) by enabling everyone to read. COBRATE can attract and create opportunities for special needs (blind category) to ensure they are not left behind when getting information in the ever-changing technology flows. In order to ensure that there is no discrimination between the normal and the special needs (blind category), COBRATE is suitable for all users, namely in Malay and English, but the most unique is when it can also be found in Chinese as well as Tamil and translated into Braille format. This will create a society or nation that loves to read and establish close family ties between mother, father and child when sharing information together by reading the same book.
Let’s Read Together for 10 Minutes with Welfare Recipients @ Development Committee & Coordination of the Legislative Assembly (JAPERUN) of Melaka

Suhaimi Bin Sarijan dan Mohd Ridzuan Bin Abdul Jalil
Perbadanan Perpustakaan Awam Melaka

Abstract. Melaka Public Library Corporation (PERPUSTAM) has taken the initiatives in widening the coverage of Let’s Read Together for 10 Minutes which started back in 2014 at national level by initiating similar effort. This program is collaborating with Development Committee Coordination of the Legislative Assembly (JAPERUN) of Melaka and Department of Social Welfare. PERPUSTAM is targeting welfare recipients to participate in this reading program as one of the main activities to them which mainly comprised of senior citizen community at 28 JAPERUN all over Melaka. By having this reading encouragement program, PERPUSTAM has succeeded in attracting approximately around 100 up to 300 peoples at each location which consists of JAPERUN staff members and the welfare recipients to encourage them to read. Based on statistical data gathered, this program has been successful in getting the involvement of approximately 60,000 participants throughout the whole year of the implementation of reading program amongst JAPERUN level. As for the incentives and token of appreciation to JAPERUN who has contributed with full commitment, PERPUSTAM has awarded them with best participation award for their involvement in this reading program.
Abstract. Perpustakaan Sultan Ismail is one of the departments under City Council of Johor Bahru where we provide services to the community around Johor Bahru. We serve the community by providing them the information that they need, serving the services by doing a program to school, Community Rehabilitation Center and also doing the activities in library. The read and ride program are collaborate with the Happy Rider Connect whereby this is NGO. The purpose of providing this program is to educate our kids about safe cycling, help kids to do beneficial activities and do the outdoor games, approach the modified bike kids, and educate them to helping each other and strengthen the relationship with the community. The program is on every Saturday every 3rd month. The target participants are the community area itself, the Happy Rider Connect, Perpustakaan Sultan Ismail staff and also the volunteer. The services that we provide are such as mobile bus, reading, indoor games, and colorings. We also collaborate with the NGO to do the plogging and volunteering for the kids before they go to riding a bicycle. From the services we can identify illiteracy among the kids, improve the second language and kids will use the appropriate gears when riding the bicycle.
One Day, One Heart

Mohamad Sani Abdullah, Syahlizan Sainin. Tengku Tarmizi Bin T.Aziz
Perpustakaan Sultan Ismail, Majlis Bandaraya Johor Bahru

Abstract. Sultan Ismail Library allocates a whole day providing a interactive activity with disabled children and adults in Community Rehabilitation Centre (PDK) in Johor Bahru City Council area. We serve the community by providing them the information that they need, the services by doing a program to school, Community Rehabilitation Center and also doing the activities in library. The purpose of spending one day at the Community Rehabilitation Center is to give awareness about humanity and educate the values of caring regardless of physical condition, created a platform to encourage MBJB involvement in humanitarian activities and help them to build a confident around normal people. The program we provide is in 4 times per year where we targeted the participants are from the PDK coach itself, volunteer from the School or Universities and also Perpustakaan Sultan Ismail staff itself. The services that we provide are such as indoor games, knowledge sharing, art and craft, movie screening and storytelling. From the services we can raise awareness towards people with special needs and introducing City Council services to the disabled person.
RsDA Inventory Database

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Abstract. To improve the findability of research databases in the Asian region, we are creating RsDA inventory database. We defined the schema and implemented tools to input and search inventory data.

Overview

Many databases have been built for academic researches. Some databases are well-known, but there are a lot of small databases only known in their country. We focus on those in the Asian region and have built a community and organized workshops (RsDA international workshop http://rsda.mydatabase.jp) for sharing, using and preserving those databases. As a part of the activities, we are creating the RsDA Inventory Database, which makes those databases more findable. We create schema and tools to input and search inventory data.

The process of the inventory data collection is as follows:
1. The participant copies Google Sheets template and fills it.
2. The participant shares the spreadsheet with the manager of RsDA inventory.
3. Once the submission is approved, spreadsheets are combined and transformed into CSV, JSON and Turtle periodically.
4. Search engine loads the formatted data.

For making the template in the first step and instructions for filling that, we defined the data model behind the vocabularies (Fig. 1). Inventory is the collection of Inventory Entry, each of which describes each Dataset. Dataset is the contents of the database website. Each Dataset is a bundle of Data, which is a part of Source Object and its Description (Object Description). Source Object can be a book, digitized images of that book, a geographical feature, and so on. If Source Object is in digital format, that can be included in the Dataset. Object Description is typically the metadata of Source Object. However, if the Source Object is abstract concepts, Object Description can be the primary data.

Inventory Entry mainly describes attributes of the Dataset, like title, description and contributors of the Dataset, but the name of the Source Object or Language of Object. Description is informative for users of the Dataset. Thus, such information is included in an Inventory Entry. Tbl.1 shows a part of the schema table¹ Some vocabularies are split into some columns in the Google Sheets because languages or formats of values can be varied.

¹
There are some world-wide inventory databases. re3data\textsuperscript{ii} is a famous registry of research data repositories. Our inventory, focusing on the Asian region and small data, can forward dataset information to that registry. This is one of the future works. Google Dataset Search\textsuperscript{iii} also collects dataset information from each website by reading embedded JSON-LD written in schema.org vocabularies\textsuperscript{iv}. We can generate that JSON-LD based on inventory information and help each institute to embed it.

Acknowledgement: We would like to thank participants of the 4th RsDA workshop for fruitful discussion.

\begin{table}
\centering
\begin{tabular}{|c|c|c|c|}
\hline
Schematic Vocabulary & Target & Meaning & Format \tabularnewline
\hline
URL & Dataset & The URL of the Dataset & URL \tabularnewline
Title & Dataset & A name given to the Dataset & string in the original language \tabularnewline
Subject & Dataset & The topic of the Dataset & string in English \tabularnewline
Contributor & Dataset & An entity responsible for making contributions to the Dataset & string; URI \tabularnewline
Source & Source Object & A title of related resource from which the Source Object is derived. & string in the original language \tabularnewline
Source Object Type & Source Object & The nature or genre of the Source Object & string; URI \tabularnewline
Source Object Language & Source Object & Languages of the Source Object & \tabularnewline
\hline
\end{tabular}
\caption{Schema of the Inventory}
\end{table}

\textsuperscript{1} The full schema table is available here: http://rsda.mydatabase.jp/inventory/RsDA_Schema_01.pdf
\textsuperscript{2} https://www.re3data.org/ The schema information of re3data is available at https://www.re3data.org/schema.
\textsuperscript{3} https://toolbox.google.com/datasetsearch
\textsuperscript{4} https://schema.org/Dataset
Linked Archive of Asian Postcards

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Abstract. We have collaborated with Lafayette College and Harvard-Yenching Library to build the integrated search over postcard databases of all the institutes. We call the integrated search website Linked Archive of Asian Postcards. In this paper, we describe the architecture design of the integrated search. We share metadata with the least requirement for integrated search. With some optional fields provided, users can find those items through specific search interfaces (map, timeline and category).

Overview

This paper describes the implementation of an integrated search for digitised postcards. We have focused on postcards of Asian countries in the 20th century and held a workshop primarily focused on Manchukuo. In this paper, we call the website Linked Archive of Asian Postcards (LAAP)¹. The main problem to be approached is to design the architecture which enables researchers, especially historians, to find what they want in a sustainable and scalable way.

One of the well-known related works is the Europeana Collections, which provides access to over 50 million digitised items with sophisticated search and filter tools. They define the detailed Europeana Data Model² and collect metadata from each institute. Based on that information, they provide textual search and search by colours, sources, topics, people and time periods.

On the other hand, we required only four types of metadata. URI, title and a thumbnail of each item is apparently needed in textual search interface (Fig. 1) and description is a textual clue for retrieval additional to the title. This small number of required metadata field lowers the barriers of collaboration. Each institute provided those metadata in CSV format. For example, our institute uploads our metadata to a data repository.

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Then, the developer of LAAP concatenated each metadata and implemented textual search (Fig. 2). We also developed a map search interface, which uses place names as optional metadata. We geocoded those place names automatically using Google Map API and corrected errors manually based on the domain knowledge of historians. We regard this data as a tailored gazetteer. Data can be preserved for long-term than applications, and if data is clean enough and with complementary data, applications can be implemented in a straightforward manner.

Additionally, adoption of the International Image Interoperability Framework (IIIF) enables users to curate and show images across different databases directly.

**Acknowledgement**: We would like to thank Paul D. Barclay (Lafayette College), Kuniko Yamada McVey (Harvard-Yenching Library) and other collaborators for sharing the data, organizing the workshop and sending feedback on the implementation.

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*1 https://asian-postcards.mydatabase.jp/*

*2 http://pro.europeana.eu/page/edm-documentation*

*3 CSEAS postcards collection, in HARVARD Dataverse https://doi.org/10.7910/DVN/7ZEYNX*

*4 https://asian-postcards.mydatabase.jp/map/*
Towards a Proficient Health Information Professional: 
Improving LIS Programs on Health Sciences Librarianship

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Abstract. Background. In 2017, the Medical Library Association enumerated six professional competency areas which must be inherent for prospective and currently practicing health information professionals. The six competency areas are as follows: (1) Information services; (2) Information management; (3) Instruction and instructional design; (4) Leadership and management; (5) Evidence-based practice; and (6) Health information professionalism. While some of the competency areas enumerated by MLA can be addressed by the present subjects offered in curricular programs of many library and information science (LIS) schools in various countries, there is a need to introduce subjects dedicated to health sciences librarianship and/or improve currently offered subjects in health sciences librarianship to address all aspects of the competency areas.

Objectives. This study aims to propose a program of study for health sciences librarianship within the Asia-Pacific context.

Methods. Performance indicators for each competency area of MLA 2017 competencies were examined. Knowledge and skills required for a health information professional which are not covered by basic and/or core courses in LIS programs were identified for design of necessary courses.

Results. Syllabi for six 3-unit courses for an undergraduate and/or graduate program in LIS were designed to be proposed as elective courses for students who intend to pursue health sciences librarianship as a specialization.

Contributions. The proposed courses on health sciences librarianship of this study may be adapted by any LIS program in the Asia-Pacific region to better prepare prospective health information professionals.

References

Sentiment Analysis of Tweets Mentioning Research Articles in Medicine and Psychiatry Disciplines

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Abstract. Recently altmetrics (short for alternative metrics) are gaining popularity among researchers to identify the impact of scholarly publication among the general public. Although altmetrics are have been widely used nowadays, there has been a limited number of studies analyzing users’ sentiments towards these scholarly publications on social media platforms. In this study, we analyzed and compared user sentiments (positive, negative, and neutral) towards scholarly publications in Medicine Psychiatry domains by analyzing user-generated content (tweets) on Twitter. We explored various machine learning algorithms, and constructed the best model with Support Vector Machine (SVM) which gave an accuracy of 91.6%.
Measurement and Visualization of IIIF Image Usages

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Abstract. Background. It is important for libraries and museums to understand how digital collections and their contents have been used for many reasons such as improvement of digital collections and accountability for stakeholders. The usage has been analyzed following two steps. Selection of a metrics. A metric that suits for the purpose of the analysis is chosen. Then, the metrics is measured based on data such as server logs. Second, visualization of the result. The result of the analysis is visualized to facilitate users to understand. For instance, chars have been used. In these years, a lot of digital collections have adopted IIIF (International Image Interoperability Framework), which promotes mutual use of images among institutions. IIIF defines a set of APIs to enable interoperable use of images over different institutions. In IIIF-compatible digital collection, images are fetched via IIIF Image API. Every time an image is zoomed and panned on an image viewer, the image is called via IIIF Image APIs with varying the value of region. Therefore, we can analyze the detailed image usage by examining the values of requested region. This paper demonstrates how to measure the detailed image usage and how to visualize the result of the analysis. Specifically, we employ the number of accesses to each pixel as a metric and visualize the result by heat maps.
Creating a Security Methods Taxonomy for Information Resource Management

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Abstract. We propose an approach to creating methods taxonomy for information resource management. The framework of the taxonomy is based on facet analysis and a tetra-facet model of security, object of protection, source of insecurity, and method of protection. A taxonomy of security methods can be created by combining two of the facets: source of insecurity and method of protection.
A Dynamic Microtask Approach to Collecting and Organizing Citizens’ Opinions

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Abstract. Background. A wide variety of resources in databases are essential for scholars to conduct high-quality studies. However, there is no comprehensive one-stop shopping site for scholars to explore or identify databases that could be of help. Developing an integrated catalog or a meta-search system for databases could be two potential solutions. Nevertheless, these two solutions are both highly costly. It is crucial to conduct need assessment prior to its implementation. Objectives. The current study aims to assess humanities and social science scholars’ needs for an integrated catalog or a meta-search system for databases, and to identify a feasible and helpful approach. This study also aims to develop a prototype system based on the need assessment. Methods. A web survey with 215 scholars and two follow-up focus group interviews were conducted. Questions regarding scholars’ database use preferences and their thoughts on databases catalog and meta-search system were asked. Results. While scholars agreed that a selective meta-search system could be helpful, they all concerned its feasibility. By contrast, all scholars believed a browsable and searchable databases catalog could fulfill their primary research needs. Contributions. Based on results of the need assessment, a catalog with nearly 1,000 databases and their metadata were developed as a live prototype system at http://140.112.180.236/. The system helps scholars easily explore and identify relevant databases of interest, and thus helps expand and deepen potential interdisciplinary studies.