ONLINE INTERCAMPUS COLLABORATIVE DATABASE OF LIBRARY AND INFORMATION SCIENCE THESES: DESIGN AND NEEDS ANALYSIS

Dridge Paul A. Reyes
School of Library and Information Studies
University of the Philippines, Diliman, Quezon City, Philippines

Abstract
This study presents the needs and design preferences of potential users, contributors, and administrators of a proposed Online Intercampus Collaborative Database of Library and Information Science Theses from various LIS academic institutions in the Philippines. With the use of survey questionnaires and interviews, findings show that there is a general positive agreement on the high need to establish such database. Both users and contributors generally report their significant need for ease of use and research utility. However, users are more inclined to full-text access than contributors. Both groups report a lower preference on online public access of the database. One of the academic institutions included in the study, the University of the Philippines Diliman, expresses full support on this project and its willingness to spearhead, manage, and facilitate the database. With the initial results of this study, further studies with more respondents, and actual design and implementation of this database are highly recommended to be done.

Keywords: academic libraries, union catalogue, database design, needs analysis, library and information science schools

Introduction

Research is one of the vital functions of the academe. More often than not, it serves as a requirement for a student to finish a research-driven university's academic program. In its most common configuration, academic research comes in the form of theses and dissertations from undergraduate students and graduates students, respectively. However, beyond academic requirements, these researches must be focused to achieve a quality that should be of relevance to nation-building ("The Future of Research Universities," 2007). As such, it is vital for researchers to have access to local literature.

Research work, however, is not without challenges. According to a recent study by Dadipoor et al. (2019), "the most prevalent barriers to research activities among researchers" was "limited access to information sources" (p. 1). This is further supported by older studies by Farzaneh et al. (2016) and

Abushouk et al. (2016). In the Philippines, "identification of researchable issue" and "collection and choice of related studies/theories as bases to support the study" (Bocar, 2013, pp. 4–5) were also identified as difficulties encountered by student-researchers. Cacdac (2014) also talked about how research in the Philippines are short-term in nature as they are neither carried over to further prospective research or utilized for the client's benefit, due to the lack of information of research.

Despite the generally increasing research output in the Philippines, due to the presence of specific field research centers, policies for research still needs changing and reforming (Cacdac, 2014). Academic research universities in the Philippines are a wealth of research resources as they produce and store research in their own repository. Often, however, these repositories, or even merely their catalogues, are only accessible through their own personal system. These researches reach a wider audience only when published in online subscription-based journals. If a researcher desires to have a glimpse of the research landscape, one must then consult each respective database separately, provided one is available.

One potential solution to aforementioned issues is the establishment of a union catalogue: "a catalogue that contains not only a listing of bibliographic records from more than one library, but also locations to identify holdings of the contributing libraries" (Feather & Sturges, 2003, p. 451). An online union catalogue has the potential to be indexed by search engines thus "facilitating discovery of, access to, and maximizing the value of disparate library collections" (Wakeling et al., 2017, p. 2167).

The union catalogue is not something novel. It has been in use to aggregate knowledge as early as 1956 with the publication of the National Union Catalogue, showing every significant title printed and acquired by American Libraries (Schwegmann, 1957). Later years would see its evolution from its simple purpose of centralized record, identification of availability, and location. There have been shifts into the concept of fusion catalogue where union member institutions provide different cataloguing data sets, and are blended together. And with the advent of technology comes the need for a web-based catalogue, "where direct and immediate access to the needed library materials is the priority" (Cheung & Lau, 2014, p. 98).

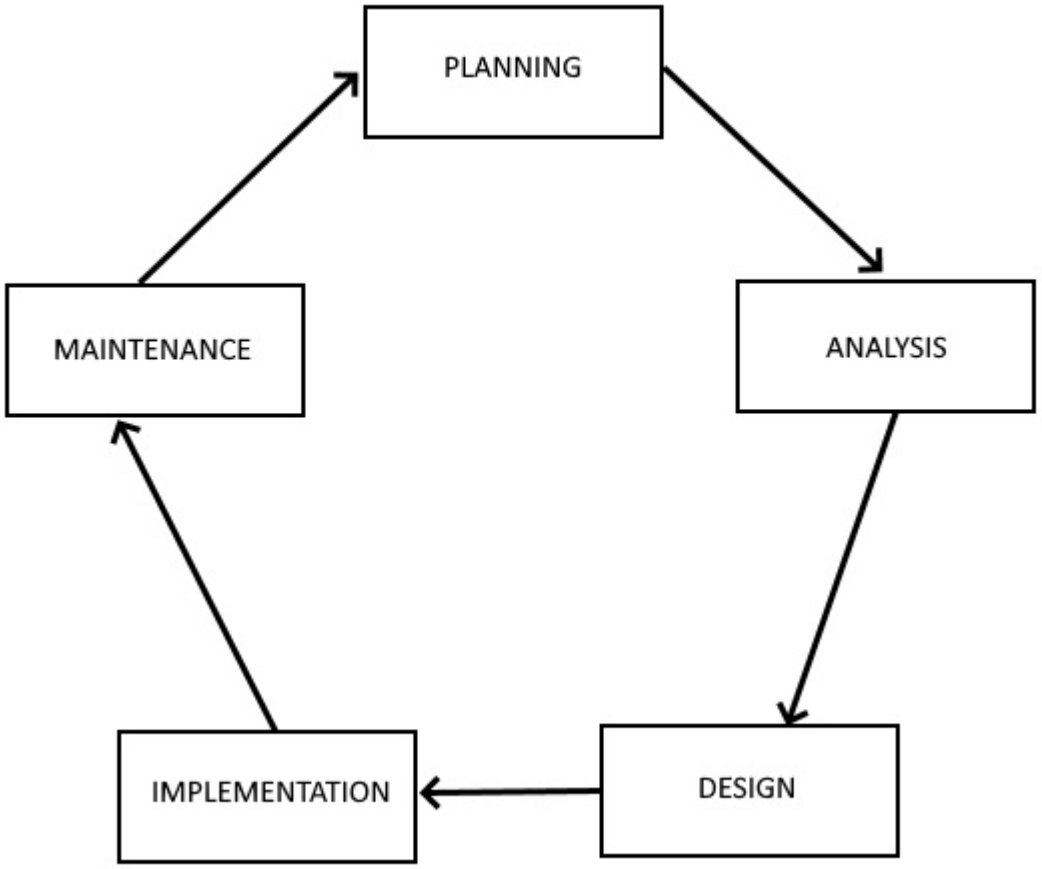
Chamberlain (2013) further notes that online union catalogues serve as an alternative in the global networked environment where users generally go towards search engines and social networks for their information needs. This can never be truer as in the case of the world's largest bibliographic database, a global union catalogue as it is, and that is the WorldCat.org, reported to have catered to more than 200 countries and territories (Wakeling et al., 2017). Despite this, WorldCat and search engine transactions do not necessarily translate to library connections, especially in the local context.

Local union catalogues, therefore, have a vital role to play in the progress of research by aggregating the local landscape. A centralized aggregation of local researches meets the "need to expose the vast wealth of library collections data produced" (Teets & Goldner, 2013, p. 436). A mixed approach of physical and virtual catalogues have proven successful in localized contexts (Boberić-Krstićev & Tešendić, 2015). Despite this, very little attention has been paid to union catalogues in the local context. Or perhaps what little attention is out of sight due to lack of ease of access. Further, for these aggregates to fulfil their potential, a clear understanding of the users' potential information needs and tasks to be done as they access these data (Allen, 1996). Within this context, this study aims to determine the information needs and design preferences for a potential online database with special focus on library and information science theses.

Theoretical and Conceptual Framework

A systems development life cycle (SDLC) is an outlined process composed of a number of steps used by the software industry in planning, designing, building, testing, and delivering information systems. SDLC delineates the steps as to provide for a system meeting or exceeding user expectations, based on

Figure 1
General SDLC Model



Note. Adapted from *Modern Systems Analysis and Design* (8th ed.) by J. S. Valacich, and J. F. George, 2017, Pearson Education. Copyright 2017 by Pearson Education.

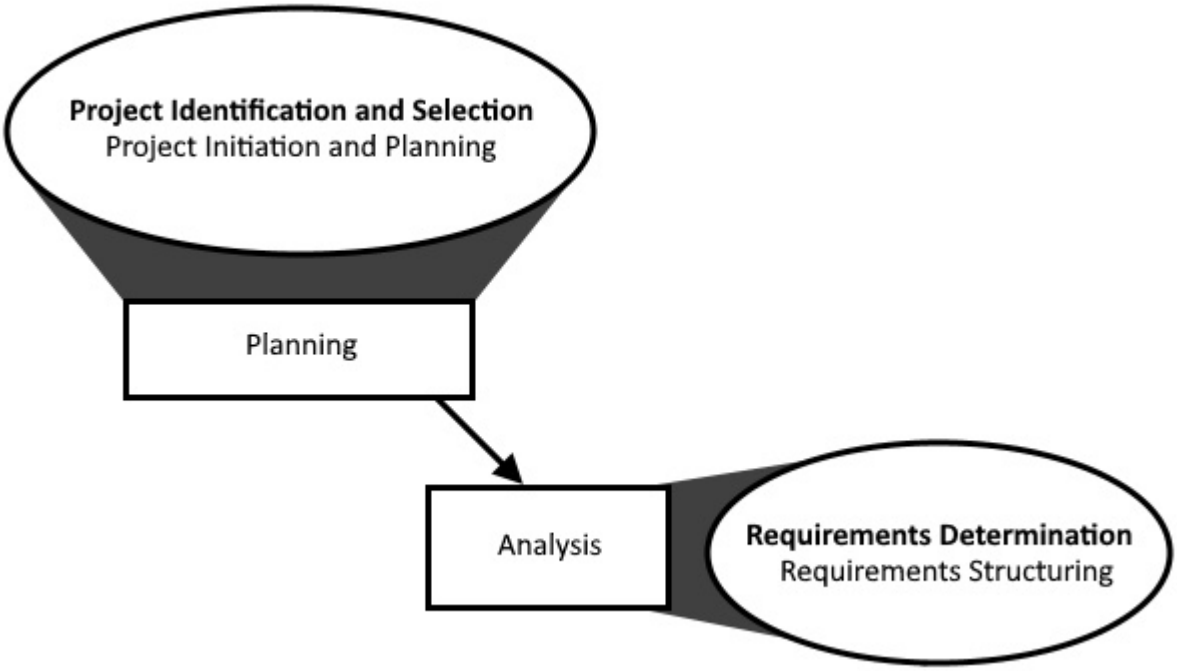
their requirements, by guiding the project in clearly defined phases ("Systems development life cycle," 2013). For the purpose of this study, the simplest general model of SDLC (Figure 1) is used.

Hoffer et al. (2008) mentioned that while the life cycle may appear to be sequentially ordered in set phases, it should be considered as circular in nature, with no pre-identified beginning or end. Any given SDLC may return to an earlier phase if necessary, and may begin anywhere, or done at the same time, depending on the program's need. The cycle, however, still depends on the existing product of the other cycles as its input. Thus, in the case of a new proposed software, one has no option but to begin with the planning phase. Specifically, this study focused with the first two steps: planning and analysis (see Figure 2).

Planning involves the identification, selection, and initiation of the project. This phase aims to answer the following concepts, contextualized in this study:

- Perceived and Real Needs, which is determined by the potential users' experiences;
- Existing Available Resources, which is determined by the institutions' assets: financial, manpower, and informational, among others;
- Current Organizational Environment, which is determined by the institutions' willingness to cooperate along with other factors including administration, legalities, and technology; and,
- Evaluation Criteria, which includes the above criteria along with those to be discussed under analysis (Valacich & George, 2017).

Figure 2
SLDC Phase 1 and 2



Note. Adapted from *Modern Systems Analysis and Design* (8th ed.) by J. S. Valacich, and J. F. George, 2017, Pearson Education. Copyright 2017 by Pearson Education.

During this phase, three important questions must be answered:

1. How much effort should be expended on the project initiation and planning process?
2. Who is responsible for performing the project initiation and planning process?
3. Why is project initiation and planning such a challenging activity? (Pressman, 2014)

Analysis involves Requirement Determination and Requirements Structuring. Requirement Determination collects "information on what the system should do from as many sources as possible." (Valacich & George, 2017, p. 216). This phase will also include the identification of what data and features the users would expect from the project, policies and guidelines affecting the project, and the source, volume, handling, and responsibility of data, among others. Requirement Determination involves methods including interviews, ocular observations, surveys, and document analysis, all of which are incorporated in the study's methodology.

In Requirement Structuring, information gathered in Requirement Determination are processed and translated for model representation. Requirements are graphically represented into functions or processes around the system, its environments, and the components within it. These graphical representations take the form of Data Flow Diagrams (DFD).

Objectives and Scope

Ample related literature is vital in any kind of research endeavors. Ideally, local literature should be consulted to determine current research landscape and to further improve past studies in the same setting. Thus, a centralized database for existing local literature would prove beneficial to researchers. Specifically, this study aims to propose an online collaborative database of existing theses in the library and information studies from academic institutions offering library and information science (LIS) programs. The actual need of such and desired features are determined from potential users. Design, potential cooperation,

and recommendations have also been consulted from potential member institutions. The resulting proof of necessity and proposed design may serve as a basis for the actual implementation of such a project.

This study focused on three academic institutions offering LIS, namely: University of the Philippines Diliman, University of Santo Tomas, and Centro Escolar University-Manila. The first step of the systems development life cycle—Waterfall Model is followed in this study, namely the Requirement Analysis. The resulting desired needs and recommendations is digested and outlined to serve as basis for subsequent steps of the model for potential future implementation.

Method

This study conducted needs analysis through survey questionnaires. This was done in order to invite users to report their actual needs and desired features. LIS students and library staff were provided questionnaires to answer. Both printed and online questionnaires were utilized in accordance with the institution's preference. Respondents were requested to elect for their preferred features and provide further comments and suggestions. Questionnaires for researcher users and library staff users were similar with an added section of administrative features for the latter group. Unstructured interviews were also done to determine the potential cooperation and recommendations of the academic institutions. Documents pertinent to the interview were also requested and provided to the author for further reference and analysis. The needs and desired features for both researchers and library staff users were both collected through survey questionnaires. As for the institutional cooperation and recommendations, the author paid attention to the insights shared by the institutions' administrative representatives.

ANALYSIS OF DATA

User Needs Analysis

Demographics

Printed survey questionnaires were provided to LIS students and alumni available for manual distribution, an online version of the same were also provided for ease of access. Both versions depended on the snowballing method of sampling. A total of 153 responses were collected from 13 different institution affiliations.

Research Needs

Frequency of using the internet for research, with a scale of 1 as never and 5 as always, is reported with an average score of 4.33, indicating prominent dependence of respondents to online sources.

Difficulty of locating relevant local literature, with a scale of 1 as very easy and 5 as very difficult, yielded an average score of 3.43, an above median difficulty experienced by the respondents.

As for the necessity of an online theses database, with 1 as not necessary at all and 5 as highly necessary, respondents provided an average score of 4.64 indicating respondents high need.

Design Needs

Potential users rated each potential feature on a scale of 1 to 5, 1 being the least desirable / not needed feature and 5 being the most desirable / highly needed feature. Results are summarized in Table 1.

Basic search features limited by title, author, subject, location, and year only received an average score of 3.61, 3.36, 3.61, 3.21, and 3.22, respectively. All of which deemed of above average necessity in contrast with the ability to search all fields provided with a high average score of 4.38.

Advanced search features were all also provided above average necessity with phrase searching at 3.88, root searching at 4.12, Boolean at 4.2, and combinations of the above at 4.31. This indicates potential users' familiarity with advance searching alternatives and assures potential efficient usage of the database.

As for the display options, all were given high scores, with location at 3.95 getting the lowest of them. The displays of title, author/adviser, date, and abstract

received 4.52, 4.19, 4.32, 4.27, and 4.4, respectively. It also bears special note that the display of full paper received a high average score of 4.04, indicating potential users' preference to full-text access, alongside giving importance to associated metadata.

As for accessibility, local access, campus access, user access, and public access received 4.03, 4.23, 4.46, and 3.82, respectively. Interestingly, Online Open Public Access received the lowest score among the alternatives, albeit having an above median score. In contrast, access through user specific access codes got the highest score. This may indicate underlying concerns from the users and may merit further study.

Bookmarking features all received high scores above 4 with record bookmarking at 4.23, bibliography creation at 4.08, and bookmark email sending at 4.07, which may indicate users' high need for ease of research utility.

It should also be noted that several respondents recommended, in the comment area, that the database provide a list of newly-added theses. Some sort of reader's advisory corner or a RSS-like subscription may be implemented to meet such necessity.

Contributor Needs Analysis

Demographics

Printed survey questionnaires were provided to librarians handling LIS collections available for manual distribution, an online version of the same were also provided for ease of access for other universities. Both versions depended on the snowballing method of sampling. Due to the limitations of the study and the number of librarians per institution, only a total of 4 respondents from 2 institutions were collected.

Research Needs

Frequency of using the internet for research, with a scale of 1 as never and 5 as always, is reported with an average score of 4.75, indicating prominent dependence of respondents to online sources.

Difficulty of locating relevant local literature, with a scale of 1 as very easy and 5 as very difficult, yielded an average score of 4.25, an above median difficulty experienced by the respondents.

As for the necessity of an online theses database, with 1 as not necessary at all and 5 as highly necessary, respondents provided an average score of 4.5 indicating respondents high need.

Design Needs

Potential contributors rated each potential feature in a scale of 1 to 5, 1 being the least desirable/not needed feature and 5 being the most desirable/highly needed feature. Results are summarized in Table 1.

Basic search features limited by title, author, subject, location, and year only received high average scores of 4.5, 4.5, 4.75, 4.25, and 4.5, respectively. While it is worth noting that the ability to search all fields received the highest necessity score of 5.

Advanced search features were all also provided above average necessity with phrase searching at 4.5, root searching at 4.75, Boolean at 5, and combinations of the above at 4.5. Again, this indicates potential contributors' familiarity with advance searching alternatives and assures potential efficient usage of the database.

As for the display options, displays of title, author/adviser, date, and abstract all received a score of 5. It also bears special note that only the display of full paper received a score of 4.75, which may indicate minor reluctance from the librarians and may merit further study.

As for accessibility, local access, campus access, user access, and public access received 3.5, 5, 4.25, and 2.25, respectively. It is of note that respondents provided the highest score of 5 to campus restricted access whilst consequently giving a below median score of 2.25 to online public access. Again, this may indicate underlying concerns from the librarians and may merit further study.

Bookmarking features all received high scores with

record bookmarking at 5, bibliography creation at 4.25, and bookmark email sending at 5

As for the management features, username assignment, online registration, personal profiles, and automatic backups all received the top score of 5. Categorization of access and easy-restore capabilities both received 4.75. Off-campus management got 4.5, while audit trails and record history both got 4. On the contrary, cross-campus editing received a below median score of 2.5, which may indicate contributors' desire for campus autonomy on entry access.

Submission features all also got high scores. Subject heading list and authority file additions both received a 4. Auto-setting of location was given 4.75. While real time updates, duplicate validation, full paper PDF conversion, record CSV import-export, and online help facility all yielded a perfect 5.

All report generating features, use statistics, staff performance output, and holdings summary, were all given a top score of 5.

It should also be noted that several respondents recommended, in the comment area, the inclusion of, and compliance to, data privacy in the database provision.

INSTITUTIONAL DIALOGUES

University of the Philippines Diliman

The University of the Philippines School of Library and Information Studies (UP SLIS) is the country's first and only Commission of Higher Education Center of Excellence for library science education. Its dean, Prof. Kathleen Lourdes Obille was interviewed for the purposes of this research.

Dean Obille (personal communication, April 11, 2019), reported that the UP SLIS Library holds all of the completed undergraduate and master theses of graduates since the 1960s. For redundancy, UP SLIS also holds softcopies in CDs and also provides CD copies to the UP Diliman University Library, whom they have a good relationship with. Further, the National Library of the Philippines is also given copies of the master dissertations. Everyone can access the thesis collection provided respective processes.

Dean Obille believes that we should already be doing the database already, as our thrust is to complete the landscape of Philippine librarianship. She believes that all of us are doing the same thing and that the database will help in completing the gaps in the landscape. As an example, it was mentioned that through a database someone from Visayas to see what else has not been done by those in Luzon and in Mindanao, providing a benchmark for future research. She believes that the database is only a matter of time as there is a need for documentation and monitoring of the changes in trends of LIS and LIS schools.

When quizzed about UP SLIS's interest in cooperating, Dean Obille answered "We should start, we can host". UP SLIS is willing to spearhead, establish, maintain, and facilitate the database and "just need to get people on board". As the integrated library system of UP Diliman University Library, iLib, is already capable of hosting full papers, Dean Obille also proposes the database provide full text papers, minus the datasets and personal profiles. She believes that there is not much resource needed besides hosting and manpower, and UP SLIS is willing to locate the funding necessary and will provide access to other schools to upload their own entries.

When asked about potential issues on full-text databases, she answered that there are no potential disadvantages. She believes that plagiarism is not an issue as by putting the full-text paper out there it also makes it easier to detect, and thus prevent, plagiarism.

As for the database design, she only wanted it, at minimum, be a full-text keyword searchable database. The interview concluded by her saying that the database's end goal is that so "we can write something from this" basing from the database contents as a "matter of putting things together".

Table 1

Summary of Feature Average Scores

Feature	Average Score Users	Average Score Contributors
I. Basic Search Features		
Limit search by title only	3.61	4.50
Limit search by author only	3.36	4.50
Limit search by subject only	3.61	4.75
Limit search by location only	3.21	4.25
Limit search by date/year only	3.22	4.50
Search all fields	4.38	5.00
II. Advanced Search Feature		
Include phrase searching (search for exact phrase)	3 88	4.50
Include truncation/root searching (searching index returns indexing, indexes, etc.)	4.12	4.75
Include Boolean searching (use of logical AND/OR/NOT)	4.20	5.00
Allow combing two or more search options	4.31	4.50
III. Display Options / Information Provided		
Display the title	4.52	5.00
Display all authors, including adviser	4.19	5.00
Display all subjects	4.32	5.00
Display date/year	4.27	5.00
Display location	3.95	5.00
Display abstract	4.40	5.00
Display full paper	4.04	4.75
IV. Accessibility		
Local Access (specified computers within library/campus)	4.03	3.50
Campus Access (computers connected to in—campus network)	4.23	5.00
ser Access (accessible to off—campus users thru access codes)	4.46	4.25
Public Access (accessible to everyone online)	3.82	2.25
V. Bookmarking Features		
Allow bookmarking of records (Add to Cart/Favorite List)	4.23	5.00
Include bibliography creation on bookmarked records	4.08	4.25
Include "send to email " option on bookmarked records	4.07	5.00
VI. Management and Security Features		
Each user assigned username/password	—	5.00
Allow users (staff/librarians) to add/edit records off—campus	—	4.50
Different user group categories with different access privilege (e.g. admin, encoder, editor/reviser)	—	4.75
Allow users to register online	—	5.00
Allow cross—campus source edits (e.g. Campus1 staff can edit entries by Campus2)	—	2.50
Include "audit trail" (all user actions such as adding, editing, deleting records will be logged)	—	4.00
Allow users to update their own profile (e.g. update of email, password)	—	5.00
Show information such as user who created and last edited a record	—	4.00
Do not delete records physically, only mark them as deleted for easy restore (i.e. Recycle Bin)	—	4.75
Automatically back—up date files on schedule	—	5.00
VII. Online Record Submission Features		
Search or browse built—in authority file for subject headings	—	4.00
Allow adding new entries to authority file	—	4.00
Automatically sets newly encoded record location to encoder's location (i.e. Campus 1, Campus 2, etc.)	—	4.75
Show new records and updates in "real time"	—	5.00
Validate and check for duplicate entries	—	5.00
Allow exporting/importing of .csv records	—	5.00
Allow auto—conversion of full paper to .pdf	—	5.00
Provide online help system to facilitate encoding/editing	—	5.00
VIII. Report Generation Capability		
Batch printing of records		5.00
Generate report for statistics of use		5.00
Generate report for staff performance output		5.00
Generate summary of holdings		5.00

University of Santo Tomas

The University of Santo Tomas (UST) Library and Information Science Department, under the College of Education, is a consistent top performer in the Librarian Licensure Examination given by the Professional Regulation Commission. The LIS program coordinator, Prof. Ma. Pri-Ann Tinipunan, was interviewed for the purposes of this research.

Prof. Tinipunan (personal communication, May 17, 2019), reported that the graduate theses and the undergraduate theses are handled separately. The graduate students are required to submit both printed and electronic copies of their studies to the UST Miguel de Benavides Library. Everyone can access the printed thesis collection provided respective processes, and photocopying limited to 15 pages only. Further, the electronic copies are accessible online through their Lorenzo platform, with proper log-in credentials. As for the undergraduate theses, these are collected not by the library but by the college itself. They are catalogued, in compliance with accreditation guidelines, but are not organized in the context of a library. While Prof. Tinipunan admitted that there is a challenge in organizing the undergraduate collection, there is a recurring project lead by the LIS department, with the help of LIS students and alumni volunteers. The undergraduate theses are housed in respective locations in their department and are accessible by everyone provided respective processing in coordination with the Dean. Further, Prof. Tinipunan admits she cannot speak for the library and recommends further inquiry with the chief librarian.

Prof. Tinipunan, on the significance of the online database, cited a scenario where her thesis students found difficulty in identifying related literatures. She believes that while they have databases, it is different if there is such literature that has already been written by others on the topic. She believes that access to these is significant to help students do their research.

When asked about UST College of Education's interest in cooperating, Prof. Tinipunan acknowledged that she cannot answer on behalf of the college, and will need coordination with the dean. However, she, in her position as LIS program coordinator, is willing to cooperate provided that the members are assured equal access.

For potential issues, she expressed concern over plagiarism, when consulted sources are not cited properly. She maintains that these papers are a product of hard work and that there is need to protect the intellectual property of the researchers. Plagiarism is therefore a potential issue that needs to be addressed.

Further, while she agrees on full-text access, Prof. Tinipunan reiterates apprehensions relating to intellectual property concerns. While she allows that full-text access be open to all member institutions provided proper log-in credentials, she proposes a paid subscription for access to non-members as a double purpose of additional security and as source of funding for sustainability. She also recommends further study of existing consortia to benchmark existing policies and adopt best sharing practices.

The creation and establishment was proposed to be a cooperative endeavor with representatives from member institutions. Maintenance, facilitation, and the location of server, however, she leaves to be determined and agreed upon by the member schools, with assigned key person, as per future agreements.

As for the design, she expects that it should be remote access, user-friendly interface, not too complicated, full-text access, and have safeguards to deal with potential plagiarism concerns.

Centro Escolar University Manila

The Centro Escolar University (CEU) Manila has also been consistently performing well with their LIS program under the School of Education, Liberal Arts, Music, and Social Work. The LIS program coordinator and library services department head, Prof. Salvacion Arlante (personal communication, November 18, 2019), along with her technical services section coordinator and LIS lecturer, Prof. Amaryliss Joson, were interviewed for the purposes of this research.

Prof. Joson assured that all thesis abstracts since from the program's formation up till the batch preceding the interview are all digitized. On the other hand, best researches and those published or presented in journals and seminars have their full text digitized. In terms of access, undergraduate students can only access the thesis abstracts. Graduate students and external researchers, however, can access the full text for room-use only, and provided pertinent fees and documentation for the latter.

With the current digitization status, both respondents agree that CEU is ready for consortiums and partnerships. Prof. Arlante is confident that with their digital archives of best research, CEU is ready to link.

Prof. Arlante sees no apparent advantage in consortiums and only sees its significance and its potential benefits. According to her, from her own digital diagram study, "the basis for academic institutions to expand their program […] is to expand networking capabilities and resource sharing". She notes, however, that institutions should be open to their own limitations as to come into proper agreements on the cooperative give-and-take relationship. This open communication, according to her, is the key to a successful research sharing consortium.

As it is, Prof. Arlante supports the resource sharing of theses, dissertations, and faculty papers. These consortiums, according to her, are venues to show the world over the quality of education and research one can give. Institutional repositories, she says, is a factor of quality and it shows one's status and quality. Thus, collaborations, like this study proposes, are venues to promote global visibility, marketing, and to promote capabilities and facilities.

The only issue that CEU noted is the potential concern on data privacy violation. As such, they expect the potential consortium to be wary and ensure the proper consent of everyone involved, including the thesis authors, respondents, students, and faculties, among others.

Prof. Joson and Prof. Arlante highly recommend coordination with the Philippine Association of Academic and Research Librarians, along with the Mendiola Consortium, and the University Belt Consortium. Further, while Prof. Arlante leaves the issue of consortium administration, budget, maintenance, and the likes to the future cooperative decision, she assures that CEU is ready and is willing to cooperate to their best extent.

For the design, they look forward to a "search engine style" of federated searching for easier access, with the database being searchable by any term in the abstract. They expect it to be user friendly and accessible as, according to them, "what use is a project that is hard to use?"

Conclusion

Regarding the need for the database, it can generally be concluded that the potential users, contributors, and member institutions all agree on the significance of its creation. As for the design, all features received consistent high average scores. Further, it can be noted that there is higher preference for features providing ease and accuracy of searching, and security.

Regarding potential members' cooperation, the three institutions interviewed all responded positively on the proposed database. Two agreed in potentially providing full-text access to the database, while one leaned on providing abstracts only. Despite this minor contention, as it is there are already at least three assured proponents when and if a database is implemented. It is however, worth noting, that the study was only able to execute institutional dialogues with three potential members.

As such, this research concludes that there is indeed a need, and potential support, for an online intercampus collaborative database of LIS theses. It is therefore recommended that actual design and implementation of the same should be considered. Further, dialogues with other LIS institutes should be attempted as prospective database collaborators.

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