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Contributed Papers were presented for the second consecutive year at the TLA Annual Conference. Proposal abstracts were submitted via an online form on the TLA website and the Contributed Papers Subcommittee selected eight papers for presentation and publication in 2019. Contributed Papers consist of two parts: a 20-minute presentation at the TLA Annual Conference, followed by publication of the paper in a special digital-only issue of the *Texas Library Journal* in the summer.

Most of the 2019 presenters are academic librarians or faculty at LIS schools. Five are in Texas institutions, but three are from out of state, two from Oklahoma and one from Arkansas. Topics presented included:
- Recruiting military veterans to librarianship,
- Challenges of data curation,
- Propaganda analysis in academic library instruction,
- Cyberinfrastructure adoption in academic libraries,
- Analysis of e-book platforms,
- Article processing charges in Library Science journals,
- Using advertising campaigns to increase library usage, and
- Promoting library programming through campus-wide workshops.

Due to an upcoming publication in the fall/winter 2019 issue of open-access ALA journal, *Reference & User Services Quarterly* (RUSQ), one of the eight papers presented, Where's the EASY Button for eBooks? is not included in this special issue.

Academic librarians, especially those needing to publish, are encouraged to submit their paper abstracts for consideration. Deadlines for submitting paper proposals for the 2020 TLA Annual Conference will be announced in October. For more information, contact Tine Walczyk at tine133@gmail.com.

Sarah Merrill is the Librarian II/Assessment Officer at Texas Woman's University, School of Library and Information Studies, and chair of the TLA 2019 Contributed Papers Subcommittee

The Challenges of Data Curation in Libraries

BY SHENISE MCGHEE

Abstract

The paper discusses the challenges posed by data curation to library acquisition and preservation processes. Such as, technical issues along the lines of organizational structure, the use of equipment and training; legal issues about to copyright and licensing; financial challenges for staffing, equipment and long term funding support. It indicates that the collection, readability, and long-term access of digital information cannot be taken for granted. It mentions that data curation demands that people keep the valuable assets feasible and shareable across fields and for future generation. It states that librarians have to improve existing skills in creating and implementing data management in libraries. It suggests informational professionals working to increase their own data literacy and awareness, and equipping themselves to provide educational and consultative services related to data management.

Keywords: data curation, data management, and digital preservation

Introduction

Data curation is described as the current and continuing management of data complete life cycle of interest and practicality to scholarship, science, and education with events that facilitate data discovery recovery, value, assessment, and make available for reuse over time. These new innovation consist of verification, archiving, organization, conservation, recovery, and illustration (Scaramozzino, Ramirez, & McCaughey, 2012 p. 349). Researchers need a better understanding of the library's role in data management. The production of data will grow and the user's needs associated with access to data. Patrons' increased demands for digital information assets will impact the collection of library resources services resulting in the change of librarians into data scientists and libraries into data centers.

Literature Review

Given the lack of data curation awareness in most disciplines, academic libraries have a remarkable opportunity to apply traditional strengths toward collecting and organizing digital research content. According to Choudhury, data curation methods for libraries include observing "data as collections; data as services, librarians as data scientists; and data centers as the new library stacks. "It is in this manner vital for libraries to improve their knowledge of researchers in science collect,

record, and disseminate information more plainly the responsibility library's in managing data resources effectively (p. 350).Why is data curation so crucial? Data curation fits into and is part of the normal research process, specifically the need for others to validate and replicate research. Sound research must be backed up by verifiable data which in turn may lead to new knowledge and further research. Some data are unique and cannot be replaced if destroyed or lost. What's more, your research community may be legally required, or implicitly obliged, to manage some or all of the data that you hold. However, there are some challenges that arise in the process of bringing data curation materials to the targeted user audience as well as preserving data curation information materials for long-term use. We live in an environment where data information in binary digital form surrounds us and is essential for most activities in which we participate. Librarians act as data creators, data users and re-users, and data curators in increasingly digitally oriented environments. Despite this, the professional practice has not caught up with digital method in many respects. Caring for data, ensuring its usability and reuse in the future, and ensuring its accessibility and understandability over time require new strategies, practices, and tools.

Traditional library and preservation processes developed in a pre-digital and largely paper-oriented environment do not automatically transfer to the current digitally oriented environments. Although the past decade has seen the rapid development of new strategies, practices, and tools, these are not yet sufficiently mature (Ogburn, 2010, p.242). This paper will address the challenges in the data curation process in libraries as they occur under three different categories: namely, technical, legal and financial. While the opportunities of data curation are great, this emerging field also poses some risks to those who want to be part of addressing its challenges. Perhaps the greatest risks are associated with creating solutions before understanding fundamental problems. Among the problems that need further understanding are data sharing an assumption of any type of data curation activity is the desirability, at least over time, of sharing data beyond its author or authors.

Background

Metadata and schemas a great challenge of data curation is ensuring that data, once preserved, remains meaningful either within the same research domains. Data curation existed

in the beginning conceptualized as an e-Science problem caused by big quantities of data in electronic formats. There has been emerging challenges for curation and humanities. Data curation is aware of the concern of sustaining digital information that is delivered throughout research in a way that protects its importance and accessibility as possible contribution for further research (Heidorn, 2011, p. 663). Curation includes gathering material, making it discoverable by portraying and sorting out it, putting it in a setting of related data, supporting its utilization for differing scholarly purposes, and guaranteeing its long haul survival (Munoz and Renear, 2011 p.2).

Technical Challenges in Data Curation

Researchers report that a variation of technical problems, such as insufficient access to networked storage, information damage for inadequate organization, file formats and scale of their data can harm available infrastructure. Although some of these issues branch from a deficiency of training or familiarity about best strategies for data management, the concerns must not remain separated from access to adequate infrastructure (Jahnke and Asher, 2012 p.15). Data management systems currently should be required improvement to meet the volume of demand for safe storage and transmission of research data. The process of data preservation system integrating with the active research phase is fundamental to support researcher investment. However, the need for curatorial work throughout the data lifecycle from planning to creation to publication, reuse and preservation, scholars will need sufficient skills to perform at least some curation of their own data. Librarians will need technical and research skills to be effective partners in curation. (Munoz and Renear, 2011, p.4).

Legal Challenges in Data Curation

Data curation initiatives intended to foster e-science at libraries must be cognizant of intellectual property issues. Different types of intellectual property may be at issue in a data deposit. They include copyright protection does not extend to factual data. Compilations of data, however, can be copyrighted if the organizing principle behind the compilation is itself the data a photographer, for example, or to a sound engineer who makes a recording if they contribute something original to the recording.

While the data itself may not be protected by copyright, the creator and owner of the data may impose license conditions comparable to copyright rights when depositing the material with a data archive (CUL, 2008 p.25). Copyright laws usually include a provision that an item can be copied for preservation purposes without specific approval from the copyright owner. Copyright legislation typically does not extend this blanket provision to copying data, so for data covered by such legislation, the ability of data curators to make copies for preservation purposes is compromised. This is of crucial importance because copying is the basis of the digital

preservation strategies of refreshing, migration, and emulation. Copying data for preservation purposes can infringe current intellectual property rights for some material (Harvey, 2008, p.15).

Financial Challenges to Data Curation

According to Mayernik (2012), the three main costs of running a data curation solution is hardware, staffing, and administrative expenses. Hardware charges consist of the prices of buying and running servers, storing media, maintenance and servicing expenses that add up over time. Additional hardware cost includes equipment essential to generate off-site back-up copies of data collections. Another cost model institution can improve and extend their services by facilitating professional development opportunities for staff. These costs include computer equipment, furniture, supplies, phones, and physical space charges. It is important to ensure a long-term, sustainable commitment to the data curation project through all its phases. Data curation efforts will require access to computing facilities. Having adequate and long-term funding support means that resources and the equipment required to support the data curation implementation effort can be purchased and allocated in a timely fashion. In-house data curation eliminates the expense of external repository fees that eat up a large chunk of data curation-related budgets (Simbulan, 2013, p.496). With adequate funds, staffing is needed to support the data curation effort can be recruited, trained and organized. Renar (2011) points out while all of the potential homes for curation services have drawbacks; the library is most likely to have the longevity and impartiality to take the lead on data curation and should embrace this role. This may require diverting resources from the development and management of print collections or other budgetary changes. Connecting students and faculty and their research materials with analysis and presentation tools, datasets, and identity and other curation services should be part of the mission of the academic research library even if this means considering additional fees or increases in indirect cost structure.

Conclusion

While research and education are likely to remain a primary focus of data curation activity by academic libraries in the immediate future, the number of professional library publication and events related to data curation suggest that longer-term place for libraries in digital data curation is emerging. Informational professionals have opened national dialog and invested in both formal education and continuing professional development. Also notable is the broad level of engagement of individual librarians, who are actively working to increase their data literacy and awareness, and equipping themselves to provide educational and consultative services related to data management and curation to their students and faculty.

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Cyberinfrastructure Adoption in University Libraries

BY XIAOYU ZHANG, DUHA ALSMADI, JIANGPING CHEN, AND ZHIWU XIE

ABSTRACT

Cyberinfrastructure (CI) refers to a collection of services on the Internet that enable institutions to support data storage, management, mining, visualization, and other computing and information processing tasks. We conducted a study to understand factors that affect university libraries' adoption of CI for big data sharing and reuse. A CI adoption model which contains ten factors was proposed based on the technology-organization-environment (TOE) framework and the literature regarding tradeoffs of applying cyberinfrastructure. We evaluated this model through an online survey of information professionals in university libraries in the United States. Our results based on the responses from 105 participants indicated that perceived indirect benefits, such as improving libraries' organizational image, competitive advantages, and library services, and technological readiness may significantly affect university libraries' cyberinfrastructure adoption. More data collection and analysis will be conducted to evaluate our CI model.

Keywords: cyberinfrastructure adoption, TOE framework, university libraries, data management

INTRODUCTION

Cyberinfrastructure (CI) refers to the framework on which we can do digital and computational work. It is a concept used broadly to represent hardware, storage systems, advanced instruments, software applications, and/or data repositories. This term was first used in 2003 in a report from the U.S. National Science Foundation and was described as "infrastructure based upon distributed computer, information and communication technology" (Atkins 2003, 5).

As a key component of the nation's knowledge infrastructure, libraries play important roles in organizing and managing data and information for a variety of information users. Libraries must continuously reinvent themselves with the emergence and establishment of new information organization and management paradigms. The prevailing development in data intensive science has motivated many high profile library big data services. Notable examples are the ambitious plan to archive all tweets at the Library of Congress (Raymond 2010; Zimmer 2015), the heterogeneous and geographically replicated archival storage known as the Digital Preservation Network (Korner 2013), the data mining facility at the HathiTrust Research Center (McDonald 2015), and the metadata hubs developed at the Digital Public Library of America (Altman, Gueguen, and Breedlove 2014). However, the nature and performance characteristics of these primary library big data sharing and reuse service patterns are far from being thoroughly understood. Intelligently matching these service patterns with appropriate cyberinfrastructure (CI) resources constitutes an even more significant challenge.

Building large, single tenant data centers at each university library would be prohibitively expensive. Therefore, shared CI resources are promising options for library big data management and services. Although shared CI has been used in all stages of the research data lifecycle, few studies have explored CI adoption by university libraries. To date, no unified CI framework or strategy could be referred to as best practice to select CI for different library big data sharing and reuse situations. Factors behind CI adoption by libraries are unknown, and varied CI resources cause difficulties in finding the most appropriate options.

This paper is a part of a project entitled "Developing Library Cyberinfrastructure Strategy for Big Data Sharing and Reuse," which was funded by the U.S. Institute of Museum and Library Services. This project was a collaboration between Virginia Tech and the University of North Texas Department of Information Science. One of the objectives of this project is to achieve a better understanding of the relationship between library big data services and CI. We found that there was little research exploring the factors that affect the adoption of CI by university libraries for big data services. The purpose of this study is to develop a theoretical framework to understand the factors that affect academic libraries or university libraries adopting CI.

The remaining paper is organized as follows. We first review the related literature on CI and research on technology adoption. Then we present the proposed research model from the literature review. Next, we describe our data collection and results. The paper concludes with a discussion of the significance and limitations of the study.

RELATED LITERATURE AND PRACTICE

This section reviewed the related literature and library practices on big data management, digital libraries, and theories on technology adoption.

UNIVERSITY LIBRARY BIG DATA MANAGEMENT AND SHARED CYBERINFRASTRUCTURE

Many university libraries have provided big data services to their universities and users. Due to the characteristics of big data in terms of velocity, volume, and variety of data (Hilbert 2016), different libraries have applied different CI strategies. Chen et al. (2018) categorized CI into four types, each with its unique strengths, weaknesses, and challenges: 1) institutional high-performance computing (HPC), high-throughput computing (HTC), and storage facilities, such as Indiana University's Big Red II and Virginia Tech's BlueRidge; 2) national HPC, HTC, and storage facilities, such as XSEDE; 3) national research clouds, such as Chameleon Cloud, CloudLab, and Open Science Data Cloud; and 4) commercial clouds, such as Amazon Web Services (AWS) and Rackspace.

The commercial clouds, such as AWS and the Google Cloud Platform, provide shared computational capacities for users in the cloud for high performance computing. Users pay only for capacity actually used or network storage used with no long-term commitment or upfront cost. Figure 1 is an illustration of the services provided by AWS. The platform provides database, application services, and development & management. It allows a user to store, compute, analyze, manage data, and provide services to customers.

Figure 1. AWS Cloud Infrastructure Services
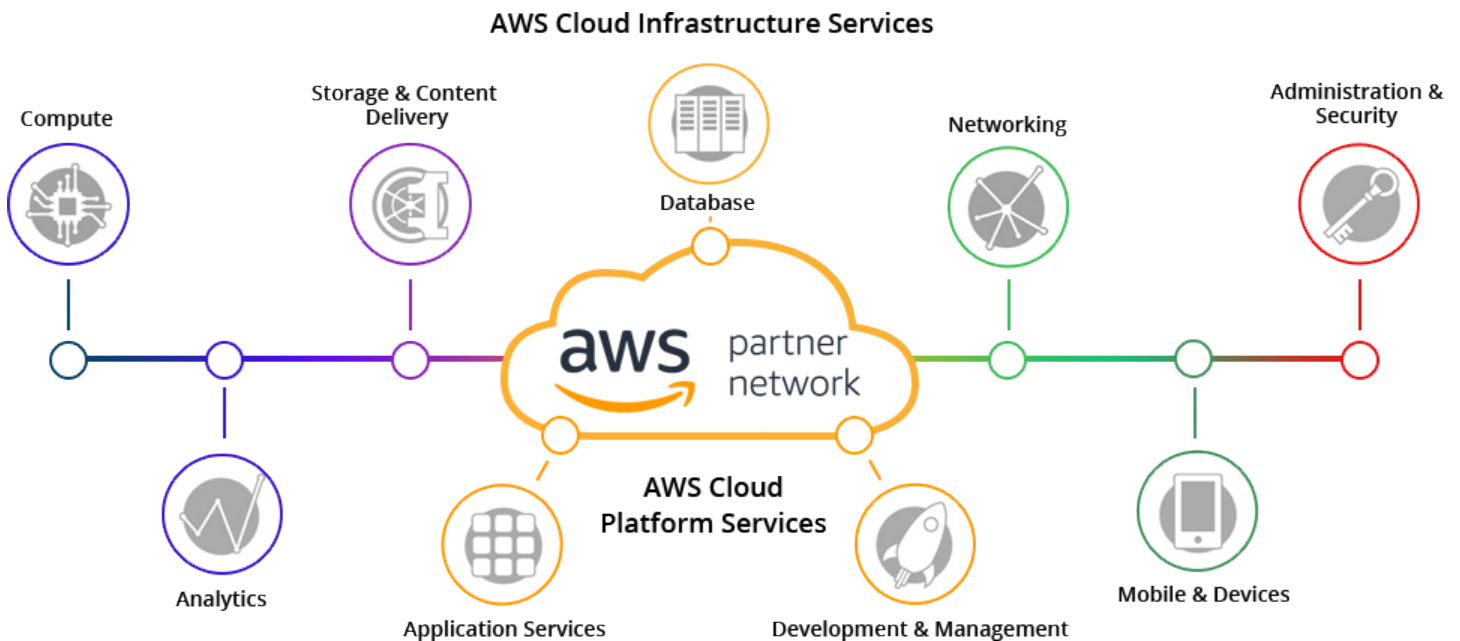
Lyon (2012, 127) described today's data-centric research landscape as "infrastructure [that] encompasses hardware and software components for data integration, manipulation, recombination and storage, but also includes the essential human infrastructure". We believe that university libraries have performed a particular role to advise, guide, train, coordinate, and lead the effort to develop data management capacity and capability in the past, and now is the time to examine the structure, function, and service portfolio critically. In order to propose possible actions to ensure that university libraries are capable of supporting data-intensive research effectively, we need to understand how university libraries may adopt various cyberinfrastructure, especially shared cyberinfrastructure.

DIGITAL LIBRARIES

Digital libraries are complex information systems that require computational resources as their digital records grow. In February 2001, the President's Information Technology Advisory Committee Panel on Digital Libraries submitted a report entitled "Digital Libraries: Universal Access to Human Knowledge" to the President (Nagel et al. 2001) which presented the idea of connecting digital devices to retrieve all human knowledge and further promoted digital libraries as the tool for universal access to that knowledge in order to form a widespread knowledge environment.

The continuous development of digital libraries, which are mostly hosted by public or academic libraries, is another motivation

to investigate CI. For example, the University Libraries at the University of North Texas provides infrastructure support to its digital libraries, such as the [Portal to Texas History](#).

University libraries are also an integral part of research data management for their respective universities. Delserone (2008) presented how the University of Minnesota (UMN) and its libraries attempted to understand the nature and intensity of data produced by its researchers and addressed the management and stewardship of its institutional research output. The study described the concerns, needs, and behaviors of scientific researchers, as well as the implementation of the University Digital Conservancy, the libraries' involvement in the UMN's research CI alliance, and its initiation of the e-science and data services collaborative.

Due to the cost of computational resources, such as hardware, network, and software, and computational professionals, shared CI are important to operate large digital libraries. Jordan et al. (2008) presented some examples of CI collaboration: the Texas Advanced Computer Center and the Texas Digital Library, the NDIIPP-Funded projects at the San Diego Supercomputer Center, and HathiTrust and Indiana University. These examples indicate that supercomputing centers could make significant contributions to the achievement of digital preservation objectives by merely providing the necessary archival storage infrastructure required. Moreover, supercomputing centers can help institutions in disciplines, such as the humanities, and services, such as institutional repositories.

CI ADOPTION BY LIBRARIES

As mentioned in Chen et al. (2018), very few studies have done research into library adoption of CI. Literature on infrastructure elements of large, non-commercial digital libraries (Henry 2012) and library services for research data management (Lyon 2012) are relevant as they specified some of the important factors, such as technology challenges and information professionals' knowledge skills. Recently, studies of library adoption of cloud computing technology (Sudhier and Seena 2018) and Python projects hosted in public software repositories on GitHub (Krohn and Weninger 2019) have been conducted.

Technology adoption for different organizations or information systems has been extensively explored (Lian, Yen, and Wang 2014; Pan and Jang 2018). We are particularly interested in theoretical adoption models in order to propose a model for CI adoption in university libraries. Oliveira and Martins (2011) reviewed theories for adoption models at the firm level used in information systems literature and discussed two prominent models: the diffusion on innovation (DOI) theory and the technology-organization-environment (TOE) framework. They concluded that the TOE framework was more complete with a solid theoretical basis, consistent empirical support, and the potential of application to information technology adoption.

THE TECHNOLOGY-ORGANIZATION-ENVIRONMENT FRAMEWORK

The technology-organization-environment (TOE) framework was developed by Tornatzky, Fleischer, and Chakrabarti in 1990. This model contains three elements or contexts that present constraints and opportunities for technological innovation and influence the adoption and implementation of new technology in an organization, such as a firm. The three elements are: 1) the technological context, which includes the internal and external technologies that are relevant to the organization. Technologies may include both equipment as well as processes; 2) the organizational context, which refers to the characteristics and resources of the organization, including its size, degree of centralization, degree of formalization, managerial structure, human resources, amount of slack resources, and linkages among employees; and 3) the environmental context, which includes the size and structure of the industry, the firm's competitors, the macroeconomic context, and the regulatory environment (Tornatzky, Fleisher, and Chakrabarti 1990).

Previous studies utilized perspectives relevant to the TOE framework to investigate the adoption of technological innovations. A number of researchers have worked on using the TOE framework to adopt technology applied in many different organizations, such as small businesses and hospitals, as well as in the manufacturing and communication industries (Kuan and Chau 2001; Lian, Yen, and Wang 2014; Pan and Jang 2018; Wang, Wang, and Yang 2010; Xu, Ou, and Fan 2017). However, in our preliminary investigation conducted in 2018, the authors found that very few studies have investigated factors that affect library adoption of CI (Chen et al. 2018). One of the objectives of this study is to evaluate the TOE framework in the context of university libraries.

RESEARCH METHODOLOGY

The Proposed CI Adoption Framework and the Research Question

The purpose of this study is to develop a model that could address CI adoption in university libraries. Applying the TOE framework as the theoretic lens, and literature on research data management and digital libraries service, we propose a CI adoption model, as illustrated in Figure 2.

Figure 2. Proposed CI Adoption Model
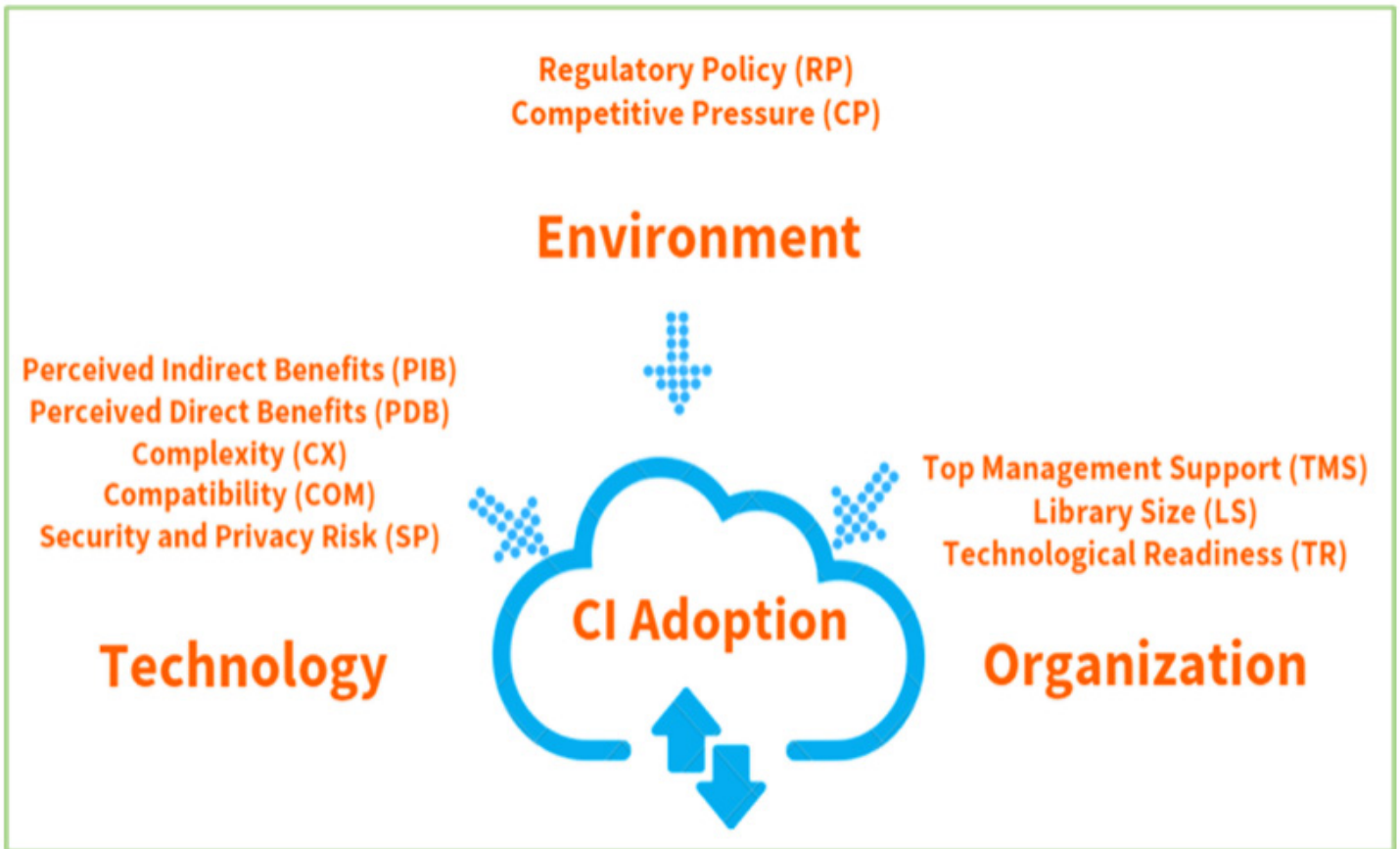
In this model, we identified ten factors from the literature that may affect CI adoption by university libraries. These factors are classified into three categories: technological, organizational, and environmental. The ten factors, their number of indicators, and a sample indicator for each factor are presented in Table 1. Subsequently, the research question of this study is:

What are the factors that affect cyberinfrastructure adoption by university libraries for big data sharing and reuse?

Table 1. The major survey constructs with indicators (revised from Chen et al. 2018)

Category	Construct	(Number of Indicators)	A Sample Indicator
Technology	Perceived Direct Benefits	4	I think that using CI in the library improves data accuracy.
	Perceived Indirect Benefits	4	I think that using CI in the library improves the organizational image.
	Complexity	4	The skills required to adopt CI are not too complex to our employees.
	Compatibility	4	CI is compatible with current library practices.
	Security and Privacy Risk	4	I do not think it is safe to use CI because of privacy and security concerns.

Organization	Top Management Support	4	Top management supports the adoption of CI.
	Technological Readiness	3	We have the technical knowledge and skills to implement CI.
	Library Size	3	The number of employees in the library is adequate to support CI.
Environment	Regulatory Policy	4	I expect that legal implications are negatively related to the decision to adopt CI.
	Competitive Pressure	4	The library faces a high level of rivalry among other university libraries.

RESEARCH DESIGN

To answer the research question, we conducted a survey based on the proposed CI adoption model and the constructs presented in our previous iConference 2018 poster (Chen et al. 2018). The survey was approved by the Institutional Review Board of the University of North Texas in October 2017.

The questionnaire has 45 questions, including 7 demographic questions and 38 five-point, Likert-scale statements covering the ten factors (listed in Table 1) that were deemed, based on previous research, to affect CI adoption by university libraries. Prior to rating the statements, respondents were asked a yes or no question to identify if their library is using CI resources to provide online services for their digital contents. The survey design allowed us to collect quantitative data from respondents to answer our research question. The questionnaire was piloted with a small sample of people representative of the target population to remove inconsistencies and to improve the instrument's readability and validity.

PARTICIPANTS

Based on the U.S. News National University Rankings 2018 (*U.S. News & World Report 2018*), we identified the top 100 universities in the United States. Then, based on the university libraries listed on LibWeb, we identified another 100 universities by state to ensure that each state will have at least two represented university libraries. Once the list of university libraries was compiled, we started to identify participants who were listed on the websites of these libraries. An Excel spreadsheet was created to input information about the potential survey participants. The data included the following information: University Name, State, Library Name, Library URL, Staff Directory URL, Staff Name, Staff E-mail, Staff Phone Number, Staff Job Title/Position, and Department. In targeting participants who are library IT staff, we looked for those who had job titles such as: infrastructure developer, infrastructure operations analyst, storage infrastructure administrator, infrastructure management services, technology infrastructure manager, digital library infrastructure lead, library technology infrastructure and special projects manager, IT manager, director of technologies, systems librarian, systems administrator, library systems analyst, library systems manager, integrated library systems engineer, information technology specialist, technology specialist for libraries, applications systems analyst, applications systems programmer, collaboration & interoperability architect data analytics and management librarian, and database specialist. In total, we collected 415 names from the Internet.

Respondents were contacted by e-mail from November 2018 to January 2019, which introduced them to the study and its goals and directed them to the online survey hyperlink. The survey was sent to the 415 e-mail addresses and a total of 206 questionnaires were returned for a 51% response rate; 101 of which were deemed unusable, leaving 105 usable responses for testing the proposed research model. Table 2 presents the demographic summary of the participants.

DATA ANALYSIS

We first analyzed the demographic information of the participants to understand especially to what degree that U.S. university libraries have used CI. Next, data were entered into IBM SPSS statistics 22. Based on the survey results, we performed a binary logistic regression analysis, which attempted to predict which factor might determine whether a university library would adopt CI. The results of the analysis are reported in the next section.

Characteristics of the Participants and Their Libraries

For this paper, we obtained 105 usable responses. The demographic information of the participants and information about their libraries are summarized in Table 2. As shown in Table 2, 73.5% of the respondents' libraries have used CI resources to provide online services for their digital contents. As for the size of the libraries, about 70% of the respondents worked in the libraries that have more than 100 staff members. Only 30% of them worked in libraries that have fewer than 100 full-time staff members. Also, about 44% of the participants worked in a library that has more than 20 full-time employees whose main responsibilities are as IT personnel, such as programmers, IT managers, and system administrators.

This is not surprising to us since we intentionally chose top ranked universities for this study. These universities usually have a large university library system to support teaching, learning, and research.

In terms of job position, 29% of the respondents are information systems administrators, 21% are IT personnel, and 14% are library administrators. On the size of the digital collections as a whole at the library, the majority (66%) of the respondents' library digital collections are measured in terabytes and 17% are measured in gigabytes. In terms of the types of CI services the respondents' libraries are using, or plan to use, for online access to digital contents, about 48% are using or plan to use commercial clouds, 22% are using or plan to use national research clouds, 20% are using or plan to use institutional high-performance/high-throughput computing (HPC/HTC), and only 9% are using or plan to use national HPC/HTC. Obviously, more libraries are using commercial clouds than other types of shared CI for their digital library or big data services.

Table 2. Demographic Characteristics of the Participants

Question	Answer	Frequency	Percentage
Does your library use CI resources to provide online services for its digital contents?	Yes	77	73.49%
	No	28	26.51%
The number of staff members working in my library is:	Less than 100 full-time staff members	32	30.00%
	101-300 full-time staff members	47	44.29%
	301-500 full-time staff members	16	15.71%
	501-700 full-time staff members	7	7.14%
	Other, please specify	3	2.86%
The number of full-time employees (FTEs) whose main responsibilities are as IT personnel.	Less than 20	58	55.71%
	21-50	37	35.71%
	51-100	7	7.14%
	More than 100, please specify	2	1.43%

Title/position at your library?	Library Administrator	15	14.29%
	Librarian	12	11.43%
	Information Technology Personnel	23	21.43%
	Information Systems Administrator	30	28.57%
	Digital Library Practitioner	11	10.00%
	Other, please specify	15	14.29%
Size of the digital collections at your library:	Measured in kilobytes	5	4.29%
	Measured in megabytes	7	7.14%
	Measured in gigabytes	18	17.14%
	Measured in terabytes	69	65.71%
	Measured in petabytes	6	5.71%
Types of CI services used or plan to use (choose all that apply):	Institutional high-performance/ high-throughput computing (HPC/ HTC)	21	19.80%
	National HPC/HTC computing	9	8.91%
	National research clouds	23	21.78%
	Commercial clouds	44	41.58%
	Other	8	7.92%

RELIABILITY AND VALIDITY OF THE INSTRUMENT

Reliability and validity are important measures to ensure the quality of a quantitative study. We used Cronbach's alpha (α) to measure the instrument's reliability and confirmatory factor analysis to assess the instrument's validity (Hair, Black, and Babin 2010). Table 3 shows the results of appropriate reliability and validity measures for the factors. The α and factor loading scores indicated that the instrument is reliable (α > = 0.7) and valid.

Table 3. Results: Cronbach's alpha and Factor Loadings of the Instrument

Category	Factor	Corresponding Statements	α	Factor Loading
Technology	Perceived Direct Benefits (PDB)		0.74	
	PDB1	I think that using CI improves data accuracy.		0.790
	PDB2	I think that using CI maintains data security.		0.791
	PDB3	I think that using CI improves operation efficiency.		0.630
	PDB4	I think that using CI reduces critical errors.		0.786

Perceived Indirect Benefits (PIB)		0.83	
PIB1	I think that using CI in the library improves the organizational image.		0.746
PIB2	I think that using CI in the library improves competitive advantage.		0.822
PIB3	I think that using CI in the library benefits other work practices.		0.830
PIB4	I think that using CI in the library improves the library services.		0.852
Complexity (CX)		0.70	
CX1	CI is not difficult to maintain compared to traditional systems.		0.852
CX2	CI is not difficult to operate compared to traditional systems.		0.839
CX3	The skills required to use CI are not too complex for most of our employees.		0.657
CX4	Learning to use the CI system has been difficult for employees.		0.526
Compatibility (COM)		0.79	
COM1	CI is compatible with my current library practices.		0.829
COM2	CI is in compliance with my library core values and goals.		0.680
COM3	CI is compatible with the current information infrastructure.		0.809
COM4	CI is compatible with the overall operation of the company.		0.827
Security and Privacy Risk (SP)		0.82	
SP1	The use of CI may allow user's personal information to be stolen.		0.780
SP2	I do not think it is safe to use CI because of the privacy and security concerns.		0.864
SP3	I have doubts about the data security of CI applications.		0.930
SP4	I expect that the employees' perception of risks will negatively influence the decision to adopt CI.		0.629

Environment	Regulatory policy (RP)		0.70
	RP1	I expect/find that my library participates in the formulation of international communication standards.	0.712
	RP2	I expect/find that my library establishes an environment conducive to promotion.	0.647
	RP3	I expect/find that my library intends to provide incentives to use CI.	0.796
	RP4	I expect/find that my library would offer legal protection for CI users.	0.738
	Competitive Pressure (CP)		0.77
	CP1	My library faces a high level of rivalry among other academic libraries.	0.802
	CP2	My library faces a high level of pressure from other libraries that use CI as an institutional standard.	0.839
	CP3	I think that there is an impact of adopting CI technology to my library's future operation.	0.623
	CP4	I think that CI is becoming the major strategy for improving my library's competitive advantage.	0.782
Organization	Technology Readiness (TR)		0.76
	TR1	We use CI because we know the technology.	0.806
	TR2	We have the technical knowledge and skills to implement CI.	0.859
	TR3	We know how to integrate CI with the existing systems of our library.	0.797
	Library Size (LS)		0.75
	LS1	High volumes of data are more likely to be migrated to CI storage resources.	0.686
	LS2	The capital of my library is high compared to the other academic libraries.	0.891
	LS3	The number of employees at my library is high compared to other libraries.	0.855

		0.84
Top Management Support (TMS)		
TMS1	I believe in my managers' enthusiasm in adopting CI technology.	0.787
TMS2	Top managers provide resources to adopt CI technology.	0.874
TMS3	Top managers understand the benefits of CI technology.	0.817
TMS4	Top managers encourage the development of CI technology.	0.826

REGRESSION ANALYSIS RESULTS

To answer the research question, *What are the factors that affect cyberinfrastructure adoption by university libraries for big data sharing and reuse?* we input the data into IBM SPSS statistics 22 and performed a binary logistic regression analysis. The binary logistic regression analysis allows us to understand to what degree the factors, or independent variables, can predict the dependent variable (CI adoption in this study). Our analysis identified two statistically significant factors: perceived indirect benefits (PIB) and technological readiness (TR). In other words, the perceived indirect benefits (using CI could improve a library's organizational image, competitive advantage, other work practices, and services) and technological readiness (having the technical knowledge and skills to implement CI, know the technology, and how to integrate CI with existing library systems) make it more possible to lead to the adoption of CI. Table 4 lists the detailed results of the analysis.

Table 4. Variables in the Equation (variables in bold are statistically significant)

Table 4. Variables in the Equation (variables in **bold** are statistically significant)

	B	S.E.	Wald	df	Sig.	Exp(B)
PDB	-.191	.848	.051	1	.821	.826
PIB	1.745	.752	5.382	1	**.020**	5.727
CX	-.678	.747	.824	1	.364	.508
COM	.118	.700	.029	1	.866	1.126
SPR	.784	.538	2.120	1	.145	2.190
TR	1.640	.572	8.217	1	**.004**	5.155
TMS	.615	.533	1.335	1	.248	1.850
LS	-.388	.483	.644	1	.422	.679
RP	.610	.711	.735	1	.391	1.840
CP	.222	.629	.124	1	.725	1.248
Constant	-12.763	3.213	15.782	1	.000	.000

Notes:

The B column is the coefficient for the constant (also called the "intercept").

The S.E. column is the standard error around the coefficient for the constant.

The Wald column is the Wald chi-square test that tests the null hypothesis that the constant equals 0.

The df column is the degrees of freedom for the Wald chi-square test.

The Sig. column is the p-value.

The Exp(B) column is the exponentiation of the B coefficient, which is an odds ratio (UCLA Statistical Consulting Group n.d.).

DISCUSSION

Our study is the first attempt to understand factors affecting CI adoption by university libraries using a theoretical framework. The proposed model identified ten possible factors based on the existing literature, mostly from industry or for-profit organizational settings. The results of our analysis indicated that only two of the factors are significant, or have the power to predict whether a university library adopts CI or not.

This study is significant as it is the first of this kind that attempts to apply a theoretical model to understand university library CI adoption. The quantitative methodology used in this study has not been widely applied to understand university library issues. Academic librarians will need to apply quantitative research method in conjunction with qualitative methods to improve our understanding of important issues of university libraries on user service, information organization, and others.

This study has limitations. First, we had a lot of difficulty in collecting data from library staff, which may affect the accuracy of the results. Innovative data collection approaches need to be explored. Second, the participants have different types of positions. Not all of them are information technology personnel, which may affect the results of the analysis. We would like to continue to collect data to increase the sample size. Also, we will explore ways to refine the model.

CONCLUSION

This study explored possible factors that affect U.S. university libraries in adopting cyberinfrastructure for their big data management and reuse. Our results provide promising and innovative insights to the CI adoption literature and extend our understanding of the factors behind CI adoption by U.S university libraries. In particular, the research shows that two factors may significantly affect the CI adoption by university libraries for big data sharing and reuse. In addition, we gathered information about the current status of some of the university libraries' use of CI resources.

Lian, Yen, and Wang (2014) used the TOE framework to adopt cloud computing in a hospital, and two studies explored the use of the TOE framework to adopt technology applied in the manufacturing industry (Li 2008; Wang, Wang, and Yang 2010). However, none of these studies explored technology adoption in the field of university libraries. Hence, an important line of further research should center on understanding strategies that can be used in CI adoption and, more specifically, on the best practices in selecting cyberinfrastructure for different library big data sharing and reuse situations.

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Incorporating Propaganda Analysis in the Use of the Framework for Information Literacy for Higher Education in a Post-Truth Era

BY DOUG CAMPBELL, MLIS, MA, MDIV AND GREG HARDIN, MLS

A Night at the Garden is a 2017 short film documenting the 1939 Nazi rally at Madison Square Garden where 20,000 Americans gathered to show support for Adolf Hitler and the National Socialist's political power in Germany. The documentary reveals the enthusiasm of thousands of U.S. citizens in support of fascists ideologies and anti-Semitic beliefs about which modern Americans perhaps may find objectionable if not repulsive. (Curry 2017)

In Charlottesville, VA during a two-day rally in August 2017, hundreds of mostly white males and members of various far-right extremist organizations met to protest the removal of pro-slavery monuments depicting Confederate States of America military leaders. The groups espouse ideas of white racial dominance, neo-Nazism, and anti-Semitism, repeating slogans such as "While lives matter," "Jews will not replace us," and "You will not replace us." Seventy-eight years after the Nazi rally in New York, U.S. citizens maintain as truth the seemingly unconscionable tenets of white nationalism and white supremacy. (Joe Heim 2017)

Librarians and educators who advocate for and teach critical thinking as a pathway to information literacy, which equips information consumers to identify, judge, and constructively interpret information, data, and facts in ways that are responsible and reliable. At its most fundamental definition, information literacy is the ability to think critically about information.

In 2000, the Association of College and Research Libraries (ACRL), a division of the American Library Association (ALA), released "Information Literacy Competency Standards for Higher Education," describing five standards and numerous performance indicators considered best practices for the implementation and assessment of postsecondary information literacy programs. (ACRL 2000) The five standards are:

- The information literate student determines the nature and extent of the information needed.

- The information literate student accesses needed information effectively and efficiently.

- The information literate student evaluates information and its sources critically and incorporates selected information into his or her knowledge base and value system.

- The information literate student, individually or as a member of a group, uses information effectively to accomplish a specific purpose.

- The information literate student understands many of the economic, legal, and social issues surrounding the use of information and accesses and uses information ethically and legally.

The five standards span from the simple to more complex, or in terms of Bloom's Taxonomy of Educational Objectives, from the "lower order" to the "higher order." Lower order skills involve, for instance, being able to use an online catalog to find a book relevant to an information need in an academic library. Higher order skills comprise critically evaluating and synthesizing information from multiple sources into a coherent interpretation or argument. The standards were criticized by proponents of critical information literacy for being prescriptive, inhibiting users to apply critical analysis to information sources.

In 2016, ACRL rescinded the Standards and replaced them with the Framework for Information Literacy for Higher Education. (ALA 2015) The Framework is organized into six frames, each consisting of a concept central to information literacy, a set of knowledge practices, and a set of dispositions. Knowledge practices are proficiencies or abilities that learners develop as a result of their comprehending a threshold concept. Generally, a disposition is a tendency to act or think in a particular way. More specifically, a disposition is a cluster of preferences, attitudes, and intentions, as well as a set of capabilities, that allow the preferences to become realized in a particular way.

The six concepts that anchor the frames presented alphabetically:

- Authority Is Constructed and Contextual

- Information Creation as a Process

- Information Has Value

- Research as Inquiry

- Scholarship as Conversation

- Searching as Strategic Exploration

The Framework:

• Combines a cluster of interconnected core concepts, with flexible options for implementation within each unique institutional and disciplinary context.

• Envisions information literacy as the set of integrated abilities encompassing the reflective discovery of information, the understanding of how information is produced and valued, and the use of information in creating new knowledge and participating ethically in communities of learning.

• Provides the foundation for collaborative instructional design and assessment to scaffold learner progression in all the frames from novice to expert in their understanding of the core information literacy concepts, knowledge practices, and dispositions through all stages of their academic careers and beyond.

The Framework includes interconnected concepts. It is note a set of prescriptive standards, learning outcomes, or skills. At its core, the Framework is a set of conceptual understandings that organize other ideas about information, research, and scholarship into a coherent whole.

It is termed "framework" because it consists of interconnected core concepts designed for local interpretation and implementation depending on the context and needs of the audience. The Framework draws from research about threshold concepts, or ideas that are gateways to broader understanding or skills in a given discipline. It also draws from research about metaliteracy and assumes a holistic view of information literacy that includes information creation, collaboration, and consumption.

Metaliterary casts a vision of information literacy as an overarching set of abilities in which information users are consumers and creators of information who participate in collaborative spaces. A growing body of scholarly research describes faculty-librarian collaborations delivering information literacy skills practice into higher education curriculum, and moving beyond "one shot" lectures to an integrated model in which librarians help design assignments, create guides to useful course resources, and provide direct support to students.

These are the six concepts that anchor the Framework presented alphabetically:

• Authority Is Constructed and Contextual

• Information Creation as a Process

• Information Has Value

• Research as Inquiry

• Scholarship as Conversation

• Searching as Strategic Exploration

The Institute for Propaganda Analysis (IPA) was established in 1937 by Clyde Miller and Kirtley Mather, and was funded by a $10,000 grant from Edward Filene. The IPA sought to instruct the American public about how to recognize and analyze propaganda materials created by domestic and foreign sources. Composed mostly of social scientists and journalists, the IPA published a series of books, including *The Fine Art of Propaganda*, *Propaganda Analysis*, *Group Leader's Guide to Propaganda Analysis*, and *Propaganda: How to Recognize and Deal with It*, and an annual journal, *Propaganda Analysis*. In *The Fine Art of Propaganda*, Alfred and Elizabeth Lee stated the IPA's impetus.

"It is essential in a democratic society that young people and adults learn how to think, learn how to make up their minds. They must learn how to think independently, and they must learn how to think together. They must come to conclusions, but at the same time they must recognize the right of other men to come to opposite conclusions. So far as individuals are concerned, the art of democracy is the art of thinking and discussing independently together." (Lee and Lee 1939)

The IPAs primary tools for instruction on how to detect propaganda were the seven common techniques or devices of propaganda. (Institute of Propaganda Analysis 1937, 5-8) The seven devices were:

Name Calling
Using negative or discriminatory words, propagandists arouse suspicion and prejudice. The goal is to create an overall dislike of a group of people, so verbally attacking their beliefs, institutions, leaders or religion is fair game. Name calling is often used in ridiculing cartoons or writing.

Glittering Generalities
Using slogans or simple catchphrases, propagandists make generalized statements attractive to their audience. Usually these statements involve ideas of love, honor, glory, peace, family values, freedom, patriotism - anything general enough to inspire pride. These statements usually say very little, so they cannot be proved or disproved.

Transfer
A transfer associates a revered symbol with an idea the propagandist wants to promote. If an idea can be linked with, say, a flag, it has a greater chance of winning popular approval. The stir of emotions makes it difficult for people to clear their minds and think critically.

Testimonial
A testimonial makes an association between a respected or authoritative person and the cause. The hope is that the respected person will lead others to follow his ideas. It is similar to a celebrity endorsement of a product.

Plain Folks
The goal of this technique is to convince the audience that the spokesman is like them and shares their woes and concerns.

Using plain language and mannerisms, he is able to build trust by his followers.

Bandwagon
This technique capitalizes on the human drive to be part of a crowd, a member of the winning team. By creating the illusion that widespread support exists, the propagandist hopes those who are on the fence will join the cause. If they refuse, this technique seeks to make them feel isolated.

Card Stacking
By using only those facts that support their ideas, propagandists can make it seem that their way is the only correct way. The aim of card stacking is for the audience to assume these facts are conclusive. By "stacking cards against the truth," propagandists can control the beliefs of their audience.

One of the pedagogical methods used by the IPA to demonstrate the power of critical thinking over propaganda was a morality play based on the 1937 Walt Disney Productions film, *Snow White and the Seven Dwarfs*. IPA's version was unoriginally titled, *Snow White and the Seven Propaganda Devices*. (Newsweek April 3, 1939, 32) The story depicted Snow White, personifying the Gullible Public, confused about the Neutrality Acts of the 1930s. Manipulated by the seven dwarfs of propaganda, Snow White wavered in her decisions until rescued by Price Charming who represented the concept of Critical Thinking.

Instead of singing "hi ho, hi ho, it's off to work we go," the dwarfs sang the play's theme chorus:

> Oh, we are the seven devices,
> We turn up in time of crisis;
> We play upon your feeling,
> We set your brain a-reeling,
> We are seven active contrabanders,
> We are seven clever propaganders.

Seventy-nine years before the adoption of the Framework, the IPA developed the "ABC's of Propaganda Analysis" as a guide for the public to evaluate and examine propaganda media. (Lee and Lee 1939) The ABCs included:

• Ascertain the conflict element in the propaganda.

• Behold your own reaction element.

• Concern yourself with today's propaganda associated with today's conflicts.

• Doubt that your opinions are "your very own."

• Evaluate, therefore, with the greatest care your own propaganda.

• Find the facts before you come to any conclusion

• Guard against omnibus words; words difficult to define.

Summing up the spirit of the seven devices and the seven ABCs:

• Don't be stampeded.

• Beware of your own prejudices.

• Suspend your judgment until more sides of the issue are presented.

• Analyze them. (Lee and Lee 1939)

Violet Edwards, educational director of IPA, believed that librarians were in unique positions to teach propaganda analysis to the public because of librarians' unique position of direct access to members of the public who visited public libraries. Edwards noted that librarians "must be encouraged to take a position of leadership and of responsibility in today's most vital educational task—the development on the part of all of us of the ability to think critically and creatively." (Edwards 1940, 8-10)

Academic librarians are in similar positions today in their libraries. Academic librarians have unique and influential positions in relation to post-secondary students, teaching them critical thinking skills. The Framework is a relevant and useful tool for instructing students about information literacy and cultivating critical thinking, but where the Framework may be lacking in an emphasis of self-analysis, the ABCs can inform the Framework. If librarians utilize ACRL's Framework for Information Literacy, then they might consider emphasizing self-analysis as IPA's ABC's of Propaganda Analysis emphasized personal biases as well as consult the ABCs where it complements the Framework. The ABCs and the Framework are valuable pedagogical tools in a Post-Truth era where "fake news" and "alternative facts" pervade the information ecosystem.

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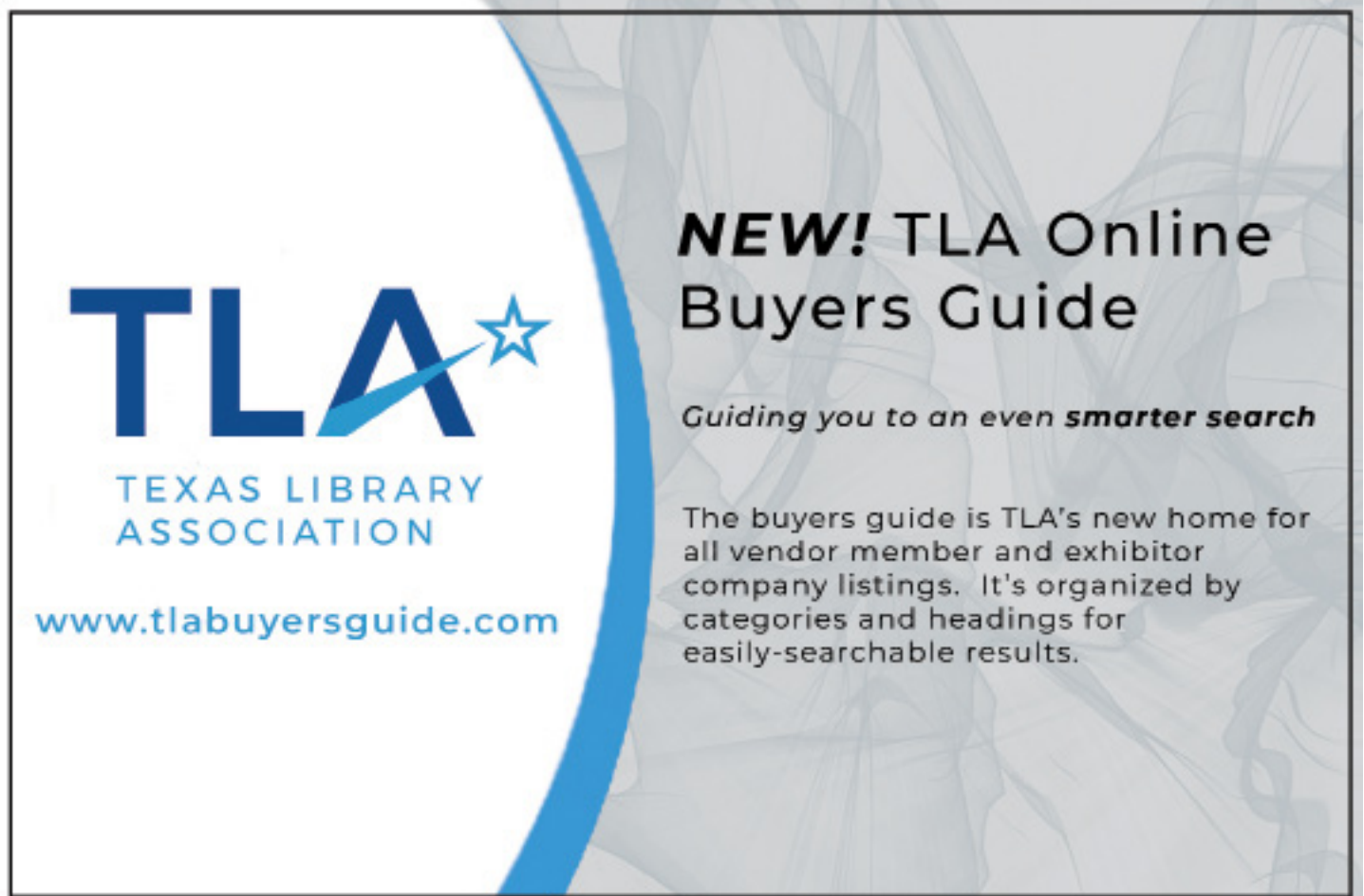
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Opening the Door for LIS Articles

BY TRAVIS FORD HOLDER

Librarians know all about tight budgets, especially when it comes to electronic resources. We instruct users to search the literature and contribute to it. There are limits on scholarly communication that are the biproducts of years of changes in the academic publishing world. For our profession, publishing, ethics and cost are closely related.

In the subscription model of publishing, vendors are paid by institutions for access to journals. Libraries must make tough choices. When publisher prices swell, cuts are all but inevitable. As costs have increased, so too has the level of concentration. For example, in the social sciences, the top five commercial publishers accounted 15% of scholarly articles in 1995, but this number climbed to 66% in 2013 (Larivière, Haustein, and Mongeon, 2015). The combination of flat budgets, rate increases and concentration of literature into a small number of publishers has been referred to as the "serials crisis."

Research is affected by the serials crisis. The pressure to publish has made access to journals more important than ever. Only scholars affiliated with institutions that can afford costly journal subscriptions have access to the most current literature. That is where open access comes in. In 2002, a statement called the Budapest Open Access Initiative described open access as making scholarly literature freely available online, allowing broad permissions to all users. Other statements followed in 2003, from Bethesda and Berlin, clarifying the definition and goals of open access publishing. Open access journals are readable by anyone in the world with an internet connection. As a response to the practices of top commercial publishers, some academics have taken the position that they will only publish in open access journals. Open access publishing has already made a significant impact in academic publishing. There are currently more than 13,000 journals indexed in Directory of Open Access Journals (DOAJ), and a recent study found a steady increase of open access journals indexed in both DOAJ and Journal Citation Reports (Poltronieri et al, 2016). Many of the same publishers who have been criticized by the open access movement themselves created open access journal sites.

Librarianship has played an active role in promoting open access principles. Librarians who value their role in sharing or facilitating access to information may find much to support in the open access movement. Since journal subscriptions are often paid for through academic library budgets, cost increases present an ongoing dilemma for collection development and scholarly communications.

There are different forms of open access publishing. The most prominent is gold open access. In the gold model, the cost to publish a journal is paid for using article processing charges or "APCs." These are fees paid to the journal after the article has been accepted for publication. Some institutions have funding designated for this purpose, and it varies whether this is done through the library or another department. In other cases, authors will seek out grants or simply pay out of their own pocket. Some journals will waive the APC in some limited circumstances, such as economic hardship.

Although APCs are quite common in open access publishing, they are the subject of considerable debate. Jeffrey Beall a librarian formerly employed at the University of Colorado, has argued that fees such as these create a conflict of interest for the publisher (2016, 115). There is a financial incentive to accepting articles, including articles of dubious quality. Beall coined the term "predatory publisher" to refer to those who publish open access journals with questionable standards, especially lack of legitimate peer review. It is crucial that librarians help authors understand how to evaluate any journal that they are considering submitting their work to.

In addition to the potential effect on publishing standards, article processing charges can be quite costly for authors. Scholars looking to publish in open access journals must be investigate whether and publication fees are higher than their personal or sponsoring budget will allow. However, not all open access publishers employ article processing charges. While librarians may have assisted others in the article submission process, they have not necessarily encountered APCs in their own field. For this reason, I wanted to document article processing charges that exist specifically in open access library and information science (LIS) journals.

Multiple indexes were searched for open access library and information science journals. The best-known index of open access journals is the Directory of Open Access Journals (DOAJ). DOAJ indexes LIS journals within the "Bibliography. Library science. Information resources" subject category. There are 140 journals indexed in this category. Journal Citation Reports (JCI) and SCImago Journal Rank were also searched. JCI lists 6 open access journals in the Information Science & Library Science category. SCImago lists 41 open access journals in the Library and Information Sciences category. In total, 160 open access library science journals were found using the 3 indexes. Some journals were also indexed in other subject categories related to education, medicine and technology. Journals were

published in 41 countries. The United States had the most open access LIS journals with 29, followed by Brazil with 21, Spain with 12 and Indonesia with 11.

From this large number of journals, only 8 (5%) required an article processing charge or member fee to have an accepted article published. The amount of the fees ranged from $40 to $1890. Of the 4 journals with the most expensive APCs ($950 to $1890), 3 are connected to Springer Nature or its parent company, Holtzbrinck. The other journal is published by Elsevier.

Amount	Journal Title	Publisher	Notes
$1890	Journal of Cheminformatics	BioMed Central	Owned by Springer Nature
$1690	Scientific Data	Nature Publishing Group	Owned by Springer Nature
$1100	Library and Information Science Research	Elsevier	
$950	Frontiers in Research Metrics and Analytics	Frontiers Media/ Holtzbrinck	
$315	Electronic Journal of Knowledge Management	Academic Conference and Publishing International	
$143	South African Journal of Libraries and Information Science	Stellenbosch University	
$75	Informing Science	Informing Science Institute	Membership fee encouraged, APC is same amount.
$40	Pakistan Journal of Information Management and Libraries	University of Punjab	

The average time from submission to publication was almost 15 weeks. One journal listed the duration as 1 week. If the process occurs too rapidly, this is sometimes an indicator of weak or nonexistent peer review.

It is very important to examine the peer review policy of a journal before submission. With blind peer review (or "single blind"), the author is unaware of the identities of the reviewers. However, the reviewers still see the author's name during the review process. For double blind peer review, neither the author nor the reviewers know each other's identity. Fortunately, many journals described their practices as either blind peer review (36 journals) or double-blind peer review (76 journals).

The number of open access LIS journals that use article processing charges is quite low. This is great news! I hope that this information encourages librarians to consider writing an article and contribute to the literature of our own profession.

The full spreadsheet of open access LIS journals can be viewed at https://libguides.library.tmc.edu/OpenAccess/LIS.

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ORGANIZING CAMPUS-WIDE WORKSHOPS TO PROMOTE LIBRARY PROGRAMMING

BY VICTOR D. BAEZA

INTRODUCTION

Academic libraries exist to support learning experiences on campus. As the range of services and resources to accomplish this expands, the challenge becomes developing and promoting these resources to their target audience. The Oklahoma State University (OSU) Libraries developed a digital badge program for the OSU Graduate College, serving as the campus organizer, developer and host of training activities. The Library now organizes and helps promote workshops offered by the Library, Career Services, the Writing Center, the High Performance Computing Center, and the Office of Research.

Library support for graduate students is not a new concept. What is new is the breadth of research conducted on assisting graduate students to succeed. From how to assist first year international graduate students transition to U.S. academic libraries (Cooper and Hughes 2017), to how mothers deal with the stress in deciding between their graduate studies and their families (Prikhidko and Haynes 2018), all aspects of a graduate student's life is being investigated in order to better help them. As a result, libraries are now looking at addressing more than the typical challenges students face in seeking information.

In 2015, the OSU Libraries began a graduate student 360° workshop program to provide opportunities for students to gain skills for all facets of their life. About the same time, the Graduate College was looking for a way to recognize the learning students were doing outside of class. This was also the time when digital badges were gaining traction as a way for schools, libraries and businesses to recognize and reward the "soft skills" acquired independently.

BACKGROUND

Oklahoma State University (OSU) is a land-grant university founded in 1890. OSU offers masters and doctoral degrees to approximately 3,700 students in graduate programs both on and off campus. According to the 2018 student profile, 906 (24%) of the graduate students were international students, and 66% (2,441) of the graduate student population was part-time (Institutional Research and Information Management 2018). Since most graduate international students are full-time,

a requirement for staying in the United States, the vast majority of full-time students are international, so have been a focus of support services on campus.

Prior to 2015, many OSU support service departments provided presentations for graduate students, but sometimes these support offices lacked the ability (i.e., public speaking, teaching experience) or facilities to conduct workshops. Typically they would conduct short 10-15 minute presentations at orientation sessions or at graduate student meetings. To reach out to students, these support services would send notices to be included in mass messages, like a weekly e-mail newsletter from the Graduate College or from individual departments. But there was no one central location for graduate students to find out about the various learning opportunities. Like the Library, most campus support offices recognized the Graduate College as the best resource for reaching the most graduate students. The Graduate College however, depended heavily on the students reading a weekly e-mail newsletter sent on Mondays. The newsletter also listed meetings, deadlines, general announcements and other general information so the workshops were not a focus of them.

It was within this environment the OSU Libraries started the 360° program for graduate learning through the Edmon Low Library in the spring of 2015. Using the Western University's (Ontario, CA) 360° Graduate Student Professional Development Initiative, which was part of the special report "Graduate Student Professional Development: A Survey with Recommendations" (Rose 2013), as well as programs discussed in the Association of Research Libraries (ARL) special report "New Roles for New Times: Research Library Services for Graduate Students" (Covert-Vail and Collard 2012), the OSU Libraries began to develop campus partnerships. Over the next two years, various departments began offering workshops as part of the program, including the Writing Center, Career Services, and eventually the Office of Research. Then when the Library started developing the digital badge program in 2016 for the Graduate College, the Institute for Teaching and Learning Excellence (ITLE), the Wellness Center, and the High Performance Computing Center (HPCC) were invited to participate.

STARTING THE PROGRAM

The first step in coordinating campus workshops for graduate students was in collaborating with the Writing Center. The initial program was a four-part Wednesday lunch writing workshop to be held on consecutive Wednesdays during the summer. Each sessions was a 1-hour workshop based on the book "How to Write a Lot: A Practical Guide to Productive Academic Writing" by Paul J. Silva (2007). The Writing Center director had considered offering the workshop series before, but lacked a place with computers and writing space where she could conduct the workshops. The OSU Libraries computer-training lab in the main building met her requirements. The shortage of places for support service offices to hold workshops became the cornerstone of the development of the 360° program because the OSU Libraries had available spaces. With the success of the How to Write A Lot workshop, the Writing Center then developed a literature review writing workshop, and Career Services began offering workshops later in the year covering resumes/CVs and interviewing techniques.

As planning continued, the decision was made to start focusing on increasing awareness and attendance of the workshops. Although average attendance was above the minimal attendance goal initially set at 5 students per workshop, ways to increase attendance were pursued. In addition to developing a poster campaign and visiting graduate programs in person, it was decided to ask the Graduate College to endorse of the program. That's when we discovered the Dean of the Graduate College was looking for a way to recognize graduate students "soft skills" developed outside of the classroom. The idea of a digital badge program was then suggested, which the Graduate College Dean promptly supported. Unfortunately, the Graduate College did not have the resources to develop a digital badge program, so the Library offered to create a "proof of concept" digital badge program because we had the resources (i.e., systems office, meta-data specialists, instructors) to start it. The hope was that with the backing of the Graduate College the program would gain more credibility in the eyes of the graduate students, and to possible future campus partners.

TRANSFORMATION TO DIGITAL BADGES

Switching to a digital badge program would require much more work, which was not taken lightly. To add digital badges to the 360° program, a case study for using digital badges in support of Self-Regulated Learning (Cucchiara et al. 2014) was used as a model. But because the program wasn't being designed for a course, as in the case study, research had to be done to investigate all the various ways digital badges could be recognized beyond the campus environment. In general, the more you want badges to be recognized, or respected, the more work needed to be done both on the front end (i.e., workshop design, assessment) and the back end (i.e., badge registration, metadata). Due to the amount of work required to maintain the badge program at the level the Graduate College desired (18 badges), the decision was made early to transfer the administrative responsibilities to the Graduate College once it had been established. If Library resources could have been reassigned to support a digital badge program, there were enough benefits for the Library to administer it. But many of the benefits sought by the Library, like greater support for students and increased awareness of library services, only required the Library to participate in the program once it was developed.

In fall 2016, the first semester of the digital badge program, 12 different workshops were offered with a total of 180 attendees. Two years later in the spring of 2018, the program had grown to 28 workshops with 315 attendees. With the success and growth of the digital badge program, the spring of 2018 was the final semester administered by the Library. The Graduate College took over administrative control, and the responsibility of determining what was required of students to earn digital badge credit. Since the system was setup as a Self-Regulated Learning model, students were required to submit a reflective piece to demonstrate how what they learned applied to their learning goal. Of the students (59) who attended multiple workshops, 20 (34%) of them requested digital badge credit. The remaining 39 were contacted through e-mail, and the 27 who replied said they did not request digital badge credit because they were only attending the workshops because of the topic matter. 15 of the 27 who replied also stated that they weren't completely sure what the purpose was for the digital badge program. We took this to mean that the program was meeting needs for many of the attendees, but that clearer communication and material needed to be utilized to promote the program.

BENEFITS

One of the benefits of the digital badge program, and also during the 360° program, is the increased contact with graduate students. The appeal for other support services on campus to offer workshops through the program was that the Library would handle registration, communication, attendance and assessment. All they would have to do is actually conduct the sessions. Although the Library only conducted about a third of the workshops, a Library employee attended all the workshops in order to take attendance, which allowed us to speak with the students during the 5-15 minutes before the workshops began. This time before the sessions is referred to as "working the room," which allows us to ask the students about their needs and/or wants, and gives us a chance to discover training activities going on in their individual departments. Another benefit from "working the room" is that it engaged the students, leading to greater student interaction during the sessions.

Another benefit of making a connection with the students during the "warm up" period is that it made our personal appeal to fill out the e-mail evaluations more effective. Once this personal appeal began, the participation rate jumped from below 5% up to 20%. Although that is only 1 in 5 participants, this was by far the highest e-mail evaluation participation the graduate workshops had ever had. Also, since someone from the Library was present at all of the workshops in the first two years, students began to associate the Library as a source for training opportunities.

CONCLUSION/RECOMMENDATIONS

Libraries are in a rare campus situation in that they typically have contact with students, staff, and faculty from all areas of the campus. By attempting to coordinate workshops across campus for graduate students, libraries can help increase awareness of various support services. Before taking on this endeavor though, an organization must be clear about overall goals and what resources can and are available to be dedicated to the endeavor. In order to determine if goals are being met, a clear and easily quantifiable method of how to collect statistics should be planned prior to the start of the program.

Assessment and feedback are important elements of this workshop model. Students consistently mentioned there being a small number of workshop locations as being extremely helpful. Although it seems like something very simple, not having to search for or figure out where the training is taking place does influence student's choices to register for and attend workshops. So, limiting workshop sites to a few places requires agreements between the partner offices. Along with a set number of workshop locations, students reported having one source for finding information on workshops as helpful. Creating an online workshop calendar also helps in the discovery aspect for students, but also assists the workshop providers from creating scheduling conflicts. This avoids workshops being offered at the same time, and helps organize the workshops in an order that helps the student's learning by having the sessions build on each other.

As universities support students through learning experiences, libraries can exploit the micro-credentialing (digital badge) movement as an opportunity to become campus leaders in developing, offering, and coordinating student learning. Librarians can also utilize the digital badge model to enhance the development and coordination of workshops offered across campus that promote student well-being. In doing so, libraries can become the central learning resource for graduate students.

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REACHING THOSE WHO SERVED: RECRUITING AND PREPARING MILITARY VETERANS FOR CAREERS IN LIBRARIANSHIP

BY LORIENE ROY AND RACHEL MEYER

Although libraries today offer a wide variety of programs to support veterans in many aspects of their life, little research has been done into what factors cause veterans to choose library and information sciences as career professions. [1] Reaching Those Who Serve (RTWS) aims to look at how we as a community of information professionals can support our veterans by welcoming them into the library and information science field through direct outreach.

Introducing: A Grant through the Institute of Museum and Library Services (IMLS)

In 2014 we received a one-year planning grant through the Institute of Museum and Library Services (IMLS) to identify how libraries were providing services to military veterans. [2] Through our data gathering for the project, "Libraries and Veterans: Identifying Services and Possibilities," we had numerous conversations with librarians who were veterans and those who supported their services. Our interest in assessing the connection between library services and staffing libraries with military veterans led to our submitting a second grant proposal to IMLS. "Reaching Those Who Serve" (RTWS) was subsequently funded for three years, from 2017-2020, to allow us to explore recruitment of military veterans to library and information studies (LIS) graduate programs. [3] The grant supports direct financial aid to students to observe and advocate for admissions of military veterans as well as to survey admissions staff at LIS programs and conduct interviews with military veterans in or retired from careers in the information fields and those who advocate for them.

RTWS focuses on finding answers to two main questions:

  • How do military veterans choose careers in library and information studies, and

  • What are effective strategies to recruit military veterans into LIS programs today?

Why veterans?

In 2014 we interviewed ten library staff members whose departments offered programs for veterans for the Libraries and Veterans: Identifying Services and Possibilities project. In addition, we conducted an in-depth literature review to locate programs hosted by libraries. In 2016 we repeated the literature review and found an exceptionally promising increase in the number of libraries with veterans programs, growing from 10 to over 80 libraries. This growth trend in veterans programs in libraries only serves to emphasize the ways in which welcoming more veterans into this career field would be beneficial for all library patrons. We were approached by veterans when we presented our findings from that one-year planning grant at the 2016 Public Library Association conference in Denver and at the Diversity and Outreach Fair at the 2016 American Library Association annual conference in Orlando.

From discussions with these veterans about their particular skill sets and interests, we gathered that veterans are an excellent pool of citizens with skills that go hand in hand with careers in LIS.

Veterans share attributes and skills with many LIS students. They demonstrate flexibility and adaptability. They are life-long learners. And, they have a strong service orientation and motivation to serve others. LIS careers also share commonalities with careers that are considered 'hot' for veterans including computer information systems manager, computer systems, software application developer, and cyber security analyst. [4]

Reaching Those Who Served (RTWS): Details of the Program

RTWS funding provides scholarships/cost of living stipends to twelve military veterans to make progress toward completing a master's degree in information studies at one of three universities. Funding supports up to four students attending each of the following programs:

  • The School of Information at The University of Texas at Austin (UT-Austin)

  • Library and Information Science Program at The University of Hawaii at Manoa (UH-Manoa)

  • School of Information at San Jose State University (SJSU)

The University of Texas at Austin is the lead school in this program, as it is the home of this grant, as well as the previous IMLS grant. UT-Austin offers a 36 graduate hour in-person master's degree program in information studies. The University of Hawaii at Manoa offers online and in-person courses, and was an obvious choice for this program, both due to the quality of their information studies program and the large number of military bases around the university that are prime recruiting fields. San Jose State University offers a fully online masters programs in library and information sciences, which means

that veterans across the country could apply for the RTWS grant scholarship for their studies that they could complete in any location.

In addition to tuition and/or cost of living support, the grant also provides a stipend for a graduate research assistant (GRA) and travel costs. Each of the locations had the option of customizing a recruitment package for their RTWS students.

Reaching Those Who Served (RTWS): Research Methods

We found little coverage in the literature on recruiting veterans to the LIS fields. Instead, we had many questions. At what point in their military career do veterans consider pursuing higher education? When do veterans decide to pursue a degree in LIS? What attracts them to the fields? How do veterans pay the costs of their education? What types of government funds are available to support them in pursuing their educational goals? What resources are available to veterans who have depleted the government funding at their disposal to allow them to continue their education? How do veterans select the school or program they wish to attend; what features and attributes of the program are important to them? All of these questions helped us focus the strategies we wanted to follow. We designed the program to gather information through the following activities:

• Advising and monitoring progress of RTWS students;

• Interviewing veterans who are also LIS professionals;

• Studying admissions processes via a survey to LIS program admissions staff;

• Conducting entrance and exit interviews with students in the program.

The veterans who receive these grant scholarships will be interviewed as they complete their programs to gain a better understanding of the experience of veterans returning to academia, as well as to better understand the specific ways veterans' talents and skill sets might relate to gaining an education in LIS. In addition to these interviews, interviews with veterans currently working in LIS fields will be conducted, to again assist in developing a fully realized understanding of the experience as a veteran of transitioning from school to their chosen career.

Reaching Those Who Served (RTWS): Initial Findings

To begin studying recruitment strategies for veteran students, we conducted a survey of admissions staff at a variety of schools offering masters degrees accredited by the American Library Association. The survey consisted of 14 questions, and we received a total of 41 responses out of 60 distributed. Of the responses we received, several key pieces of information stood out in regard to how information studies programs reach out to military veterans. First, 87 percent of respondents reported

that they had never hosted an admissions information session for prospective students who are veterans, and only 16 percent reported they had a program in place to recruit veterans, although none of the respondents had a program in writing about veteran recruitment. While 78 percent responded that they would like to have a plan in place to recruit military veterans, 96 percent said that an applicant's status as a veteran had no relevance in their admissions process. While it is understandable that these universities do not discriminate or give special treatment to applicants based on their military status, it does make creating a structured recruiting program for veteran applicants difficult.

One way in which we hope to address this difficult conflict of interests is by analyzing the feedback from our current RTWS students to find more natural recruiting strategies that increase the overall number of military applicants, thereby increasing the likelihood that more military veterans will be admitted to ALA accredited masters programs.

Recruitment and admission strategies for Reaching Those Who Serve include a variety of avenues. These range from booths at campus events and professional conferences, to providing online content, to informal word of mouth sources. Our online presence currently consists of a project website, along with an email listserv and Facebook group to keep in contact with program students once recruited. We have also sought to identify services already in place at UT-Austin, UH-Manoa, and SJSU to share announcements of the available RTWS funding. Announcements of the grant and its availability were published online on the LIS program websites and submitted to newsletters and the membership of veteran service groups. Additionally, the first round of veteran students admitted to the program have provided us with feedback as to where and how to reach veterans, and we seek to utilize this feedback in recruiting the final students to the program.

Lesson #1. Recruiting Advice: Go to Where Veterans Are

Some of the most important lessons we have learned via Reaching Those Who Served have come from interviews with the students currently enrolled in their programs. They have provided a level of insight and wisdom about recruitment strategies that is unique to their backgrounds and as such has become invaluable as a resource for future recruitment strategies. One of the most pertinent pieces of feedback we received from these interviews was that in order to recruit veterans, we need to go where they already are. Students and veteran program coordinators both were quick to inform us that veterans may not be likely to go out of their comfort zone and community to find information about LIS programs and funding, so we need to meet them where they already feel comfortable. As such, we have attended veteran meetups, coffee breaks, and happy hours in order to expand our reach for recruitment. We have also attempted to leave flyers and

advertisements at college campus veteran centers, again seeking to remove another step veterans would have to take in order to have access to useful resources.

The veteran students within Reaching Those Who Served have also offered to do program outreach themselves. This can be as simple as word of mouth, like casually bringing up the program in conversations with their friends and fellow veterans, or a more structured form of outreach like giving a brief talk on the program to their military colleagues and coworkers. Additionally, social media has been a useful way to reach out and get to know new veteran communities, again seeking to go to them and meet them where they are. Specifically, we have sought to post on veteran accounts and program Facebook and Twitter pages, as well as making a Facebook group for veterans currently enrolled in the program.

Lesson #2. Online Programs Preferred

Veterans highly value flexible programs that allow them to continue living where they want and attending to their responsibilities to work and family. This leads directly into another valuable piece of feedback we received from our students about the preference for online programs within the veteran community. Veterans may still be serving their country in the National Guard, or even deployed on active duty. As such, they prefer flexible education programs like the fully online degree program offered by SJSU that they can access anywhere in the world. In the creation of future degree programs, universities would be wise to create at least a portion of courses students can complete online if they seek to actively include the military population in their target enrollment group.

Lesson #3. Personal touches appreciated

There is a risk that students involved in the RTWS may fail to make progress towards completion of their degree. We are addressing these risks through pre-testing, creating follow up questionnaires, providing advising to students in the program, and providing students in the program with ways to connect to each other to create an internal support system while pursuing their degree.

Personal touches were also highly valued by the students. Specifically, they enjoyed time taken by advisors to walk them through not only what courses would be appropriate to take, but what it is like to be enrolled in an information studies masters program. They enjoyed the creation of a group email so that they could stay in touch and reach out to one another for support throughout the academic year. These kind of humanizing pieces of the program helped ease the transition from military life to civilian life that includes being a graduate student.

Lesson #4. Veteran-Specific Orientation Program Desired

One other key area of interest in studying recruitment strategies for veterans is funding. Veterans are able to receive funding for tuition from multiple different government sources and bills, however understanding of the varieties, nuances, and rules around these funding sources is not well known in the LIS community. We seek to explore the details of these funding sources and create a resource for others in the LIS community to familiarize themselves with and utilize when recruiting veteran students to their programs.

In the same vein, students within the program suggested that a preparation course or transition orientation program would be highly useful to veteran students. They noted that it is often difficult to know what to expect in civilian academic interactions, for example what level of assertiveness within the classroom or group project settings is appropriate, as this can sometimes differ in a military setting. These types of nuanced recommendations are vitally useful to veteran students and help put them at ease while beginning a new chapter in their life. The students within RTWS stated that even an hour-long orientation course to help familiarize them with some of the academic jargon that is to be expected within programs in the LIS fields would be extremely advantageous to veteran students. With the establishment of the Veteran Caucus Membership Initiative Group (MIG) within ALA in spring 2019, there might be interest in pursuing the RTWS recommendations at a national level. [5]

RTSW: A Start in Creating a National Effort at Recruitment into LIS Programs

In creation of a veteran-focused recruitment program, adaptability is key. Many institutions are working with tight budgets and limited resources, so we hope that the insights provided by research within RTWS can assist in helping admissions staff and LIS educators focus in on key areas that will yield the greatest results in recruitment of veterans. By meeting veterans where they are, being creative with word of mouth and informal info sessions, and partnering with veteran program coordinators, we feel all masters degree programs can begin to take steps to create a veteran-focused recruitment program within their university and academic community. We look forward to sharing additional insights with the LIS community as we further investigate useful recruitment strategies brought to light by RTWS.

RTWS has the potential to create an enormous amount of positive impact within the LIS community, at an individual, local, and national scale. Students within the program themselves will benefit from furthering their career goals without incurring debt via loans to cover tuition. In turn, these students are able to become ambassadors to their community and fellow veterans for the LIS field, which has a high chance of

resulting in an increased number of veteran applicants to LIS programs in the future. At a national level, the research from this grant will allow other universities to create strategies to better reach potential veteran students and more successfully recruit veterans into their LIS degree programs.

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Utilizing Integrated Marketing Communication Campaigns to Boost Library Usage Among College Students: Insights Gained from Empirical Research

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ABSTRACT

Background: While libraries play a positive role in college students' learning and academic success, library use among college students is in decline. Furthermore, there is a dearth of research on what factors influence students' library usage. Thus, we aim to investigate barriers and facilitators that shape college students' library visits, and use these insights to develop an integrated marketing communication campaign that aims to boost library usage among college students.

Method: An online survey comprising fixed-choice and open-ended questions was sent to students enrolled in a regional Midwest university. A total of 205 college students and faculty members (18-68 years old; M_{age}= 25.09, SD = 9.76; 77.1% female; 69.8% White; 80.0% undergraduate) offered complete answers.

Results: Descriptive analyses of the fixed-choice questions showed that participants' library usage was limited in frequency, diversity, and engagement. Using thematic analysis, a list of barriers (e.g., lack of self-motivation, personal preferences and productivity concerns) and facilitators (e.g., coursework or research needs) were identified from the qualitative data. These factors were then used for campaign development. In addition to survey findings, research insights gained from the literature, informal focus groups and feedback from students, faculty, and librarians were also utilized to finalize the campaign strategy. Preliminary results showed that the campaign yielded positive outcomes.

Conclusion: Findings of this study emphasize the importance of adopting empirical-based and research-guided integrated marketing communication (IMC) campaigns to address real-world problems, such as how to promote library usage among college students. Results also underscore the importance of integrating feedback from key stakeholders, such as students, faculty members, and librarians, to make sure the campaign intervention is tailored to the target audiences' needs and reflects community values.

Keywords: Integrated marketing communication campaigns; IMC campaign; library campaign; library usage; college students; intervention design

Introduction

Libraries play an integral role in propagating knowledge and improving academic performance among college students (Ogungbeni, Obiamalu, Ssemambo, & Bazibu, 2016). As research indicates, library usage is positively associated with college students' academic performance (Whitmire, 2002; Wong & Webb, 2011). For instance, research finds that students attending universities with more library resources have greater critical thinking abilities (Whitmire, 2002). Findings also show that frequent usage of the library is linked to better academic performance among students in terms of grade (i.e., grade point averages or GPAs) (Soria, Fransen, & Nackerud, 2013; Wong & Webb, 2011). Furthermore, researchers also found that compared to non-library users, first-time and first-year undergraduate student library-users have higher retention from fall to spring (Soria et al., 2013).

The majority of academic libraries offer both physical and online resources, which help to support students' academic and social needs (Delaney & Bates, 2015). However, as research indicates, libraries have been dealing with various issues such as long-term declines in circulation, reference transactions, reserves, and in-house library materials usage (Han, Song, Li, & Zhu, 2018; Martell, 2008; Shapiro, 2016). For instance, analyses on academic library use between 1995 and 2006 show that physical use of library collections and services is in steady decline (Martell, 2008). Research further indicates that students' use of libraries' digital learning opportunities is also unsatisfactory, such as infrequent and limited use of library resources (Judd & Elliott, 2017).

Against a backdrop of limited library budgets and declining usage (Rose-Wiles & Irwin, 2016), insights on how to promote library usage among key stakeholders, such as college students, are needed. Previous findings show that students use the library mainly for purposes such as learning and information seeking (Kim, 2017). However, while useful insights are available, there is a lack of

understanding on factors, such as facilitators and barriers that influence college students' library usage. In other words, questions such as "What factors prevent students from using the library services more often?" and "What factors promote students' library usage?" could not be adequately answered by the current literature. Gaining a deep understanding on barriers and facilitators that shape college students' academic library usage and engagement could shed light on campaign intervention strategies, such as integrated marketing communication (IMC) campaigns, that have the potential to increase students' library usage.

To this end, this study aims to (1) investigate barriers and facilitators that impact library usage in college students (Study 1) and (2) develop a cost-effective IMC campaign to boost students' library usage, mainly based on empirical insights gained from Study 1. In the context of this study, we define cost-effectiveness IMC campaigns as campaigns that can be achieved with a small budget and do not require structural or systematic changes (e.g., change library's hours).

Study 1: Survey Research

Methods

Study design

In order to understand barriers and facilitators to college students' library usage, an online survey was developed and distributed university-wide to all enrolled students. Questions were adopted using insights gained from current literature (Judd & Elliott, 2017; Kim, 2017; Rose-Wiles & Irwin, 2016), students, faculty, and librarians. The survey was pilot tested among a small group of students prior to mass distribution. Insights gained from the pilot test were used to further improve the survey. The final survey measures the characteristics of (e.g., specific services used, frequency of library usage), facilitators, as well as barriers to library usage among college students, along with socio-demographic questions (e.g., age, gender, school classification). Both fixed-choice and open-ended questions were adopted to ensure comprehensive insights could be captured from the students. Study approval was obtained from the University's Institutional Review Board.

Data analysis

Descriptive analyses were used to gain insights from fixed-choice questions that aimed to gauge frequency of visits, diversity of services, and levels of engagement of participants' library usage. Braun and Clark's (2006) thematic analysis technique was adopted to explore open-ended questions on facilitators and barriers to library usage among college students.

Results

Sample characteristics

A total of two hundred and five adults (including both college students and faculty members) participated in the survey (77.1% female, M_{age} = 25.09, SD = 9.76). No screening measures were used to exclude any individuals from participating in this study. Participants were consisted of 69.8% White (n = 143), 3.4% African American (n = 7), 12.7% American Indian (n = 26), 8.3% Asian (n = 17), 1% Pacific Islander (n = 2), and 4.9% participants reported their race/ethnicity as Other (n = 10). In terms of school status, there were 21% freshman (n = 43), 16.1% sophomore (n = 33), 21.5% junior (n = 44), 21.5% senior (n = 44), 15.6% graduate students (n = 32), 2.9% faculty (n = 6), 0.5% staff member (n =1), and 1% of individuals reported other status (n = 2) (see Table 1).

Table 1. Characteristics of the study participants (*N* = 205)

Variables	
Gender, *n* (%)	
Male	46 (22.4)
Female	158 (77.1)
Other	1 (0.5)
Age in years, *M* (*SD*)	25.09 (9.76)
Race/ethnicity, *n* (%)	
White	143 (69.8)
African American	7 (3.4)
American Indian	26 (12.7)
Asian	17 (8.3)
Pacific Islander	2 (1.0)
Other	10 (4.9)

School Status, n (%)	
Freshman	43 (21.0)
Sophomore	33 (16.1)
Junior	44 (21.5)
Senior	44 (21.5)
Graduate student	32 (15.6)
Faculty member	6 (2.9)
Staff member	1 (0.5)
Other	2 (1.0)

Characteristics of college students' library usage and engagement

Participants were asked about their current library usage and engagement. Current library usage was assessed with 13 questions such as "During the semester, about how often do you: use the library website," "During the semester, about how often do you: use library databases," and "During the semester, about how often do you: access online articles." The items were scored on a 6-point scale from 1 = did not know I could to 6 = very frequently. (see Table 2).

Table 2. Characteristics of college students' library usage and engagement (N = 205)

Items	1	2	3	4	5	6	7	8	9	10	11	12	13
Library usage, frequency													
Did not know I could	2	2	1	11	5	5	6	9	22	15	6	4	59
Never	19	20	22	63	50	74	82	149	134	120	85	58	103
Rarely	37	44	43	58	58	60	54	33	32	44	43	38	18
Occasionally	64	60	61	47	46	34	42	9	14	20	42	53	7
Frequently	45	43	41	16	27	21	15	3	2	5	10	32	9
Very frequently	38	36	37	10	19	11	6	2	1	1	19	20	8

1, use the library website; 2, use library databases; 3, access online articles; 4, access e-books; 5, access print articles; 6, access print books; 7, request books or articles; 8, talk with a librarian on the phone; 9, chat with a librarian online; 10, email a librarian; 11, search for items in the library catalog; 12, check library hours or contact information online; 13, other.

Barriers to college students' library usage

All participants were asked to respond to three open-ended questions gauging factors that inhibit their library usage and engagement. Data analyses revealed five themes: *time, work, and transportation constraint, lack of self-motivation, personal preferences and productivity concerns, lack of awareness of library services, having alternatives to library's resources, and not satisfied with existing library facilities or services.*

Time, work, and transportation constraint

Participants indicated that time, work, and transportation constraint as one of the most important barriers to their library usage. Overall, students suggested that conflicting priorities or schedules prevented them from being able to visit the library as frequently as they preferred. In addition, ease of access, mainly in the form of transportation, was also indicated by the students as an inhibitor to their library usage. Below were direct quotes from students, brackets ([…]) were used for missing words and participant background information.

If I lived on campus, I would visit the library more often.
[Male, Senior, Age 24]

I'm not really sure. Since I commute, it's hard for me to go to a building besides work and class. [Female, Senior, Age 22]

Lack of self-motivation, personal preferences and productivity concerns

Respondents indicated that internal factors, such as lacking of self-motivation, personal preferences for learning and studying, as well as productivity concerns are barriers to their library usage. Similar to time, work, and transportation constraint, this barrier was also an internal one to respondents' library usage. Different from time, work, and transportation constrain, which was oriented

toward objective inhibitors, this barrier was centered on subjective factors, such as not having enough self-motivation to visit the library.

There are other places, such as computer labs, that are closer and that I am more comfortable with using. [Female, Junior, Age 22]

I like being alone when I work on things because that's where I do my best thinking. And by "alone" I mean actually closed off in a room by myself. Noises and sounds are distracting even if it's just someone typing on a keyboard or moving a chair. I would kind of like sections like the group rooms, but for independent work--if possible. Otherwise, I normally see no reason to come to library to work unless it is with a source that absolutely cannot leave the library. [Female, Senior, Age 22]

Lack of awareness of library services
Respondents indicated that a lack of awareness to library services was a key barrier to their library visits. Most respondents indicated that not having enough, or relevant information that could guide their library use was a barrier. Interestingly, though the library offers complimentary tours on its collections and services, some students were not aware of this opportunity.

It's overwhelming in there when you don't know exactly where everything is. [Female, Freshman, Age 19]

Inform people more on all services the library offers and how to access them. [Male, Senior, Age 21]

Having alternatives to library's resources
Students suggested that having alternative learning resources, both offline and online, as a key reason for their lack of library visits. Overall, students considered being able to study elsewhere and having alternative online learning choices as inhibitors to their library visits.

I would use it more often if I wasn't able to study in my Dorm. [Female, Freshman, Age 18]

Since I have everything the library offers (laptop with internet, printer and scanner, quiet study space, books, even AV equipment) at my house, I don't think I would be their target audience to incentivize. However, I would love more fun events in the library. [Female, Senior, Age 22]

Not satisfied with existing library facilities or services
One reason indicated by the participants for not using the library was related to their satisfaction of existing library facilitates and services. Most of concerns voiced by the students were related to access to the library, such as more flexible library hours.

More open hours on the weekend. After I work all day, my time is short for studying. I have to come home, cook dinner, monitor my kids and their homework, drive my older kids to work, clean up, etc. By the time I get to get to my assignments, I'm too tired, so I save my work, if possible, for the weekend. If the library were open more, then I would utilize it more on Saturdays and Sundays. [Female, Master's program, Age 41]

I would like all the hours to be the same. For example, all of the services and opportunities inside have the same hours as the regular library hours. [Female, Freshman, Age 19]

Facilitators to college students' library usage
All respondents answered to three open-ended questions gauging facilitators to their library usage and engagement. Six themes--*coursework or research needs, availability of study companions and social space, presence of friendly and helpful librarians, preference for library's distraction-free environment, online access to library services and resources, and availability of a great variety of facilities and resources* were identified from the thematic analysis.

Coursework or research needs
Having coursework or research needs was considered as a key facilitator to students' usage of the library's facilitates and services. Overall, students appreciated library's abilities to help them finish their coursework needs or research requests.

I am an education major so I find the children's literature section very careful. I also like how Marla will talk in some of our classes at the beginning of the semester and give us information. For example, how to use the library resources online and how to correctly use APA. [Female, Senior, Age 22]

[I appreciate the library] mostly for the articles that I want for my research. If I put a request, they also order papers that weren't available before. [Male, Senior, Age 22]

Availability of study companions and social space
Participants suggested that being able to learn with study companions and having social space for group study as one of the facilitators to their library visits. Students also indicated that facilities in the group study rooms were helpful, such as large monitors, which allow them to practice coursework like presentations.

The TV in the group study rooms allows me to visualize and work on group presentations…Make it more of a chill, and do homework with friends atmosphere [would encourage me to use the library more. [Female, Freshman, Age 18]

I appreciate that the library provides a meeting space for group projects. [Male, Senior, Age 22]

Presence of friendly and helpful librarians
Students also suggested that the presence of friendly and helpful librarians facilitated their library visits. A number of students indicated that they always felt welcomed by the librarians, even the front desk student workers.

I love having a place that I can go to and be in the mindset to study. I really appreciate having access to all of the books and online resources that really aid in research I have to do. I love having librarians there all the time that I can ask questions and who are always just friendly faces. [Female, Junior, Age 21]

I appreciate that it is a quiet and friendly environment. I also appreciate that there are people here willing to help you in any way possible. [Female, Sophomore, Age 20]

Preference for library's distraction-free environment
Being able to study in a distraction-free environment offered by the library was one of the frequently mentioned facilitators to students' library visits. Respondents indicated that they appreciated the fact that studying at the library allows them to concentrate and complete coursework effectively.

The quiet environment makes it nice to study and relax.
[Female, Senior, Age 22]

The quietness and how I know when I go to the library I can always get work done. [Female, Freshman, Age 19]

Online access to library services and resources
Participants considered having online access to service and resources as a key facilitator to their library usage. Students frequently indicated that online resources' ease of access as one key reasons for their use of library services.

[I like having] online access to different articles because I am required to write and abundance of research papers. It is easier for me to access things online than to go to the library in person. [Female, Junior, Age 20]

I use the online library resources any chance I get. [Female, Master's Program, Age 37]

Availability of a great variety of facilities and resources
In addition, the availability of a great variety of facilities and resources was also considered as a key facilitator to library visits by most participants. Overall, students suggested that the diversity of facilities and resources, both online and offline, as one main reason that contribute to their online and offline library visits.

The convenience of being able to go to the library and use the computers, media services, or check out a book or DVD.
[Female, Junior, Age 20]

I appreciate the variety of services available to us, as well as the access to them. The annex is also something I appreciate greatly. [Female, Freshman, Age 18]

Discussion

Study 1 aimed to gauge insights on college students' library usage as well as identify barriers and facilitators that influence library visits among college students. To our knowledge, this is the first study that investigated factors that shape library usage among college students, factors which can be used for developing intervention strategies, such as IMC campaigns, to promote library visits and engagement among the target audience.

Results indicate that participants' library visits were limited in visit frequency, diversity of services used, and engagement with the library services. Findings from thematic analysis further show that college students consider *time, work, and transportation constraint, lack of self-motivation, personal preferences and productivity concerns, lack of awareness of library services, having alternatives to library's resources, and not satisfied with existing library facilities or services* as main barriers to their library usage. In addition, results suggest that college students consider *coursework or research needs, availability of study companions and social space, presence of friendly and helpful librarians, preference for library's distraction-free environment, online access to library services and resources, and availability of a great variety of facilities and resources* as factors that ease their library visits. These practical insights are then adopted as the main research foundation for the advertising campaign.

Study 2: Campaign Development
Methods

Study design

For Study 2, we aimed to create an IMC campaign as a cost-effective intervention strategy to promote library use among college students. In the context of this study, IMC campaigns could be understood as consumer-centric promotional efforts that incorporated advertising, public relations, and marketing strategies (Kitchen & Burgmann, 2010; Schlosser & Kanfer, 2000).The advantages of IMC campaigns are that compared to other promotional efforts, they are more customer-centric and multidimensional, which allow them to be able to address campaign objectives more cost-effectively (Broderick & Pickton, 2005; Kitchen & Burgmann, 2010; Schlosser & Kanfer, 2000). In addition, research also suggests that IMC campaigns can help organizations build positive brand images among the target audiences (Madhavaram, Badrinarayanan, & McDonald, 2005). In sum, IMC campaigns are considered as an effective approach to adopt for the current study.

The IMC campaign was developed mainly based on empirical findings gained from Study 1 and insights obtained from extant literature on college students' library usage (Datig, 2014; Head & Eisenberg, 2011; Jiao, Onwuegbuzie, & Lichtenstein, 1996). It is important to note that, among all the barriers and facilitators identified from Study 1, we only incorporated factors that can be easily addressed in the campaign strategy development process. In other words, barriers and facilitators that require structural or systematic changes were not used for campaign development. For instance, a number of participants indicated that their time, work, and transportation constraints prevented them from using the library more often. Though this barrier was voiced by a number of participants, it cannot be readily addressed without structural or systematic changes initiated by both the users and the library. Therefore, we decided not to use this factor to guide our campaign design. A list of factors included/excluded could be found in Table 3.

Table 3. Factors included/excluded in the IMC campaign development

Barriers	Facilitators
1. Time, work, and transportation constraint (excluded) 2. Lack of self-motivation, personal preferences and productivity concerns (included) 3. Lack of awareness of library services (included) 4. Having alternatives to library's resources (excluded) 5. Not satisfied with existing library facilities or services (excluded)	1. Coursework or research needs (excluded) 2. Availability of study companion and social space (included) 3. Presence of friendly and helpful librarians (included) 4. Preference for library's distraction-free environment (included) 5. Online access to library services and resources (included) 6. Availability of a great variety of facilities and resources (included)

After the preliminary campaign was developed, students were asked to review and critique the campaign materials in the form of informal focus group. These insights from the students were then used to improve campaign strategies to make sure they are grounded in research and in line with students' feedback. To make sure the campaign reflects community value, insights from key stakeholders such as faculty members and librarians were also obtained and integrated into the campaign development. Overall, the IMC campaign was developed based on insights gained from (1) primary research insights from Study 1, (2) secondary research findings such as extant literature, (3) input obtained from faculty and librarians, and (4) preliminary campaign evaluations gained from students. We used an iterative process, which requires constantly adjusting our campaign strategies and execution plans based on students' feedback, to make sure our campaign is grounded in reality. A detailed account of the campaign development process could be found in Figure 1.

It is worth mentioning that the main designers of this advertising campaign were students enrolled in the principle researcher's Advertising and Public Relations Campaign class. In line with the collaborative learning and "learning by doing" philosophies (Arrow, 1971; Blumenfeld, Marx, Soloway, & Krajcik, 1996; Foster & Rosenzweig, 1995), this Campaign class was designed to integrate course materials into practical campaign practices. Overall, students' campaign endeavors were mentored by both the principle researcher, other faculty members in the Mass Communication department, as well as librarians.

Figure 1. Campaign development stages

Stage 1	Identify campaign objectives	The objectives of the present advertising campaign are to use persuasive communication deliverables, such as posters, to boost library usage and engagement in college students.
Stage 2	Develop overarching campaign strategies	Insights gained from Study 1 on barriers and facilitators to college students' library use, along with feedback from librarians, were used as foundation for campaign strategy development.
Stage 3	Generate and evaluate preliminary campaign ideas	Preliminary campaign ideas are developed based on insights gained from Stage 2. College students, recruited in the form informal focus groups, are asked to evaluate these campaign ideas.
Stage 4	Adjust preliminary campaign ideas	Based on preliminary evaluation results, campaign strategies were then adjusted and finalized.
Stage 5	Finalize overarching campaign strategies and specific execution plans	Using campaign strategies finalized at Stage 4, campaign deliverables, such as posters, social media posts, and events that are tailored to college students' preferences are developed. These campaign deliverables are then adopted by the library to promote usage and engagement among the college students.

Results

The IMC campaign was developed based on the collective insights mentioned above. Both the students, faculty, and the librarians responded positively toward the campaign materials. In terms of communication deliverables, tailored promotional posters, events, as well as infographics were created by students. Example campaign materials and mock-up social media posts could be found in Figure 2-5.

Figure 2. Example campaign poster

Figure 3. Example event promotion posters

Figure 4. Example campaign infographics

Figure 5. Example campaign infographics

Discussion

Our Study 2 aimed to adopt insights gained from the survey research, the literature, informal focus groups, as well as input from faculty and librarians into IMC campaign development. To our knowledge, this research is among the firsts that used empirical findings to inform library campaign intervention design, to make sure intervention efforts are empirical-based and tailored to students' needs and wants. Previous research suggests that collaborative efforts between key stakeholders, such as campus organizations, faculty members, and students have the potential to promote library usage and learning activities (Delaney & Bates, 2015; Joy, Annie Keola Kaukahi, & Joyce, 2018). Our findings offer empirical evidence that supports participatory and collaborative approaches to promote library services. Overall, there are three main takeaways that we wish to highlight: (1) the importance of empirical research in campaign intervention design, (2) merits of using a participatory and collaborative approach to promote library services, and (3) cost-effectiveness of IMC campaigns as an intervention strategy.

Empirical research in campaign intervention design
Using formative research in IMC campaigns has a long history in fields such as communication and marketing (Atkin & Freimuth, 2001; Hennink-Kaminski, Ihekweazu, Vaughn, & Ward, 2018). However, this practice is less common in the context of library usage promotion campaigns. We adopt a 2-study design for the current study, the first one mainly focuses on using formative research to gain empirical insights from the students. We believe insights gained from the survey are critical, as they allow us to tailor the campaign messages based on students' library use preferences and practices as well as our cost-effective evolutions (e.g., whether addressing the barriers or facilitators mentioned by the students require structural of systematic change). Our survey study also offers a rich pool of potential campaign strategies that we, as researchers, can brainstorm collaboratively with students, faculty, and librarians. In addition, insights obtained from informal focus groups and interviews with faculty and librarians also render us a more connected understanding on students' library usage. Therefore, we recommend future library campaigns to adopt formative research methods, such as survey, focus group, or qualitative interview, to ensure campaign messages are relatable to the target audience.

Using a participatory and collaborative approach to promote library services
We integrated feedback from students, both library users and non-users, as well as faculty and librarians in our campaign design. By gaining a diverse pool of insights on ways to promote students' library usage, we are able to develop a tailored IMC campaign that resonates with community values. Another benefit of adopting a participatory and collaborative approach to promote library services is that it allows the campaign messages to be more engaging to all key stakeholders, as these stakeholders are involved and invested in the campaign from the start. By adopting a participatory and collaborative campaign development approach, the execution of the campaign is also made smoother, as key campaign executioners such as librarians, are closely involved in the campaign design and development and are familiar with the campaign content and purposes. Here, we hope to underscore the importance of having a framework in designing empirical-based and research-guided IMC campaigns. To maximize campaign outcomes, we developed and followed a 5-stage campaign development procedure, which encompasses an iterative process that integrates key stakeholders' feedback into campaign design. This 5-stage campaign development procedure can also be applied to other library campaign intervention contexts. Researchers and librarians should tailor the procedure based on their specific research needs and contextual considerations.

IMC campaigns as a cost-effective intervention strategy
As a cost-effective intervention strategy, IMC campaigns have great potential in changing individuals' attitudes and behaviors (Krugman, 1965; Snyder & DeBono, 1985; Witte & Allen, 2000). Advertising campaigns as a mechanism of intervention have been studied in contexts such as political campaigns (Valentino, Hutchings, & White, 2002), health communication (Cohen, Shumate, & Gold, 2007), and pro-environmental research (Bator & Cialdini, 2000). Our study is among the first that adopts formative research in an IMC campaign development in the context of library use promotion. In line with the collaborative learning and "learning by doing" philosophies (Arrow, 1971; Blumenfeld et al., 1996; Foster & Rosenzweig, 1995), we turn a mass communication campaign class into a practical pedagogy plus hands-on experience campaign practice, which generates positive and cost-effective outcomes for students, faculty, and librarians. Furthermore, the use of digital platforms as communication delivery channels also contributes the cost-effectiveness of our campaign. Overall, we are able to create a tailored and engaging campaign with a very limited budget. We believe this pedagogy plus hands-on experience campaign practice can be adopted in other courses and campaign contexts as well, particularly those that aim to promote maximum student learning outcomes and community wellbeing.

Limitations
There are a few limitations to acknowledge. First, due the cross-sectional design of the survey, no causal relationships could be drawn from the findings. Second, as the survey is self-administered by the participants, findings of the survey may subject to desirability and recall biases. Future research could address these limitations by adopting longitudinal research design with both objective and subjective data collection methods to further enrich the literature. Furthermore, due to time and resources limitation, other than informal feedback from stakeholders, such as college students, faculty, and librarians, no systematic campaign evaluations are available during the research period. To address this issue, future studies could use more rigorous campaign evaluation methods, such as tools like Google Ads, to gain more nuanced insights into students' response toward the campaign messages. It is also important to note that both the survey and campaign are conducted in one regional university, which indicates that insights from the present study are limited in terms of generalizability. Future research could adopt a more comprehensive sample of college students and university libraries to further enrich the literature.

Conclusions

We identified factors that shape college students' library usage, and incorporated these insights into developing a tailored IMC campaign that could help boost students' library usage and engagement. Overall, our study provides practical insights into how to develop empirical-based and research-guided IMC campaigns that are tailored to the target audiences' needs and are grounded in community values. Findings of the present study also provide useful directions for future research endeavors. For instance, future studies could investigate how to best develop on-campus IMC campaigns that could improve libraries' brand image among end-users, such as students and faculty, using the 5-stage IMC campaign development process created in this study. Overall, more research is needed to understand potential cost-effective campaign approaches that could yield more desirable attitudinal and behavioral changes related to library usage and engagement among the college students.

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