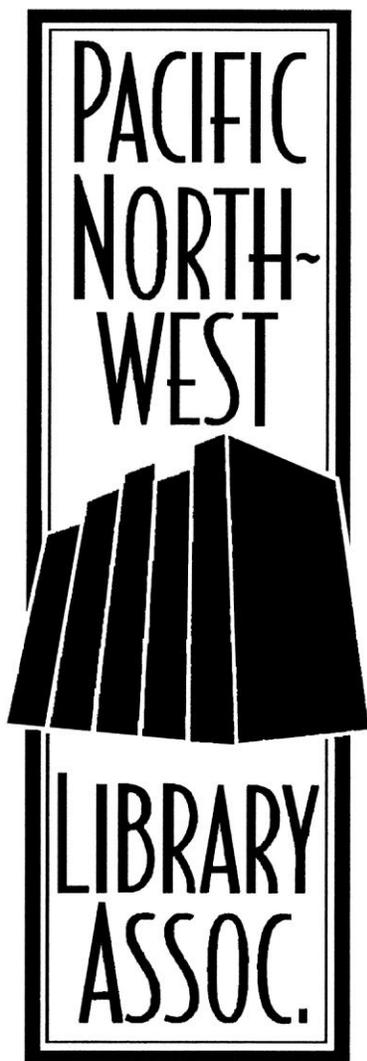# PNLA QUARTERLY

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Call for submissions and instructions for authors

Authors should include a 100-word biography and mailing address with their submissions. Submit feature articles of approximately 1,000-6,000 words on any topic in librarianship or a related field. Issue deadlines are October 1 (Fall), January 1 (Winter), April 1 (Spring), and July 1 (Summer). Please email submissions to mbolin2@unl.edu in rtf or doc format.

President's Message
Michael Burris

July is one of my favourite months (along with December, for obvious reasons!) Here at home, it always seems that someone hits a switch and we leave behind the gloom of months of rainy weather and enter a stretch of glorious weather that reaffirms Vancouver's reputation as one of the best cities anywhere. It is the month of my birthday (and I am still at a stage where I look forward to, and don't hide from, that date). And July is the final month of preparation for the annual PNLA conference, which has become one of the highlights of my "professional" calendar. I have been fortunate during my time on the PNLA Board to visit some terrific cities. Big Sky, Eugene, Missoula, Post Falls, Spokane, and even Victoria, which I travel to more than once a year, but which was an awesome place to have a conference. These cities may not rank with Paris and London as travel destinations, but each were amazing in their own way, and they are places that, without my PNLA involvement, I may have never visited. More than just being great spots to visit, attending the conferences in each of those locations has made me a better librarian. As I've mentioned in the past, I've learned so much from my PNLA colleagues. The PNLA conference always has an excellent selection of programs. This year is no different. I am really looking forward to the upcoming conference in Anchorage. Having been lucky enough to attend an AkLA conference in Juneau, I know that the library community in Alaska has tremendous energy and will be putting on a terrific conference. Heidi Chittim, Sara Saxton and the rest of the conference team have been working extremely hard, in very trying circumstances and deserve heaps of praise. PNLA conferences in Alaska are always special. I hope that many of you are taking advantage of this opportunity and are joining us at the beginning of August.

Before I wrap up for this issue, I wanted to shine the spotlight on PNLA Leads. I have not been writing enough of our plans for Leads. There is always so much to write about on other topics. Some of our biggest supporters of Leads have been asking about the Institute's future and I am here to assure you that we on the Board feel that future is bright. The last Leads was in 2010, which would normally have meant that the next Institute would have been this year. However, the Board voted to move the next Leads to 2013 to avoid scheduling conflicts with other leadership programs in other states. Coordinators Mary DeWalt and Sam Hines continue to work hard on the planning for the 2013 PNLA Leads. We were recently informed that PNLA will receive an IMLS grant for Leads. That is excellent news and is greatly appreciated. We are also working on securing sponsorship for Leads. These efforts will do much to ensure that Leads continues past 2013. As the number of Leads "graduates" increases, so does the amount of positive word of mouth it receives. It is very gratifying to receive emails from past participants letting us know that they are

recommending that staff from their workplaces attend. 2013 will be the best Leads yet! See you in Anchorage!

From the Editor
Mary Bolin

This issue features articles on a variety of interesting topics, including information literacy, information-seeking behavior, records management, and several aspects of metadata. We are proud to include international authors, authors from the PNLA region, and LIS students as contributors to this issue.

I'm sure everyone is looking forward to the PNLA annual conference in Anchorage. I'm looking forward to publishing the papers and presentations in the fall issue of the *Quarterly*.

Assessing and Improving Data Literacy: A Study with Urban and Regional Planning Students

Justin L. Otto

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Introduction

The ability to access, manage, and manipulate quantitative data is important for success in a number of academic and professional disciplines. Urban and regional planners, both as students and professionals, often find themselves called upon to create population projections, conduct analyses of regional economic conditions, and otherwise use quantitative data to solve problems for cities, counties, and larger regions. The research skills needed for success in a discipline such as this is a form of information literacy: data literacy. As the subject liaison for the Urban and Regional Planning Department (URP) at Eastern Washington University (EWU), the author conducts data-focused instruction sessions in close cooperation with the Urban and Regional Planning faculty, and is interested in learning whether these sessions have a measureable impact on students' skills with data. The collaborative relationship between the Library and the Urban and Regional Planning program at EWU provided an opportunity to trial a methodology for assessment of the impact of library instruction on data literacy. This article reports on the data literacy assessment project that was undertaken with undergraduate and graduate students in the Urban and Regional Planning program at Eastern Washington University during the 2010-2011 academic year. The assessment employed a combination of pre- and post-tests and an examination of student assignments.

Literature Review

The need for data skills and experience is often treated as an issue specific to academic disciplines that are heavy users of data. This is reflected in the fact that much of the discussion on the topic is within the discipline-specific pedagogy literature. In the planning literature, Friedmann proposes, "a set of skills common to good planning practice", among which is Quantitative Methods, which includes "urban data sources," and "estimation and forecasting procedures" (1996, 99-100). In URP programs, data acquisition and analysis techniques are usually the focus of "planning methods" courses (Mahayni, Sanchez, and Kelly 1999; Ottensmann 2000). Edwards and Bates (2011), in an examination of the core curricula of thirty master's degree programs in planning, found that every one of them requires at least one planning methods course.

The body of library literature on data literacy is small, but some useful definitions of data literacy exist. Carlson et al., in summarizing other literature on the topic write, "Typically, data literacy involves understanding what data mean, including how to read graphs and

charts appropriately, draw correct conclusions from data, and recognize when data are being used in misleading or inappropriate ways" (2011, 633). Carlson et al.'s definition of data literacy fits closely with what is also referred to as "statistical literacy" (Gray 2004; Stephenson and Caravello 2007). Schield gives a more narrow definition of data literacy, defining it as the ability to, "access, manipulate, and summarize data" (2004, 8). Schield also makes data literacy a foundation of his separate concept of statistical literacy, which he describes as the ability to "analyze, interpret, and evaluate" data (7). He concludes that data and statistical literacy are components of overall information literacy, especially in academic disciplines that work regularly with numeric data.

The library literature on the use of data is primarily focused on the provision of data services by the library (Read 2007) and on the need for librarians to have basic competencies with data and statistics in order to meet the needs of their patrons (Gray 2004; Humphrey 2005). There is little on the assessment of patrons' literacy with regard to this type of information or on the impact of library instruction on data literacy. Stephenson and Caravello (2007), however, describe the development and assessment of a pilot course designed to teach statistical literacy to sociology students. Recently, Carlson et al. (2011) used insights gained from assessing both faculty responses to a survey and the performance of students in geoinformatics courses in the development of a set of Core Competencies for Data Information Literacy. Their Data Information Literacy framework is focused on the sciences and encompasses data discovery, data generation, and the preservation of data sets stemming from original research, in addition to understanding what data mean and how to manipulate data.

The types of data used in URP are primarily demographic and economic data generated by government at various levels, not self-generated scientific data. Therefore, the definition of data literacy put forth by Schield (2004) - the ability to access, manipulate, and summarize data - is the one used as the model for this assessment of URP students.

Two kinds of assessment described in the literature - an organic assessment (Brown and Kingsley-Wilson 2010) and an authentic assessment (Gulikers, Bastiaens, and Kirschner 2004) - were good fits with the design of the curriculum in the URP program at Eastern Washington University. Brown and Kingsley-Wilson (2010) used the phrase "organic assessment" to describe taking an existing course assignment and adapting it to become an assessment tool. They worked with journalism faculty to use a journalism assignment as an information literacy assessment tool. In the data literacy assessment of URP students at EWU, assignments from two courses were examined for evidence that the students were learning the concepts and skills necessary for finding, accessing, and retrieving numerical data; i.e. whether they were improving their literacy with data. Similar to organic assessment is authentic assessment, defined by Gulikers, Bastiaens, and Kirschner as "an assessment requiring students to use the same competencies, or combinations of knowledge, skills, and attitudes, that they need to apply in the criterion situation in professional life" (2004, 69). URP courses require students to learn and employ skills they will use as professionals, and students are expected to deliver assignments much like what they would produce while working as professional city or regional planners. Since this assessment project investigated data literacy skills necessary for real-world applications, it was an authentic assessment of the foundational skills and knowledge necessary for professional planners.

The Library and the URP Department

Eastern Washington University is a regional, comprehensive public university with approximately 10,000 students and 500 faculty members. EWU's Urban and Regional Planning Department resides within EWU's College of Business and Public Administration. The department offers both Bachelor's and Master's degrees in Urban and Regional Planning and has approximately 20 undergraduate and 30 graduate students in its B.A. and M.A. programs. The undergraduate program is one of only 14 such accredited programs in the United States (Eastern Washington University College of Business and Public Administration).

URP is a "problem-solving profession". The stated goal of the program is to train professionals for careers in planning, and the curriculum stresses "the acquisition of practical, analytical and organizational skills designed to aid the student in analyzing problems and organizing community activities to help solve problems" (Eastern Washington University College of Business and Public Administration). The program emphasizes practical professional skills, such as the ability to identify, retrieve, and employ mathematical modeling techniques with demographic and economic quantitative data. Assignments are designed to mimic the type of work output expected of professional planners. It is in this data-centric, "real-world" aspect of the URP curriculum that the EWU Library has a close cooperative relationship with the URP Department.

Prior to 2008, the author, as the library liaison for URP, provided both bibliographic and data-centric instruction sessions for URP courses at faculty request. Sessions tended to be of the "one-shot" variety that tried to cover everything at once. In the fall of 2008, the URP Department participated in a project facilitated by EWU Libraries called the Research Skills Initiative, which encourages participating academic departments to incorporate more research-based assignments into their curriculum and approach information literacy in their disciplines in a more systematic way (Miller 2010). URP faculty saw the value of integrating research and research skills more fully into their curriculum and identified literacy with quantitative data as an area for emphasis. Specifically, faculty wanted their students to be able to locate and retrieve appropriate data, understand its uses and limitations, and manipulate and employ it effectively; they wanted their students to be data and statistically literate. Data literacy became the focus of library instruction sessions for URP courses, while statistical literacy in the context of URP was integrated within course assignments and was the responsibility of the course instructors.

This integrated instruction partnership between the Library and the URP Department has worked well. Instructors are pleased with the systematic approach to librarian-presented data literacy instruction that was developed jointly and have expressed that their students' work has improved since the liaison librarian became more involved with their curriculum. But this is just an anecdotal measure of success. After two academic years of providing detailed data literacy instruction, the third year of instruction provided an opportunity to develop a more rigorous assessment of students' data literacy with quantitative data.

Courses Assessed

Two planning methods courses, the undergraduate PLAN 301 "Planning Methods and Techniques" and the graduate PLAN 504 "Planning Methods II", were chosen for this study. Both courses were taught by the same URP instructor. In the URP curriculum, the planning methods courses are focused on real-world applications of urban planning data analysis techniques. After receiving data literacy instruction from the liaison librarian, the class instructor expected students to identify the types of data they need, retrieve it themselves, and create detailed reports, using real-world scenarios, based on the results of their data

analyses. The real-world scenarios tend to involve writing for a target audience, such as a city council or county commissioner. The planning methods courses are the ones that the author, as liaison librarian, is most involved with, which make them good test cases for assessment of library instruction.

The two courses (PLAN 301 and PLAN 504) fill the same role at the undergraduate and graduate levels; to introduce the students to the mathematical and statistical models and techniques that professional planners use for demographic analysis of regions, population projections, and economic and industry analysis. The students at both levels learn to employ the same basic principles and techniques, but the graduate students are expected to employ them in a much more involved and rigorous fashion while compiling and using larger data sets from a wider variety of data sources. Essentially, the undergraduate course is an introductory survey of planning methods, while in the graduate course, students are expected to use planning methods and data in the way that a professional planner would. While there are significant differences in the rigor of the two courses, the commonality in curriculum and types of data used in the planning methods courses provide a natural setting for an experiment in which to compare students at the undergraduate and graduate levels.

Two ninety-minute library instruction sessions were provided for each planning methods course. The first session for each class occurred about one-third of the way through the course and focused on demographic and population data. The second session, two-thirds of the way through the course, focused on economic data. The general learning outcomes for both sessions, at both levels, were for students to:

1. select appropriate data sources;

2. use the features of data sources; and

3. retrieve needed data

The theme of the sessions (demographic and population data, economic data) was identical at the undergraduate and graduate levels because of the commonality in the curriculum of the two courses. There were differences in the content of the sessions, however, because the type and volume of data the undergraduates were expected to employ differed from those expected of the graduate students.

Table 1 details the data sources (topics) in the library instruction sessions for both classes. The first half of the curriculum of both PLAN 301 and PLAN 504 covered the methods and techniques used in demographic analysis and population projections. This library instruction session introduced the data sources that the undergraduate and graduate students should be familiar with in order to accomplish the county-level demographic analysis/population projection class project that corresponded to this portion of the curriculum. The undergraduates were expected primarily to use decennial census data in their work. Much of their instruction session was dedicated to the census and to retrieving census data in different formats. The undergraduates were not assumed to bring any prior knowledge of the census, or any of the other data sources discussed in this session, to PLAN 301. One of the purposes of the PLAN 301 library instruction sessions was to ensure that all of the students were "up to speed" with the data resources they were expected to use on their projects. Alternatively, the graduate students were assumed to have some knowledge of the census, and so their session emphasized various kinds of population estimate and population forecast data from the State of Washington. These data are more sophisticated and difficult to use than the census, and while the undergraduates were introduced to it

during their session, the graduate students were expected to employ it as the primary type of data for their mathematical modeling (see Table 1).

Table 1: Data Sources Covered in URP Library Instruction Sessions
Instruction Session 1 - Demographic and Population Data
PLAN 301 and PLAN 504 U.S. Census American Community Survey Washington State Office of Financial Management Washington State Department of Health
Instruction Session 2 - Economic Data
PLAN 301 and PLAN 504 County Business Patterns, from the U.S. Census Bureau North American Industry Classification System (NAICS) and Standard Industrial Classification (SIC) codes Regional Economic Accounts, from the Bureau of Economic Analysis Local Area Personal Income and Employment tables, from the Bureau of Economic Analysis Quarterly Census of Employment and Wages, from the U.S. Bureau of Labor Statistics

The second half of PLAN 301 and PLAN 504 covered economic and industry analysis. This library instruction session introduced the data sources that both classes should be familiar with in order to accomplish the county-level economic analysis and development project that is the culmination of this part of the course. An identical instruction session on employment and earnings data was given to both the undergraduates and graduate students. As with the first part of the course, the graduate students would be using the same techniques while doing more rigorous work than the undergraduates, but for the second part of the course, both classes were expected to use the same sources and types of data. PLAN 301 and 504 was most likely the first time most of the undergraduate and graduate students had ever used, or even seen for that matter, data sources like the Census Bureau's County Business Patterns, the Regional Economic Accounts from the Bureau of Economic Analysis, or the Quarterly Census of Employment and Wages from the Bureau of Labor Statistics. As the course instructor did not expect either group of students to have any prior knowledge of the types of data they were expected to use, it was appropriate to cover the same topics in the same level of detail for both classes (see Table 1).

A combination of lecture and hands-on teaching methods were used in all four of the library instruction sessions for the Planning Methods courses in order to achieve the desired learning outcomes of the sessions. Lecture was employed to meet learning outcome 1: that the students will be able to select appropriate data sources (see Table 2). Detailed course-specific online research guides were maintained for each class

(http://research.ewu.edu/plan301 for PLAN 301 and http://research.ewu.edu/plan504 for PLAN 504) which contain links for the data resources necessary for the course projects. The lecture involved descriptions of the various data resources listed in the research guide, what kinds of data they offered, and how it met the data needs the students had for their projects.

Hands-on teaching was used to meet learning outcome 2: that students are able to use the features of data sources (see Table 2). Every student was at a computer for both sessions, and they were asked to work along with the presentation to gain experience in finding their way through different web-based resources, such as American Factfinder, the website of the Washington Office of Financial Management, and the Census Bureau's County Business Patterns. In the first PLAN 301 session, in which the undergraduate students were introduced to older census materials in print, the students were asked to identify the same observations of data via print data tables over a couple of decades in order to demonstrate that they understood how to navigate and retrieve data presented in that format. The students were also given data-retrieval tasks, such as downloading large comma-delimited data files from County Business Patterns and importing them into Microsoft Excel, to gain experience in the tasks necessary to acquire their needed data.

Lecture was again the teaching method employed to meet learning outcome 3: that students were able to retrieve needed data (see Table 2). As the students were performing their hands-on data retrieval exercises, they were given explanations of how to interpret the data, the meaning of the data, and how the data is collected. For example, in the case of data on the number of jobs by industry found in County Business Patterns, it was explained to the students that the data represented jobs, not individual people, and that people with two jobs would be double-counted in the data.

Table 2: PLAN 504 learning outcomes and required skills for data literacy with the US Census

Learning Outcome	Skills required	Assessment measure
1. Select appropriate data sources	Identify and recognize types of data available from the census, so can identify when census data is appropriate to fill a data need	Successful completion of the following tasks in the PLAN 504 Demographic Assignment require the data skills from Learning Outcomes 1, 2, and 3:
2. Use the features of data sources	Navigate American Factfinder and select variables to retrieve appropriate data tables Export data in Microsoft Excel format	· Linear Model population forecast · Ratio Model population forecast · Cohort Survival Technique net migration estimates
3. Retrieve needed data	Read and evaluate contents of data tables Identify differences in content between the Census Summary files	Correct answers on questions on the pre- and post-test that refer to the census

	Understand geographic hierarchy of the census to retrieve data at the appropriate geographic level	

The three learning outcomes were applied to each of the data sources introduced in the instruction sessions. The skills required to meet the learning outcomes were defined for each data source as well. Table 2 provides an example of how the three learning outcomes were applied to library instruction on a data source. In the case of Table 2, the learning outcomes, and the skills required to meet the outcomes, are shown for data literacy with the U.S. Census in PLAN 504 (see Table 2).

Assessment Design

The assessment was conducted in two parts. The first was a pre- and post-test. Identical multiple-choice questionnaires were given before the first instruction session and again at the end of the quarter. The same questionnaire was used with both the undergraduate and graduate students. The second part of the assessment was an examination of the students' assignments in which they were expected to employ the information provided in the library instruction sessions.

The assessment received EWU Institutional Review Board approval and was voluntary and anonymous. The course instructor assigned numbers to the participants so their course assignments could be matched with the appropriate pre-and post-test scores. To help ensure anonymity, the author received ungraded copies of the assignments.

Pre/Post-Test Questionnaire

The questionnaire, administered both pre- and post-library instruction, was designed to measure students' understanding of basic concepts regarding the location and retrieval of data. The Government (federal, state, and local) is a major provider of demographic and economic data, and while much of that data is accessible online, students often have the expectation that all data is on the internet. This may be true for data gathered and disseminated by government agencies in the last 10-15 years, but may not be true for older data. It is also important for students to be able to identify reliable sources of data and differentiate them from data that they might haphazardly encounter using a search engine. URP students need to have a set of resources they can rely on and should start with when looking for the types of data that planners routinely use. The questions were structured to ascertain whether students could identify the trusted government data resources discussed in class and listed in the course research guide. In addition to the resource-specific questions, the questionnaire included conceptual questions about how to look for data in general and what kinds of web-based sources are generally trustworthy. The questionnaire was vetted by the course instructor for PLAN 301 and 504, who thought that the questions were appropriate and captured the type of data literacy concepts that the URP department wants their students to have. Feedback was also solicited from the author's library colleagues (see Appendix 1 for the full questionnaire).

Examination of Course Assignments

The goal of examining course assignments was to see whether the students were able to put data literacy instruction into practice and successfully apply it to their assignments. Both classes completed a county-level demographic analysis/population projection assignment

individually and a county-level economic analysis and development assignment in teams. PLAN 301 is offered during Winter Quarter, while PLAN 504 is offered in the Spring. Due to the timing of Institutional Review Board approval, the author was able to get the 2nd assignment, the economic analysis, from the PLAN 301 students and to get both assignments from PLAN 504.

The course assignments were discussed at length with the class instructor to learn what the expectations for the assignments were, what kind of mathematical and statistical modeling would be used, and most importantly for this study, what kinds of data would be required to complete all portions of each assignment successfully. Simple yes-or-no rubrics were developed for the parts of each of the class assignments that required data identification and retrieval (see Appendix 2 for the assessment rubrics). While the students' successful navigation of the appropriate data resources and acquisition of the appropriate data would not be directly observable, there would be indirect evidence of whether they had successfully met the learning outcomes of the library instruction, based on whether or not they successfully completed their assignments. Table 2 illustrates how assignment completion, as an assessment measure, corresponds to the learning outcomes of data literacy instruction (see Table 2).

Results and Discussion

All eight of the students enrolled in PLAN 301 participated in the assessment. In PLAN 504, thirteen of the sixteen students who began the course participated in the study. Three students either declined to participate or dropped the course.

Test scores of the eight undergraduates stayed about the same from the pre- to the post-test. On the twelve-question test, they scored a mean of 7.25 on the pre-test and 7.5 on the post-test (see Table 3). But the averages do not tell the whole story, as five students improved their score by one question and three students scored one question worse on the post-test. The median score actually decreased from 8 to 7 between the pre-and post-tests. Additionally, the students' answers were not consistent from the pre-test to post-test. Some of the students who improved their scores missed a post-test question that was correct on the pre-test, only to answer two other questions correctly to improve their overall score. These results indicate that the students did not internalize some of the general data literacy concepts as well as had been hoped.

Table 3: PLAN 301 Undergraduate Student Assessment Results			
Participant (ID number)	Pre-test score (out of 12)	Post-test score (out of 12)	Economic Development Assignment completed (3 parts)
1	8	7	3
2	8	9	3
3	8	7	3
4	9	10	3

6	6	7	3
7	7	8	3
8	8	7	3
9	4	5	3
Mean:	7.25	7.5	
Median:	8	7	

The thirteen graduate students did not show as much innate grasp of data literacy in the pre-test as the undergraduates did. They had a much greater disparity in their scores but also greater improvement from the pre- to the post-test. The mean score was 5.77 for the pre-test and 7.62 for the post-test (see Table 4). The median score improved from 5 to 8. With a sample size this small, outliers can dramatically affect the mean of the scores, and in this case, the means were skewed by a student with very low scores. On the post-test, only two students scored worse while the other eleven improved their scores. In fact, five students improved their scores by three questions, and one student improved by five questions.

Table 4: PLAN 504 Graduate Student Assessment Results				
Participant (ID number)	Pre-test score (out of 12)	Post-test score (out of 12)	Demographic Assignment completed (4 parts)	Economic Development Assignment completed (4 parts)
2	7	10	3	4
3	5	8	4	4
4	5	8	4	4
7	5	6	4	4
8	5	10	3	4
9	5	8	3	4
10	7	9	4	4
12	5	6	4	4
13	2	4	4	4
14	8	7	4	4
15	6	9	4	4
16	9	10	4	4
17	6	4	4	4
Mean:	5.77	7.62		
Median:	5	8		

In both the undergraduate and graduate classes, the examination of course assignments revealed that almost all of the students used the information presented in the library instruction and were able to obtain the data necessary to do their assignments. In the undergraduate team economic analysis, all of the teams completed all portions of the assignment (see Table 3). In the graduate individual demographic analysis assignment, ten out of thirteen obtained the data necessary for the demographic analysis assignment, and all thirteen obtained the data necessary for their team economic analysis (see Table 4). The examination of course assignments provided indirect evidence that the undergraduate and graduate students were able to understand and put into practice the resource-specific skills that were presented during instruction. It was also encouraging that the three graduate students who did not complete all portions of their demographic assignment did show substantial improvement from the pre-to post-test.

It was not entirely unexpected that the graduate students did not initially show as much innate grasp of data literacy as the undergraduates did. A background in urban planning is not a prerequisite for entrance into the Master's Degree program, which is designed as a stand-alone professional program. Some of the graduate students may have had very little experience with quantitative data before beginning the program. If an assessment like this one is undertaken again, the questionnaire will incorporate some questions into the pre-test to measure the students' prior experience with data to see whether it correlates with their pre-test scores.

When the test scores and assignment examinations were taken together, an interesting picture emerged of the students and their data literacy skills. Students in both classes learned the skills and knowledge to do the specific tasks expected of them in this class, but they did not necessarily internalize the broader concepts to be able to extrapolate them to

other circumstances and scenarios. They did not seem to have perceived a connection between the two. An example of this is the way the students answered question 9 on the post-test (see Appendix 1). Question 9 asks, "Where is a good place to start if you are looking for data on the number of businesses, number of employees, and business payrolls at the state and county level for Washington?" The correct multiple-choice answer is "County Business Patterns." The undergraduate and graduate students both needed to be able to navigate and collect data from County Business Patterns in order to complete their county-level economic analysis and development assignment, and the review of those assignments showed that they were able to do so. And yet, even after making extensive use of the County Business Patterns website and data, 63% of the undergraduates and 38% of the graduate students did not answer question 9 correctly on the post-test.

This result indicates that in future instruction sessions, more emphasis needs to be placed on the broad concepts and their context. It needs to be conveyed to the students that the resource-specific skills that are introduced in class are really an extension of the broader concepts and not the other way around. By developing a deeper data literacy, they will be able to adapt in the future to a wide variety of resources and situations, even ones that do not use the data resources from PLAN 301 and PLAN 504. This presents a challenge because there is a large amount of material to cover in each instruction session, and time is limited. The instruction sessions for PLAN 301 and 504 are at the upper limit of what can effectively be accomplished in two instruction sessions. As much as time allows, the lecture portions of the sessions will be restructured into a guided discussion on the content and context of the resources to help engage the students in considering these issues. While the sessions, at an hour and a half each, were longer than most library instruction sessions, it was still difficult to incorporate teaching methods like active learning or learning by teaching, which arguably could help students see the data sources in a broader context. The results of this assessment could, however, be used to make the case that data literacy instruction could be provided more effectively, and with greater achievement of the desired learning outcomes, if the number of library instructions sessions were to be expanded beyond the two sessions per class that were used in these two URP courses.

One obvious limitation of this study was that the sample sizes were small (eight undergraduates and thirteen graduate students). While useful insights and topics to focus on in future instruction sessions were gained, outliers in a small sample can skew the results, which was found with the pre- and post-test that was administered. It also means that the results, while providing insight, cannot be generalized.

Another limitation was the fact that it was not feasible to do a trial run of the pre- and post-test prior to implementing them. During the course of this project, the test results indicated that there were additional things that could have been asked about, such as prior experience with quantitative data. Given the small size of the student population in URP and the very specific kinds of knowledge covered in these courses, there was no practical way to run a trial of the test without giving it to students who would then be assessed with it again later.

A third limitation was the "yes-or-no" rubric that was applied to the assignment examination portion of the assessment. The assignments that both the undergraduate and graduate students submitted were designed to be a report that a city planner would submit to a decision-making body like a city council, so they presented the results of their work, but not the data sets they compiled or the mathematical modeling they used to arrive at their results. Those portions of the students' work were submitted to the instructor as appendices to which the author did not have access. The types of data and the sources the students

should have used to complete their assignments were known, however. While it could be inferred that the students obtained the correct data, exactly how successful they were in data retrieval, and what kinds of difficulties they encountered along the way to compiling their data sets, were not observable. It was hoped that these types of insights could be gained from passively observing the students' work, but it was learned that the assessment methodology needs to become more active.

Conclusion

Data literacy is the foundation of the statistical and information literacy necessary for success in a number of professions, including urban and regional planning. Urban and regional planning is a problem-solving profession in which practitioners routinely employ quantitative data to inform decision-making. Planners need to be data literate in order to access, manipulate, and summarize data. The literature has few attempts at a formal assessment of data literacy. The collaborative instructional relationship between the Library and the Urban and Regional Planning Department at EWU provided an opportunity to pilot an assessment of data literacy in library instruction.

Assessment is often thought of as a tool for librarians to demonstrate their value and contributions, but the true goal of assessment is to improve instruction. This assessment of data literacy did what it was supposed to do. It revealed what was not happening: the students were not thinking of their data literacy skills in generalized terms. The assessment was also a success because areas for increased emphasis in data literacy instruction were identified. However, just as important as the insights gained were the lessons learned about how the assessment methodology could be improved to assess data literacy more effectively.

Future Directions

The small enrollments of the assessed courses meant that the results of the study were susceptible to problems inherent with small sample sizes. In the future, this assessment will be conducted over a three- to five-year period, in order to obtain a larger sample size. This first use of the pre- and post-test revealed that there are potentially pertinent factors, such as prior experience with data, that the test did not capture. The test instrument will contain additional questions when this assessment is conducted again.

The examination of students' assignments was helpful, but its contribution to the overall assessment results could be improved with access to the students' compiled data sets and mathematical/statistical work. When this assessment is conducted again, the students' data appendices will be requested along with their final reports. It would also be helpful to work with the course instructor to have some questions added to the assignments to prompt students to reflect on their level of difficulty or success with data retrieval and whether or not the data literacy instruction helped them complete their assignments.

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Appendix 1: Pre- and post-test questions (correct answers are in *bold*)

Assessment of Data Literacy Skills of Urban Planning Students

For questions 1 through 7, please circle the answer you feel is most appropriate

1. The main mechanism for the collection and dissemination of data used in Planning is

a) Private organizations and interest groups

b) A mix of governmental and private organizations

c) The U.S. Census Bureau

d) Various federal, state and local government organizations

2. If you are just beginning to look for specific data, what is a good way to start?

a) start google-ing your topic and see what comes up

b) use a library database to search for peer-reviewed articles that use data

c) ask yourself who might want to collect data on that topic and start with their website

d) 1 and 3

e) all of the above

3. If you get data from non-government websites, what is a good way to evaluate if the data is

legitimate?

a) check if the website says where they got their data, and then go to the source and retrieve it from there

b) learn about who is providing the data, and what their agenda is (if any)

c) they describe their methodology for collecting and analyzing data

d) look for their methodology for collecting and analyzing data

e) all of the above

4. U.S. Government data on the internet can all be found online through search engines like Google

a) True

b) False

5. The U.S. Government has made all of the data they have available online

a) True

b) False

6. Is it acceptable to use sources of repackaged (reprinted) data?

a) Yes, if it is known as a reliable source

b) No, you should always go to the originator of the data

7. What is NAICS?

a) A level of census geography

b) Classification system for industries and businesses

c) A department of the Washington State government

For questions 8 through 12, please match the data type with the organization that provides it:

8. A good place to go for state-level population estimates and forecasts for the state of Washington is _**B**_

9. Where is a good place to start if you are looking for data on the number of businesses, number of

employees, and business payrolls at the state and county level for Washington? _**E**_

10. Which of the following would be most likely to have data on birth and death rates? _**H**_

11. Age, race, and gender data for a Metropolitan Statistical Area _**G**_

12. Large economic time-series data sets compiled from various agencies _**F**_

a) The Washington State Census Bureau

b) The Washington State Office of Financial Management

c) The U.S. Bureau of Economic Analysis

d) The U.S. Bureau of Labor Statistics

e) County Business Patterns

f) FRED (Federal Reserve Economic Data)

g) U.S. Census Bureau

h) Washington State Department of Health

i) U.S. Department of Housing and Urban Development

Appendix 2: Yes-or-no assessment rubrics for each course and assignment

Rubric for PLAN 301 County-Level Economic Analysis and Development Group Assignment		
Task	Data Requirements (and data literacy skills necessary to accomplish task)	Accomplished Task? (Yes or No)
1. Location Quotient industry analysis for assigned county in Washington	County Business Patterns (CBP) data · identify needed years of CBP data · read and interpret CBP data tables · retrieve data stored in multiple formats (html tables for current CBP, comma-delimited text files for historical CBP data) · import comma-delimited files into Excel · understanding of North American Industry Classification System (NAICS) and Standard Industrial Classification (SIC) codes U.S. Census Nonemployer Statistics · identify needed data · understanding of how the data relates to CBP data Bureau of Economic Analysis, Regional Economic Accounts data · identify needed data § agriculture employment and earnings data § public employee data · navigate BEA website and identify appropriate data tables for retrieval Bureau of Labor Statistics, Quarterly Census of Employment and Wages (QCEW) · identify needed data	

	· use BLS website interactive tables to retrieve appropriate data	
2. Shift-share analysis of economic cycles for assigned county in Washington	Same data requirements as for Location Quotient	
3. Industry Sorting analysis for assigned county in Washington	Same data requirements as for Location Quotient and Shift-share analysis	
	Total:	__ out of 3

Rubric for PLAN 504 County-Level Demographic Analysis/Population Projection Individual Assignment		
Task	Data Requirements (and data literacy skills necessary to accomplish task)	Accomplished Task? (Yes or No)
1. Linear Model Population Forecast for assigned county in Washington	Decennial U.S. Census data · identify needed data · retrieve data stored in multiple formats (print, American Factfinder online, CD-Rom) · read and interpret data as presented in different formats · understanding of geographical organization of data American Community Survey data · understanding of how sampling data differs from decennial census · identify needed data · retrieve data from American Factfinder WA Office of Financial Management (OFM) state population estimates data · identify needed data · navigate OFM website to retrieve data (both historical estimates and current projections)	
2. Ratio Model Population Forecast for assigned county in Washington	Same data requirements as for Linear Model Population Projection	

3. Cohort Survival Technique Net Migration estimates for assigned county in Washington	Same U.S. Census data requirements as above	
	Same American Community Survey data requirements as above	
	Same WA OFM data requirements as above	
	WA Department of Health, Center for Health Statistics, birth and death data	
	· navigate DOH website to retrieve data	
	· read and interpret data as presented in DOH data tables	
	· identify needed data	
4. Comparison of accuracy of various population projection methods	WA OFM growth management forecasts data	
	· identify needed data	
	· navigate OFM website to retrieve data	
	Total:	__ out of 4

Rubric for PLAN 504 County-Level Economic Analysis and Development Group Assignment		
Task	Data Requirements (and data literacy skills necessary to accomplish task)	Accomplished Task? (Yes or No)
1. Economic Profile for assigned county in Washington	County Business Patterns (CBP) data · identify needed years of CBP data · read and interpret CBP data tables · retrieve data stored in multiple formats (html tables for current CBP, comma-delimited text files for historical CBP data) · import comma-delimited files into Excel · understanding of North American Industry Classification System (NAICS) and Standard Industrial Classification (SIC) codes	

	U.S. Census Nonemployer Statistics · identify needed data · understanding of how the data relates to CBP data Bureau of Economic Analysis, Regional Economic Accounts data · identify needed data § agriculture employment and earnings data § public employee data · navigate BEA website and identify appropriate data tables for retrieval Bureau of Labor Statistics, Quarterly Census of Employment and Wages (QCEW) · identify needed data · use BLS website interactive tables to retrieve appropriate data	
2. Location Quotient industry analysis for assigned county in Washington	Same data requirements as for Economic Profile	
3. Shift-share analysis of economic cycles for assigned county in Washington	Same data requirements as for Economic Profile and Location Quotient	
4. Industry Sorting analysis for assigned county in Washington	Same data requirements as for the above tasks	
	Total:	___ out of 4

Institutional Factors and Perceived Usefulness as Predictors of Internet Use by Postgraduate Students at the University of Ibadan, Nigeria

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Introduction

Interest in the use of Internet has recently increased significantly. As the learning, teaching, research and management function importance of the Internet continues to rise in educational institutions; understanding of the factors that encourage Internet use in these institutions becomes critical (Jiang, Hsu, Klein, and Lin, 2000). Also, the revolution in Information and Communication Technology (ICT), and particularly the Internet, is exerting profound effects on institutions of higher learning. Many researchers have identified the impact of the Internet on higher education studies (Adogbji and Akporhonor, 2005).

Today's education system faces the challenge to prepare individuals for the information society in which one of the most important aims is to handle information. It is assumed that students need to respond to the rapidly changing technology and prepare themselves to handle information. The influence of Internet on the education system which had been previously confined to communication and resources sharing had gradually developed into a new dimension affecting the teaching-learning process in a direct way.

Internet has become an indicator of a country's socio-economic status in the information society as it has become an important and popular source of information. Internet has come with an evolution that cannot be compared with existing technologies that were before it (Molosi, 2001). Today growth and advancement in telecommunication infrastructure has led to increased Internet connectivity. Internet has shifted the paradigm of education from the traditional classroom lecture that it used to be to electronic teaching-learning process. The Internet can be used as a supplement to traditional instructional method (Usum, 2003). To complement a lecture, instructors may ask students to find specific web sites to gain more in-depth knowledge about a particular topic. The instructor may also ask students to search the Internet for information on services offered in a particular location.

The Internet may also be used to replace the traditional classroom lecture through the offering of courses via the Internet (Hawkins, 1999). The Instructor can place course notes on pages create a video recording of live lecture for viewing on the Internet or use combinations of these ideas. Zakon (1999) emphasized several methods of preparing courses for the Internet including the use of video clips and other graphics on web pages.

Since Internet's infancy higher education institutions have pioneered many innovations (Bates, 2000). He further emphasised that Internet have allowed higher education to, among other things, expand access to education and training; raise quality; lower costs; and increase cost-effectiveness. It also enabled higher institutions to, expand the number of

courses and programs; generate higher levels of tuition-based revenues; develop specialized programs of study that would not otherwise be possible; and use the process of technological innovation as a vehicle for revitalisation of other aspects of their operations (Daniel, 2001).

Moreover, students coming out of the high school systems in those countries are increasingly aware of the opportunities offered by the Internet users prior to entering a university. The Internet is used as a research tool, and has become very important means of information dissemination, that is, communication, for individuals, governments, businesses and educational institutions (Oniyide, 1998). The use of Internet by students is being addressed extensively in recent scholarship and research. One major area of inquiry involves the role of the Internet in conducting research for class projects (Lindsay and McGuigan, 2001)

The Nigerian National Policy for Information Technology (2001) defined Internet as the interconnection of systems or subsystems of equipment that is used in the automatic acquisition, storage, manipulation, management, movement, control, display, switching, interchange, transmission or reception of data or information". Thus, the Internet can be seen to provide resources and services that for accessing, processing, gathering, manipulating, and presenting or communicating information. These could include software, hardware, and even connectivity (Anderson & Baskin, 2002). Internet is becoming an essential tool in any educational system. It has the potential of being used to meet the learning needs of individual students, promote equality of educational opportunities; offer high quality learning materials, increase self-efficacy and independence of learning among students, and improve teachers' professional development. Furthermore, Internet offers great potentials for revolutionizing school administration (Kirschner & Selinger, 2003).

Internet has the potential to accelerate, enrich and deepen basic skills in teaching and learning. It helps in motivating and encouraging students in learning as they are encouraged to be more independent and responsible for their own learning. The influence of Internet is pervasive in education; and strengthens teaching and learning as it provides powerful resources and services for students thereby enabling them to meet their individual needs. Also, Internet ICT allows for networking among students and teachers, thus teachers and students are more connected with each other. Internet also facilitate exchange of ideas, sharing of resources, and improve teaching-learning practices as well as provide opportunity for connecting schools to the world, as learning is expanded beyond the classroom, thus, relevant real life context can be established (Abolade and Yusuff, 2005). With Internet, students and teachers can access information and resources, and they can communicate with experts and peers and make useful contributions to knowledge through electronic publications.

The use of Internet in education is growing in all parts of the world while their application is becoming an integral part of education in many parts of the globe. Nicolle (2005) affirmed that most of the developed countries have exploited the potentials of Internet to transform their educational landscape at the tertiary, secondary and even primary school levels, particularly in the instructional process. Also, Al-heala (2001) attested that Internet use in instructional delivery is a demand that society has placed on educational institutions. Hence educational institutions are therefore expected to equip both teachers and students with skills relevant to meet these demands.

Studies (Oletu, 2007; Ololube 2006) have indicated the benefits of Internet use in education and have found consistent positive and moderately high achievement gains at all

educational levels from computer mediation in school subjects. Major benefits of Internet in education include: promotion of greater collaboration among students for communication and sharing of knowledge; and accurate feed backs to students that contributes towards positive motivation. It also allows students to focus on strategies and interpretations of answers rather than spend time on tedious computational calculations (Becta, 2003). Furthermore, Internet also supports constructivist pedagogy wherein students use technology to explore an understanding of concepts. This approach promotes higher order thinking and better problem solving strategies.

It is generally believed that the permeation of Internet into education sector in developing nations such as Nigeria would help to bridge the information barrier between developed and developing nations. However, improved access to Internet does not seem to result in improved utilization for research purposes (Forgasz and Prince, 2001).

The use of Internet in Nigeria and African countries generally is increasing and dramatically growing. However, while there is a great deal of knowledge about how Internet is being used in developed countries, there is not much information on how it is being used for research activities in developing countries. (Beukes – Amiss and Chiware, 2006). The role of Internet in teaching, learning and research is rapidly becoming one of the most important and widely discussed issues in contemporary education policy.

The use of Internet for educational purposes usually involves the use of e-mail, newsgroup, chartgroup etc for communication, collaboration and information sharing. Internet holds greater promise in the education process. However, in spite of the potentials of Internet, its use by students, especially in Nigeria, is limited as only resourceful and competent students can exploit the potentials (Oletu, 2007).

It is observed that some studies have been conducted on uses of Internet by students in the process of learning (Beuke-Amiss and Chiware, 2003; Al-heala, 2001). Most of these studies were carried out in developed countries where the use of Internet has come of age, and where there are resources and material to maintain them. However, researchers in the area of Internet use by students generally in Africa and in Nigeria, specifically, have just started emerging.

The provision of an appropriate framework for the full integration of Internet into the education system of any nation is the responsibility of the federal or central government as the case may be. For the proper integration of the Internet and related technologies into the education system, there is need for a comprehensive policy document to serve as a guide for stakeholders in the education sector. Such policy document is expected to give direction to the provision of the conceptual framework, the objectives, the strategy, the action plan and the evaluation of the successes of the integration.

The effective use of Internet into the educational system could be seen as a complex, multifaceted process that involves not just technology. Competence, adequate funding, provision of infrastructural facilities, institutional factors, environmental factors, demographic factors, students' attitude, skills, students self efficacy and intention to use are key factors that determine the successful use of Internet for information retrieval and sharing in education (Chan, 2005). There has been few studies on the demographic and environmental factors influencing the use of Internet for educational purposes (Aramide, Gbotosho, and Sote, 2011; Egbetokun and Siyanbola, 2010; Lee, Lin and Pai, 2005; Kirk and Zander, 2004) among others. Thus, this study intends to specifically focus on the

institutional factors that influence the use of Internet use in universities with specific focus on the postgraduate students at University of Ibadan.

Statement of the Problem

The influence of Internet on education and educational activities has been a pronounced world especially in this age of knowledge economy such that the education stakeholders at all levels of education are relying on the Internet facility to institute the expected change in teaching and learning paradigm. This has been against the back drop that administrators are pumping large amount of resources in a bid to increase availability of and accessibility to Internet resources in educational institutions. These developments have placed a lot of pressure on educators to transform schools through technology.

The adequate provision of facilities and resources for Internet use has been found to be key factor in the effective use of Internet for educational activities such as teaching, learning, and research. The availability of these resources and facilities varies from one institution to the other which ultimately may affect and determine the way and purpose for which Internet facilities are used by students and staff of any particular institution as well as the extent to which such Internet resources and sources would be used. Hence, this study is focussing on the Institutional factors predicting the use of Internet by the postgraduate students of the University of Ibadan.

Objectives of the Study

The broad objective of this study is to investigate the influence of personal, environmental and Institutional factors on the use of Internet by the postgraduate students at University of Ibadan, Nigeria. The specific objectives of the study are to:

i. identify the institutional factors that determine the use of Internet by the postgraduate students in University of Ibadan

ii. ascertain the perception of the postgraduate students on the usefulness of Internet resources and sources for academic activities.

Research Questions

ii. What institutional factors affect the use of Internet by the postgraduate students in University of Ibadan?

iv. What is the perception of the postgraduate students on the usefulness of Internet sources and resources for academic and research activities?

Research Hypotheses

H_{01} There is no significant relationship between institutional factors and Internet use among the postgraduate students in the University of Ibadan

H_{02} There is no significant relationship between perceived usefulness of Internet and Internet use among the postgraduate students in the University of Ibadan

Scope of the Study

This study focuses on the influence of personal factors, environmental factors, and institutional factors on Internet use by postgraduate students in University of Ibadan. The study covers only postgraduate students in the Faculty of Science in the University of Ibadan. The study identified the extent of Internet use as well as the roles played by personal, environment and institutional in the use of Internet by the postgraduate students. However, even though the study aimed at determining the influence of personal factors, environment factors, and institutional factors on the use of Internet by postgraduate students, it only focuses on the use of Internet for research and academic activities.

Literature Review

Factors influencing the use of Internet have been classified by McGuigan (2001) as institutional, instructional, technical and personal factors that have to be dealt with for effective technology integration into education. Nigeria as a nation came late and has progressed slowly in the use of Internet in education. This is as a result of chronic limitation brought about by economy disadvantages and government policies which have direct consequences on the nation's educational development.

Fundamentally Ololube (2006) identified major barriers to effective use of Internet in education to include, the lack of access to basic ICT facilities, low Internet connectivity and lack of computers, and inadequacy in the use of Internet resources. This is corroborated by Nertha (2007) that emphasised cost of connectivity accessibility to reliable electricity, lack of training in Internet use, lack of trained personnel to service equipment and unavailability of infrastructure as major factors that can stand in the way of successful integration of Internet into the curriculum in most African countries.

Institutional factors hindering and influencing conditions for adoption and use of Internet by students are like two faces of the same coin (Chan, 2005). The same factor may be a facilitating factor if it is present while lack of that same factor may be a barrier. Moreover, Lishan (2004) reiterated that the utilization of Internet is a function of several factors among which is the perceived ease of access to the Internet while there are various challenges that constrain the use of Internet by users. He further emphasized that one of the major challenge of Internet is obstruction of widespread access by poor telecommunications the result of veiled interests in state monopolies of obsolete networks with prohibitive price structures. Anderson (2004) on the other hand emphasized the cost of Internet access which is beyond the reach of most institutions and individuals. The high cost is exacerbated by lack of a policy environment that fosters competition, foreign direct investment and private sector participation. Adeogun (2002) in his own view sees the biggest obstacle to Internet us as the limited service bandwidth which affects the ease and spread of access.

Institutional support is a major factor that affects the use of Internet. According to Adams (2003) inadequate technology support can hinder effective use of Internet in teaching-learning process in the schools. This technology support can be viewed from the perspectives of technical support for technical problems and instructional (pedagogical) support for instruction.

The institution factors had considerable effects on students' utilization of Internet. Alhaji (2007) categorized the main institutional determinants of access and use into three categories namely connectivity infrastructure, costs, and physical infrastructure of the Internet. He further highlighted that in Nigeria, cost ranks as the highest institution constrains to the use of Internet, and closely followed by physical infrastructure and the

connectivity infrastructure. Adams (2003) in his study on factor affecting Internet use in Kenya revealed connectivity infrastructure as the most limiting factor, followed closely by costs.

Also, Baguchi and Udo (2007) emphasized that there are many institutional level factors determining the adoption and use of Internet in developing countries. Among such factors are infrastructure, lack of institutional policy on ICT resources development, technology supply problems, scarcity of human resources, education problems, and economic factors. Adeoye (2004) observed that a policy and institutional framework is needed to explain the diffusion of Internet into educational institutions in Africa. To properly use Internet, institutions should provide the basic infrastructural requirements such as electricity, while commitment from policy makers should be put in place. However, Anderson (2002) observed that many developing countries have a long way to go before securing a steady supply of electricity. As much as organizations and institutions tried to make available Internet facility for use by their people, inadequate access points, connectivity problems as well as affordable computing accessories are major constraints (Lishan, 2004). These constraints are strong factors against Internet use since they bring extra costs to end-users.

Leadership and management approaches specifically in the ICT arena in organizations are also critical in determining the extent of use of Internet particularly when viewed in the context of broad organizational objectives. Benneth (2003) investigated the alignment between organizational critical success factors and Internet use. That is key organizational processes can positively influence the capability of people to use Internet

Yuen, Law and Wong 2003, investigated the links between leadership characteristics and successful ICT resources initiatives in schools. They emphasized that leadership characteristics can also affect the context of Internet use in schools. Yuen et. Al.'s work is extremely useful in categorizing educational institutions based on certain aspects of their organizational culture as it relates to ICT resources implementation and use. With the system and technology held constant it will be factors such as leadership characteristics that will determine the varying levels ICT implementation success, and Choe (2003) identified strong leadership; excellence across the schools operations; Positive ethos and collaborative culture; and well-motivated and caring staff as major institutional characteristics determining the extent of use of Internet in an organization.

The focus on the technology, as opposed to the need to apply it to the situation of teaching and learning, has dominated many studies, and it may be the that has led to the common belief that Internet in schools is a technology-driven activity (Usum. 2003), when in fact the process is about change management and how the organization supports the use of the technology as a change enabler. Internet use and perception in schools is about the institutions people, process and policies, not the infrastructure in use. Choe (2003) observed that the issue Internet use is not about the relative importance of equipment, support or training, but a much broader debate about mindsets, assumptions, beliefs and value of individuals and organizations.

Also, Lee, Lin, and Pai (2005) emphasized the school ICT capacity as a major institutional factor influencing the adoption and use of Internet facility by students. Internet adoption and use is observed to have a strong relationship with Internet skills and knowledge.

As much as users would want to use the Internet and be able to derive maximum benefits from its use either for education, communication or recreation purposes, major technical factors make this impossible. Technical factors are factors related to technicalities in

effective search, downloading, evaluating and use of Internet and Internet resources (Chan, 2005). Lishan (2004) highlighted some technical factors that hinder effective use of Internet to include, technological obsolescence of hardware and software which may pose problems of access to information in digital form, unless urgent interventions are taken; funding for regular refreshing and preservation of digital resources; and high infrastructure costs associated with design and implementation of Internet, among others.

Moreover, the Internet in general is yet to be rooted and institutionalized in people's cultural life. They pose challenges of usability nature, despite the fact that many users are gaining high level of familiarity with computer and web searching, they are still unable to see the value of Internet due to their lack of adequate skill, especially with respect to navigation, support and usability. Users perceive usability as poor and one that obligates them to keep up with training and retraining.

Furthermore, Kwom and Zmud (1999) and Robertson and Gatignon (2006) developed a more comprehensive frameworks for studying organisational adoption and use of Internet and Kwom and Zmud (1999) defined institutional factors among the five contextual factors that include community characteristics, organisational characteristics, technology characteristics, and task characteristics. It should be noted that there are macro-institutional factors common to all institutions, such as change in political climate and product market competition which may influence technology adoption which cannot be easily accounted for in the micro-analysis at institutional level (Lee, Lin and Pai, 2005). Meso, Musa and Mbarika (2005) emphasised that developing countries lag in adopting modern technologies such as Internet facilities for reasons such as geo-political, cultural, structural, ethnic, environmental and socio-economic policy factors.

Ajayi (2002) reported lack of adequate facilities as major institutional barrier affecting the use of Internet for teaching and learning in tertiary institutions. According to him many institutions lack adequate ICT infrastructure such as computer hardware and software and high speed Internet.

Research Methodology

The survey research design method was adopted for this study while the questionnaire was used as the major instrument of data collection. The population for this study comprises of all the 793 postgraduate students in the Faculty of Science, University of Ibadan. (Postgraduate School Record, 2010).

The purposive sampling technique was used to select only the students that make use of Internet facilities. This is determined through a pre-administration of questionnaire interview. Every student was asked on whether they make use of Internet. The questionnaire was served only after ascertaining that a particular student makes use of Internet for academic and research purposes. A total number of one hundred and seventy eight (178) students were purposively chosen for the study.

The data for this study was collected with the use of questionnaire. Copies of the questionnaire were administered on the 178 postgraduate students purposively selected from the Faculty of science. Also, the interview method was adopted to complement data collected through the use of questionnaire.

Data Analysis and Discussion of Findings

A total of one hundred and seventy eight (178) copies of the questionnaire designed for the study were administered on the students, out of which only two hundred and nine (110) copies were returned with useful responses, making a response rate of 61.8%. This study has its central focus and objective on the Institutional Factors as Predictors of Internet Use by Postgraduate Students of University of Ibadan with special focus on the postgraduate students at the Faculty of Science.

The descriptive statistics i.e. frequency and percentages as well as the inferential descriptive such as Paired T-test, Regression and Mean distribution were used in analysing the data as well as to test the hypotheses at 0.05 level of significant.

Table 1: Personal factors of respondents

Variables		Frequency	Percentage (%)
Sex	Male	60	54.5
	Female	50	45.5
Total	Total	110	100.0
Age	Less than 20 yrs	2	1.8
	21 – 25 yrs	20	18.2
	26 – 30 yrs	42	38.2
	31 – 35yrs	29	26.4
	36yrs Above	17	15.5
		110	100.0%
How long have being using the Internet	Less than 1 year	10	9.1
	1 to 5 years	49	44.5
	6 to 10 years	34	30.9
	11 to 15 years	13	11.8
	16yrs and Above	4	3.6
Total		110	100.0

Table 1 which shows the demographic characteristic of the respondents revealed the gender distribution of respondents to include 60 (54.5%) male respondents and 50(45.5%) female. This implies that there are more male respondents among the postgraduate students at the Faculty of science than female. Also the table presented information on the age group of respondents which revealed that majority 64 (58.2%) of the respondents are within the age range of 30 years. This implies that majority of the postgraduate students in the Faculty of science are young people.

On how long the respondents have been using the Internet, it was revealed that majority of the respondents 83 (75.4%) have been using the Internet for between 1 to 10 years while only few of the respondents (17 (15.4%) have used Internet an upward of 11 years and above. This may mean that the postgraduate students are familiar with the use of Internet due to the reasonable number of years they have been using the facility.

Table 2: Competency level of respondents

Variable		Frequency	Percentage
How would you rate the competency level in the use of Internet	I can't say	4	3.6
	Low competency	4	3.6
	Moderate competency	67	60.9
	High Competency	35	31.8
	Total	110	100.0

Table 2 shows the rate of competency level in the use of Internet of respondent, the summary from the table revealed that a larger proportion of the respondents 102 (92.7%) has reasonable competency level in the use of Internet. The high proportion of respondents that are competent in the use of Internet may be due to the number of years the students have been using the Internet which has made them to be familiar with the Internet.

Research question 1: What Institutional factors affect the use of Internet by the Postgraduate students in University of Ibadan

Table 2: Shows the level of institutional factors predicting Internet use

SN	Variables	SA	A	D	SD	Mean	SD	Sig
1	The computer provided in the ICT centre for Internet use are enough	6	37	51	16	2.30	0.785	*
2	There is adequate availability of computers connected to the Internet	12	27	64	7	2.40	0.769	**
3	There is adequate training for students on how to use the Internet	9	26	64	11	2.30	0.761	*
4	Interaction with colleagues enabled me to use Internet effectively	27	66	13	4	3.05	0.715	***
5	The environment in the ICT centre is conducive	9	55	45	1	2.65	0.642	***
6	There are policies to support ICT use in academic work in my Institution	13	51	37	9	2.62	0.801	***
7	There are adequate rules and regulations governing the use of Internet in my Institution	18	54	29	9	2.74	0.831	***
8	There is an adequate infrastructural facility to support Internet use	10	61	31	8	2.66	0.745	***
9	The rules and regulations governing the use of Internet in my Institution is too hard for the students	6	33	59	12	2.30	0.736	*
10	The burden of my academic work does not allow me to make use of the Internet	7	30	65	8	2.33	0.705	*
11	There are inadequate access points for Internet use in my Institution	8	60	32	10	2.60	0.757	***
12	The cost of using Internet in my Institution is too expensive	12	48	37	13	2.54	0.842	***
13	There are adequate computer accessories and resource (e.g Printers, scanner) to support Internet use in my Institution	20	32	46	12	2.55	0.915	***
14	There is adequate provision of steady power supply in my Institution	11	39	37	23	2.35	0.923	*
15	The connectivity to the Internet in my Institution is reliable	4	44	45	17	2.32	0.777	*
16	There is adequate administrative and technical support for Internet use by Students	11	35	50	14	2.39	0.836	**
	Average weighted means					2.487		

X=Means Scores=2.487, Highly ***, Moderate **, Low *

Table 2 shows the analysis of institutional factors predicting Internet use by the postgraduate students using the means and standard deviation. The information from the Table shows that the postgraduate students affirmed that Interaction with colleagues enabled (X =3.05), availability of adequate rules and regulations (X =2.74), adequacy of infrastructural facility to support Internet use (X =2.66), provision of conducive ICT environment (X ==2.65), adequate policies to support ICT use in academic work (X =2.62), and availability of adequate computer accessories (X =2.55) as institutional factors that positively predict their use of Internet, while on the other hand affirming that the

inadequate provision of access points for Internet use (2.60) and, high cost of Internet access (X =2.54) as institutional factors that hinders their use of Internet.

Also, the weighted average estimated mean of Institutional factors that encourage the postgraduate students' use of Internet in University of Ibadan was 2.48 which is greater than 2.30 expected mean. Hence the conclusion can be drawn that Institutional factors influence the use of Internet by the Postgraduate students in University of Ibadan.

question 2: What is the perception of the postgraduate students on the usefulness of Internet sources and resources for academic and research activities?

Table 3: Respondents opinion on the usefulness of Internet sources and resources for academic and research acativities

SN	Variables	Very Useful	Useful	Fairly Useful	Not useful	Mean	SD	Sig
1	Downloading of information for assignment purposes	71	34	4	1	3.59	0.610	***
2	Conducting research	59	39	12	0	3.43	0.683	***
3	Searching for and downloading professional and disciplines information	42	38	22	8	3.04	0.938	***
4	Communicating and Chatting with Colleagues and teachers	72	31	5	2	3.57	0.670	***
5	Online learning	45	31	22	12	2.99	1.027	**
6	Videoconferencing and Teleconferencing purposes	9	32	26	43	2.06	1.007	*
	Average weighted means					3.113		

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X = Means Scores = 3.113, Highly ***, Moderate **, Low *

Table 3 presents the analysis of the perception of the postgraduate students on the usefulness of Internet for academic and research activities using the Mean and Standard deviation and it shows that the respondents attested to the usefulness of Internet resources for: downloading of information for assignment purposes (X =3.59), communicating and chatting with Colleagues and teachers (X =3.57), conducting research (X =3.43), searching for professional and disciplines information (X =3.04), and online learning (X=2.99). This implies that the postgraduate students considered the Internet resources useful for their academic and research activities. The poor perception of the respondents about the usefulness of Internet for videoconferencing/teleconferencing may be due to the challenge of low bandwidth which might hinder effective use of videoconferencing and teleconferencing facilities.

On the other hand, the weighted average mean distribution of the respondents on their opinion on the usefulness of Internet revealed that the weighted average estimate of 3.11 is greater than 2.06 which is the expected mean. Hence the conclusion can be drawn that Internet is considered useful for academic and research activities by the postgraduate students.

H0: There is no significant relationship between Institutional factors and Internet use among the Postgraduate Students in the University of Ibadan

Table 4: Paired T-Test of Personal factors and Internet Use

Variable	N	Mean	Std. Dev	Std Error	t. Cal	t. Crit	df	Sig(2 tail)
Institutional factors	110	41.15	6.34	0.6103	26.211	3.57	109	0.000
Internet use	110	10.38	1.42	0.2235				

t Calculated value = 26.211, t Critical value = 3.57, df = 109, p = 0.000 Decision=0.05 level of significant

Table 4 presents information on the analysis of the relationship between the independent variable (institutional factors) and the dependent variable (Internet use) and it shows that there is a significant relationship between institutional factors and Internet use (the t-Calculated value, 26.211 was greater than t-Critical values, 3.57, df=109, P=0.000<0.05). The Null hypothesis was rejected. Therefore, it was concluded that there is a significant relationship between institutional factors and Internet use among the Postgraduate Students in the University of Ibadan.

Research Hypothesis 2

Ho:-There is no significant relationship between perceived usefulness of Internet and Internet use by the Postgraduate Students in the University of Ibadan

Table 5: Paired T-Test of Perceived Usefulness and Internet Use

Variable	N	Mean	Std. Dev	Std Error	t. Cal	t.Crit	df	Sig(2 tail)
Perceived Usefulness	110	20.60	3.75	0.3579	12.317	1.96	109	0.000
Internet use	110	15.72	3.77	0.3599				

t Calculated value = 12.317, t Critical value = 1.96, df = 109, p = 0.000

Decision =0.05 level of significant

Table 5 presents information on the analysis of the relationship between the independent variable (perceived usefulness) and the dependent variable (Internet use) and it shows that there is a significant relationship between perceived usefuness and Internet use (the t-Calculated value, 12.317 was greater than t-Critical values, 1.97, df=109, P=0.000<0.05). The Null hypothesis was rejected. Therefore, it was concluded that there is a significant relationship between perceived usefulness of Internet by postgraduate students and Internet use among the Postgraduate Students in the University of Ibadan.

Discussion of Findings

The personal information of the respondents according to the findings of the study revealed that there are more male students at the postgraduate level of study of the Faculty of Science, University of Ibadan. The findings of the study further revealed that the age range of the postgraduate students is within 21 – 35 years which implied that there are mature students at the postgraduate levels of study in the University of Ibadan. This corroborated

Mayanja (2002) views that emphasized that the youth within the age range 21 – 40 years are capable of making use of Internet more than any other age group.

Also, the study revealed that the postgraduate students have been using Internet for a reasonable long period of 6 years and above, hence they are considered as being experienced in the use of Internet just as this has translated into the competency level affirmed by the postgraduate students.

The findings from the study further revealed length of years of using Internet and Internet competency level of the students as major personal factors that significantly contribute to and influence the use of Internet by the students. This may therefore mean that the familiarity with Internet use as a result of longer period of time of use and the competency level achieved by the postgraduate students would determine the extent of use of Internet. This finding corroborated Alampay (2006) that the years of experience that a students has in the use of Internet determines how frequently he/she would want to use the Internet. The years of experience determines the degree of skill and competency one has in the use of Internet which ultimately influences the interest to use regularly or not.

On the influence of institutional factors on Internet use among the postgraduate students, findings from the study revealed, adequate availability of computers, interaction with colleagues on Internet use, conducive ICT environment, adequate rules and regulations governing the use of Internet, adequate policy to support ICT use for academic work and adequate availability of computer accessories and resources as major institutional factors that positively contribute significantly to Internet use by the postgraduate students at the Faculty of science of the University of Ibadan.

Moreover, the findings of the study further revealed that the postgraduate students affirmed the usefulness of Internet use for academic and research activities especially for downloading of information for assignment purposes, conducting research, searching and downloading of professional and discipline information, communicating and chatting with colleagues and teachers, and online learning. This corroborates Awoleye and Siyanbola (2006) views that emphasised that Internet resources as valuable resources for academic and research activities by people in the university.

The relationship between institutional factors and Internet use was found to be significant and positive. This is in line with Baguchi and Udo (2007) that emphasised institutional factors as determining the adoption and use of Internet in developing countries. In summing up, the study revealed that institutional factors do influence Internet use by postgraduate students in universities to a great extent.

Conclusion

This study evaluated the relationship between institutional factors on the use of Internet by the postgraduate students of Faculty of Science, University of Ibadan. The study concluded that institutional factors do make significant contribution to the use of Internet by the postgraduate students in the Faculty of science, University of Ibadan.

It can also be concluded from the study that the postgraduate students have a positive perception toward the usefulness of Internet for academic and research acticvities which may be as a result of the fact that the Internet is able to meet their information, academic and research needs at every point in time. The usefulness of Internet for students' research, academic, and communication activities was established.

Recommendations

The following recommendations were made:

a) There should be adequate orientation on the content, adequacy and relevance of the Internet and Internet resources to the academic and research activities of the students. This will ultimately encourage the students' regular use of the Internet.

b) The management of the University should ensure the adequate provision of appropriate institutional factors in terms of adequate policies framework, steady power supply, reliable Internet connection etc to ensure that the Internet is always available for use always

c) The cost of accessing the Internet should be made affordable to the students..

d) There is also the need for the provision of a good policy environment for the effective use of the Internet facility by the students

e) The authority of University of Ibadan should ensure the provision of adequate infrastructural facilities to ensure effective performance of the Internet facility in terms of speedy access, fast retrieval and easy download of information resources.

f) There should be provision of adequate access points for the students to enable them make effective use of Internet.

g) There should also be training and retraining of the students in other to develop their computer literacy skills, Internet use competency, level, Internet self-efficacy skills, as well as information search and retrieval skills. Such training should focus on developing the information literacy skills and Internet use skills of the students.

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Information Needs and Acquisition of School Pupils in Abeokuta, Ogun State, Nigeria

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Introduction

Education is concerned with the imparting of information – not just the simple acquisition of declarative facts, but also procedural information such as how to do things, even how to learn. It is therefore, necessary that the pupils should have adequate information seeking behavior in order to acquire reliable information through the different information sources. Indeed, the pupils can actually go and get the information needed rather than waiting for their teacher or the librarian. It thus seems that the pupils are most likely to utilize such information obtained through personal efforts much better.

Objectives

The objectives of the study are to:

1. determine the information needs of primary school pupils

2. determine the pupils' information seeking behaviour

3. identify way in which pupils acquire information

4. determine the effect of each source of information on the pupils

5. suggest strategies for improving pupils' information seeking behaviour

Literature Review

The present era is called the "Information era." Information has become the most important element for progress in society. To thrive in this modern era, one needs a variety of information, no matter how well versed one is in a field or profession. Psacharopoulous (1982) discusses the necessity of information in the present age. We can reorganize the educational system and redefine scientific research only with the help of information. Information plays a significant role in our professional and personal lives. People need information to work properly in their fields.

Zhang (1998) stresses that a thorough understanding of user information needs and information seeking behavior is fundamental to the provision of successful information services. Wilson (1994) points out that the scope of information-seeking behavior research is vast and many new concepts and methods are being developed with the help of researches. It is clear that the study of human information-seeking behavior is now a well-

defined area of research. According to Devadason and Lingman (1997), the understanding of information needs and information-seeking behavior of various professional groups is essential as it helps in the planning, implementation, and operation of information system, and services in work settings. White (1975) states that if academic librarians are to realistically serve acade micresearchers, they must recognize the changing needs and variations in information gathering and provide services that would be most useful.

The study of information needs and gathering behavior dates back to 1948 when Bernal and others presented a paper on scientific information at the 1948 Royal Society conference (Bernal, 1960).

During the past 30 years or so, a considerable body of literature has been produced dealing with information needs and information-seeking behavior of both individuals and groups in a variety of contexts (Anwar, Al-Ansari, and Abdullah, 2004). It is estimated that the number of publications on information-seeking behavior were more than ten thousand in the 1990s alone (Case, 2002). Many studies have been conducted to investigate the information-seeking behavior of library users based on their subject interest, occupation, information environment, and geographical location. Information needs and information-seeking behavior of academics have also been a popular area of research for the information scientists for decades (Majid and Kassim, 2000). Many authors have pointed out that the studies on information-seeking behavior and needs of social scientists are fewer than those involving the natural sciences, and the studies of humanists' information needs are fewer still (Line, 1969; Hopkins, 1989; Blazek, 1994; Challener, 1999). In Pakistan, a number of studies on reading habits of different professional groups have been carried out by various individuals, associations, and institutions which partly indicate their information needs. Anwar (2007) reviewed different research studies on information needs and information-seeking behavior of different groups of people in Pakistan. He mentioned fifteen unpublished studies conducted on the subject so far. Shahzad (2007) conducted a survey to find out the information-seeking behavior of faculty members of Government College University, Lahore. He acquired the data from all three faculties, i.e., science and technology, social sciences and humanities. Anjum (1978) studied the information needs of humanities teachers at the University of the Punjab.

Knowledge of the information needs and information-seeking behavior of users is vital for developing library collections, upgrading facilities, and improving services to effectively meet the information needs of users.

Primary Education in Ogun State

For several reasons, primary education being the foundation could be said to be an important stage for all learners. This is more so when one considers the value Nigeria places on the primary education. The National Policy on Education stated that the objectives of primary education include:

(a) the inculcation of permanent literacy and numeracy, and the ability to communicate

(b) the laying of a sound basis for scientific and reflective thinking;

(c) citizenship education as a basis for effective participation in, and contribution to the life of the society;

(d) character and moral training and the development of sound attitudes;

(e) developing in the child the ability to adapt to his or her changing environment;

(1) giving the child opportunities for developing manipulative skills to function effectively in the society within the limits of their capacity;

(g) providing basic tools for further educational advancement, including preparation for trades and crafts of the locality.

Appropriate curricular activities at this level include the development of literacy and numeracy, the study of science, social norms and values first of the local community and of the country as a whole. The foundation for sound education should be laid through civics and social studies; health and physical education, moral and religious education, the teaching of local crafts, domestic science and agriculture.

In line with the Millennium Development Goals and Targets which stipulates that developing countries must achieve Universal Primary Education by the year 2015 such that children everywhere, boys and girls alike, will be able to complete a full course of primary school. Ogun State Government has made landmark strides in Primary Education through improved provision of teaching and learning infrastructures and teacher's welfare. The State Universal Basic Education Board (SUBEB) charged with the management of the 1368 public primary schools with a population of 452,298 pupils and staff strength of 16,821 teachers was setup through the State Law No.28 of August 2005.

Primary Schools in Ogun State according to Local Government

Imeko/ Afon LG - 50

Ipokia LG - 78

Obafemi/Owode LG - 161

Odeda LG - 102

Odogbolu LG - 52

Ogun Waterside LG - 60

Remo LG - 21

Sagamu LG - 53

Yewa North LG - 109

Yewa South LG - 69

Abeokuta North LG - 76

Abeokuta South LG - 46

Ado-Odo /Ota LG - 109

Ewekoro LG - 54

Ifo LG - 73

Ijebu Est LG - 60

Ijebu North LG - 102

Ijebu North East LG - 33

Ijebu Ode LG - 39

Ikenne LG - 21

Total - 1,368

Source: http://www.ogunstate.gov.ng/primaryschools.php

Presentation and Analysis of Data

The presentation and analysis of data was done in tabular form with each section in the questionnaire analyzed separately and interpreted immediately under the table. Brief discussion on each table was also given.

Table 1

Category of needs	Very Highly Needed	Highly Needed	Occasionally Needed	Not Needed
Educational	89%	11%		
Parental	46%	40%	14%	
Health	81%	19%		
Political	13%	21%	51%	15%
Recreation (Sport)	18%	45%	16%	21%
Social	14%	41%	20%	25%
Religion	58%	39%	3%	
Entertainment	27%	28%	37%	8%
Cultural	18%	29%	37%	16%

The above table indicates that primary school pupils in Abeokuta are very highly in need of information that will improve their academics. It indicates that primary school pupils in Abeokuta equally show very high level of parental, Health and religious information needs.

This table indicates that a larger percentage of primary school pupils in Abeokuta are occasionally in need of information that is politically, entertainment and culturally related.

The table above shows that primary school pupils in Abeokuta are highly in need of recreational and social information.

Table 2

source of information	Always	Sometimes	Occasionally	Never
Library	47%	48%	5%	
Teacher		41%	52%	7%
Parent	18%	30%	46%	6%
Peer group and friends		46%	39%	15%
Mass media e.g. Television	2%	46%	39%	13%
Internet		12%	6%	82%
Posters and Charts.		39%	45%	16%

The above data shows that majority of primary school pupils in Abeokuta do always look towards the library to acquire their information needs. The pupils sometimes required Peer group and friends for their information needs. Most of them occasionally depend on their teachers, parents and posters and charts to get information occasionally while pupils have not been using internet to source information.

Table 3

Tick as appropriate	Yes	No	Occasionally
Do you have a library in your school?	46%	54%	
Do you have a Teacher Librarian in your school?	42%	58%	
Do you require a Teacher Librarian to get information	26%	36%	38%
Do you always get needed information in your library?	26%	42%	32%
Are you permitted to borrow any library materials useful to you?	67%	30%	3%

The above data shows that most primary schools in Abeokuta have no library and Teacher Librarians in their schools. They occasionally need the assistance of teacher librarians to access required information. They do not always get needed information in their respective school libraries though they are permitted to borrow library materials useful to them in their respective school libraries.

Table 4

Reasons for searching for information	Strongly Agree	Agree	Disagree	Strongly Disagree
To pass exams	31%	51%	18%	
To get answers to homework	66%	18%	16%	
During leisure hours	2%	40%	37%	21%
For competition	48%	40%	12%	

The larger percentage of the respondents indicates that they search for information to pass examinations as represented in the table above. The finding here shows that primary school pupils in Abeokuta seek for information mostly to get answers to homework and they do search for information during their leisure hours. A relatively high percentage of school pupils in Abeokuta search for information to compete among them.

Table 5

ways of improving the pupils' information seeking behavior	Yes	No
There should be internet facilities in the library.	100%	
There should be library period in the schools' time table.	84%	16%
There should be library officer in all the class	61%	39%
Library service hours should be extended beyond school hours.	38%	62%

This result shows total acceptance for provision of internet facilities in primary school libraries in Abeokuta. The majority of the respondents in the above table agreed that there should be library period in the schools' time table. Most of the respondents agreed that there should be library officer in all classes so as to aid their attitude to information seeking. The findings here point out that the majority of primary school pupils don't want library service to be extended beyond school hours.

Summary and Discussion of Findings

The findings have overwhelmingly answered the various questions as contained in the objective of the study. The pupils information needs was categorized into around nine areas. Aside political information needs which recorded low request, pupils in primary schools in Abeokuta have shown varying high degrees of request for the rest of areas of information needs covered by the research.

Educational and Health information topped the list of information needs of school pupils under this study. Religious and parental information equally enjoys higher demand by them while social and recreational information are also occasionally requested by pupils of primary schools in Abeokuta.

The sources of information for school pupils in Abeokuta were also covered by this research. It was found that the respondents majorly looked up to the library in their respective schools to satisfy their information needs. Teachers and parents who expectedly are suppose to be direct sources of information to children due to their presumed closeness to them do not enjoy high rating as contained in the result of this research. 52% and 46% (the largest percentage) respectively indicates school pupils in Abeokuta occasionally see their teachers and parents as their sources of information respectively.

School pupils as revealed in this research results regards peer group and mass media more as their sources of information than their parents and teachers. The larger percentage of them (46%) respectively relies on peer group and mass media. This may be as a result of the readily availability of peer group and mass media to teachers and parents in serious information requests.

It was also found out that posters and charts is not hugely seen as a source of information for primary school pupils in Abeokuta. It is being occasionally by almost half of the respondents while about a quarter have never used posters and charts at all.

This research equally found out that internet does not enjoy wide access and use among primary school pupils in Abeokuta. This is not peculiar to pupils in primary schools in Nigeria only. It is a problem that affects versely all sections of education system in Nigeria. Almost all respondents (78%) under this study have not used internet for their information needs.

It was also found out in this research that more than half of the respondents claimed they do not have library in their schools. 54% said No, while 46% said Yes when they were asked if they have library in their schools.

There were not enough teacher librarians in school libraries in Abeokuta. The pupils revealed this in the research result when 58% of them reported they do not have teacher librarians in their school. This simply shows 4% of the schools that has library in their schools do not have teacher librarians to man them.

To further corroborate the findings, the libraries which have teacher librarians in their schools seem not to be functioning. 36% of the respondents do not require the help of teacher librarians to get their information. Only 26% indicated that they rely on their teacher librarians in retrieving information while 38% says they occasionally relies on their teacher librarians in retrieving information.

The research results indicates that despite pupils showing interest in the usage of school libraries to get information, very few of them indeed get the information they required using the library. 42% and 36% have not and occasionally get their information requirements using the library respectively while only 31% claimed they get required information when they use the library. It was equally found out that school pupil in Abeokuta which has access to the library were given access to borrowing library materials. Majority of the respondents (67%) indicated they are permitted to borrow library materials useful to them.

This research equally examined the purpose for which primary school pupils use libraries. Among four purposes highlighted by this research, it was found out that all the four purposes enjoys high rating with only using the library, during the leisure time enjoying lower rating among them. Pupils use the library to get answers to home work more than the three purposes. 66% and 18% strongly agreed and agreed respectively to this question.

Closely follow is the use of library by school pupils in Abeokuta for competition among themselves. Though, this research does not state what type of competition, it is assumed that school pupils in Abeokuta use the library to compete academically among themselves. Pupils also uses library in order to assist them in passing their exams. 28% and 48% of the respondents strongly agreed and agreed respectively to the question.

This study concludes by finding out ways by which pupils' information seeking behavior can be improved. The school pupils in Abeokuta believed that provision of internet facilities in their school libraries will improve their information seeking. All respondents were affirmative of the assumption of whether internet facilities should be provided in their schools.

It was also found out that school pupil in Abeokuta wanted library period to be included in their time table as part of measures that will improve their information seeking behavior. 84% of the respondents alluded to this fact. School pupils in Abeokuta also requested that library officers should be present in all classes. More than half of the respondents agreed there should be library officers in all classes.

Finally, school pupils in Abeokuta do not want library hours to be extended after the normal school hours. 62% of the respondents wanted library service hours to be programmed within the school hours as found out by this study.

Recommendations

The following recommendations are deduced from the findings and are believed to be of help to teachers, parents, government and librarians as well. It is also believed that these recommendations will assist in improving school pupils' information seeking behavior positively and enhance their general and purposeful use of information.

1. Provision of School Libraries:

This research recommends that government should start the project of improving school pupils' usage of information by providing library in schools. This could be done by converting a classroom in an existing school system, building a new or a purposely built library may not be feasible, considering the current economic situation of the country. But it is advisable that government should plan a library building in case of starting a new school afresh.

2. Stocking the School Libraries:

It is equally recommended that government these libraries being provided by the government should be stocked with both human and material facilities for them to function purposefully. The human facility means appointment of qualified librarians to man the libraries and material facilities such as furniture, and information materials-books, audio-visuals, charts, maps, e.t.c. should be provided and reviewed intermittently.

3. Inclusion of Library Period in Schools' Time-Table:

Primary schools should include in their time-table at least a period or two during the week which the pupils will officially use the library. Not ordinarily including library period, the school authority must monitor and make sure the period is honored and the pupils are enforced to attend.

4. Parents and Teachers' Change of Attitude to Pupils' Information Needs:

Findings showed that pupils have not been looking up to their parents and teachers to quench their information thirst. This study suggests that teachers and parents should have a change of attitude to children. Hey should be more open and accessible to them in order that children would be able to approach them for their information needs especially religious, social and cultural information needs.

5. Library Orientation and Training:

Librarians/library officers should organize orientation programmes at the beginning of each term or session to apprise the pupils of the library services and facilities. Training should be conducted from time to time about developments going on in and about the library. As well, training concerning the usage and purpose of each library material should be included in the training.

For instance, charts and posters that have suffered low usage could be enhanced through the teaching of the pupils of how important they are.

6. Internet Provision:

A report from this work indicates that school pupils have no access to the internet. This research recommends provision of computer and internet facilities in schools to aid access to the internet. Using the internet right from primary school will lay a good foundation for higher schools.

7. Library Service Hour Extension:

Through adequate trainings and orientations, pupils would have been re-orientated that a library service hour within the school system is not adequate for proper library usage. This study further suggests that library service hours should be extended beyond the school hours so that pupils will be able to carry out their homework since majority of them have confirmed they use library to carry out their homework.

8. Teacher Librarians Responsiveness:

Findings revealed that the pupils have not been requiring much the help of teacher librarians in satisfying their information needs. This is in contrast to their duties. Teacher librarians should be more responsive to the pupils' queries in order that they will stand relevant to the system and justify the purpose of their appointment.

9. Maintenance of Good Practices:

This study found out some good practices existing in the school libraries in Abeokuta. Such as, giving pupils access to book lending. This and other good practices should be maintained so as to motivate the pupils to continually use the library.

10. Evaluation and Motivation:

Finally, this study recommends that school libraries must as part of its routines timely carry out evaluation exercise through proper keeping of statistics about the usage of the library which will in turn aid them (i.e. the library) in buttressing their request from school authorities or government.

Motivating the pupils at the end of each term or session on library usage such as "the best library user of the term" with award of prizes will go a long way in improving the better use of library among school pupils.

Conclusion

This work titled information needs and acquisition of primary school pupils in Abeokuta, Ogun State monitored closely the information needs, information sources, purpose for use of information, the role librarians' play and ways of improving school pupils' acquisition and use of information in Abeokuta.

The research questions were clearly stated while the data collection instrument was developed purposefully and directly at obtaining the right information. The study population is those directly involved in school pupils' information needs and acquisition. That is, the pupils themselves, not their teachers or librarians.

The findings are awesome and will stand as a form of reference for others researching in related subjects to this work. It is clear from this research that school pupils need information to sustain their academic quest and good performance. It is important that libraries be instituted in schools across the country.

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Problems Associated with the Management of Medical Records in Public Hospitals in Delta State, Nigeria

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Introduction

Records management is the field of management responsible for the efficient and systematic control of the creation and disposition of records, including processes for capturing and maintaining evidence of and information about a patient's transaction in the form of records (Health informatics 2006). Medical record is a permanent documentation of the history and progress of a patient's medical care. Records are used for continuity of a patient's care, verification of insurance claims, as a legal business document outlining the course of a patient's medical care, to provide statistical and factual information for hospital administration, licensing and other regulatory bodies and medical research (Pickett 2011).

Afolabi (1999) asserted that record management practice in Nigeria has a number of problems which may include insufficient skilled and experienced record management personnel and possibly, low priority of record management in the scheme of things. In the opinion of Awe (2000) the problems of record management can be viewed from the perspective of governments, hospital management and the staff as their action and activities can lead to effective or ineffective records management. According to Utulu (2001), these adversely affect planning for and provision of structures and facilities, adequate funding, proper formulation and review of policies. Hospitals are information intensive enterprises; hospital managers must understand that only those with a strong information management system can have a smooth running of the enterprise (Perspective health information management, 2006).

In health care organizations, medical record is the principal repository of a patient's health care information, so every health organization needs a medical records department that is organized and staffed to provide adequate information (Perspective health information management, 2006)

Literature Review

Records management is the application of systematic and scientific control to recorded information that is generated in the day to day activities of public hospitals. Such control is exercised over the creation, distribution, utilization, retention, storage, retrieved protection, preservation and final disposition of all types of record within public hospitals (Roper and Miller, 1999). Records management is concerned with all of the records received for the continuance of government and business operation, at costs consistent with the service involved. Such a program uses functional approach, that is designed to achieve organization wide control so that an orderly and effectively flow of information is provided for

management problem solving and decision making, this concept of records management involves a top management directed program that maintains surveillance over all the organizations records and attempts to perform pertinent services to ensure effective control (Iwhiwhu, 1998)

The role and importance of records to any organization cannot be over emphasized. Records are not only generated and received almost on a daily basis, they constitute the tonic that keeps the organization in all aspects of its operation and existence. Information is crucial to all spheres of human endeavor (Millar, 2003). According to Hassan (2009), information is an indispensable tool in office work, in management decision making and in work productivity. In a nutshell, effective organization and management of both private and public sector organizations record depends heavily on the availability of current, complete, accurate and reliable information processed and supplied on time to facilitate planning, decision making and to enhance productivity. Stansfield (2005) viewed that the information the administrators need in the smooth running of health institution is buried in records which constitute an essential instrument of administration without which operational processes and functions cannot be executed in health care institutions.

In Nigeria, just as in America, the nature and extent of record will vary depending upon the purpose, setting and context of the services. However, whatever the record maybe, it is important that the staff get familiar with the legal and ethical requirements for record management in their specific professional contexts and jurisdiction (Egwunyenga, 2009). Generally, medical records management must be guided by some level of confidentiality, proper maintenance, security, preservation of the content and context, etc (Uwaifo, 2004; Akporhonor and Iwhiwhu, 2007). In his view, Iguodala (1998) believes that personnel (secretaries and filling clerks) who maintain the registry systems with filing cabinets containing the paper evidence of medical records are inadequate and in fact ignorant of their responsibilities. Other associated problems of recording, management identified include lack of record manual and filing guidelines which lead to loss of vital information (Iwhiwhu, 2005). Others are difficulty in record retrieval and lack of appreciation by management and staff of the need for well-controlled records (Egunleti 2001). The result of the foregoing is high profile failures in accountability and utilization of the information Fadokun (2004). Adequate manual classification, security, storage facilities and funds are generally recommended for good record management (Tower 2004).

Medical records are legal documents, and are subject to the laws of the country/state in which they are produced. As such, there is great variability in rules governing production, ownership, accessibility, and destruction (Koocher and Keith-Spiegel, 1998).

According to remote health Atlas, (n.d) one major problem to management of records in public hospital is lack of medical records management standards and policies. Consequently, there are standards set for management, storage, access and destruction of records which when not present can lead to ineffective utilization of medical records. Most records managers also face problems managing records because they don't undertake the following records management procedures according to Roper and Millar (2009);

1. Drawing up a Records Management Strategy: The hospital authority must have an agreed strategy for managing all hospital records (clinical, administrative and educational). The strategy will need to include: a records management policy, a clear statement of the responsibilities of staff at all levels for achieving the objectives of the records management programme and the organizational structure and personnel required to meet the hospital's records needs, a commitment of financial support from the hospital's senior management to

support the records management programme and assign it adequate funds and accommodation to establish and maintain the programme; the identification of appropriate records management systems and practices; a statement of service targets and performance measurements

2. Undertake a Functional Analysis: Conduct an analysis of the hospitals or department's functions and activities. Look at the way information flows within the organization. This will identify problem areas, such as diagnostic tests which have to be repeated because test reports cannot be found. When functions, activities and information flows are understood, decisions can be made about what records need to be created and held, how they are to be arranged and accessed, by whom they need to be accessed and used, for how long they need to be retained and their ultimate disposition.

3. Identify the Stakeholders and Their Needs: This can also be regarded as complementary to the functional analysis and records survey. Stakeholders in hospital record keeping may include patients, staff of the hospital and of other health facilities and central government agencies. In practice most benefit will probably be gained from identifying and interviewing members of staff within the hospital who have record-keeping concerns.

4. Design and Introduce New or Improved Record Keeping Systems: The design of record-keeping systems will depend upon the nature and characteristics of the records themselves, the functions or activities which gave rise to them, the context in which they are created or accumulated and the information requirements of the staff that will use them.

Methodology

The study employed the descriptive survey design. The population for the study was 50 (fifty) staff in the health record department in the Central hospital, Sapele and Central hospital, Oghara, both in Delta State, Nigeria. The instrument used for data collection was the questionnaire. A total of 50 copies of the questionnaire were administered to the respondents and all were retuned completed. Data were analyzed using simple percentage and frequency count.

Research Questions

The study sought answers to the following questions

- Why is it necessary to manage hospitals records?
- What are the problems encountered in the management of health record in public hospitals?

Objectives of the Study

The purpose of this study is to examine the problems associated with the management of medical records in public hospitals in Delta State.

Specifically, the study will discover

- The necessity of managing hospital records
- The problems encountered in the management of health records in public hospitals

Findings and Discussion

Findings for this study are presented in 4 tables

Table 1: Response rate of the respondents

No. of questionnaire administered	No. of questionnaire retrieved
50	50

Table 2: Distribution of respondents according to hospitals

Name of public hospital	No of staff
Delta State central hospital, Oghara	35(70%)
Delta State central hospital, Sapele	15(30%)
Total	50(100)

Table 2 shows that majority 35 (70%) of the respondents were from the Delta State central hospital Sapele, Delta State.

Table 3: Distribution of respondents according to sex

Sex	No of respondents	Percentages
Male	11	22%
female	39	78%
Total	50	50(100%)

Table 3 shows that majority of the respondents were female 39(78%) while 11(22%). This shows that there are more female than male in the central hospitals investigated.

Table 4: Distribution of respondents according to age

Age	Number	Percentage
18-25yrs	4	8%
26-35yrs	15	30%
36-45yrs	20	40%
46 and above	11	22%
	50	100%

Table 4 reveals that majority of the respondents are within the age bracket of 36-45 years (20%), this is followed by 26-35 years (15%)

Research Question 1

Why is it necessary to manage hospitals records?

Table 5: Necessity to manage hospital records

It is necessary to manage public hospitals records for	SA		A		D		SD	
	No	%	No	%	No	%	No	%
Current, complete and accurate information	15	30	16	32	10	20	9	18
Support patient treatment and care	20	40	25	50	-		5	10
Communication between physicians and other health workers	14	28	16	32	10	20	10	20
Serve as corporate memory for the hospitals	25	50	10	20	-		15	30
Research purposes	20	40	15	30	10	20	5	10
Legal purposes	20	40	7	14	10	20	13	26
Billing purposes for treatment received	15	30	20	40	5	10	10	20

Table 5 shows that majority of the respondents strongly agreed 20(40%) and agreed 25 (50%) that it is necessary to manage public hospitals records because it Support patient treatment and care, this is in agreement with (Pickett 2011) who noted that medical record is a permanent documentation of the history and progress of a patient's medical care used for continuity of a patient's care, outlining the course of a patient's medical care.

Research Question 2

What are the problems encountered in the management of health record in public hospitals?

Table 6: Problems encountered in the management of health record in public hospitals

Problems of management of medical records in public hospitals	SA		A		D		SD	
	No	%	No	%	No	%	No	%
Lack of records management standards and policy	38	76	10	20	-		2	4
Lack of records management department	20	40	18	36	2	4	10	20
Inadequate fund	18	36	25	50	3	6	4	8
inadequate trained personnel	10	20	15	30	20	40	5	10
Inadequate storage facility	12	24	10	20	8	16	20	40
Lack of records manual and filing systems	10	20	20	40	15	30	5	10

Table 6 shows that majority of the respondents strongly agreed 38(76%) and agreed 10(20%) that lack of standards and policy is one of the problems of management of medical records in public hospitals. This is followed by inadequate fund 18 (36%) and 25 (50%) respectively. This findings is in agreement with Atlas (nd) who noted that one major problem to management of records in public hospitals is the lack of medical record management standards and policies.

Conclusion

The study concludes that in most health care organizations, medical record is the principal repository of a patient's health care information, so every health organization needs a medical records department that is organized and staffed to provide adequate information

Recommendations

Based on the findings of the study, the following recommendations were made:

- The Delta State Hospital Management Board should ensure that there is a record management policy and standard in place to guide the record management of its patient records.
- Hospital Management Board should ensure that sufficient, trained and experienced record management personnel are been employed to manage the various record departments in the hospital.
- Hospital Management Board should ensure that there are adequate record manuals and filing systems in the hospitals.
- The State government should ensure adequate fund is been given to the central hospitals in order for them to meet up with their expected roles

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Values-Based Education: The Role of Library and Information Science Educators in Nigeria

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Introduction

Nigeria is a federal constitutional republic located in West Africa; the country is made up of 36 states. After attaining independence in 1960, the implementation of educational awareness in Nigeria became an essential priority with the government spending so much to establish and maintain schools at all levels of education. In a bid to increase the opportunity given to youths to pursue education at the tertiary level, six new universities were added to the already existing one hundred and four universities currently operating in the country (Apata, 2010). Despite increasing the number of universities and other educational institutions in the country, there are growing indications of eroding social values, taking into consideration daily news reports of political corruption, examination malpractices, armed robbery, human trafficking, kidnapping and a host of other related ills. This situation is however, not limited to the Nigerian society alone. The global call for values-based education (Hawkes, 2011; Sayers, 2007; Joshi, 2007) is a strong indication of the seriousness of the issue worldwide. Considering the number of students enrolled in Library and Information Science (LIS) programmes in Nigerian universities nationwide, there is need for LIS educators to take advantage of their position as teachers to contribute to societal development by adding practical life lessons beyond that found in textbooks to bring about holistic learning experiences targeted at transforming behaviour. As noted by Yogi (2009), education that does not help promote human virtues will not be of any good to the society, rather it will mislead the entirety of humanity.

Values-based Education

Education according to Aliyu and Oyafunke (2003) is a process of socialisation often performed by many institutions and agencies. Among them are the family, peers groups, school, government, cultural and religious groups. Education in the view of Erwin (1991) is the deliberate and systematic influence exerted by the mature person upon the immature, through instruction, discipline, and harmonious development of physical, intellectual, aesthetic, social and spiritual powers of human beings. Education can therefore be said to be a process of character building, whether it takes place in schools, churches, mosques or homes. The university as an educational institution oversees not only the academic achievement of students but their character building as well. As noted by Aliyu and Oyafunke (2003) at most convocation ceremonies in Nigerian universities, statements like "having been found worthy in both academics and character, we hereby award you the Bachelors in …." are usually made. This is of course a public acknowledgement that values in education are not inseparable from the values of life.

Values are principles about what is right and wrong. Ethmen, Mahlinger and Patrick (1974) describe it as standards used to decide whether some objects are good or bad, right or wrong, important or worthless, preferable or not preferable. Success in Librarianship therefore is not solely dependent on the possession of professional skills, but also on ones' ability to differentiate between right or wrong. Yogi (2009) argues that while education

opens up the mind, values-based education brings about purity of heart. A Librarian who has been well trained in the profession would therefore be in possession of professional skills and character necessary to fit into the larger society. In line with this, William (1992) as cited by Mullan (2001) describes an educated person as one who listens and hears, reads and writes, has the ability to solve problems, seeks the truth, is tolerant, humble, nurtures and empowers others.

As the quest for values-based education becomes global, there is evidence that the educated person as described by William (1996) is being sought after now more than ever before. This is affirmed by Sayers (2007), who points out that *international focus* in respect of values-based education *is on* co-operation, honesty, love, respect, responsibility, freedom, humility, peace, happiness, simplicity, tolerance and unity.

Relevance of Values-Based Education to Nigerian Society

Former president of Nigeria, Olusegun Obasanjo (1999) as cited by Ogunji (2009) admits that immorality is the bane of Nigerian society. This is affirmed by Ajala (2002) who compares the threat of moral decay in Nigeria to the threat of a nuclear bomb. Despite government efforts to bring sanity to the society through the launching of laudable programmes such as ethical revolution (1980-1982) and War against Indiscipline (1983), Nigeria continues to witness the eroding of core values, identified by Aina (2004) as taking responsibilities, family, truth, integrity equity, do not harm and common good. While the blame can be attributed to poor leadership (Gbefwi, n. d.) some strongly believe that the get -rich- quick syndrome among the youth is mostly responsible (Elebeke, 2011; Kuta, 2010). Popoola (2010), however, blames educators focus on the development of the intellectual abilities of a person at the neglect of character. This corroborates an earlier view expressed by White (2002) in which the author states that the aim of secular education is the gratification of selfish ambition and quest for supremacy which encourages centralisation of wealth and the enrichment of the few at the expense of many.

Although character building is cited as one of the aims of tertiary education in Nigeria as seen in the National Policy of Education (NPE) document (Infamuyiwa and Alebiosu, 2008), Ogunji (2010) affirms that the mission statements of most tertiary institutions in the country emphasize academic and intellectual development thereby undermining the moral aim of education as contained in NPE document which according to the author accounts for little effort in including character building into the curriculum. The implication here is that teachers are not mandated to bring in life values into the classroom. Character building, therefore, becomes a personal choice of the teacher at the detriment of the society. The relevance of values-based education for the Nigerian society is acknowledged by Akinpelu(1974) as cited in Ossat (2004) who states that character education will help to transmit socially acceptable values of the society. By introducing values to the curriculum, teachers would pay more effort to organising their lessons in ways that detail description of behaviour which are permitted in the society.

Values and LIS education

According to Highet (1974), the first responsibility of a teacher is to know his/her subject thoroughly. Subject knowledge he claims would make a teacher enjoy his or her subject, draw illustrations easily and bring out topics for discussions which are necessary for imparting values. The LIS educator, who imbibes the spirit of values-based education, would no doubt have an in-depth understanding of his subject to be able to look beyond the development of professional skills to the development of the whole being.

Various courses are taught in the process of LIS education. Courses range from Indexing and Abstracting, Records management, Management Information Systems, Cataloguing and Classification, e.t.c. These courses prepare students to work in Library and Information Services environment. Reference services as a course presents an excellent opportunity for the LIS educator to train up leaders of future industries in Nigeria. While the major objectives for teaching this course would be to: develop familiarity with general information sources; develop skills in the examination, use and evaluation of information sources; discuss the processes involved in providing information (e.g. the reference interview), e.t.c. it also presents an excellent opportunity to teach societal values. Receiving users with respect, being polite, putting up a smiling face, presenting one's ideas strongly but politely are indeed virtues that should extend beyond the work environment. They should extend to our homes, friends, colleagues and all those who come our way. It should be made a way of life for harmonious living, understanding and tolerance. LIS educators in the treatment of certain topics as "reference interview" could emphasis that Librarians do not assume to know it all, which is why they listen and seek for clarification in the reference process. This lesson could be related to the real world as it operates within the same basic principle, *nobody knows it all* using it to show the importance of listening to others and appreciating their point of view. Such emphasis, would no doubt lead to better tolerance of others in the society.

Even technical courses such as cataloguing and classification can be used in inculcating values to future Library and Information Science professionals. It would not be out of place to take topics such: "library classification" and "descriptive cataloguing" to transfer life values. The objectives for teaching in this case would extend beyond teaching students to arrange books in order to increase their utility while saving the time of users to teaching values in character building. Students should be made to appreciate the value of logical order in their personal lives as seen in library classification. They should be able to identify and meaningfully place priorities in their personal life, so that they can make maximal use of their lives. In teaching "descriptive cataloguing", LIS educators should not be contented in bringing up future Information professionals who understand the role of AACR2 in cataloguing alone. They should see it as an opportunity to raise future leaders who understand the place of rules in the larger society. Adherence to rules is not only important in bringing conformity and unity in the creation of catalogues, adherence to rules would indeed, make the world a better place to live in with citizens who are law abiding.

Conclusion and Recommendations

Eroding societal values in Nigeria is a problem that demands the urgent attention of teachers, government, families etc. In order to help tackle this issue, LIS educators in Nigeria should stand up to the challenge of guiding the thousands of Nigerian youths enrolled in LIS education all over the country towards the harmonious development of intellectual and social abilities needed to fit into the larger society by creating awareness and encouraging acceptable social behaviours. The federal government of Nigeria should not relent in pursuing its objectives of inculcating character building through schools as reflected in the National Policy of Education (NPE) document. Efforts must be made to ensure compliance with the document by making the inclusion of character building compulsory not only in the curriculum but also in the mission statements of tertiary institutions in Nigeria as this would help motivate educators in general to bring social values to the classroom.

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A Citation Analysis of Publications in the *PNLA Quarterly*

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Introduction

Librarians' goal is to meet the information needs of patrons in pursuant of this, they strived to acquire relevant materials that are frequently used and preferred by library patrons. Achieving this goal is possible with an understanding of the types of sources used or cited by researchers in a particular field. A citation study can help the librarian select the most useful publications. And as such effectively maximize the use their budget (Sandison, 1989).

Researchers use citations to corroborate or contrast present findings. Researchers can refer to basic articles to find and use relevant information. The process of selecting information for inclusion by authors in their works is based on factors such as type and format of information source, author's reputation, date of publication etc. (Sandison, 1989; Obuh & Babatope, 2011).

The study of cited documents is known as citation analysis. Citation analysis describes formal patterns of scholarly communication, publications referred to, frequency of citation, and a variety of impact measures derived. Citation counting provides analysts with a convenient way of measuring impact (Cronin, 1991). Citation analysis shows that different fields of research need different types of references. Knowing about the citation patterns in various fields and disciplines will help librarians build library collections. Citation analysis is also a way to understand users. Studying references cited by your faculty or students shows the types of sources most commonly used and valued locally (Curtis 2005).

It is a general knowledge that library acquisition budget is inadequate and as such the materials to be purchased will depend on cost. Therefore, the library needs a mechanism to ascertain the priority items to be purchased out of its numerous needs. To this end, determining the selection of publications that prove useful to users has been a growing concern to librarians. Normally a small number of relevant publications may prove more useful than a large number of general collections. Selecting the best resources will be made easier by library acquisition protocols.

This study seeks to ascertain the type and format of information resources preferred by library and information science researchers. To do this, citation analysis was conducted on research output from winter 2010 (volume 74, number 2) to Fall 2011 (volume 76, number 1) editions published in the Pacific Northwest Library Association journal, the *PNLA Quarterly (PNLAQ)*. Based on the forgoing, the following research questions were put forward to guide the study:

- What are the types of documents preferred by LIS researchers?

- What are the formats of documents preferred by LIS researchers?

Methodology

Content analysis involving the use of simple statistics such as frequency counts and percentages were used to analyze data extracted from the references in all the 46 copies of articles are available online that and published in PNLA journal from Winter 2010 (volume 74, number 2) to Fall 2011 (volume 76, number 1). The result from the analysis was used to establish the current situation with respect to the type and format of documents preferred by researchers in library and information science field.

Review of Related Literature

The research on type of materials preferred and used by researchers in carrying out their research have spanned over three decades. Many studies have compared preferred type of materials used by researchers across various disciplines; others have focused on postgraduate students and many others on undergraduate students. Magrill and St. Clair (1990) found that, out of 1,775 undergraduate term papers across different disciplines, science students cited 65% journals and 21% books, while humanities students cited 19% journals and 68% books. Social science students were found to cite 57% books and 33% journals. Similarly, Kushkowski, Parsons, and Wiese's (2003) study of masters' and doctoral theses across five disciplines found biological students cited an average of 78% journal articles whilst arts and humanities students cited an average of 29% journals. Contrarily, Zainab and Goi's (1997) study of humanities masters' and doctoral dissertations found 61.4% of the citations were to books and book chapters. Bandyopadhyay and Nandi (2001) found books accounted for 56.2% of citations in political science doctoral theses. Similarly, Okiy (2003) found 60.3% of references in postgraduate education dissertations were to books.

Swanepoel, (2008) in his study using citation analysis to determine the use of information sources by postgraduate students in the health and biomedical sciences, found that the most cited type of resources were journals and magazines 69.5%, books and chapters in books 17%, websites 4.6%, government publications 1.8%, conference proceedings and papers 1.5%, reports 1.3%, personal communication 0.8%, theses and dissertations 0.5%, unidentified 0.4% and operating manuals and user manuals 0.4%. Buttlar, (1999) in a study of library and information science doctoral dissertations found students cited an average of 46% journals, 31.9% books and 7.3% chapters in books (Buttlar, 1999) In contrast, Oppenheim and Smith (2001) found undergraduate information students cited fewer journals, 29.5%. Zainab and Goi's (1977) study of masters' and doctoral dissertations where they observed a low 3.8% citation to government documents, 2.9% to conference papers, 0.8% to newspapers, and 6.2% to theses. Edwards (1999) also found that conference proceedings accounted for 1.8% of citations in doctoral dissertations and 5.9% of citations in masters' theses. Buttlar (1999) found 4.2% of citations to theses and dissertations, 2.2% to conference proceedings, and 2.1% to reports. Oppenheim and Smith's (2001) in their study of undergraduates found 11.2% of citations were to newspapers or reports. Gooden (2001) did a citation assessment of doctoral dissertations accepted at the chemistry department of Ohio State University and reported that journal articles were cited more frequently than monographs and other sources. Bandyopadhyay and Nandi (2001) in their study found that 9.5% of citations in doctoral theses were to report literature. A related study which examined 33 undergraduate student papers presented at a symposium (Kraus, 2002) revealed that there were a total of 770 citations,

of which 76.2% came from journals, 16.4% from books or book chapters, and only 1% from websites.

Information and communication technologies (ICTs) developments have contributed to the evolution of scholarly publication by affecting the documentation format of scholarly content and its dissemination. ICTs have dramatically changed research practices by enhancing communication among scientists; access to information of all kinds; and by the provision of a greater variety of publication and dissemination platforms (Moller, 2006). According to Willinsky (2003), 75% of journals are currently available online.

De Groote & Dorsch (2001) found that there is a significantly reduced use of print journals following the introduction of online journals, including decreased use of print journals for which there was no online equivalent. More recent studies have found higher numbers of citations to electronic sources. A study by Fescemyer on undergraduate geography student citation found electronic sources to account for 36% of the citations in 1997 and 47% in 1998 (Fescemyer, 2001). Contrarily, Malone and Videon (1997) examined undergraduate bibliographies and only 7% of citations were found to be electronic. Schaffer (2004) found that Less than one-third of the articles cited in his study were available online. A survey at the University of Illinois at Urbana-Champaign reported increased overall journal use with the addition of electronic journals, along with a decline in the use of print titles (Chrzastowski, 2003).

Results and Discussion of Findings

Research Question 1: What are the types of documents preferred by LIS researchers?

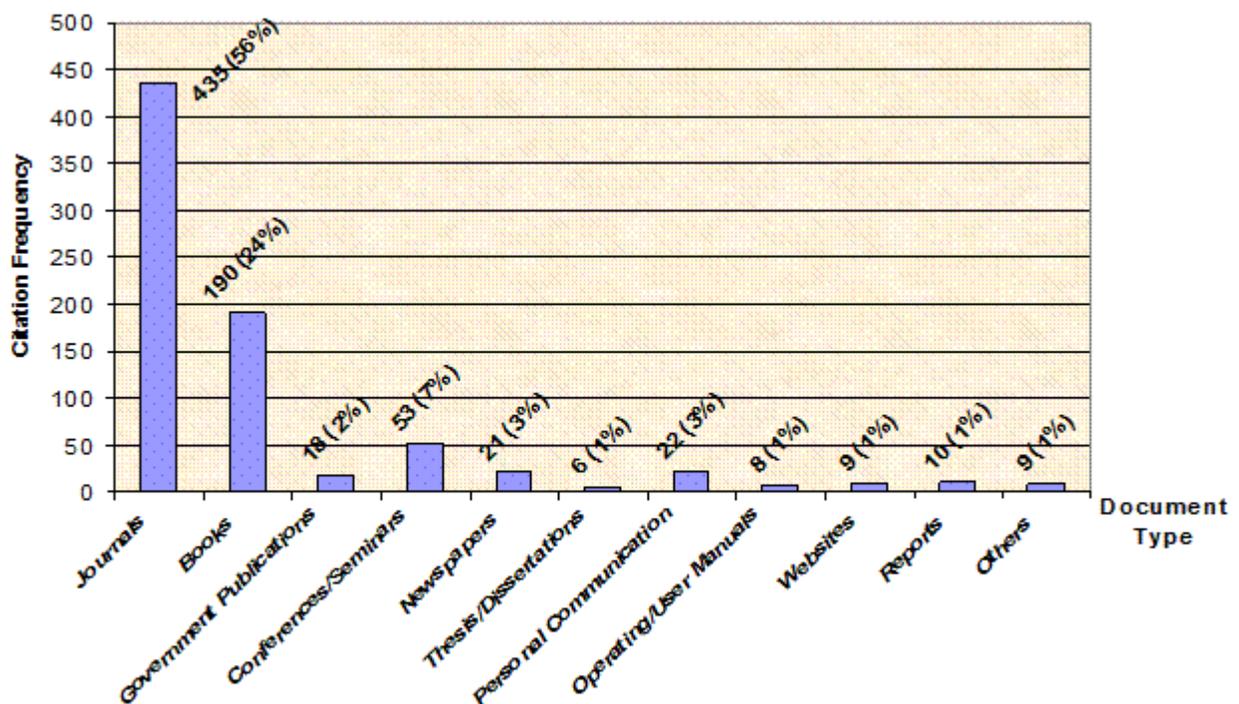The result of the analysis is presented in figure 1.

Figure 1 Bar Chart Indicating Level of Preference of Document Type

The result from the analysis as presented in the bar-chart in figure 1 show that, journals (435, 56%) ranked as the most cited information resources by library and information science authors that published in the PNLAQ followed by books (190, 24%). This result is in agreement with similar studies such as Buttlar (1999) in a study involving library and information science doctoral dissertations where he found that most of the cited documents were journals 46% and books 31.9%. Similarly, Bandyopadhyay and Nandi (2001) and Okiy (2003) found that books accounted for 56.2% of citations in political science doctoral theses and 60.3% of references in postgraduate education dissertations respectively. The study also revealed that conference/seminars papers (53, 7%); newspapers and personal communications 21, (3%) and 22, (3%) respectively, government publications 18, (2%); reports 10, (1%); websites 9, (1%); operating/user manuals 8, (1%) and thesis/dissertations 6, (1%) ranked among the types of documents that are least cited by researchers in the library and information science discipline. This corroborates Zainab and Goi's (1977) study of masters' and doctoral dissertations where they observed a low 3.8% citation to government documents, 2.9% to conference papers, 0.8% to newspapers, and 6.2% to theses. Edwards (1999) also found that conference proceedings accounted for a few i.e. 1.8% of citations in doctoral dissertations and 5.9% of citations in masters' theses.

Moreso, studies conducted in other disciplines are in agreement with the findings of the current study. For instance Swanepoel (2008) in his study using citation analysis to determine the use of information sources by postgraduate students in the health and biomedical sciences, found that the most cited type of resources were journals 69.5%, books 17%, websites 4.6%, government publications 1.8%, conference proceedings and papers 1.5%, reports 1.3%, personal communication 0.8%, theses and dissertations 0.5%, unidentified 0.4% and operating manuals and user manuals 0.4%. Similarly, Kraus (2002) examined 33 undergraduate student papers presented at a symposium and found that in all of 770 citations, 76.2% came from journals, 16.4% from books, and only 1% from websites.

Contrarily, Oppenheim and Smith (2001) found undergraduate library and information science students cited fewer journals, 29.5%. Magrill and St. Clair (1990) in their study involving 1,775 undergraduate term papers across different disciplines found that students in the humanities and social sciences cited more books 68% and 57% than journals 19% and 33% respectively. Further still, Goi (1997) analyzed the research trends of postgraduate students in the Humanities based on dissertations submitted to the University of Malaya between 1984 and 1994 and found that for the number of citations, books were cited the highest at 52.17% followed by journal articles at 23.55%.

Research Question 2: What are the formats of documents preferred by LIS researchers?

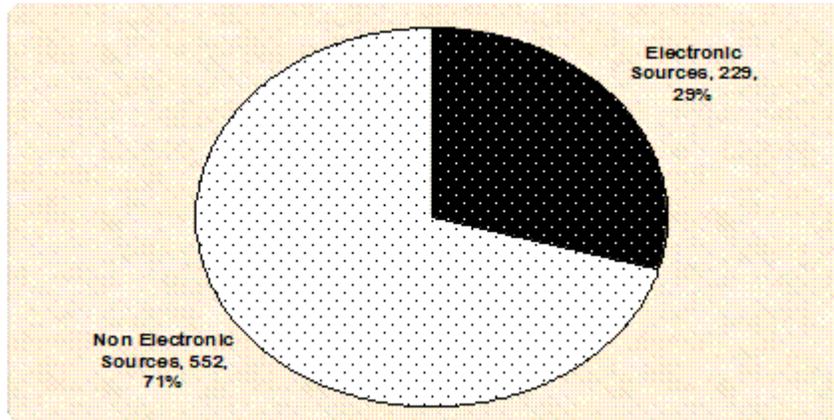The result of the analysis is presented in figure 2.

Figure 2 Pie Chart of Level of Preference of Document Format

The result from the analysis presented in the pie chart in figure 2 shows that of the 781 sources cited, non electronic sources are the most cited (552, 71%) by library and information science researchers. This result corroborates Megnigbeto (2006) in his study on the citations of dissertations of library and information science undergraduate students and found that the number of citations to electronic resources was very low. Fescemyer (2001) in a study on undergraduate geography students' citation found electronic sources to account for low 36% of the citations in 1997 and 47% in 1998. Similarly, Malone and Videon (1997) examined undergraduate bibliographies and found that only 7% of citations were electronic compared to non electronic sources. Tenopir, King & Bush (2004) in their study of medical faculty members, found that irrespective of category, they prefer to use print format journals rather than the electronic form. Davis and Cohen (2001) reported that undergraduate term papers in economics increased their number of Web site citations from 1996 to 1999.

On the contrary, more recent studies such as Chrzastowski (2003) have found higher numbers of citations to electronic sources. A survey at the University of Illinois at Urbana-Champaign reported increased use of electronic journals, and a decline in the use of print titles. Davis and Cohen (2001) reported an increase in the use of electronic resources when they asserted that undergraduate term papers in economics increased their number of Web site citations from 1996 to 1999

Conclusion

The study shows that researchers in library and information science discipline that publish their articles in the *PNLAQ* cite/use more non electronic resources than electronic resources or rather they exhibits strong preference for print over electronic format. It is worthy of note to state here that, the reverse to this trend is fast becoming a reality as recent studies on citation analysis have shown a considerable increase over time in the preference, citation or use of electronic resources by researchers. To this end, it is in order to recommend that resources should be made available in both electronic and non electronic format so as to meet the information needs of all categories of users irrespective of their preferred format. That notwithstanding, institutions and libraries must put structures in place that will allow for easy accessibility and availability of both electronic and print formats.

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nline Museums: How Are They Succeeding and What are They Doing to Succeed?

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Introduction

Museums are of great value to society. They are important to providing history, knowledge and culture to society. How do museums translate the physical aspect into the online world? As technology continues to move forward, "museums and libraries are not just creating more access but are offering new kinds of access to entirely new audiences. This, in turn, is changing the way museums perceive themselves. It is also changing the nature of curatorial practice and interpretation." (Council on Library and Information Resources) This paper will explore how museums are succeeding in today's ever changing technological world. What makes a museum succeed and continues to draw new and old visitors? What kind of software, systems do museums use to ensure that their collections will remain for the long term?

One thing that museums have done already is build a website to complement their physical museum. But just because a website is there, that doesn't guarantee success. The Council on Library and Information Resources indicated that museums are already successful with marketing on their websites. Many museum websites already have online stores, advertisement for their current and past exhibition and upcoming events. Museums *know* how to market themselves. The next step is to figure out how to draw visitors and users on a consistent basis that isn't just to find out when the museum is open or what is the latest exhibit; rather, how do you convince a visitor to stay on the website and take advantage of the site? Indeed, there were initial failures of the Tate Gallery of London and the Museum of Modern Art in New York. This only "underscores that it takes more than pairing the strengths of individual institutions to make such an enterprise succeed." (Council on Library and Information Resources) However, if a website fails, it doesn't mean that the museum will simply shut down. Without a strong web presence, a large audience will be lost. The Tate Gallery or London and the Museum of Modern Art in New York both re-launched their websites at least once. "Websites have evolved quickly, from providing little more than visitor information and collection highlights to becoming large and complex sites that present a museum's scope of activity, provide online collection databases, online exhibitions, and learning resources; and, increasingly, building communities of interest with targeted programming." (Loran, 2005)

There are many things that contribute to a success of a virtual museum. The backbone of an online museum website would be the content management system. This definitely contributes to the success of the website, but what do visitors to the website see? How does the user interface contribute to the success of an online museum? We will take some time to

explore what an online museum does on its website can contribute to its success or failure of a site.

Drawing an Audience

In the article "Cultivating Personalized Museum Tours Online and On-Site, the authors site several issues that can arise for online museums. One of the issues that they identify is how to keep users interested online. In this, it connects back to the physical space of the museum and how they can use the museum to get visitors to get back online to discover more online. How can curators get visitors to browse online collections? One suggestion that was brought up was to provide a "virtuous circle." What is a virtuous circle? The article explained it as "creating a connection between the online (virtual) and the on-site (real) information through functions such as bookmarks allowing people to save information of interest from the museum interactions (e.g. from Kiosks, PDAs) and accessing it after the visit via e-mail or on a personalized page available on the museum Web site." (Wang, Stash, Sambeek, Schuurmans, Aroyo, et al, 2009) What museums in the US have implemented this? Who has tried something like this? This is an intriguing idea and should be tested to see how effective this can be. By creating a personalized webpage for the user would ensure that the visitor would return again and again; not only to browse their own interests, but to also see what new exhibits the museum has to offer.

Another issue that the article raises is how online digital tours are disconnected with physical tours that are offered by the museum. "The first is lack of content personalization and dynamic adaptation according to the visitors; interests and the contextual information. Most tours contain a list of artworks, which is the same for everyone or for visitors from the same predetermined user groups (e.g. groups of tourists, students, experts). The second problem is lack of connection between online tours and on-site/multimedia tours, which are usually separated into two tours without any connections." (Wang, Stash, Sambeek, Schuurmans, Aroyo, et al, 2009) How can a museum then offer a more personalized tour? It can begin by creating a quick survey on the website, so it can better determine what age group and interests of the user. If the person is of a younger age, the reading material should be easier, and in larger font. If it is for the elderly, perhaps larger font should also be included. While it is true that a physical museum can offer a more personalized experience, but that doesn't mean an online museum can't do the same. An audio tour geared towards specific age groups can also be offered (a fee can also be included). One suggestion they make is to create a "Tour Wizard." This wizard would generate "online museum tours containing interesting article recommended from another tool." (Wang, Stash, Sambeek, Schuurmans, Aroyo, et al, 2009)

Lastly, it is important to create a website that is easy to use and easy to browse. This seems like common sense, but how many times has someone visited a website, only to be frustrated and never to return? In the same way one would want to create an aesthetically pleasing physical site, it is equally important to create a website that offers easy access and use. One suggestion provided by the article is to create an "Art Recommender." This tool will help users discover their art interests in the museum collection and store in in a corresponding user model. This tool can then also be used in the "Tour Wizard" that is mentioned above. Here, then, we see how this can be a virtuous circle. A user is interested in the artwork at the museum, and then goes home to research more about the particular artwork at the museum. While researching, the "Art Recommender" will remember the choices selected by the user, and select the appropriate tour for the user. As the user goes on an online tour provided by the wizard, the user increases their interest in the museum and artwork. It is a win-win situation for both the user and museum.

In addition, there are other ways to make a museum successful. Margarida Loran suggests that by being able to connect the objects to people, places and purposes; to be able to personalize the message through stories and narratives, and more importantly, allowing visitors to make decisions; these can all contribute to a successful museum. (Loran, 2005) We have often seen that people are most passionate about topics they are interested in; topics that affect themselves or their neighbors. By allowing visitors to interact with an online museum, this can equally affect a visitor's perception of a museum. It goes back to the point of keeping users engaged. Aside from just creating a website that tailors to their interests, it is also equally important to bring the social aspect to the website. Another example of community inclusion would be the Wing Luke Asian Museum. Members at this museum are encouraged to tell their stories with the space and tools that are provided by the museum. Community Advisory Committees and other members of the community also work with the museum staff on exhibition planning and implementation. (Pastore, 2009)

A Case Study: Colorado Digitization Program

The Colorado Digitization Program (CDP) was established in 1998, in order to provide access to Colorado's written and visual record of its history, culture, government and industry. This began as a collaborative organization that had participation from all cultural heritage institutions including libraries, museums, historical societies and archives. (Bailey-Hainer & Urban, 2004) Although this case study does not strictly focus on a museum, it is still important to examine how this collaboration became a success and how its successes can be applied to museums. One of the first things that had to be resolved was a lack of a common metadata entry or cataloging system that was in use in among all the institutions. Because none of the institutions were using the same content management system, CDP had to find a way to establish a common ground. Installing a new system was neither feasible nor practical, so in the end, CDP decided to use Dublin Core as the standard because it was the most hospitable for loading records from multiple systems.

At the same time, CDP also required them to build a new interoperable system so that it would allow them host both MARC and Dublin Core records. The original program that they had chosen to use was not robust enough; therefore a program was created in order to satisfy their needs. This contributed to their success to the digitization project. They also had to harvest subject headings in order to meet everyone's needs (the museums and libraries). There was no true Colorado thesaurus that existed, so a list of headings was incorporated into the new software. (Bailey-Hainer & Urban, 2004)

This case study shows that collaboration can be a success, even with the issue of various content management systems in use. By finding the lowest common denominator that everyone could use, the CDP was able to create a system that was robust enough to support all their needs. Although a Colorado vocabulary was not in existent either, the CDP was able to provide a list of vocabulary words to harvest with. The success of this project allowed for collaboration on other projects such as Colorado's Historic Newspaper Collection. How can museums learn from this collaboration project? It is possible for various museums to collaborate and combine their systems if they are interested. Smaller museums may be able to collaborate with one another and expand their collections. By combining their information, the CDP expanded their visual and written knowledge of Colorado across the state. Similarly, museums can share their knowledge with one another and the public by creating compelling online experiences for users. By having a strong content management system, this can be the first step in creating a successful museum.

Content Management Databases

With all the information that is in a museum, how does one determine where to store it? What systems will be suited best for the museum? There are various needs of a museum. Not only is the metadata important, the images that they hold are equally important. The images can be extremely large – such as paintings, portraits and large maps. What is the budget of the museum? Questions like these will determine which system is best suited for a particular museum. There are various content management systems that are out there. Some are specifically geared towards museums, such as Collective Access or MuseumPlus. Other systems, such as Fedora, are not specific to museums, but can support the needs of a museum. We will examine a few of these content management systems to see how they differ and can support the needs of museums.

Collective Access

Collective Access is web-based software that can catalogue, manage and publish museum and archival collections. Collective Access is a free web based tool that can be highly configurable for cataloguing and managing museum and archival collections. It can support a variety of metadata standards. The documentation provided by Collective Access provides an outline of how to catalogue with the product. The document "Cataloguing with Collective Access" (Collective Access) is a guide on how to catalogue with Collective Access. It is a guide on how to create new records, such as object records, collection records and entity records. It provides snapshots of the software so that a user can see where the metadata goes. The document also provides information on doing searches – from basic to advanced searches. Lastly, the document provides an appendix of editing a list of vocabularies (to suit your museum's needs), loading lists and authorities and also editing media. Collective Access itself is a wonderful resource to a museum that may not be able to pay for expensive software to deal with cataloguing.

Fedora

Fedora is also free, open-source software. Fedora stands for Flexible Extensible Digital Object Repository Architecture. Fedora is a flexible framework for building data repositories. "Fedora provides a foundation upon which many types of digital library, institutional repositories, and digital archives systems might be built. It provides separate abstractions for storage and access, integrated semantic relationships, formal mechanisms for defining classes of objects, and a message-driven framework for creating any number of indices for different patterns of content." (Duraspace Open Technologies) Fedora allows any type of content and metadata to be stored. Not only that, it also includes disaster recovery in which it will crawl to recover content and rebuild the database content from scratch. Fedora can also be customizable to suit the institution's needs; it is scalable and it can integrate with existing systems.

CONTENTdm

CONTENTdm is a content management system that offers a solution that can handle storage, management and delivery of a digital collection. Although it is primarily geared towards library use, it can also be used for a museum content management system. "CONTENTdm is a Windows-based, digital collection tool where data and digital items are prepared in large batches." (OCLC, 2012) It can include a server, where data and images are stored and edited. CONTENTdm can store multiple types of files – anything from multiple page documents, PDF files, EAD files, and audio and video files that also include

transcripts and large map files. It will also conveniently integrate with other OCLC products so that an institution can chose to build a catalogue with easy workflows. It can also have the option of harvesting from other OCLO websites and also add long term preservation. CONTENTdm also includes a tool that can upload metadata of the digital content to WorldCat. CONTENTdm allows for full control over the digital resources, descriptions, access and display. The institution can chose how to customize their metadata fields and also create predefined queries. In addition, the GUI can also be customized so that the digital collection can be presented in whichever format the institution prefers.

In addition, CONTENTdm can be an excellent choice for a museum because CONTENTdm supports a number of industry standards such as Unicode, Z39.50, Qualified Dublin Core, VRA, XML, JPEG2000, OAI-PMH and METS. (OCLC, 2012) This makes it ideal for a museum that may be using various types of files and metadata schemas. This can be an ideal umbrella to connect various metadata schemas together. As it is, OCLC suggests that CONTENTdm can be a repository to bring multiple collections together in its Web-based environment.

MuseumPlus

This is a professional collection management system that is geared for museums. It is used in over 200 museums around the world. MuseumPlus has a number of modules so a museum can select to either use all of the modules or only select a few that fits their needs. Because of this, all modules are linked together so that seamless data exchange can happen. This also means that there is an easy inventory control. MuseumPlus offers several unique things that separate rate it from other systems that have been reviewed here. It offers photo and rights management; which includes a royalty functionality that allows for easier revenue tracking from photos. They also offer a report functionality that can provide detailed information, whether by using their LightBox function, or by exporting information to Excel. It also has an easy interface to work with so data can be exported to Microsoft Access, Excel and Word. MuseumPlus also adheres to national and international documentation and harvesting standards. In additional, MuseumPlus also offers training sessions and customer support. MuseumPlus can offer in- house training that includes presentations, hands on training and remote web training. This is a huge advantage because by having training available, it allows the institution to be able to grasp the system at a quicker rate. If there were only several people learning the system at a time, the transfer rate of knowledge would be much slower. (Zetcom)

Taking a Look at Online Museums

I explored a few different online museums to examine how they drew visitors and got them to stay on their site. What did these museums do to keep visitors exploring and to come back for more? What did they offer that made it interesting to visitors? The museums examined below each were unique in their setup and how they integrated technology with their collections.

The Virtual Smithsonian

The virtual Smithsonian is a gorgeous website that first brings you through your computer settings to ensure that your computer will be able to handle the bandwidth. It tests that you have the latest software that can play their audio and video functions. It also provides audio controls so that the user can adjust the level to their liking. On the opening page, a voice over reads the introduction. The website is split into several sections with the menu on the

bottom. At the beginning of every page, an introduction paragraph is read out. A person can chose to ignore the audio and read the side bar by themselves. However, this site is very helpful to those who are vision impaired. Because every page has audio, a vision impaired person is assured that they are getting a good part of the experience. Within each page, images accompany the topic that is at hand. Most of the images are of photographs; a few are of sculptures. Regrettably, the images of sculptures are not in 3D. They are static and can only be zoomed in or out. The menu on the bottom is of smaller text; the submenu has even smaller text. Unfortunately, the text does not read out, so a vision impaired person may not know what it says. However, in the main window of each page, it does read out the submenu. The Virtual Smithsonian is a stimulating site that compels a person to explore and learn.

San Francisco Museum of Modern Art

This museum offers viewings of its collection, and other rich media that is associated with its collection. It offers blogs, videos, podcasts, audio collections and interactive features. Also from the permanent collection – it includes one to a few pictures from featured artists, about the artwork featured, a short biography and titles of other works by the artist. The museum website also provides mobile support. SF MOMA also includes a blog that discusses art, culture and other aspects of the San Francisco Bay Area. Also includes a submenu for educators. This includes information for teacher resources, school programs and teen programs. This is a very robust website that has plenty of information for everyone.

An excellent example of using their website to expand one's curiosity would be the SF MOMA's "ArtScope". SFMOMA describes it as "a visual browsing tool that allows you to explore 6,126 artworks in our collection." It looks like a telescope in which one can select a random artwork (the images are very small) and drag into the center, in which it will be enlarged. The "lens" in the center can also be enlarged by clicking to be better able to put the image in view. While looking at one image, a person can also look at the images next to it; instead of having to click "next."

Virtual Museum of Canada (VMC)

The VMC hosts virtual exhibits online that are drawn from various museums around Canada. Current online exhibits include exhibits from the Textile Museum of Canada, Kettle River Museum, and the Montreal Museum of Archaeology and History. However, with each exhibit, it takes you the individual museum page where one can explore the exhibit. I originally thought that this site would host the exhibit, but on further thought, it does make sense that it would lead to the primary museum website that is hosting the exhibit. Each museum has their exhibit and site set up differently, but it is very useful to have a central site that holds the country's museums and exhibits together. This allows for ease of use and can allow a person to check out multiple exhibits without having to open multiple windows.

The VMC also has an image gallery that holds over 900,000 images of photos, paintings, artifacts and objects from museums across Canada. A person can browse by image collection or images. A search box is also included but if I didn't know a specific artist or perhaps the correct term, I may have issues finding an image of what I am looking for. Perhaps if the VMC also included categories such as paintings, objects or photos this can help.

Conclusion

Virtual museums have so much to offer to the public. Not only do museums have their current collections online, they can also offer virtual tours, allow visitors to participate with their own stories and even have input for upcoming exhibits. Virtual museums allow anyone across the world to discover something new. However, without the proper support; whether from management, the software and or hardware, or even the employees, online museums will not be able to reach their full potentials. By examining various content management systems, projects that museums are implementing for their online presence, we can see that online museums continue to push the boundaries and are making online museums an exciting place to visit.

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MARC of the Future

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Introduction

Despite the old fashioned stereotypes of librarians with their date stamps and catalog cards, librarians are quite often at the forefront of modern technology. Card catalogs were replaced with Online Public Access Catalogs, and libraries have embraced RFID technology, which is still struggling to gain wider acceptance among businesses and the public. But in some ways libraries have remained bound to tradition, refusing to let go of the old way of doing things.

Recently, a major struggle has taken place over the subject of cataloging standards. These rules are designed to allow catalogers to format their records to one standard, so that records share the same attributes even at different libraries. The introduction of *Resource Description and Access,* a new standard designed to replace the *Anglo American Cataloging Rules, Second Edition,* was the subject of much controversy and consternation. On March 2, 2012, the Library of Congress announced they were aiming for an RDA implementation day of March 21, 2013 (Wiggins, 2012).

Other libraries will have to decide if they will also make the transition to RDA, and catalogers will continue squabbling over the changes between RDA and AACR2. However, both of these standards are designed to work with MAchine Readable Cataloging, or MARC. MARC 21 is the format; RDA is the standard for that format. But with the introduction of RDA came rumblings that changing the standard was not enough. Librarians and catalogers would also need to change the format. In essence, RDA was just a first step. The next step would be to update, or even replace, MARC 21 itself.

In this study, I will review the current formats that have been suggested to replace MARC 21—despite the fact that there is no format truly posed to replace it in any meaningful way.

The Problem

At this point, the bulk of librarians and catalogers are still adjusting to RDA and trying to consider how they will implement it at their own libraries. (The ILS used by my library system, Polaris, has not yet compatible with RDA. The discussion of RDA with our cataloger initially produced a large, heavy sigh.) It is clear, however, that RDA is intended to be just a first step of many in redefining library cataloging.

The Library of Congress announced on May 13, 2011, that they would be evaluating the "wider bibliographic framework" that RDA was to operate under (n.p.). The announcement said, "Spontaneous comments from participants in the US RDA Test show that a broad cross-section of the community feels budgetary pressures but nevertheless considers it necessary to replace MARC 21 in order to reap the full benefit of new and emerging content standards" (n.p.).

In a *Library Journal* article discussing the LOC's announcement and dated May 26, 2011, Deanna B. Marcum of the Library of Congress describes the process the LOC is taking to reevaluate MARC 21: "[…] the LOC hopes to determine whether the standard can "evolve to do all the things we'd like it to do, or do we need to replace it" with something more compatible with the Internet world" (Kelley, n.p.). The move by the Library of Congress is certainly the first step in a long process to overhaul or replace MARC 21.

Should libraries be afraid of change? The bigger question is whether or not they are even capable of it. Identifying a number of MARC 21 records out there is difficult; some numbers say it is in the billions. OCLC claims 1.5 billion items on WorldCat's front page.

In this paper, I will examine what the future holds for our MARC format, asking questions like: What is the future of MARC? What does a MARC-style format of the future look like? What should it include? Most importantly, how can it be implemented?

Literature Review

With the introduction of RDA, discussion of the future of MARC 21, previously a more academic question, has become a more pressing issue amongst library professionals. RDA incorporates many features that move it forward from the previous standards of AACR2, which was developed initially before OPACs and modern ILSs. As Finn notes, "MARC was introduced in the late 1960's, when computing power and storage were expensive, scarce, and unwieldy. Because of developments such as inexpensive and compact disk space, major changes in software systems and new technologies, we can do better today" (2004).

However, as I read through the literature I began to see how scattered the talk of MARC 21's future was. There have been few studies undertaken to really evaluate what specific format will replace it, though there are many opinions on what a MARC replacement should look like. Moreover, people have been talking about what will replace MARC 21 for a very long time; I limited myself to 2000 and up, but a brief look told me there were articles detailing the need for a replacement for MARC going back even before MARC 21 was developed.

Sally McCallum of the Library of Congress defined 9 format characteristics of MARC in her lecture titled "MARC Forward": "XML; Granularity; Versatility; Extensibility; Hierarchy support; Crosswalks; Tools; Cooperative management; Pervasive" (2007, p. 3). It's clear any replacement for MARC 21 will need these characteristics, and more.

On the amusingly named wiki "MARC must die!" a section marked "What we want," asks for "open standards, non-library specific solutions, identifiers, and mashability" (2011). While the site has not been updated much since the LOC's announcement that they would be exploring a new bibliographic framework, the idea of the site is relevant. Karen Coyle, in her blog post discussing the LOC announcement, stated, "The next data carrier for libraries needs to be developed as a truly open effort" (2011). It is important to consider that library professionals might not be the only group that should consult on a successor to MARC21. What Coyle suggests, and the wiki attempts, is to "crowdsource" the problem a bit, in order to get more input into the process of creating the next metadata format. Though this format must take into account libraries and their needs, we are not the only ones who should be working to develop it.

There are many catalogers out there who do feel MARC must die. But there are many more who struggle against the inertia of such a widely used format.

To wit, what I encountered most in the literature was the sense that MARC continued being used because so much of the data is in MARC format. As McCallum mentioned, MARC is "pervasive." McElfresh puts it this way:

We use MARC because that is what so much of our existing data is. Converting the existing data to another format would be an enormous cliff to scale, but a sudden cutover without conversion of legacy data would be simply obscene —an abrogation of our responsibilities as preservers of the cultural record, a negation of the work of generations of catalogers before us. However, the case for moving beyond MARC (or at least giving MARC a thorough reworking, not just a face- lift) is becoming compelling. (2011, p. 3).

This will be a major hurdle for any new format to overcome. While we can accuse library technology of being stagnant—though it isn't—and claim that MARC is increasingly irrelevant—though that is also not true—we cannot simply abandon all the work that has gone into making the MARC format so common. Success, in this case, is also a curse.

Among other documents I looked at was a special edition of *Library Hi Tech*, from 2004, which focused entirely on MARC and metadata. In the introduction to this issue, editor Bradford Lee Eden asks many of the same questions mentioned earlier. The articles are now somewhat out of date, but the idea that inspired the special edition is still relevant. The authors look at MARC XML, METS, and MODS, and as the editor concludes in his introduction, "the success of these MARC-based metadata schemata is dependent on libraries and librarians themselves" (p. 2).

This literature review led me to a simple research question with no obvious answer:

What will replace MARC?

Simple question; no clear answer. Like many people with a half-formed question, I went and asked the Internet, using various databases, "What will replace MARC?" almost always in those exact words, though I used Boolean searching when appropriate. (Many of the results I discarded involved the designer Marc Jacobs, making me briefly consider if libraries could change to a more fashion forward format.)

RDF?

One of the first results was a set of slides from a presentation by Christopher Cronin of the University of Chicago Library. (I found many presentation slides; this is a hot topic at conferences, for good reason.) Asking the same question I searched for, Cronin answers: "RDF comes up again and again in the Semantic Web and linked data literature and, for right now, seems to be the framework most are experimenting with and promoting as an alternative to encoding our data" (2011, p. 7).

Following Cronin's example, let's look at RDF! Resource Description Framework is "a standard model for data interchange on the Web. RDF has features that facilitate data merging even if the underlying schemas differ, and it specifically supports the evolution of schemas over time without requiring all the data consumers to be changed" (2012, n.p.). RDF is developed by the World Wide Web Consortium. RDF is an essential component of the Semantic Web, a movement begun by the W3C, defined by Tim Berners-Lee as "a web of data that can be processed directly and indirectly by machines." RDF is a promising format, and the Semantic Web is a promising concept. However, no one besides Cronin seems to

think that RDF can totally replace MARC. In fact, it's not easy to find anyone else discussing such a thing in the same way he did. Deanna Marcum, in another presentation, identifies "analyze what is missing from RDF and try to change" as a fundamental bit of work for a post-MARC world, but does not identify RDF as a ready-made format (2012, p. 13). More likely MARC will absorb components of RDF and semantic web.

XML?

Another result I received was from 2001 and dealt with the differences between XML and MARC 21, positing a rivalry between the two. Johnson, the author, comes to decide that MARC is the more relevant format and will be relevant for years to come, though XML's applications for library data should be studied (p. 88). This paper was written before the LOC decided to create MARC XML, which uses MARC 21 data in an XML framework.

Sally McCallum, Chief of the Network Development and MARC 21 standards office at LOC, discussed MARC XML with the coordinators of GUMARC21, the Italian MARC Users Group, saying:

MARCXML takes the MARC 21 data elements, coded values, and data tagging and enables them for XML. Only the MARC structure is left behind so that the beauty of the MARCXML is that is can "play" well with older systems and system modules, via a transformation to the MARC 21 structure, and also with newer XML-based applications. (Contessi & Raga, p. 2.)

It seems despite Johnson's ambitions for XML to replace MARC 21, LOC simply adapted MARC to use its own version of XML. Whether it's fair or accurate to say MARC is attempting to "absorb" XML or not, the LOC is certainly attempting to prevent XML from replacing MARC21 outright.

It occurred to me that LOC had two interesting formats of its own up its sleeve, MODS and METS.

METS?

METS is of course the Metadata Encoding and Transmission Standard. METS, according to LOC, "provides a flexible mechanism for encoding descriptive, administrative, and structural metadata for a digital library object, and for expressing the complex links between these various forms of metadata" (Library of Congress, 2011, n.p.). Wagner points out in her "METS: A Survey of Recent Literature and Applications" that "While METS is a tool which can be used for transmission of metadata, the fact that there is no standard implementation actually impedes the transmission of metadata" (2011, n.p.). METS has been implemented by libraries in a variety of ways, and it seems clear METS is not ready to accept any of the heavy MARC lifting.

MODS?

Meanwhile, MODS, Metadata Object Description Schema, according to LOC:

As an XML schema it is intended to be able to carry selected data from existing MARC 21 records as well as to enable the creation of original resource description records. It includes a subset of MARC fields and uses language-based tags rather than numeric ones, in some

cases regrouping elements from the MARC 21 bibliographic format. (Library of Congress, 2010, n.p.)

MODS is intended to be richer than Dublin Core but simpler than MARC. However, one of MARC's strengths is its granularity; while a simpler format is useful, MODS is also not designed for heavy lifting, and relatively few projects have been registered with LOC as using MODS.

Results

Simply put, there seems to be no clear winner. It seems obvious to me now that there is no fully formed MARC21 replacement waiting in the wings—the best we can hope from the various groups and committees looking into improving or replacing MARC21 is that they will construct a format that incorporates pieces of not only MARC21 but also MODS, METS, XML, and RDF in order to bring these different formats together into one.

Discussion

One thing that continued to impress me is the adaptability of MARC. We are on MARC21, after all, which evolved from USMARC and CAN/MARC, the US and Canadian versions of MARC, respectively. Without insulting MARC, MARC seems able to absorb new technologies as needed. It's possible to imagine a new MARC format—perhaps a MARC-Frankenstein— that incorporates MODS, METS, XML, and RDF while still retaining the peculiarities and quirks of the MARC we all love.

In my experience with XML, it is a fine enough format for the web, but I doubt its ability to be a cataloging format without serious changes. Similarly, though I was not as familiar with RDF, MODS, and METS, my sense is that the three are all flexible and usable, but do not have the same features and strengths as MARC 21.

Conclusion

It seems clear that despite the need to consider what a future cataloging format that will replace MARC will look like, library professionals are nowhere near replacing MARC. Any format that would hope to replace it would have to adapt seamlessly to current MARC records; be easy to understand; incorporate elements of the semantic web; and be suitable for all formats of materials, including born digital items.

When I first considered this question, it was with the goal of a theoretical literature review, combined with some personal reflection based on my experience cataloging in MARC. I realized in order to do a true "research study," I would need to look at something, but in the end, the lack of something to look at is answer enough to my question.

Do we need to replace MARC? Maybe. It seems almost certain that the LOC will introduce something new to compliment RDA, though probably not for several years after their RDA implementation day. That format, however, will be in an unenviable position. Whether or not MARC is a perfect or even good format, the fact remains that billions of MARC records cannot be beat. Library professionals will have to confront many of the same issues around this subject that web designers have struggled with in developing HTML and CSS; the growing pains of HTML5 come to mind as being similar to the situation librarians are in. Any

new format must accommodate the old while improving on it; this can feel a bit like building a house on shaky ground.

In the end, the work the Library of Congress has done on RDA almost guarantees that we are headed for a new format, like it or not. The important thing for a library professional to do now is keep track of the committees deciding what a new format must include, and contributing their own perspective—in order to create a format that will be truly adapted to our digital world.

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Influence of Metadata on SharePoint Search Results: An Investigation

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Introduction

The author's workgroup, in the IT organization of a Fortune 500 company, has provided useful information in document libraries on SharePoint sites. The intended audience would like to retrieve relevant results when they query the corporate intranet or a specific SharePoint site, searching for the types of information that is in these documents. Nevertheless, audience members complain that the information is hard to find. The author investigated utilizing metadata in SharePoint libraries and Microsoft Office documents to understand how metadata could improve users' ability to find the information they seek.

Background

SharePoint is a suite of Microsoft tools that allows individuals in an organization to easily create and manage their own collaborative web sites. It includes features for web-based content management and collaboration, integrating with Microsoft Windows and Microsoft Office. Its key components include Windows SharePoint Services (WSS) and Microsoft Office SharePoint Server (MOSS). WSS provides fundamental document management and collaboration tools like storage, versioning, wikis, discussion boards, calendars, contacts, and surveys. MOSS provides enterprise search, personalization, and enterprise content management.

Microsoft Office provides five types of document properties, or metadata:

- **Standard properties** such as author, title, and subject, where the user can specify text values
- **Automatically updated properties** such as file size, date created or last changed, and number of words or characters in a document. These are automatically supplied by the system and cannot be changed by the user
- **Custom properties** that can be defined by the user and can be assigned a value in the format of text, date/time, numeric or yes/no

- **Properties customized by the organization** which can set organization-specific document properties to be associated with all documents, for example a property that automatically includes the name of the company
- **Document library properties** that the user is prompted to update when adding documents to a SharePoint library

The Office document metadata values are passed to SharePoint when a document is saved or uploaded to a properly defined document library. If the SharePoint site administrator has allowed items from the site or library to appear in search results, the documents can be searched by metadata property values.

Literature Review

Technical publications provide background information on what can be expected when searching SharePoint content and on how the indexing and search work.

According to a TechNet Magazine article (Hester, January 2007), the MOSS 2007 indexing service includes a content index and a properties store. The content index includes the actual text in the documents, and the property store database holds the additional metadata properties about the documents. Both are populated when the indexing engine crawls and extracts the content to be stored in the content index and the property values to be stored in the properties store. Server administrators can configure the crawling rules to specify paths to be included or excluded.

Hanley (n.d.) wrote an account of testing out-of-the-box searches. She states, "The search engine in MOSS 2007 is much improved over the search engine in the previous version of SharePoint. However, the syntax is not always consistent in the property based searches so it can be very confusing for the end user." Hanley found that searching for Title was the most reliable way to find documents in SharePoint, and that SharePoint will search in the filename if there is no content in the Title property.

Antonovich (2010, pp. 217 - 221) provides practical information to help SharePoint site administrators utilize the Office document properties metadata in SharePoint document libraries. Key points include:

- Word passes the metadata values to SharePoint when a document is saved or uploaded to a *properly defined* document library. "Properly defined" means using the **Add from existing site columns option** in the SharePoint site settings; it does not mean creating columns with the same names as Word metadata fields.

- When columns are added to a library that already contains documents, the added columns remain blank even if those documents had metadata values when originally created in Word. The documents must be re-uploaded or edited in order to populate values into the columns.

- Metadata can be added to documents within SharePoint, by adding a column to the library. Users are prompted to supply any missing or invalid properties when saving an edited document back to the server.

- Only properties added to the document library through the existing site columns represent metadata that SharePoint can share with similarly named metadata in Word. SharePoint does not share back to Word any new columns created manually;

nevertheless, Word respects the validation and data requirements defined in SharePoint before saving a document back to the library. However, the message that displays when metadata is incomplete does not tell which field has an invalid entry.

A TechNet blog posting explains the workings of the "duplicates" feature in SharePoint search results and how the duplicate documents are identified during a search. Metadata are not part of that identification, as explained in the posting:

"Document similarity for purposes of identifying duplicates is based only on a hash of the content of the document. No File properties (e.g. file name, type, author, create and modify dates) are input to this hash. The MSSDuplicateHashes table in the SSP's search database holds, for each document, all the 64bit hashes necessary to determine if one document is a near-duplicate of another. This is read while doing a search if duplicate collapsing is enabled." (Harikumh, 2008/11/14)

When a search retrieves documents that appear to be duplicates, SharePoint does not automatically display the duplicates, but gives the user an option to display them.

Research Question and Methodology

With this background understanding of Office metadata and how it is incorporated in SharePoint, an experiment was designed to help determine how SharePoint site administrators and users can take advantage of metadata to improve search results, using the organization's current implementation of SharePoint. The experiment was based on test documents and observed search results from queries on metadata values in standard properties, custom properties, keywords, and body text.

Step 1

Several test documents were created in Microsoft Word. The following metadata properties were populated using the Document Properties feature:

Property	Type
Title	standard
Author	automatically populated by the system, but manually changed for the test
Category	standard
Keywords	standard
Comments	standard
Source	custom - set as Required, and had to be populated after uploading the document to SharePoint
Filename	automatically populated when the document is saved in Word

To avoid confusion from a large number of hits in the search results, the test documents contained one of the following unusual words in the filename, body, or metadata properties:

abecedism: meaning "word created from the initials of words in a phrase"

zabernism: meaning "misuse of military authority; bullying"

In each document, one property contained the unusual word. All the other document properties were populated with the word "nul."

A document library named Test_A was created in SharePoint, defined with columns for the metadata properties in the documents. The documents were then uploaded to the SharePoint library, as shown in Figure 1.

Test_A

For testing search capabilities. Contact Lea Mason for more information.

| New ▾ | Upload ▾ | Actions ▾ | Settings ▾ | | | | View: | **All Documents** ▾ | |

Type	Name	Modified	Modified By	Source	Keywords	Category	Comments	Author
📄	abecedism	4/25/2012 4:16 PM	Mason, Lea	nul	nul	nul	nul	nul
📄	nul02	4/25/2012 4:17 PM	Mason, Lea	nul	nul	nul	nul	
📄	nul03	4/30/2012 11:35 AM	Mason, Lea	nul	nul	nul	nul	abecedism
📄	nul04	4/25/2012 4:18 PM	Mason, Lea	nul	nul	abecedism	nul	
📄	nul05	4/25/2012 4:19 PM	Mason, Lea	nul	abecedism	nul	nul	
📄	nul06	4/27/2012 11:05 AM	Mason, Lea	nul	nul	nul	abecedism	nul
📄	nul07	4/27/2012 11:07 AM	Mason, Lea	abecedism	nul	nul	nul	nul
📄	nul08	4/25/2012 4:26 PM	Mason, Lea	nul	nul	nul	nul	
📄	nul09	4/25/2012 4:26 PM	Mason, Lea	nul	nul	nul	nul	
📄	nul10	4/25/2012 4:27 PM	Mason, Lea	nul	nul	nul	nul	
📄	nul11	4/25/2012 4:27 PM	Mason, Lea	nul	abecedism, zabernism	nul	nul	

Figure 1: SharePoint library view after adding columns for metadata and uploading documents

Step 2

After the indexing engine did its work – which takes place overnight – search queries were entered using the unique words. The search terms were used alone and -- where applicable -- with a property, using the syntax *property: value*, e.g., *comments:abecedism*. An Intranet search and a SharePoint search were performed on each of the search terms, and search was limited to the test library.
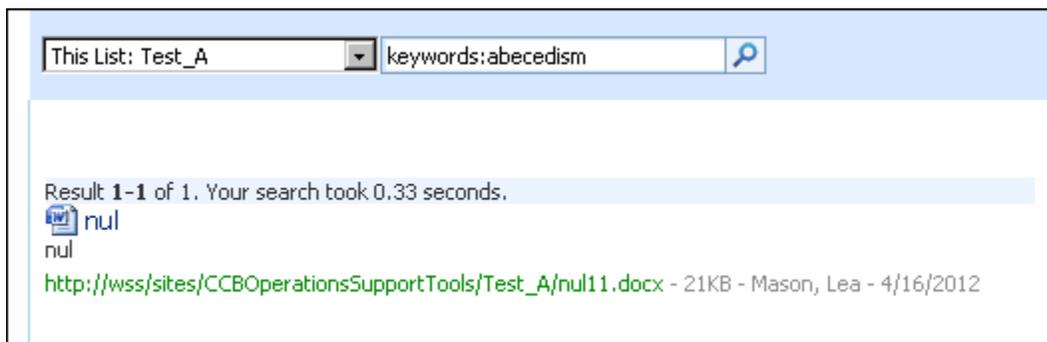
| This List: Test_A ▾ | keywords:abecedism | 🔍 |

Result **1-1** of 1. Your search took 0.33 seconds.
📄 nul
nul
http://wss/sites/CCBOperationsSupportTools/Test_A/nul11.docx - 21KB - Mason, Lea - 4/16/2012

Figure 2: A typical result for a property search

Results

Some technical issues were encountered during the investigation. When searches were performed on the test library and on some production libraries, documents that should have appeared in the search results did not always appear as expected. Technical support responded by re-indexing the sites, which took three days to complete. The re-indexing resolved the issue on the test library. On one production SharePoint site, however, searching did not work at all, even after the re-indexing. The issue has been escalated to a higher level of technical support. The observation that there had been server-level issues with searching SharePoint sites provided insight into the users' complaints about the difficulty of finding information.

With the server-level issues resolved for the test library, consistent search results were achieved when using the Intranet search box and when using the SharePoint search box. The table below shows details of the search queries and results.

Results Detail

| File	Property	Value	Search query	Document Found?
abecedism.docx	Filename	abecedism	abecedism	yes
abecedism.docx	Source	nul	source:abecedism	See note 2
abecedism.docx	Filename	abecedism	filename:abecedism	yes
nul02.docx	Title	abecedism	abecedism	See note 1
nul02.docx	Title	abecedism	title:abecedism	yes
nul03.docx	Author	abecedism	abecedism	See note 3
nul03.docx	Author	abecedism	author:abecedism	yes
nul04.docx	Category	abecedism	abecedism	yes
nul04.docx	Category	abecedism	category:abecedism	yes
nul05.docx	Keywords	abecedism	abecedism	yes
nul05.docx	Keywords	abecedism	keywords:abecedism	yes
nul06.docx	Comments	abecedism	abecedism	yes
nul06.docx	Comments	abecedism	comments:abecedism	yes
nul07.docx	Source	abecedism	abecedism	See note 1
nul07.docx	Source	abecedism	source:abecedism	yes
nul08.docx	Body text 1x	abecedism	abecedism	yes
nul09.docx	Body text 3x	abecedism	abecedism	yes
nul10.docx	Body text 2x	abecedism	abecedism	yes
nul11.docx	Keywords	abecedism, zabernism	abecedism	yes
nul11.docx	Keywords	abecedism, zabernism	zabernism	yes
nul11.docx	Keywords	abecedism, zabernism	keywords:abecedism	yes
nul11.docx	Keywords	abecedism, zabernism	keywords:zabernism	yes

Note 1: Some documents expected to be found on a property search were not found. Further investigation is needed to clarify if this was due to the on-going technical issues in the search function or some other reason.

Note 2: A document was found on the property search *source:abecedism*, although the value is not in the *Source* property, only in the filename. A hypothesis for future investigation is that the property search did not work because Source is a custom property added in Word, and not one of the standard columns in SharePoint.

Note 3: A document containing the value *abecedism* in the Author property was not found on the property search. A hypothesis for future investigation is that this anomaly may have occurred because the Author property is different from the other properties. Author is automatically populated by the system when a Word document is created, although it can be modified by the user and was modified for this experiment.

The test also provided the opportunity to observe the View Duplicates feature in the search results. A search result identifying duplicates is shown in Figure 3.

Figure 3: Search results with duplicates collapsed
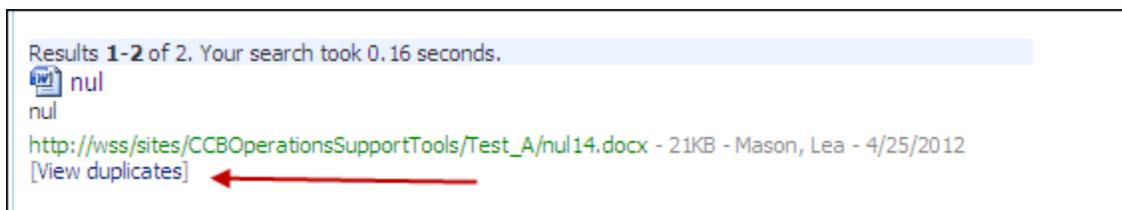
Clicking the *View duplicates* link expands the view to show documents where the document body was similar to that in the items found via the search, although the search terms were not present in the body or metadata of the duplicate documents.

Discussion

While the indexing issue was a distraction from the planned testing, it provided important information. A network support technician acknowledged problems with the organization's current implementation of search. Test results differed on different days, and some tests had to be repeated. Some of this was due to the process of learning how the Office document metadata properties would be exposed to SharePoint search, and some may have been related to network or server issues. While it was difficult to draw conclusions from all of the results, test results in general confirmed that:

- Searches on terms in a document's body text resulted in finding the document, even if the term occurred only once
- Identification of duplicates is based on body text, not metadata
- Terms in metadata properties will be found in SharePoint only if the property is exposed by being added from the "existing columns"
- Values of custom properties set in Word document properties will not be found via SharePoint search, although they can be used to sort and filter documents within a library

- The company's general intranet search will show the same SharePoint results as searching from the SharePoint search box; the intranet search results has a separate tab for SharePoint, so the user can see results from the intranet, SharePoint, and/or contacts based on the search term. For example, a search on "Marketing" might find the Marketing department's intranet page, SharePoint documents about Marketing, and contact information for people in the Marketing department, each on a separate tab.
- The SharePoint tab of the intranet search will show properties searches, e.g., keywords:abecedism, just like searching in the SharePoint site.
- If a required property was not populated in Word, it has to be populated in SharePoint before users will be able to see the document, i.e., before it is checked in to the library
- If a custom property created in Word (i.e., not one of SharePoint's existing columns) was populated in Word, the value will not be uploaded to SharePoint. If the property is required, it will have to be populated in SharePoint before users will be able to see the document (i.e., before it is checked in to the library.

An issue for further investigation with technical support is the continuing unpredictable results on searches in various SharePoint libraries. In general, it seems that documents edited or uploaded in recent weeks are found, but documents uploaded or edited earlier than that are not turning up in search results.

Conclusion

The investigation demonstrated that, in a functioning SharePoint environment, the use of metadata is effective in finding information stored in Microsoft Office documents. Metadata can be created when documents are created in Microsoft Office or when they are uploaded into SharePoint. Issues with the search functionality in the organization's current SharePoint implementation reduce the findability of documents, regardless of metadata. Users have a valid complaint that it is difficult to search for information in the intranet and SharePoint.

Apart from the search issue, metadata can be still be used to organize documents in a SharePoint library, making them easier to find once to user reaches the library. A user can sort or filter the documents in a SharePoint library view by a metadata property, as in Figure 4 below.

Figure 4: Example of filtering the test library by the Source property

As another option, the user can create a view that groups the documents by metadata properties. The groups can be collapsed or expanded for the ability to drill down within a category. Figure 5 shows such a view with the groupings collapsed. Each group can be expanded to see the document records.

Figure 5: A library view grouped by the Category property, and then by the Title property
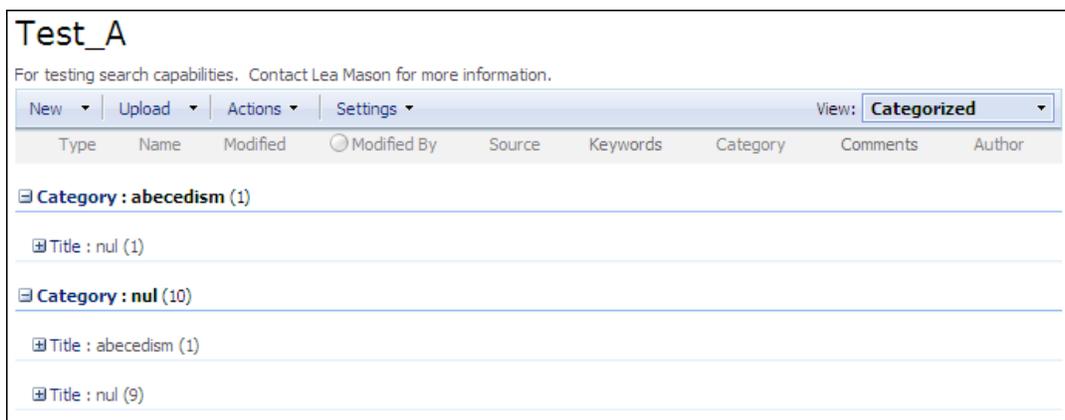
This investigation shed light on the potential and limitations of using metadata to help users find information in the organization's current SharePoint implementation. With the current implementation, metadata cannot be relied on to improve relevant search results, although it can help organize documents within a library and provide selective views.

In a promising development, the organization has started an initiative to improve internal knowledge sharing via the Intranet, which includes SharePoint. This initiative may provide the opportunity to resolve issues identified in this study and to make useful information more readily accessible by employees.

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