Undergraduates’ Perceptions and Use of the University Libraries Web Portal: Can Information Literacy Instruction Make a Difference?

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ABSTRACT
There is a common concern among academic libraries that their library Web portals are being underutilized. Literature pertaining to technology acceptance and information systems success indicates that user training plays a pivotal role in fostering favorable attitudes, and facilitating information systems usage among users. However, no study had been conducted to investigate the effect of user education on the acceptance and use of academic library Web portals. To address this gap in the literature, the researcher took the initiative to explore the impact of a semester-long credit-bearing information literacy course on undergraduate students’ perceptions and use of the University at Albany Libraries Web portal. Data were collected through two rounds of survey over a period of an academic semester. Results showed that the information literacy course positively influenced participants’ perceptions of the Libraries Web portal in terms of perceived ease of use, information quality, system quality, and user satisfaction. Yet, the course did not have an impact on their perceptions of service quality. In addition, statistically significant differences were not found in the overall frequency and duration of use, but in other dimensions of use, namely purpose and task.

Keywords
Technology acceptance model, IS success model, information literacy, instruction, user training, satisfaction, library Web portal, perceptions, use.

INTRODUCTION
As digital resources increased exponentially over the last decade, academic libraries have heavily invested in electronic books, research databases, as well as electronic journals, and made them accessible via their library Web portals. Some libraries also undertake usability initiatives to improve their Web portals in order to provide users with better and easier access to their electronic collections and services. Despite these great efforts, it has been observed that instead of accessing a wealth of electronic content through the library Web portal, students tend to rely on Internet search engines (e.g., Google), and public Web portals (e.g., Yahoo) even though scholarly information is not always readily available there (Low, 2003), and they often have difficulty distinguishing authoritative from non-authoritative information on the Internet. As a result, underutilization of library electronic resources has become a common concern (e.g., Hong, Thong, Wong, & Tam, 2002; Thomsett-Scott & May, 2009).

There has been a considerable amount of research in the information science and technology field examining the determinants of information technology (IT) acceptance and utilization among users (e.g., Venkatesh, 2000; Heo & Han, 2003; Shih, 2004). Most of such research was based on the technology acceptance model (TAM) (Davis, Bagozzi, & Warshaw, 1989). TAM proposes that an individual’s behavioral intention to use a technology is determined by two salient beliefs: perceived usefulness (PU), and perceived ease of use (PEOU). Intention to use leads to actual system use.

While PU and PEOU have been used to predict users’ initial adoption or use of a new information technology, the construct of users’ satisfaction has been widely adopted in information systems (IS) research as an indicator of IS success and use (e.g., Delone & McLean, 1992, 2003; Doll & Torkzadeh, 1988). According to DeLone and McLean model of IS success (1992, 2003), system quality, information quality, and service quality significantly affect both use and user satisfaction. Like TAM, the IS success models have been empirically tested and expanded in numerous studies (e.g., Wang, 2008; Häkkinen & Hilmola, 2008; Schaupp, Bélanger, & Fan, 2009).

In addition to PU, PEOU, information quality, system quality, service quality, and user satisfaction, researchers indicate that availability of training would directly affect information system usage as well (e.g., Al-Gahtani & King, 1999; Gallivan, Spitler, & Koufaris, 2005; Igbaria, Zinatelli, Gragg, & Cavaye, 1997). The effects of user training on the acceptance and use of information systems have been shown to be important in enhancing user satisfaction with the system (e.g., Al-Gahtani & King, 1999; Igbaria, Zinatelli, Gragg, & Cavaye, 1997). The researcher took the initiative to explore the impact of a semester-long credit-bearing information literacy course on undergraduate students’ perceptions and use of the University at Albany Libraries Web portal.
training on the acceptance and use of information technology, promoting greater understanding, and fostering favorable attitudes have also been discussed in the literature (e.g., Nelson & Cheney 1987; Raymond, 1988; Rouibah, Hamdy, & Al-Enezi, 2009).

Despite an overwhelming literature validating or extending the TAM and the IS success models, longitudinal studies examining the IS use patterns over time are generally lacking. This is especially manifest in research pertaining to library information systems. Additionally, effects of credit-bearing instruction on library users’ perceptions and use of academic library Web portals remain unexplored. Based on the theoretical constructs derived from TAM and the IS success models, the researcher initiated this study to address these gaps in the literature by examining the effect of a semester-long 3-credit information literacy course on undergraduate students’ perceptions and use of an academic library Web portal. Data were collected at both start and end of a semester to allow for observation of the impact on perceptions and use.

Research Context
The University Libraries at the researcher’s institution, a member of the State University of New York, is a mid-size research library in the United States. It is also one of the 126 members of the Association of Research Libraries in North America. For the 2009 academic year, the University Libraries invested more than one third of its collection acquisitions budget in electronic resources. The University Libraries Web portal serves as a gateway to access the digital information, and provides information on non-digital materials owned by the Libraries via the online public access catalog. In addition, it delivers online services such as research assistance, book renewals, interlibrary loans, class sign-up, and so forth. The Libraries Web portal is intended to effectively facilitate learning, teaching, and research.

Every semester the College of Computing and Information offers Internet and Information Access, one of the three-credit information literacy courses meeting the general education requirements, to the university’s undergraduate students. This course is required for both those who major in Information Studies and minor in Informatics, and it is an elective course for the other students. It is taught by a library faculty member, and the course content includes an introduction to the Internet and World Wide Web, Internet security, Web directories, online information resources, social networking services, search engines, as well as finding, evaluating, and producing information on the Internet. Part of this course introduces students to the University Libraries Web portal teaching them how to use library resources, such as the online public access catalog, electronic databases, and library tutorials, for their research and assignments. Traditionally, this class has a good mix of undergraduate students. By using students enrolled in this course as the research population, the researcher aims to answer the following question:

Does the information literacy course have any impact on undergraduate students’ perceptions and use of the University Libraries Web portal?

Understanding the influence of information literacy courses on students’ perceptions and their use of academic library Web portals could provide insights into the prospect of facilitating the use of library resources through credit-bearing information literacy instruction.

LITERATURE REVIEW

Theoretical Underpinnings
Studies on user technology acceptance have proliferated in the IS literature, and a large body of technology acceptance research is connected to behavioral intention. TAM (Davis et al., 1989) is a seminal work for predicting an individual’s intention to use and acceptance of information systems (IS) and information technology (IT). TAM theorizes that a person’s attitude toward using a technology is determined by two user beliefs: PU and PEOU which lead to an individual’s behavioral intention to use the IS or IT in question. PU is defined as "the degree to which a person believes that using a particular system would enhance his or her job performance" (Davis, 1989, p. 320). PEOU refers to "the degree to which a person believes that using a particular system would be free of effort" (Davis, 1989, p. 320).

Behavioral intention is defined as “a measure of the strength of one’s intention to perform a specified behavior” (Davis et al., 1989, p. 984). As depicted in the model, attitude toward using an information system and perceived usefulness jointly determine behavioral intention which leads to actual system usage. In addition, PEOU has an impact on PU. External variables can influence both PEOU and PU, which subsequently affect usage behavior.

TAM has been well-referenced in the IS literature. However, most studies have tested it on relatively simple systems with homogeneous participants. Thus, its applicability to a complex information system, such as an academic research library Web portal, and diverse populations (e.g., students in different grade levels and academic programs) can be questioned.

Parallel to the TAM model and its variations, another research stream, information systems (IS) success models
investigates user satisfaction and technology acceptance. Based on a comprehensive literature review of the IS success definitions and measures, DeLone & McLean (1992) developed a taxonomy consisting of six dimensions of IS success (see Figure 2):

1. **System Quality** refers to measures of the information processing system itself;
2. **Information Quality** refers to measures of information system output;
3. **Use** refers to recipient consumption of the output of an information system;
4. **User Satisfaction** refers to recipient response to the use of the output of an information system;
5. **Individual Impact**, closely related to performance, refers to the effect of information on the behavior of the recipient, and
6. **Organizational Impact** refers to the effect of information on organizational performance.

As illustrated above, both System Quality and Information Quality affect Use and User Satisfaction. The realization of system benefits for individual users and the organization as a whole depends on the significant impact of Use and User Satisfaction.

With the advent of Web technology and the growing popularity of e-commerce, DeLone and McLean (2003) updated their original model by including Service Quality to reflect the critical aspect of online service and support in e-commerce systems. Intention to Use was added to measure user attitude. Also, individual and organizational impacts were collapsed into a single benefit impact called Net Benefits (see Figure 3).

Through analyzing IS models, dimensions, measures, and interrelationships, Petter, DeLone, and McLean (2008) indicate that the relationships between Use and User Satisfaction, as well as the correlation between Use and Net Benefits have received moderate support from the IS literature. Additionally, the path from User Satisfaction to Net Benefits is strongly supported. Although the updated DeLone and McLean’s (2003) IS success model has been widely applied to research in the areas of e-commerce, knowledge management systems, and specialized business applications, it has not been broadly validated in academic settings. Library-based studies grounded in this conceptual model are minimal.

**Research Relevant to Academic Library Web Site Usage**

Although there is a wide array of literature discussing determinants of technology acceptance and information systems success, research on how the IT/IS acceptance and success factors impact students’ acceptance and use of academic library Web portals has been very limited. Kim (2006) conducted a study exploring factors affecting user acceptance of Web-based subscription databases using the TAM2 model as theoretical framework. Contrary to the findings of prior studies (e.g., Bradley & Lee, 2007; Hu, Clark, & Ma, 2003), user training did not correlate with either PEOU or PU for participants who had received database training. Nevertheless, the training intervention used in Kim’s (2006) study was single workshops; the impact of a semester-long, credit-bearing user instruction course could be significantly different.

Expanding the scope from web-based subscription databases to a digital library Web site, Hong et al. (2002) studied the acceptance of the Open University of Hong Kong’s E-Library based on the TAM model. They explored the effect of some critical external variables on the intention to use the electronic collections by distance learners. Their research results showed that both individual differences and the system characteristics significantly influenced PEOU. Additionally, relevance was the only system characteristics that positively impacted PU. Their research demonstrated the effect of external variables on behavior intention through users’ beliefs postulated in TAM. In their subsequent study on the E-Library, Thong, Hong, and Tam (2002) examined the effect of system interface, organizational context, and individual differences on the adoption intention of users. Their research outcomes indicated that both PU and PEOU determined user acceptance. Mirroring their initial study, both system interface and individual differences influenced PEOU. Organizational context (i.e., relevance of the system to users’ information needs, system accessibility, and system visibility) affected both PEOU and PU. An academic library Web portal has a wider scope than E-library; hence, the results need to be verified in such a context.

To test the applicability of the TAM model in developing countries, Park, Roman, Lee, and Chung (2009) studied the
User training allows end users to obtain the required skills and the confidence for effective use of the target system. According to Heany (1972), one of the critical factors for the successful introduction to an information system is developing its users’ abilities through a system-related training program. Nelson and Cheney (1987) mentioned that information systems can have a significant positive impact on task performance if organizations provide all levels of users with sufficient education or training. An information literacy course can help students with different levels of experience effectively use a library Web portal for their study-related work; thus, it has the potential to facilitate user acceptance of this information system.

The reviewed literature pertaining to library information systems use is grounded in TAM and the usage is captured at a single point of time. In addition, electronic resources and digital libraries are the dominant research agendas. As the Web is an emerging technology that keeps evolving, and academic library Web portals have become the major mechanism to disseminate information and deliver services, exploring the University Libraries Web portal as a whole to broaden the research scope will be a significant addition to the knowledge base. To date, no study has been conducted to review the use of academic library Web portals based on the IS success frameworks. Neither is there any research identifying the relationship between information literacy instruction and the use of library Web portals. Therefore, incorporating constructs derived from the TAM and IS success models to examine the impact of a credit-bearing information literacy course on students’ perceptions and use of the University Libraries Web portal will provide a fresh perspective and fill a gap in the literature.

**Research Proposition**

The goal of this study is to identify the effect of credit-bearing instruction on the perceptions and use of the University Libraries Web portal. To compare students’ views and usage of the Web portal before and after receiving the information literacy instruction, the researcher drew on constructs from TAM and the IS success models. They are perceived ease of use, perceived usefulness, information quality, system quality, service quality, user satisfaction, and use.

User training in information systems refers to the extent to which an individual has been trained about information systems through college courses, vendor training, in-house training, and self-study (Igbaria, Guimaraes, & Davis, 1995). Prior research indicates that training helps users shape their perceptions of information systems and become well-versed in how to best use the systems (e.g., Shachak & Fine, 2008).

User training can be an external factor in the TAM model (Davis et al., 1989) that influences perceived ease of use. Several empirical studies have tested and support the positive relationship between user training and perceived ease of use (e.g., Igbaria et al., 1995, 1997; Taylor & Todd, 1995; Thompson, Higgins, & Howell, 1991). Likewise, examples of positive impact of user training/user education on perceived usefulness and user acceptance of information systems are evident in the literature (e.g., Igbaria et al., 1995; Rouibah et al., 2009; Sabherwal, Jeyaraj, & Chowa, 2006; Venkatesh & Davis, 2000). User education enables users to identify system capabilities, as well as understand the fit between their tasks and the system functions, thus significantly affecting users’ perceptions of usefulness of a system (Santhanam & Sein, 1994; Venkatesh, 1999). Since there are many empirical studies signifying the favorable relationship between user training and users’ beliefs, the following hypotheses are proposed:

- **H1:** Information literacy instruction has a positive impact on perceived ease of use of the University Libraries Web portal.
- **H2:** Information literacy instruction has a positive impact on perceived usefulness of the University Libraries Web portal.

Training guides users to better understand the organization of an information system and the logic of the design, thus alleviating the gap between the mental model of the system and that of the users. The effect of training on users’ perceptions of system quality is also mentioned in the literature (e.g., Sabherwal et al., 2006). Since searching for authoritative information and evaluating information are part of the course content, the researcher suggests that instruction will help students recognize the quality of information provided through the Libraries Web portal. Additionally, as the course instructor introduces students to various online library services, such as e-mail and Instant Messenger for research assistance, the researcher speculates that the instruction will raise students’ awareness of online services available to them. This, in turn, can have a positive impact on their perceptions of the service quality of the Libraries Web portal. Therefore, the following hypotheses are generated:

- **H3:** Information literacy instruction has a positive impact on perceptions of information quality.
- **H4:** Information literacy instruction has a positive impact on perceptions of system quality.
- **H5:** Information literacy instruction has a positive impact on perceptions of service quality.
User satisfaction is broadly used in IS research as an indicator of user perception of the effectiveness of an information system (e.g., DeLone and McLean, 1992, 2003). It reflects one's attitudes toward factors related to information systems. As it is postulated that there will be a positive change in students’ perceptions of perceived ease of use, perceived usefulness, information quality, system quality, and service quality after the instruction, it is logical to assume that the information literacy course will positively influence students’ satisfaction toward the Web portal. In addition, the impact of user training on information system usage is also supported by many researchers (e.g., Al-Gahtami & King, 1999; Gallivan et al., 2005; Igbaria et al., 1995, 1997). Therefore, the following hypotheses are proposed:

H6: There will be a positive change in students’ satisfaction toward the Libraries Web portal after the information literacy instruction.

H7: There will be a positive change in students’ use of the Libraries Web portal after the information literacy instruction.

METHODOLOGY
To test the proposed hypotheses, a survey instrument consisting of measurements for each construct was developed. The survey questionnaires were composed of multiple choice questions and Likert scales. Multiple choice questions were used to collect demographic information; while Likert scales were applied to measure participants’ perceptions and use of the University Libraries Web portal.

In order to develop a comprehensive instrument, multiple items were used to measure each construct. All of the construct indicators were derived from previously validated instruments based on a comprehensive literature review. Three items, selected from studies by Heinrichs, Lim, Lim, and Spangenberg (2007) and Kim (2010), were used to measure the ease of finding information and navigation. Four items for the perceived usefulness construct were adapted from Davis (1989), Heinrichs, et al. (2007), and Hong, et al. (2002) to capture the perceived benefits as a result of using the Libraries Web portal. The information quality construct comprises six items (Kim, Lee, & Law, 2008; Lin & Lee, 2006; Schaupp, et al, 2009) to measure aspects of content and timeliness. The system quality construct was composed of four items (Hong, et al., 2002; Roca, Chiu, & Martinez, 2006; Yen & Lu, 2008) to assess availability, speed, task-flow, and layout. Three items were used to measure service quality regarding online support and assistance (Roca, et al, 2006; Ozkan, Koseler, & Baykal, 2009). The indicators used to determine user satisfaction focus on effectiveness, efficiency, and users’ overall attitude (McGill & Hobs, 2008; Wang & Wang, 2009). Likert scales (1-5), with anchors ranging from ‘1 = strongly disagree’ to ‘5 = strongly agree’ were used for all questions.

Use was measured in terms of frequency, duration, purpose, and task (Igbaria, Livari, & Maragaghih, 1995; Igbaria, et al., 1997; Kellar, Watters, & Shepherd, 2007; McGill & Hobs, 2008). Frequency was measured on a 5-point scale from ‘0’ to ‘over 8’ times per week. Similarly, duration was measured on a five-point scale from ‘0’ to ‘over 8’ hours per week. Items for purposes and tasks were measured in a 7-point scale with anchors ranging from ‘Never’ to ‘Daily’ (see Appendix).

Wording for each question was slightly modified to fit the context of the current study. A faculty panel specializing in information science and technology reviewed the questions to ensure the measures can be categorized as per theoretical predictions. To estimate the duration of time needed for completing the questionnaire, and to find any ambiguity in questions for refinement, prior to the initial data collection, the survey was tested by five undergraduate students who had not taken the Internet and Information Access course.

As permitted by the course instructor and approved by the University’s Institutional Review Board, the researcher recruited participants from the 405 students enrolled in the Internet and Information Access course for the Fall 2010 semester on the first day of the class. The researcher explained the study to the students, indicating that the participation was voluntary. Students completing the pre- or the post- survey or both surveys would receive extra credit. In order not to make students feel coerced to participate, it was made clear that those who chose not to participate in the surveys could receive the same amount of extra credit by writing up to two short reports on the Libraries Web portal. In addition, to minimize the effects of social desirability bias, the students were told that there were no right or wrong answers, and their responses would be kept in confidence. Two rounds of surveys were administered at two points in time: the first day of the class, and the end of the course. Both pre- and post-course surveys were conducted in class. Data were analyzed using SPSS.

RESULTS and DISCUSSION
Participants
Of the 405 students enrolled in this information literacy course, 357 participated in either pre-course, or post-course, or both suveys. The number of participants for the pre-course and post-course surveys was 306 each for a response rate of 75.5%. Since first semester freshmen and transfer students had not had opportunities to explore or use the Libraries Web portal when the pre-course suvery was conducted, their data were removed, leaving a sample of 145 students taking both pre- and post-course surveys for investigating the impact of the information literacy class. These participants were from 30 academic departments; some programs were more heavily represented than the others. A summary of the demographic characteristics is shown in Table 1.
### Table 1. Descriptive statistics of participants for both pre-course and post-course surveys (n = 145).

<table>
<thead>
<tr>
<th>Participant characteristics</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>91</td>
<td>63%</td>
</tr>
<tr>
<td>Female</td>
<td>54</td>
<td>37%</td>
</tr>
<tr>
<td><strong>Year</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Freshman</td>
<td>2</td>
<td>1%</td>
</tr>
<tr>
<td>Sophomore</td>
<td>64</td>
<td>44%</td>
</tr>
<tr>
<td>Junior</td>
<td>52</td>
<td>36%</td>
</tr>
<tr>
<td>Senior</td>
<td>27</td>
<td>19%</td>
</tr>
<tr>
<td><strong>Academic Program</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Business</td>
<td>45</td>
<td>31%</td>
</tr>
<tr>
<td>Humanities</td>
<td>10</td>
<td>7%</td>
</tr>
<tr>
<td>Social Sciences</td>
<td>66</td>
<td>46%</td>
</tr>
<tr>
<td>Science &amp; Technology</td>
<td>24</td>
<td>16%</td>
</tr>
</tbody>
</table>

The Impact of the Information Literacy Instruction on Participants’ Perceptions of the University Libraries Web Portal

Contrary to Kim’s (2006) findings that training in Web-based subscription databases did not positively influence PEOU, the outcome of this current study showed a strong relationship between user education on University Libraries Web portal and PEOU. The paired samples t-test results showed that there were statistically significant differences in participants’ perceptions of perceived ease of use before and after the information literacy instruction (see Table 2). After receiving instruction, participants found it easier to understand the organization of the University Libraries Web portal and navigate for needed information. Thus, Hypothesis 1 was supported.

<table>
<thead>
<tr>
<th>Perceived Ease of Use</th>
<th>Pre-course survey</th>
<th>Post-course survey</th>
<th>t</th>
<th>p*</th>
</tr>
</thead>
<tbody>
<tr>
<td>easy to find information</td>
<td>3.63 1.00</td>
<td>3.89 0.91</td>
<td>2.84***</td>
<td>0.003</td>
</tr>
<tr>
<td>organization of information is easy to understand</td>
<td>3.57 1.04</td>
<td>3.86 0.90</td>
<td>2.85***</td>
<td>0.003</td>
</tr>
<tr>
<td>easy to navigate</td>
<td>3.54 1.11</td>
<td>3.88 0.98</td>
<td>3.19***</td>
<td>0.001</td>
</tr>
</tbody>
</table>

*One-tailed. ***p < .005, ** p < .05

### Table 2. Participants’ perceptions of perceived ease of use before and after the course (n = 145).

The t-test presented mixed results for PU. Participants’ perception of the Libraries Web portal’s leading them to better research was positively impacted by the instruction (p < 0.005). The other indicators of PU did not show statistically significant differences (see Table 3). Therefore, Hypothesis 2 was partially supported. This could be an issue of fit between the participants’ tasks and the Libraries Web portal. For example, when a student needs to look up a mathematical theorem, using Google will likely be easier and faster than the Libraries Web portal. Individual differences can influence PEOU and PU. Users with more computer experience and better knowledge of subject domain are more proficient in formulating proper queries and interpreting search results (Thong, Hong, & Tam, 2004). Thus, participants’ domain knowledge, experience in using the Libraries Web portal, and their abilities to synthesize information retrieved could be another set of factors that mediate the influential power of instruction over perceived usefulness.

<table>
<thead>
<tr>
<th>Perceived Usefulness</th>
<th>Pre-course survey</th>
<th>Post-course survey</th>
<th>t</th>
<th>p*</th>
</tr>
</thead>
<tbody>
<tr>
<td>better research</td>
<td>3.68 1.09</td>
<td>4.09 0.89</td>
<td>3.79***</td>
<td>0.000</td>
</tr>
<tr>
<td>easier to do assignments</td>
<td>3.55 1.17</td>
<td>3.71 1.04</td>
<td>1.33</td>
<td>0.092</td>
</tr>
<tr>
<td>academic performance</td>
<td>3.53 1.11</td>
<td>3.60 1.04</td>
<td>0.62</td>
<td>0.267</td>
</tr>
<tr>
<td>productivity</td>
<td>3.43 1.14</td>
<td>3.55 0.98</td>
<td>1.03</td>
<td>0.152</td>
</tr>
</tbody>
</table>

*One-tailed. ***p < .005, ** p < .05

### Table 3. Participants’ perceptions of perceived usefulness before and after the course (n = 145).

As shown in Table 4, the positive influence of the information literacy course on participants’ perceptions of information quality was evident in each indicator. Hence, Hypothesis 3 was supported. In a way, this outcome reflects the perceptions of usefulness that the Libraries Web portal leads to better research.

<table>
<thead>
<tr>
<th>Information Quality</th>
<th>Pre-course survey</th>
<th>Post-course survey</th>
<th>t</th>
<th>p*</th>
</tr>
</thead>
<tbody>
<tr>
<td>sufficient information</td>
<td>3.77 1.02</td>
<td>4.03 0.84</td>
<td>2.94***</td>
<td>0.002</td>
</tr>
<tr>
<td>accurate information</td>
<td>4.05 1.03</td>
<td>4.26 0.92</td>
<td>2.12**</td>
<td>0.018</td>
</tr>
<tr>
<td>up-to-date information</td>
<td>3.89 1.00</td>
<td>4.28 0.84</td>
<td>4.18***</td>
<td>0.000</td>
</tr>
<tr>
<td>timely information</td>
<td>3.81 1.02</td>
<td>4.14 0.93</td>
<td>3.49***</td>
<td>0.001</td>
</tr>
<tr>
<td>information that is helpful</td>
<td>4.03 1.01</td>
<td>4.25 0.70</td>
<td>2.51**</td>
<td>0.007</td>
</tr>
</tbody>
</table>

*One-tailed. ***p < .005, ** p < .05

### Table 4. Participants’ perceptions of information quality before and after the course (n = 145).

Positive changes in participants’ perceptions of system quality after course instruction were also observed in all of the indicators (see Table 5). These positive associations echo prior studies on the relationship between training and system acceptance (e.g., Santhanam & Sein, 1994; Venkatesh, 1999). Instruction bridges the gap of mental models between participants and the Libraries Web portal. As a result, participants could better appreciate the design logic, and the layout of the University Libraries Web portal more than before taking the course. Thereby, Hypothesis 4 was supported.
The information literacy course notably raised the level of participants’ satisfaction (see Table 7). Shachak and Fine (2008) indicate that user training not only enables users to become experienced in using the information systems but also shapes their perceptions. This positive outcome might be due to the fact that instruction helped participants get familiar with the functions/features of the Libraries Web portal and shortened their learning curves. Thus, Hypothesis 6 was supported.

**Table 7. Participants’ satisfaction towards the Libraries Web portal before and after the course (n = 145).**

<table>
<thead>
<tr>
<th>Satisfactorily</th>
<th>Pre-course survey</th>
<th>Post-course survey</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>efficient</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>effective</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>satisfied</td>
<td></td>
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</tr>
</tbody>
</table>

*One-tailed. ***p < .005, ** p < .05

The Impact of Information Literacy Course on Participants’ Use of the University Libraries Web Portal

Participants’ use of the Libraries Web portal was examined from multiple angles. Statistically significant differences were non-existent in both frequency and duration. Possible explanations for no increase in these two dimensions could be: availability of alternative tools, such as Internet search engines and public Web portals; and limited number of assignments required participants to use the Libraries Web portal.

On the other hand, instruction exhibited a strong positive influence on most of the indicators of purposes (see Table 8). As each purpose might require multiple activities to fulfill, frequencies of tasks performed relevant to these purposes (i.e., find books, find journals, find articles, retrieve course readings on electronic reserves, look up citation guides, take library virtual tours, and use e-mails for research assistance) also showed statistically significant increases. Hence, Hypothesis 7 was partially supported.

**Table 8. Participants’ purposes of using the Libraries Web portal before and after the course (n = 145).**

<table>
<thead>
<tr>
<th>Purpose</th>
<th>Pre-course survey</th>
<th>Post-course survey</th>
<th>t</th>
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<td>Fact Finding</td>
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<td>Assignments</td>
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<td>In-depth Research</td>
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<td>Transactions</td>
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<td>Communications</td>
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*One-tailed. ***p < .005, ** p < .05
CONCLUSION
This current study explored the effect of a credit-bearing information literacy course on undergraduate students’ perceptions and use of the University Libraries Web portal. The outcome, to a great extent, resonates with prior studies that user training can shape user beliefs, foster favorable attitudes, and facilitate use. The fact that this 3-credit course exerts positive influences on PEOU, information quality, system quality, satisfaction, as well as the purpose and task dimensions of use sends out a strong signal that integrating information literacy instruction into credit-bearing courses can help facilitate the acceptance of the Libraries Web portal among undergraduates. Yet, based on the findings of this study, user education alone cannot fully affect users’ perceptions. Intuitive, interactive, and responsive online support and services have to be in place to cultivate positive user experiences and attitudes.

As the results signified an increase in user satisfaction after the course instruction, the next step is to follow-up with participants to determine if higher user satisfaction leads to more use and vice versa. This is an area lacking empirical research, and remains unexplored in the academic library setting. Additionally, developing a conceptual model to examine the dynamic relationships among the constructs would allow the researcher to identify factors influencing undergraduates’ use patterns of the Libraries Web portal. The discovery resulting from the intended research could help library practitioners address issues deterring patrons from visiting their library Web portals and formulate strategies for promoting use.

REFERENCES


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**APPENDIX**

1. What is your gender?
2. What year are you in?
3. Are you a first semester transfer student?
4. What is your major or intended major?
5. Perceived Ease of Use
   - I find it easy to use the Libraries’ Web portal to find the information I need online.
   - The organization of information on the Libraries’ Web portal is easy to understand.
   - The Libraries’ Web portal is easy to navigate.
6. Perceived Usefulness
   - Using the University Libraries’ website provides me with information that would lead to better research.
   - Using the Libraries’ Web portal makes it easier for me to do my assignments and prepare for examinations.
   - Using the University Libraries’ Web portal increases my academic performance.
   - Using the Libraries’ Web portal increases my productivity.
7. Information Quality
   - The Libraries’ Web portal provides sufficient information to accomplish your task.
   - The Libraries’ Web portal provides accurate information.
   - The Libraries’ Web portal provides up-to-date information.
   - The Libraries’ Web portal provides timely information.
   - The Libraries’ Web portal provides information that is helpful.
8. System Quality
   - The Libraries’ Web portal is always available.
   - The Libraries’ Web portal displays information quickly.
   - Steps to complete a task in the Libraries’ Web portal follow a logical sequence.
   - Layout of the Libraries’ Web portal is clear and consistent.
9. Service Quality
   - The Libraries’ Web portal provides quick responses to library service requests I make.
   - The Libraries’ Web portal has a good interface to communicate my needs.
   - It is easy to get online assistance when I have trouble finding information using the Libraries’ Web portal.
10. Satisfaction
    - The Libraries’ Web portal is efficient.
    - The Libraries’ Web portal is effective.
    - Overall I am satisfied with the Libraries’ Web portal.
11. How often do you use the University Libraries’ Web portal for each of the following purposes?
    - Fact finding
    - Assignments
    - In-depth research
    - Transactions (e.g., placing an online request for interlibrary loan)
    - Communications (e.g., using e-mail, Instant Messenger for research assistance)
12. How many times per week do you use the University Libraries’ Web portal?
13. How many hours per week do you use the University Libraries’ Web portal?
14. How often do you use the University Libraries’ Web portal to perform each of the following tasks?
    - Find books on a specific topic
    - Find journals in print and electronic formats
    - Find full-text journal articles
    - Retrieve readings on electronic reserve
    - Look up an online encyclopedia or dictionary
    - Sign up for training courses provided by the Interactive Media Center
    - Renew books online
    - Have the Libraries scan an article and deliver it to you electronically
    - Look up library hours
    - Use IM to ask a research question
    - E-mail a librarian your research questions