

Factors Affecting the Adoption of Online Library Resources by Business Students

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The overall goal of this study is to explain how information literacy instruction (ILI) influences the adoption of online library resources (OLR) by business students. A theoretical model was developed that integrates research on ILI outcomes and technology adoption. To test this model, a web-based survey, which included both closed and open-ended questions, was administered to 337 business students. Findings indicate that the ILI received by students is beneficial in the initial or early stages of OLR use; however, students quickly reach a saturation point where more instruction contributes little, if anything, to the final outcome, such as reduced OLR anxiety and increased OLR self-efficacy. Rather, it is the independent, continuous use of OLR after receiving initial, formal ILI that creates continued positive effects. Importantly, OLR self-efficacy and anxiety were found to be important antecedents to OLR adoption. OLR anxiety also partially mediates the relationship between self-efficacy and perceived ease of use. Implications for theory and practice are discussed.

Introduction

Information is a vital resource for businesses and organizations. The ability of knowledge workers to find, retrieve, analyze, and use information, both effectively and efficiently, is seen as a necessary set of skills for employees to have. Collectively, these abilities are known as information literacy skills.

Many business schools today, in response to international accreditation standards, are starting to recognize the explicit need to train their students how to locate, access, and interpret information from a wide variety of information sources (Detlor, Julien, Willson, Serenko, & Lavallee, 2011). Business schools are becoming more aware that their students will need to utilize information for knowledge-building and decision-making purposes after they graduate. Importantly, business schools are starting to recognize that in today's Internet-enabled world, many of these information sources exist in digital form. For that reason, business schools are starting to place more emphasis on training their students to be proficient at utilizing information technology tools that provide access to electronic information sources; many such sources are available through the university's online library resources (e.g., databases, indexes, journal suites, online catalogs, library portals, etc.).

The importance of information to businesses is easy to understand when it is recognized that information and decision making are intertwined. People are only able to make informed decisions when they have relevant and accurate information. In the same manner, businesses are only able to make effective decisions on an ongoing basis when their processes are able to supply information regularly and cost-effectively. Information is the fuel for effective decision making. Therefore, it behooves business schools and organizations to train and educate their students and employees to become information literate, which means having "the ability to recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information" (American Library

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Association, 1989). The teaching of information literacy skills is called information literacy instruction (ILI). In business schools, ILI is usually tied to instruction on the use of online library resources (OLR).

OLR are the content stored in digital library repositories and the information systems that allow people to search and retrieve that content. OLR include any items accessible by electronic means through academic library websites, as well as the technology that makes those items accessible. Examples of OLR include the online library catalog, the library website itself, digital books, electronic journals and articles, online magazines, online newspapers, theses and dissertations in digital form, and electronic databases such as Business Source Complete, Factiva, and Web of Science.

Though business schools are keen to offer ILI to their students, the best way to go about this is unclear. Several factors that influence student learning outcomes of ILI in business schools have been identified, but more research is needed to demonstrate and validate these factors (Detlor et al., 2011; Julien, Detlor, Serenko, Willson, & Lavallee, 2011; Serenko, Detlor, Julien, & Booker, 2012). Of particular interest is the influence of the amount of ILI received on the adoption and use of OLR.

Universities have invested large sums of money to obtain and maintain OLR. In 2008, academic libraries in the United States spent approximately \$1 billion on subscriptions to electronic serials and \$133.5 million on electronic books, serial backfiles, and other electronic materials (Phan, Hardesty, Scheckells, & Davis, 2009). Yet, many students entering higher education institutions lack proficiency in information literacy skills, and generally are unaware of this deficiency of skills (Gross & Latham, 2012). As a result, they eschew the use of OLR in favor of less credible but easier-to-find Internet-based resources (Davis & Cohen, 2001; Grimes & Boening, 2001; Gross & Latham, 2011; Metzger, Flanagan, & Zwarun, 2003; Thompson, 2003). Although the adoption of OLR by students is considered important, the factors that influence adoption are not well understood. Previous studies have investigated the adoption and use of library websites and digital libraries—not OLR specifically. Most focused on the technical aspects of the system interface (Ramayah, 2006; Thong, Hong, & Tam, 2002). Only a few looked at individual differences such as self-efficacy (Ramayah & Aafaqi, 2004) or investigated the effects of individual factors, personality traits, and system characteristics on digital library use (Nov & Ye, 2008). One studied the influence of service and task functionality on satisfaction and intention to use an academic library website (Heinrichs, Lim, Lim, & Spangenberg, 2007), but none examined the influence of instruction on OLR adoption. In fact, there has been a call for research that identifies the impact of training on technology acceptance (Venkatesh & Bala, 2008).

Given the above, this study seeks to answer the following high-level research question: What is the impact of ILI on the adoption of OLR by business students?

Literature Review and Model Development

Few executives yet know how to ask: What information do I need to do my job? When do I need it? From whom should I be getting it?

Peter Drucker (1992, p. A16)

What Is Information Literacy?

In the context of business, information literacy skills have been defined as “the ability to effectively and efficiently access and evaluate information for problem solving and decision making” (Hawes, 1994, p. 6). The American Library Association defines information literacy as a set of abilities that enable people to “recognize when information is needed and have the ability to locate, evaluate and use effectively the needed information” (American Library Association, 1989). Information literacy skills are the “foundation for the development of higher-level thinking and evaluative skills” (Orr, Appleton, & Wallin, 2001, p. 459) and believed to foster deep rather than surface learning (Bruce, 2004). Information literacy is a keystone to academic attainment and lifelong learning (Kurbanoglu, 2003) and is essential to success in school, the workplace, and our personal lives (Gross & Latham, 2007). Those who do not have information literacy skills are on the disadvantaged side of the digital divide. Consequently, information literacy is viewed “a practical necessity and a moral right” (Bawden, 2001, p. 232).

Unfortunately, not all people possess adequate information literacy skills. For example, students tend to enter college without adequate information literacy skills (Gross & Latham, 2007, 2012). This fact is demonstrated by people’s information-seeking habits. Typically, people use the most convenient method to quickly find any related information they need (Urquhart & Rowley, 2007). Most people prefer to use the Internet when they need information (Dewald, 2005; Johnson & Rader, 2001) and evaluate it superficially (Grimes & Boening, 2001).

The urgent requirements for information literacy skills create a strong need for ILI (Cooney & Hiris, 2003; Hawes, 1994). Research has linked ILI with beneficial outcomes in many business disciplines. For example, students who receive ILI improve their research skills (Rutledge & Maehler, 2003), become more familiar with peer-reviewed publications (Cunningham & Anderson, 2005), efficiently retrieve information and apply it for problem solving (Atwong & Heichman Taylor, 2008), and hone their communication skills (McInnis Bowers et al., 2009). However, previous research has not investigated the adoption of OLR as an outcome of ILI. This area of inquiry requires attention.

Online Library Resources Adoption

One of the key outcomes of ILI is the use of OLR. The technology acceptance model (TAM) is the most widely

used model for explaining and predicting the adoption and use of an information or computer technology. It suggests that behavioral intentions to use a technology are influenced by two key variables: perceived usefulness, defined as “the degree to which a person believes that using a particular system would enhance his or her job performance”; and perceived ease of use, defined as “the degree to which a person believes that using a particular system would be free of physical and mental effort” (Davis, 1989, p. 320). Perceived ease of use also affects perceived usefulness.

TAM has many characteristics that make it popular. First, it is simple (Legris, Ingham, & Colletette, 2003) yet robust (King & He, 2006). Second, TAM is versatile. It has been used to predict the adoption and use of a wide range of technologies including e-Commerce (Huang, 2008), e-Learning tools (Chang & Tung, 2008; Martinez-Torres et al., 2008), ERP systems (Amoako-Gyampah & Salam, 2004; Bueno & Salmeron, 2008), m-Commerce (Wong & Hsu, 2008), online auctions (Stern, Royne, Stafford, & Bienstock, 2008; Turel, Serenko, & Giles, 2011), and wireless technologies (Kim, 2008). Last, TAM is adaptable and customizable. It can be extended by adding external variables (King & He, 2006; Wixom & Todd, 2005). All of these features—simplicity, versatility, and extendability—make TAM well suited to the study of the adoption and use of OLR.

Although TAM-based publications could fill volumes, there are opportunities for more work. There are still gaps in TAM research (Legris et al., 2003). Particularly, TAM research should investigate the effectiveness of training in influencing technology adoption processes (Venkatesh & Bala, 2008). To date, no research has been undertaken that investigates ILI as a predictor of the adoption of OLR.

In addition to the amount of ILI, OLR self-efficacy and OLR anxiety are important variables that serve as antecedents to TAM constructs. Self-efficacy is “beliefs in one’s capabilities to organize and execute the courses of action required to produce given attainments” (Bandura, 1997, p. 3). Self-efficacy is not a universal phenomenon that applies to every situation, nor is it a phenomenon for which a general measure can be used. An individual can have a high level of self-efficacy in one domain and a low level of self-efficacy in another. Therefore, “scales of perceived self-efficacy must be tailored to the particular domain of functioning that is the object of interest” (Bandura, 2006, pp. 307–308). Consequently, a measure of OLR-specific self-efficacy must be employed. Accordingly, OLR self-efficacy is defined as an individual’s beliefs in his or her capabilities to organize and execute the courses of action required to utilize OLR.

Self-efficacy plays an important role in determining performance outcomes and success in learning. For example, self-efficacy has an effect on work performance improvement (Stajkovic & Luthans, 1998) and engagement in academic activities (Moos & Azevedo, 2009). Therefore, improvement in self-efficacy is a desirable learning outcome that may be achieved by means of ILI.

OLR anxiety has not been studied before, but two closely related forms of anxiety have been documented. First, computer anxiety, which is the fear or apprehension experienced by a person when using computers or when considering the possibility of computer use, has been studied quite extensively. Second, library anxiety has received considerable attention (Jiao, Onwuegbuzie, & Lichtenstein, 1996; Mellon, 1988; Onwuegbuzie, 1997). Library anxiety—defined as negative feelings about using an academic library (van Scoyoc, 2003)—was first documented in the seminal work of Mellon (1986), who demonstrated its existence, causes, and impact on academic performance. Because people are known to be anxious about using computers and libraries, it is natural to expect that individuals will be anxious about using OLR. Given these definitions, OLR anxiety is defined as a marked and persistent fear cued by the use of OLR or the anticipated use of OLR, which causes the use of OLR to be avoided or endured with distress.

Both library anxiety and computer anxiety are too broad to be applied directly to the phenomenon of OLR anxiety. Library anxiety has been identified as having five dimensions: (a) barriers with staff (i.e., students’ perceptions that the library staff are unapproachable), (b) affective barriers (i.e., students’ perceptions that their library skills are inadequate), (c) comfort with the library (i.e., students’ perceptions that the library is a safe and comfortable working environment), (d) knowledge of the library (i.e., students’ familiarity with the library), and (e) mechanical barriers (i.e., students’ beliefs that they can use library equipment; Jiao & Onwuegbuzie, 1997). Computer anxiety has been found to have three dimensions including anxiety, computer liking, and confidence (Loyd & Gressard, 1984), which do not relate to OLR specifically.

Even though library anxiety and computer anxiety do not apply directly to OLR anxiety, a compelling image of OLR anxiety can be formed by examining these concepts. Computer anxiety results in the avoidance of computers, excessive caution with computers, negative remarks about computers, effort to cut short the use of computers, lowered expectations of performance, reduced confidence, unpleasant body sensations, negative evaluations, debilitating thoughts, and longer times to complete tasks (Heinssen, Glass, & Knight, 1987). Students who are high in computer phobia are less likely to maximize their use of computers (McIlroy, Sadler, & Boojawon, 2007). Similarly, library anxiety is typified by tension, fear, uncertainty, helplessness, self-defeating thoughts, and mental disorganization (Jiao et al., 1996). Students experiencing OLR anxiety may make negative remarks about using OLR, take longer to complete tasks, or minimize their usage time. In stronger cases, they may experience bodily sensations such as sweaty palms and heart palpitations. Some students may experience feelings of helplessness or uncertainty, or intrusive self-doubting thoughts while using or contemplating the use of OLR. OLR anxiety may cause students to divert their attention away from the task at hand toward coping

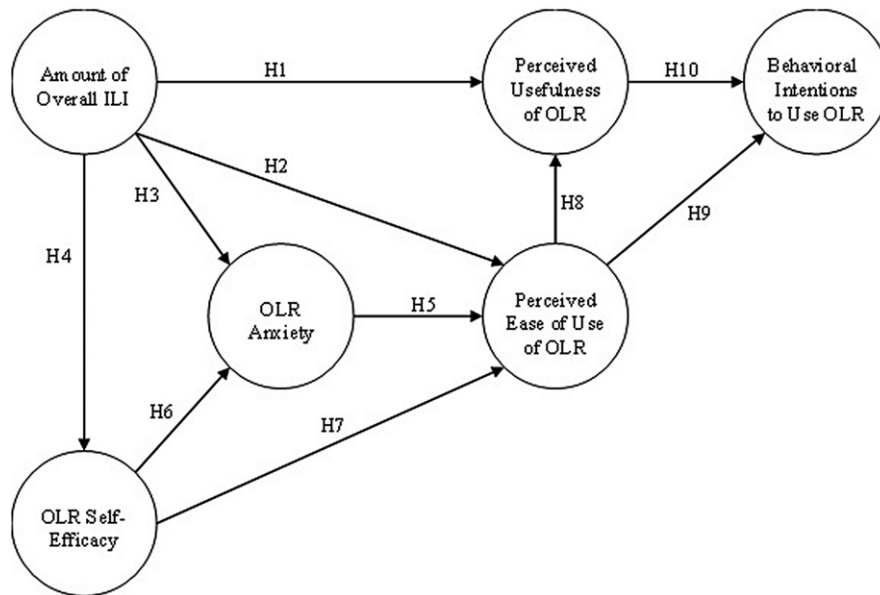


FIG. 1. The proposed model.

with their anxiety. Overall, it may act as a barrier to academic success.

Overall, it is concluded that TAM is a useful lens of analysis to investigate the adoption of OLR. The amount of ILI and the degree of OLR self-efficacy and OLR anxiety are external variables (i.e., from TAM's perspective) that warrant further exploration. These constructs are utilized in the development of the study's model and related hypotheses, presented below.

Model and Hypotheses

Based on the extant literature, the following model is suggested (see Figure 1). TAM is represented by three constructs—perceived usefulness, perceived ease of use, and behavioral intentions to use OLR—and three paths.

In this model, ILI exerts its influence on OLR adoption through perceived usefulness and perceived ease of use of OLR. These relationships make intuitive sense. Students will perceive a technology to be more useful after they have been shown all of the benefits that the technology provides. For example, when students have been demonstrated all the features of OLR and all the information contained in the various databases, they should find OLR more useful. Instruction that is designed to facilitate the use of a technology will cause students to perceive the technology easier to use. After business students have been trained to use OLR, they should find OLR easier to use. For example, they should find it easier to develop and execute search strategies and to find and retrieve information from OLR once they have developed information literacy skills. The research model presents these ideas as relationships between the amount of ILI and the perceived usefulness of OLR, and between the amount of ILI and perceived ease of use of OLR. Therefore,

H1: The amount of ILI received has a positive direct effect on perceived usefulness of OLR.

The model also assumes the relationship between ILI and perceived ease of use because there is evidence supporting this link. For example, Detlor et al. (2011) conducted interviews at three business schools and found that ILI resulted in a reduction in effort and time to find information. Thus,

H2: The amount of ILI received has a positive direct effect on perceived ease of use of OLR.

Previous research within the information systems and the library and information sciences disciplines has found that relevant training reduces computer anxiety (Igbaria, 1993) and library anxiety (Mark & Jacobson, 1995). Accordingly,

H3: The amount of ILI received has a negative direct effect on OLR anxiety.

Instruction also improves students' self-efficacy (Gist, 1987). For example, Ren (2000) found that electronic information search self-efficacy is significantly higher after receiving library instruction. Monoi, O'Hanlon, and Diaz (2005) assessed the influence of ILI on online searching self-efficacy by administering a test before and after an online research skills course. They reported that the students' self-efficacy was significantly higher at the end of the course. Therefore,

H4: The amount of ILI received has a positive direct effect on OLR self-efficacy.

Negative emotions are a deterrent to technology adoption. Anxiety forces technology users to divert attention away from the task at hand, creates self-deprecating thoughts, and discourages users from persisting in utilizing a technology

long enough to master its use. These diversions reduce users' perceived ease of use of an information system (Saade & Kira, 2007; Venkatesh, 2000) and digital libraries (Nov & Ye, 2008). Thus,

H5: OLR anxiety has a negative direct effect on perceived ease of use of OLR.

Social cognitive theory conceptualizes self-efficacy and anxiety as reciprocal determinants of each other (Bandura, 1986). In prior studies, the relationship between self-efficacy and anxiety was modeled with self-efficacy as a determinant of anxiety (Compeau & Higgins, 1995) and also with anxiety as a determinant of self-efficacy (Thatcher & Perrewé, 2002). In this model, it is expected that students have higher levels of OLR anxiety early on. ILI, therefore, has an influence on OLR self-efficacy, and it is the increase in self-efficacy which brings about a reduction in anxiety. Therefore,

H6: OLR self-efficacy has a negative direct effect on OLR anxiety.

The relationship between self-efficacy and perceived ease of use of technology is well established in various contexts (Ong, Lai, & Wang, 2004), including digital libraries (Nov & Ye, 2008; Thong et al., 2002). In the suggested model, self-efficacy partially mediates the influence of anxiety on perceived ease of use. Thus,

H7: OLR self-efficacy has a positive direct effect on perceived ease of use of OLR.

The relationships among the TAM constructs are well supported by a large number of studies (King & He, 2006). These relationships have also been confirmed in the context of library website use (Ramayah & Aafaqi, 2004). Perceived ease of use has a direct effect on perceived usefulness; perceived ease of use has a direct effect on behavioral intentions (Ramayah, 2006); and perceived usefulness has an impact on behavioral intentions (Thong et al., 2002). Therefore,

H8: Perceived ease of use has a positive direct effect on perceived usefulness of OLR.

H9: Perceived ease of use has a positive direct effect on behavioral intentions to use OLR.

H10: Perceived usefulness has a positive direct effect on behavioral intentions to use OLR.

Methods

Instrument

Recall that the theoretical model consisted of six constructs: (a) amount of ILI, (b) OLR anxiety, (c) OLR self-efficacy, (d) perceived usefulness, (e) perceived ease of use, and (f) intentions to use OLR.

To measure the amount of ILI received, students were presented with a list of preidentified courses that had an ILI component and asked to simply identify which courses

they had taken and the year in which they took these courses. Bear in mind, the librarians, who keep track of all information literacy activities in the business school, had earlier provided the researchers with a breakdown of the minutes spent teaching information literacy competencies in each course in each year. This information was used to create a table representing the amount of ILI received in each course. The table was used to translate the students' self-report of the courses they had taken into a measure of the minutes of ILI they received. For example, if students indicated that they took two courses, the total minutes of instruction provided in each course were added together to obtain an approximate measure of an overall amount of ILI received.

In addition, the literature suggests that there are two modes of instruction: active and passive. The active mode of instruction seeks to make students participants in the learning process by having them engage in activities that require the use of higher-order thinking skills such as analysis, synthesis, and evaluation. Some examples of activities commonly used in active instruction include reading, writing, analyzing, and discussing (Allen, 1995; Bonwell & Eison, 1991; Prince, 2004). The passive mode is typified by the traditional lecture-based instruction familiar to most university students where the instructor conveys information to the students, who passively listen to the lecture and look at slides. The passive mode of instruction seeks to impart knowledge to students (Whetten & Campell Clark, 1996).

Regrettably, the influence of these two modes of ILI on learning outcomes is not fully understood. No prior studies have investigated the effect of these two modes of instruction on the adoption of OLR. In response, the ILI data in this study were decomposed into minutes of active ILI and passive ILI received based on the input given to the researchers from the librarians.

Because the existing instruments used to capture computer anxiety, Internet anxiety, and library anxiety were deemed to be inappropriate for this study, a new instrument was developed to measure OLR anxiety. The method used to capture OLR anxiety was slightly different from those used in prior studies. Instead of measuring the different aspects of anxiety, such as fear, apprehension, hesitation, or intimidation, this study assessed the anxiety associated with a specific set of library skills. Seven skills were identified from the SAILS (Standardized Assessment of Information Literacy Skills; see <https://www.projectsails.org> for detail) test. They include

1. Selecting finding tools. Selecting finding tools is about choosing indexes, databases, and collections. To select finding tools, an information-literate person has to be knowledgeable about information sources that are suited to the information problem.
2. Searching. Searching is about using the search features of information resources (such as OLR) to locate information. To search effectively, it is necessary to

understand how to use a controlled vocabulary, subject- or discipline-related terminology, and Boolean logic.

3. Using finding tool features. An information-literate person should be able to use the help functions, basic and advanced search capabilities, field searches, etc., of information sources.
4. Retrieving sources. Retrieving sources is about obtaining information sources after they have been identified and located. Traditionally, this meant using a call number to locate a printed item on a library shelf. In the context of OLR, retrieving sources usually means downloading an article or its citation file from a database.
5. Evaluating sources. An information-literate person should be able to evaluate information sources before relying upon them.
6. Documenting sources. Documenting sources relates to citing sources appropriately by knowing which citation styles are accepted by various groups, selecting an appropriate citation style, and citing different types of sources (journal articles, books, book chapters, etc.) correctly and consistently.
7. Understanding economic, legal, and social issues. This category involves understanding when it is economical, legal, and socially appropriate to use information. For instance, an information-literate person should understand issues related to intellectual property, copyright, ethics, and fair usage.

Note that the SAILS instrument tests eight skills. However, one of them (i.e., developing a research strategy) is not applicable to OLR because it tests students' general research abilities, which are not related to their information literacy skills. As such, a question was designed to capture a respondent's level of anxiety with each of the seven remaining skills tested in SAILS.

The instrument to measure OLR self-efficacy was developed by following Bandura (2006), who indicated that self-efficacy is multifaceted, the tasks should represent a graduation of challenge or impediments, and the construction of a self-efficacy scale requires "a good conceptual analysis of the relevant domain of functioning" (p. 310). Consequently, self-efficacy scales should reflect the multiple dimensions of the issue under consideration. In the case of OLR self-efficacy, the domain of skills required has been well established in the information literacy standards, ranging from simple skills (such as searching for and retrieving documents) to higher-order thinking skills (such as evaluating sources and understanding social issues associated with the use of information). The respondents were presented with a specific set of tasks and asked to assess their level of confidence in their ability to perform these tasks. The tasks were based on the categories of information literacy skills identified by the SAILS test.

The scales measuring perceived usefulness, perceived ease of use, and behavioral intentions to use OLR were adapted from Davis (1989) and are considered reliable and valid. For this, the term "online library resources" was used as an information technology artifact; "academic performance" and "course work" were used as examples of the

area of application. For instance, Davis's perceived usefulness question, "Using WriteOne would improve my performance in the MBA program" was adapted as "Using online library resources improves my academic performance." This adaptation approach is consistent with previous TAM-based empirical studies (e.g., see Venkatesh & Davis, 2000). The questionnaire also included four demographic variables: (a) gender, (b) year of study, (c) concentration of study, and (d) academic achievement.

Although the hypotheses developed for this study are well supported by previous research, the novelty of the OLR anxiety and self-efficacy constructs warrants further examination. Open-ended questions enable researchers to capture the points of view of the respondent without predetermining response categories (Patton, 1990). Two qualitative questions were designed for each of the OLR anxiety and self-efficacy constructs to facilitate the interpretation of the quantitative results. The questions were kept broad to give respondents the greatest latitude in interpreting the questions and shaping their responses. Because the studied phenomenon was new, it was expected that qualitative data would clarify the patterns found in quantitative data.

The survey instrument was face-validated by a team of doctoral students, librarians, faculty, ILI experts, and undergraduate students. They commented on the clarity of the questions employed, the reading level, the ease of use of the survey, the appropriateness of the response formats, the survey completion time, and whether the entire domains of the constructs were represented by the questions. Based on their feedback, some adjustments were done. The instrument is given in the Appendix.

Sample

The data for this study were collected using a web-based survey of 337 undergraduate business students of a North American university. This is an advantageous approach because online surveys are fast, inexpensive, convenient for respondents, easy to administer, and media rich.

This target population was ideally suited to the study of the adoption and use of OLR by business students. The business school is accredited by the Association to Advance Collegiate Schools of Business (AACSB) and offers programs at the undergraduate, graduate, and doctoral levels. The school has a business library committed to improving ILI for business students. Business students have access to excellent OLR. The university libraries have nearly 1.465 million print monograph titles, 369,000 electronic monographs, and 66,000 electronic serials. All undergraduate business students are exposed to ILI, which is delivered by several instructors and is held as independent sessions or part of business courses.

Respondent recruitment was guided by Dillman's (1999) tailored design survey method adapted for the modern era. An e-mail invitation was sent to all 2,049 undergraduate students in the business school, followed by three follow-up

TABLE 1. Count of survey responses by phase.

Phase	Number of responses	Cumulative responses
Initial invitation	161	161
Reminder 1	46	207
Reminder 2	75	282
Reminder 3	55	337
Total	337	337

reminders. The incentive prize consisted of 100 randomly distributed \$50 gift certificates.

Results

Three hundred thirty-seven usable responses were gathered, a response rate of 16.4% (see Table 1). There was the same number of female and male respondents: 25% were in year 1; 24% in year 2; 32% in year 3; and 19% in year 4. They majored in accounting (35%), finance (21%), marketing (19%), human resources (7%), general management (2%), information systems (1%), and operations research (1%). Fourteen percent were still undecided on their major. The demographics from the sample were compared with student demographic information from the business school to ensure sample representativeness. Despite some minor differences, the obtained sample is a fair representation of the population of students at the business school.

The Measurement Model

The quantitative examination proceeded in two steps. First, the measurement model was assessed for validity and reliability. Second, the structural model was estimated.

Common method bias, which is a form of systematic error overstating the actual interconstruct correlation that occurs when constructs are measured using the same method (Podsakoff, MacKenzie, Jeong-Yeon, & Podsakoff, 2003), was assessed by means of Harman's (1967) one-factor test. If common method bias is present, all indicators load on a single factor accounting for the majority of the variance (Malhotra, Kim, & Patil, 2006). An exploratory factor analysis was undertaken on 22 items. The two behavioral intention items were excluded because they are the ultimate dependent items in the model and are expected to correlate heavily with perceived usefulness and perceived ease of use. Six items with an eigenvalue of greater than 1 emerged, with the first factor explaining only 30% of the variance. No single factor that accounted for the majority of the variance appeared. Consequently, common method bias is unlikely to be a concern for this study.

Table 2 presents measurement items descriptive statistics and reliability assessment. All item loadings were statistically significant (at the lowest *t*-value of 6.042) and exceeded a recommended cutoff point of 0.7, which is required to explain at least 50% of construct variance.

TABLE 2. Descriptive statistics and reliability assessment for the measurement items.

Item	<i>M</i>	<i>SD</i>	Loading	Error	Item-total correlations	<i>t</i> -value
OLRAX1	3.08	1.44	0.863	0.078	0.807	11.499
OLRAX2	3.09	1.41	0.879	0.076	0.810	14.384
OLRAX3	3.14	1.45	0.885	0.079	0.823	15.228
OLRAX4	3.13	1.49	0.899	0.081	0.849	14.024
OLRAX5	3.29	1.51	0.852	0.082	0.819	13.479
OLRAX6	3.48	1.56	0.750	0.086	0.738	6.550
OLRAX7	3.42	1.56	0.736	0.086	0.722	6.287
OLRSE1	5.55	1.07	0.854	0.059	0.801	20.618
OLRSE2	5.47	1.08	0.887	0.059	0.842	20.135
OLRSE3	5.57	1.08	0.863	0.058	0.794	20.094
OLRSE4	5.53	1.10	0.881	0.060	0.819	19.171
OLRSE5	5.32	1.14	0.845	0.062	0.807	19.115
OLRSE6	5.15	1.19	0.739	0.066	0.738	11.308
OLRSE7	5.00	1.24	0.622	0.069	0.673	6.042
PEOU1	4.37	1.51	0.708	0.082	0.610	7.436
PEOU2	5.16	1.13	0.864	0.061	0.745	20.997
PEOU3	5.12	1.28	0.910	0.070	0.789	23.187
PEOU4	4.94	1.37	0.900	0.075	0.788	24.554
PU1	5.19	1.19	0.846	0.065	0.747	26.010
PU2	5.20	1.21	0.909	0.066	0.829	28.643
PU3	5.33	1.12	0.921	0.061	0.850	34.577
PU4	5.50	1.22	0.854	0.066	0.725	21.391
BI1	5.73	1.19	0.975	0.065	0.874	48.046
BI2	5.75	1.18	0.971	0.064	0.874	66.063

TABLE 3. Descriptive statistics and reliability/validity assessment for the constructs.

Constructs	<i>M</i>	<i>SD</i>	Cronbach's α	Composite reliability	AVE
Overall	58.52	22.08	<i>na</i>	<i>na</i>	<i>na</i>
Instruction (min)					
OLRAX	3.23	1.26	0.93	0.94	0.71
OLRSE	5.37	0.95	0.92	0.93	0.67
PEOU	4.89	1.13	0.88	0.92	0.73
PU	5.30	1.05	0.91	0.93	0.78
BI	5.73	1.15	0.94	0.97	0.95

Note. AVE = Average variance extracted, *na* = not applicable.

Corrected item-to-total correlations were very high, which further assures the reliability of the measures (Nunnally & Bernstein, 1994).

Table 3 shows construct descriptive statistics and reliability/validity assessment. All Cronbach's alpha measures exceeded the 0.8 value required for confirmatory research. The composite reliability and average variance extracted (AVE) values were above 0.7 and 0.5, respectively, as recommended by Fornell and Larcker (1981). Overall, both tables demonstrate an acceptable level of the psychometric properties of the measurement instrument. To test for discriminant validity of the measures, the matrix of cross-loadings was constructed. It is expected that all items load higher on their own factor than they cross-load on other unrelated factors. It was observed that all indicators loaded

TABLE 4. Matrix of loadings and cross-loadings.

	AILI	OLRAX	OLRSE	PEOU	PU	BI
Overall	1.000	0.025	0.022	-0.026	-0.071	-0.081
Instruction						
OLRAX1	0.059	0.863	-0.312	-0.342	-0.198	-0.299
OLRAX2	0.044	0.879	-0.349	-0.387	-0.224	-0.316
OLRAX3	0.060	0.885	-0.386	-0.406	-0.202	-0.276
OLRAX4	0.074	0.899	-0.316	-0.396	-0.199	-0.246
OLRAX5	-0.001	0.852	-0.347	-0.315	-0.181	-0.252
OLRAX6	-0.107	0.749	-0.243	-0.270	-0.132	-0.180
OLRAX7	-0.039	0.735	-0.262	-0.243	-0.139	-0.203
OLRSE1	-0.005	-0.381	0.855	0.564	0.452	0.434
OLRSE2	-0.003	-0.333	0.888	0.555	0.409	0.359
OLRSE3	0.002	-0.350	0.863	0.517	0.403	0.436
OLRSE4	-0.001	-0.370	0.881	0.575	0.407	0.458
OLRSE5	0.112	-0.310	0.845	0.531	0.377	0.330
OLRSE6	-0.009	-0.231	0.739	0.457	0.389	0.292
OLRSE7*	0.043	-0.142	0.622	0.351	0.302	0.234
PEOU1	0.057	-0.218	0.359	0.707	0.227	0.080
PEOU2	-0.050	-0.415	0.616	0.884	0.525	0.425
PEOU3	-0.018	-0.382	0.557	0.910	0.475	0.378
PEOU4	-0.036	-0.333	0.554	0.900	0.498	0.330
PU1	0.020	-0.125	0.398	0.433	0.846	0.515
PU2	-0.109	-0.207	0.432	0.540	0.907	0.572
PU3	-0.064	-0.209	0.452	0.481	0.922	0.630
PU4	-0.049	-0.227	0.412	0.419	0.855	0.718
BI1	-0.078	-0.291	0.452	0.390	0.700	0.975
BI2	-0.080	-0.301	0.429	0.364	0.649	0.971

Note. *Removed item.

TABLE 5. Discriminant validity assessment.

	OLRAX	OLRSE	PEOU	PU	BI
OLRAX	0.840				
OLRSE	-0.388	0.818			
PEOU	-0.415	0.630	0.854		
PU	-0.254	0.417	0.537	0.883	
BI	-0.302	0.401	0.422	0.727	0.973

Note. The diagonal elements are the square roots of the average variance extracted. The off-diagonal elements represent correlations between constructs.

heavily on their own factor, except OLRSE7 (see Table 4). A closer examination revealed that OLRSE7 represented students' self-efficacy with assessing the ethical use of information. Because the business librarians reported that they did not provide explicit instruction on the ethical use of information, it is reasonable to remove the OLRSE7 indicator. The same pattern of loadings and cross-loadings was observed after OLRSE7 was removed.

Table 5 presents additional measures of discriminant validity assessment (Gefen & Straub, 2005). To ensure discriminant validity, two conditions should be met: (a) the square root of the average variance extracted (on the diagonal) should exceed inter-item correlations, and (b) none of the inter-construct correlations should be over 0.8 (Fornell

& Larcker, 1981). Because both conditions were met, there is some degree of assurance in the discriminant validity of the constructs.

The Structural Model

SmartPLS version 2.0.M3 was used to assess the structural model (Chin, 1998). The significance of the path coefficients (i.e., *t*-values) was estimated using the bootstrapping technique with 700 samples (Efron & Tibshirani, 1998). Bootstrapping repetitively resamples with replacement to create an estimate of the distribution of a statistic (Mooney & Duval, 1993). Figure 2 presents the structural model; Table 6 outlines the results of hypotheses testing. First, as expected, the technology acceptance model explained a major portion of the variance in behavioral intentions to use OLR (i.e., 48%). Second, the effect of perceived ease of use on behavioral intentions was fully mediated by perceived usefulness of OLR. Third, self-efficacy reduces anxiety and augments the perceptions of ease of use. Anxiety, however, negatively affects ease of use perceptions. Fourth, none of the hypothesized relationships between the amount of ILI and the dependent variables were supported.

Recall that the amount of overall ILI consists of two components: the amount of active ILI and the amount of passive ILI. To further explore a potential effect of these instructional modes on the adoption of OLR, two additional PLS models were tested. In each of them, the amount of overall ILI was replaced with the amount of active and passive ILI, respectively. The results, however, did not change (see Table 7). No relationship between the amount of either active ILI or passive ILI and dependent variables was observed.

Mediation Analysis

Based on the structural model, OLR anxiety partially mediates the effect of OLR self-efficacy on perceived ease of use. This mediation effect was tested using three approaches: (a) Baron and Kenny's (1986) classic method, (b) the Sobel (1982) test, and (c) PLS (Bontis, Booker, & Serenko, 2007). Each method has its own advantages and limitations; the use of all three produces the most valid results.

Baron and Kenny's method was applied in four steps (Table 8). The first step showed that the independent variable was significantly related to the dependent variable. The second step revealed that the independent variable was significantly related to the mediator variable. The third step demonstrated that the mediator variable was significantly related to the dependent variable. The fourth step indicated that the relationship between OLR self-efficacy and perceived ease of use of OLR dropped from 0.687 to 0.602 after the mediator variable was included. This indicates that the relationship between OLR self-efficacy and perceived ease of use is partially mediated by OLR anxiety.

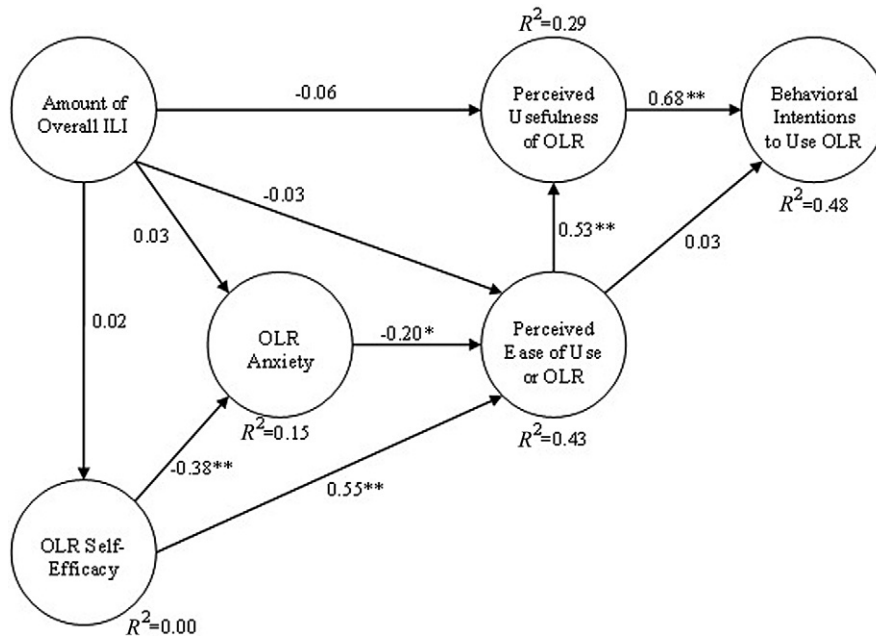


FIG. 2. The structural model (*- $p < 0.005$; **- $p < 0.001$).

TABLE 6. Hypotheses testing.

Hypothesis	Path	Beta	<i>t</i> -value	<i>p</i> -value	Result
H1	Amount of Overall ILI → PU	-0.06	1.262	<i>ns</i>	Rejected
H2	Amount of Overall ILI → PEOU	-0.03	0.456	<i>ns</i>	Rejected
H3	Amount of Overall ILI → OLRAX	0.03	0.424	<i>ns</i>	Rejected
H4	Amount of Overall ILI → OLRSE	0.02	0.390	<i>ns</i>	Rejected
H5	OLRAX → PEOU	-0.20	2.938	<0.005	Supported
H6	OLRSE → OLRAX	-0.38	5.782	<0.001	Supported
H7	OLRSE → PEOU	0.55	14.304	<0.001	Supported
H8	PEOU → PU	0.53	10.699	<0.001	Supported
H9	PEOU → BI	0.03	0.501	<i>ns</i>	Rejected
H10	PU → BI	0.68	13.424	<0.001	Supported

TABLE 7. Effect of the amount of active and passive ILI.

Path	Beta	<i>t</i> -value	<i>p</i> -value	Result
Amount of Active ILI → PU	-0.08	1.232	<i>ns</i>	Rejected
Amount of Active ILI → PEOU	-0.01	0.823	<i>ns</i>	Rejected
Amount of Active ILI → OLRAX	0.03	0.647	<i>ns</i>	Rejected
Amount of Active ILI → OLRSE	0.06	0.407	<i>ns</i>	Rejected
Amount of Passive ILI → PU	-0.02	0.325	<i>ns</i>	Rejected
Amount of Passive ILI → PEOU	-0.03	0.726	<i>ns</i>	Rejected
Amount of Passive ILI → OLRAX	0.02	0.478	<i>ns</i>	Rejected
Amount of Passive ILI → OLRSE	-0.02	0.295	<i>ns</i>	Rejected

Note. ILI = Information literacy instruction; *ns* = non-significant.

The Sobel test uses the multivariate delta method to derive the asymptotic variance of the indirect or mediated effect (MacKinnon, Warsi, & Dwyer, 1995). The Sobel test is a product of coefficients test. It is undertaken by conducting two regression analyses. First, a regression is undertaken

TABLE 8. Assessment of mediation using Baron and Kenny's four-step method.

Step	β	<i>p</i> -value
1. OLRSE → PEOU	0.687	0.000
2. OLRSE → OLRAX	-0.518	0.000
3. OLRAX → PEOU	-0.163	0.000
4. OLRSE → PEOU & OLRAX → PEOU	0.602	0.000

with the independent variable predicting the dependent variable. Second, a regression is undertaken with the independent variable and mediating variable predicting the dependent variable. The Sobel test assesses the significance of the mediation by taking the intervening variable effect (the beta of the first regression multiplied by the beta of the second regression) and dividing it by the standard error (MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002).

TABLE 9. Cross-tabulation effects of ILI on OLR anxiety.

Level of OLR anxiety	Effect of ILI on anxiety						Total (count / %)
	No effect	Somewhat reduced anxiety	Reduced anxiety	Much reduced anxiety	Increased anxiety	No response	
No anxiety	35	4	59	3	1	26	128 59%
Some anxiety	9	5	32	0	0	21	67 31%
Anxiety	5	2	10	1	1	2	21 9.5%
Strong anxiety	0	0	1	0	0	0	1 0.5%
Total (count / %)	49 29%	11 7%	102 61%	4 2%	2 1%	49	217 100%

The result of the calculation is compared to the standard normal distribution. The two-tailed test is undertaken to test the hypothesis that the mediated effect equals zero (Preacher, 2010). The Sobel test also revealed a partial mediation effect (OLRSE \rightarrow OLRAX \rightarrow PEOU: $a = -0.518$; $b = -0.163$; $Sa = 0.066$; $Sb = 0.040$; test statistic = 3.616; p -value = 0.000).

To perform the mediation analysis in PLS, a simple model was created that depicted a relationship between the independent variable and the dependent variable. Then, a second model was created that included the mediator variable. The two models were tested by using PLS. The path betas and R^2 were recorded. The t -values were used to assess the significance of the relationships. The results demonstrate that the R^2 of the mediated model was higher than that of the simple model (simple model $R^2 = 0.388$ vs. mediated model $R^2 = 0.422$). Therefore, OLR anxiety partially mediates the effect of OLR self-efficacy on perceived ease of use of OLR.

Open-Ended Questions Analysis

The coding method was based on the procedures recommended by Strauss and Corbin (1990). First, objects and items were labeled according to their qualities or characteristics. Second, conceptual ordering was performed by categorizing data into mutually exclusive and collectively exhaustive categories across multiple dimensions according to their attributes. For this, a classification scheme was developed and refined as coding progressed. Coding consisted of identifying the attributes of data followed by assigning labels, categorizing the data, and relating data to one another according to their attributes. Third, after the data were coded, categories were summarized and analyzed. The qualitative analysis was done by a single coder who had developed expertise in the information literacy field because he studied the information literacy literature for a number of years, authored several scholarly ILI publications, and was actively involved in this project. It was believed that he had sufficient knowledge to make sound

interpretations in his analysis of the data (i.e., he was theoretically sensitive, or theoretically primed, to the object of study). In qualitative data analysis, the coder's expertise in the domain under investigation is the key factor to ensure results validity. In addition, the textual responses were very concise, to the point, and easy to interpret.

To investigate OLR anxiety, the first open-ended question asked respondents to comment on their level and cause of anxiety. Most began their response by revealing their current anxiety level. The responses were coded into four categories: no anxiety, some anxiety, anxiety, and strong anxiety.

The second open-ended question asked how library instruction affected the respondents' level of OLR anxiety. The responses were categorized into five categories: no effect, somewhat reduced anxiety, reduced anxiety, much reduced anxiety, and increased anxiety. The answers were analyzed using frequency counts and cross-tabulations (Krippendorff, 1980) (see Table 9).

The analysis of the open-ended questions reveals that OLR anxiety is commonly experienced by business students. Although only 41% of respondents commented that they currently experienced anxiety, a majority of the remaining 59% reported that their anxiety had been reduced as a result of ILI. This indicates that they had previously experienced anxiety. When the respondents who had previously experienced OLR anxiety were added to the respondents who currently experience OLR anxiety, the proportion of respondents who ever experienced OLR anxiety rose to 71% (155 of 217). In other words, a large majority of business students experience OLR anxiety during their career at business school.

Analysis of the open-ended questions shows that ILI effectively diminishes OLR anxiety. Only 29% of the comments indicated that ILI had no effect on anxiety. The majority of respondents (70%) stated that ILI much reduced their level of OLR anxiety (2%), reduced their level of OLR anxiety (61%), or somewhat reduced their level of OLR anxiety (7%). Some representative excerpts are provided below:

TABLE 10. Selected sources of anxiety.

Task or activity	Count
Searching	19
Citing sources	14
Evaluating sources	7
Academic dishonesty or plagiarism	6
Selecting databases	5
Too much information / too complex	5
Selecting keywords	2

Before receiving instruction from the librarians, I was not aware of the amount of resources available for use at the library when completing essential assignments. After receiving instructions by the librarians, I became more capable at accessing these resources, which decreased my anxiety over the assignments that needed to be completed for my courses.

The instruction decreased my anxiety because they gave me the knowledge to be successful.

I am not anxious because I feel well informed about how to use the technology given to me and how to properly assess my findings.

It definitely decreased my anxiety. I feel a lot more comfortable using the online sources.

The respondents commented on the source of their anxiety. Some stated in general terms about being overwhelmed by the level of complexity of OLR. Others mentioned that they were generally comfortable using OLR, but felt anxiety when conducting specific tasks or activities. Most were able to identify one or more specific information literacy task that made them anxious (Table 10). It is interesting that the respondents felt comfortable or confident with some information literacy skills, but experienced anxiety with others. This suggests that OLR anxiety is a task-specific, distinct phenomenon.

Next, the questions related to OLR self-efficacy were analyzed. These questions were similar to the questions related to OLR anxiety. The first question solicited comments on the level of OLR self-efficacy. Most students revealed their current level of comfort or confidence. Their responses were labeled and classified into the following categories: not confident, somewhat confident, not fully confident, confident, and very confident. The second question asked how library instruction affected their level of comfort and confidence using online library resources. The responses were classified into four categories: no effect, somewhat increased OLR self-efficacy, increased OLR self-efficacy, and greatly increased OLR self-efficacy (see Table 11). A link between ILI and increased self-efficacy was established:

After being taught shortcuts and tips by the librarians, I am confident in my ability to use the online resources.

I'm comfortable with using library resources because, once again, I found the instruction in first year very helpful, and I also had much experience with it as well.

On the one hand, the results of the quantitative and qualitative parts of this study are somewhat contradictory. The written comments call into question the results of the quantitative model. The qualitative responses strongly support the influence of ILI on OLR self-efficacy and on OLR anxiety. On the other hand, the quantitative model found no statistical correlation between the amount of ILI and OLR self-efficacy and OLR anxiety. A detailed examination of the written responses revealed that many students mentioned not only ILI, but also their actual hands-on experience with OLR as a source for reduced anxiety and improved self-efficacy. Therefore, actual hands-on OLR experience emerged as an additional variable that was not envisioned during study design. For example, some students stated:

I am comfortable using the online resources because I have had more experience with them now.

I am very comfortable and confident because I watched the librarian show us how to use certain resources, and after using them over and over, I feel I can use them with no difficulty.

I learned general knowledge from the instruction sessions and have since then figured my own way around the resources.

A common theme was that the formal information literacy training (i.e., either active or passive) provided students with the initial knowledge and skills necessary to start using OLR. However, reduced anxiety and increased self-efficacy only occurred sometime later after students had a chance to independently and continually use OLR when working on individual assignments, group projects, reports, etc., that required the use of credible information sources:

During my first year these sessions increased my level of comfort when using these resources, but throughout my time at [university name] the sessions have become very repetitive; thus, there has been no real effect with my level of comfort and confidence.

The library instruction did boost my comfort and confidence using online library resources when I was in my first year. . . . Since then, I have found that I have used the library instruction much less (if at all) and have been able to better find relevant information on my own or with my group.

The following section elaborates on these unexpected findings in more detail.

Discussion

Recall that the overall purpose of this study is to explain how ILI influences the adoption of OLR by business students. For this, a mixed method approach was employed by soliciting responses from 337 undergraduate business students. Based on the findings, several implications emerged that warrant further discussion.

First, it was hypothesized that students would perceive OLR to be more useful (H1) and easier to use (H2) after they

TABLE 11. Cross-tabulation—effects of ILI on OLR self-efficacy.

Level of OLR self-efficacy	Effect of ILI on self-efficacy					Total (count / %)
	No effect	Somewhat increased self-efficacy	Increased self-efficacy	Greatly increased self-efficacy	Unclear effect	
Not confident	4	0	6	0	11	21 11.0%
Somewhat confident	0	1	0	0	1	2 1.0%
Not fully confident	1	0	14	0	9	24 12.6%
Confident	14	3	77	1	36	131 68.6%
Very confident	2	0	7	0	4	13 6.8%
Total (count / %)	21 (16.2%)	4 (3.0%)	104 (80.0%)	1 (0.8%)	61	191 100%

received ILI. The findings did not support either expectation when ILI was measured in terms of the amount of overall, active, and passive instruction received. It was assumed that business students would experience less anxiety (H3) and higher self-efficacy (H4) when using OLR after they had received relevant training. Again, both hypotheses were rejected for all three categories of instruction (see Tables 6 and 7).

On the one hand, these findings do not align with previous research. For example, Lombardo and Miree (2003) reported that ILI reduced frustration and increased perception of convenience among business students. Detlor et al. (2011) and Serenko et al. (2012) found that ILI reduced the amount of effort that business students had to put into finding resources and reduced the amount of time needed to find relevant materials. Igarria and Chakrabarti (1990), Igarria (1993), Prince, Helms, and Haynes (1993), Martocchio (1994), and Ayersman (1997) provide evidence that computer training is effective at reducing computer and library anxiety. Prior studies also found that training improves Internet self-efficacy (Torkzadeh & van Dyke, 2002), information searching self-efficacy (Ren, 2000), and online searching self-efficacy (Monoi et al., 2005).

On the other hand, the perplexing dissonance between the findings of this study and the results of previous projects may be resolved when one also considers the responses to the open-ended questions. The key assumption of the quantitative data analysis technique used in this study (i.e., PLS) is a presumed linear relationship between the independent variable (i.e., amount of ILI) and the dependent variables (i.e., self-efficacy, anxiety, perceived usefulness, and perceived ease of use). The fact that no statistically significant relationship between the amount of ILI and dependent variables was observed may also mean that a nonlinear relationship exists, or that a linear relationship exists only within a small range of values (i.e., only within a subset of scores).

Recall that the analysis of open-ended questions revealed that the hypothesized relationships between ILI and OLR anxiety and between ILI and OLR self-efficacy do exist (when the business students were asked how the ILI they received influenced their anxiety, comfort, and confidence when using OLR, almost 70% indicated that ILI reduced their level of OLR anxiety, and 84% felt that ILI increased their level of OLR self-efficacy). The analysis also identified a new factor that was not envisioned a priori. As such, direct hands-on experience with OLR use has an effect on OLR self-efficacy and anxiety (many students mentioned that their anxiety and self-efficacy with OLR only continued to improve after they had the opportunity to apply their newly taught information literacy skills in practical settings, for example, when they worked on projects, papers, and assignments that required an extensive use of OLR). Overall, the triangulation of the quantitative and qualitative findings suggests that ILI has a positive effect on the dependent variables, but only at the initial phase. Given the absence of a linear relationship between the amount of ILI and outcome variables, it is possible that an initial ILI session helps students build self-efficacy, reduce anxiety, and develop positive PU and PEOU perceptions of OLR. However, at some point, the amount of ILI stops contributing to the final outcome. Rather, it is the independent, continued use of OLR after receiving initial, formal ILI that creates further positive effects, as evident in the analysis of open-ended responses. Overall, it is likely that initial ILI does help students get started, but at some stage a saturation point is quickly reached where more instruction contributes little, if anything, to the final outcome.

A similar phenomenon has been observed with respect to the relationship between a person's intelligence quotient (IQ) and his or her career success (Gladwell, 2008). It is necessary for a highly successful individual to possess an average or slightly above average IQ. However, after this point, no relationship between the level of IQ and career success exists. Instead, a variety of other factors that

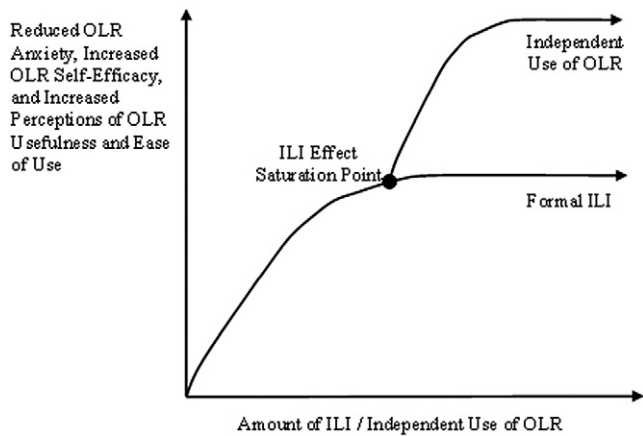


FIG. 3. The effect of ILI and OLR use on anxiety, self-efficacy, perceived usefulness, and ease of use.

determine further success come into play. In other words, to succeed, someone has to be intelligent enough, but not extremely intelligent.

With respect to ILI, it is likely that to develop OLR self-efficacy, reduce OLR anxiety, and build positive perceptions of OLR usefulness and ease of use, students still need to attend an ILI session. After that, however, additional sessions do little for the students. Instead, it is an independent continued use of OLR that matters. Figure 3 visualizes the effect of ILI and continued OLR use on self-efficacy, anxiety, perceived usefulness, and perceived ease of use discussed above.

This finding has major practical implications. Information literacy instructors and librarians should know that continually increasing the amount of ILI received is not an effective way of improving students' OLR self-efficacy, reducing their OLR anxiety, and developing positive perceptions of OLR. This study, however, does not disconfirm the importance of initial information literacy sessions delivered to students. These initial sessions are a valuable and needed step toward developing positive student learning outcomes. However, the effect of these sessions quickly reaches a saturation point, after which the value of receiving more sessions deteriorates. At this point, students would be better served if they were given opportunities to practice using OLR on their own. As such, instructors and librarians should ensure that after students receive an initial set of ILI sessions, they are provided with consistent, incremental, and independent opportunities to use OLR throughout their entire educational careers. This may be achieved, for example, through assignments, projects, and reports that require students to use a variety of credible information sources throughout their program of study. In this way, students would be better able to gradually develop higher OLR self-efficacy and lower their OLR anxiety, resulting in increased and sustained OLR use over time.

Second, OLR self-efficacy and anxiety are antecedents to OLR adoption. This study extends previous research on

computer self-efficacy, computer anxiety, and library anxiety by employing measures of self-efficacy and anxiety that are specific to OLR. It was expected as OLR anxiety increases, students would have to dedicate attention to coping with their emotional responses. Consequently, it was expected that students who have higher levels of OLR anxiety would be less inclined to perceive OLR to be easy to use. The results reveal that the relationship between OLR anxiety and the perceived ease of use of OLR is negative ($\beta = -0.20$, p -value < 0.005). This finding is consistent with prior studies that conclude that anxiety has a detrimental effect on the perceived ease of use of computer technologies (Venkatesh, 2000) and digital libraries (Nov & Ye, 2008).

The results also show a strong positive relationship between OLR self-efficacy and the perceived ease of use of OLR ($\beta = 0.55$, p -value < 0.001). This supports a large body of research that found that people who enjoy higher levels of comfort and confidence using technology tend to perceive the technology to be easier to use (Thong et al., 2002). As such, both OLR self-efficacy and anxiety are predictors of the perceived ease of use of OLR.

Third, it is concluded that the relationship between OLR self-efficacy and OLR anxiety is negative and significant ($\beta = -0.38$, p -value < 0.001). This is consistent with Bandura's (1986) social cognitive theory that describes self-efficacy and anxiety as reciprocal determinants of each other. OLR self-efficacy influences anxiety because over time, training and experience would increase students' self-efficacy, which would reduce their level of anxiety. This observation is consistent with prior research (Compeau & Higgins, 1995). In addition, OLR anxiety partially mediates the relationship between self-efficacy and perceived ease of use. This mediation effect was tested and supported through the employment of Baron and Kenny's four-step method, the Sobel test, and PLS. To the best knowledge of the authors, no previous studies assessed this mediating relationship with respect to OLR.

Because most respondents indicated that they either currently experience OLR anxiety or had succumbed to OLR anxiety in the past, information literacy instructors should be aware that OLR anxiety and OLR self-efficacy are real phenomena. This finding is similar to the results of investigations of anxiety with the use of the physical library, which concluded that anxiety is virtually inevitable and its existence should be accepted (Collins & Veal, 2004; Jiao & Onwuegbuzie, 1997). Students should realize that it is normal to experience anxiety and low self-efficacy when they first come across OLR, but these feelings can be improved through initial ILI sessions and opportunities to use OLR on a continued basis. Information literacy instructors should make a conscious effort to increase OLR self-efficacy and reduce OLR anxiety by designing training interventions that specifically address OLR self-efficacy and OLR anxiety. For this, strategies and techniques for increasing self-efficacy should be developed (Saleh, 2008). One avenue is to change the role of the information literacy librarian from a tutor, who only delivers training sessions

from time to time, to a mentor, who continuously advises students on the use of OLR during their entire school career.

Fourth, TAM is a useful (but not necessarily parsimonious) lens for studying the adoption of OLR. As expected, perceived ease of use of OLR has a strong significant effect on the perceived usefulness of OLR ($\beta = 0.53$, p -value < 0.001). Similarly, perceived usefulness of OLR has a strong significant impact on intentions to use OLR ($\beta = 0.68$, p -value < 0.001). However, the hypothesized relationship between perceived ease of use and the intention to use OLR is non-significant ($\beta = 0.03$, *ns*). Therefore, perceived usefulness fully mediates the effect of perceived ease of use on usage intentions. This finding is consistent with the results of a meta-analysis of TAM by King and He (2006). They demonstrate that out of 67 studies of the core TAM, 30 found the ease of use \rightarrow behavioral intention path to be insignificant. They conclude that the major effect of perceived ease of use on intentions is through perceived usefulness.

Limitations

Although this study makes several practical and theoretical contributions, it has a number of limitations that should be acknowledged. First, this study, like most information systems research, makes use of cross-sectional data, which cannot be used to establish causation. Instead, causation was established by relying on existing theory (specifically TAM) and findings from previous ILI studies. Future research, however, should employ longitudinal research design to verify these findings.

Second, the research participants were drawn from a single faculty of a single academic institution, which limits results generalizability. Before the findings can be generalized to other academic disciplines, the study should be replicated in other disciplines and countries. Third, technology adoption research is often criticized for making use of retrospective surveys. The measurements of user reactions are taken after the adoption decision has already been made, rather than during the adoption process. This study is limited by this common problem. Fourth, information literacy class enrollment data were self-reported by the students. Despite the best attempt of the researchers to facilitate the most reliable recall, it is possible that some respondents still provided inaccurate information. Fifth, in addition to TAM, other models may be applied to investigate the adoption of OLR. Sixth, it was argued that the effect of the amount of ILI received reaches a saturation point. More research, however, is required to identify the exact location of this point. Knowing this critical information will allow information literacy librarians to better design their sessions and hands-on assignments.

Despite the limitations identified above, this study has provided several theoretical and practical contributions. None of the limitations detracts from the rigorous methods employed. This study made use of a sizable data set of 337

records drawn from the population of interest. The sample came from students from all concentrations of study (majors) and all undergraduate year levels.

Conclusion

Recognizing the need for information literacy skills development among business school students, we report results from an exploratory study investigating the effects of ILI on the adoption and use of OLR by business students. Information literacy instruction was measured in terms of the amount of overall, active, and passive ILI received, and examined in terms of its effect on the adoption of OLR through perceived usefulness and perceived ease of use of these OLR. The effects of the ILI received on students' self-efficacy and anxiety with OLR, and how these in turn impact student perceptions of the usefulness and ease of use, and ultimately the use of OLR, were also assessed.

Importantly, an analysis of qualitative and quantitative data collected in this study identified new and interesting findings having a potentially significant impact in terms of how ILI should be delivered to business students in the future. Specifically, findings suggest that the ILI received by business students is only beneficial in reducing OLR anxiety and increasing OLR self-efficacy in the initial or early stages of OLR use. Results indicate that business students quickly reach a saturation point where more ILI contributes little, if anything, to reducing OLR anxiety or increasing OLR self-efficacy. After this saturation point, it is the independent, continuous use of OLR that creates a continued reduction in OLR anxiety and a continued increase in OLR self-efficacy. This continued use leads to continual improved perceptions of the ease of use and perceived usefulness of OLR, which in turn lead to continued increases in OLR use over time.

It is the hope of the researchers involved in this study that educators and librarians utilize these findings to tailor the delivery of ILI to business students in the future. Doing so is important. Business students need improvement in their information literacy skills, and business schools need to figure out the best way to incorporate successful ILI in their curricula. The findings identified in this study may help in this regard.

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Appendix

Online Questionnaire

In what year of study are you?

1. 1st year
2. 2nd year
3. 3rd year
4. 4th year or higher
5. Prefer not to say

What is your gender?

1. Male
2. Female
3. Prefer not to say

While you are in school, in what area do you plan to major or concentrate your business studies?

1. Accounting
2. Finance
3. General Management
4. Human Resources
5. Information Systems
6. Marketing
7. Operations Research
8. Strategy
9. Not Listed Above
10. Undecided / Not sure / Prefer not to say

Please select cells within the matrix that correspond to the courses you have taken and the year in which you have taken these courses.

	Year 1	Year 2	...	Year 6
Course 1				
Course 2				
...				
Course 6				

Note. The actual courses that had ILI components were listed, e.g., MGT101 (Introduction to Management).

Please state your level of agreement with the following statements.

Note: All items below were measured on a 7-point Likert-type scale (*strongly disagree / strongly agree*).

Online Library Resource (OLR) Anxiety Scale

Instructions: When using online library resources, I feel anxious:

OLRAX1. when I select online library resources (e.g., when I need to select specific online library resources to use, such as the library web site, library catalogue, or databases such as Business Source Complete to find the information that I need).

OLRAX2. when I use online library resource features (e.g., when I need to use the various functions within a specific online library resource, such as the library web site, library catalogue or database such as Business Source Complete to find the information that I need).

OLRAX3. when I search for information using online library resources (e.g., when I need to conduct an advanced search, use subject headings, etc.)

OLRAX4. when I retrieve information from online library resources (e.g., when I need to extract and acquire information from an online library resource, such as journal articles, books, etc.)

OLRAX5. when I evaluate the information I retrieve from online library resources (e.g., when I need to assess the relevance, reliability, validity, bias and timeliness of the information I retrieve from online library resources).

OLRAX6. when I assess citations of the information I retrieve from online library resources (e.g., when I need to decipher the reference of the information I retrieve from online library resources to see if the information pertains to a book, a book chapter, or a journal article).

OLRAX7. when I deal with the economic, legal & social issues surrounding the use of online library resources (e.g., when I need to consider the issues around the use of the information I retrieve from online library resources such as copyright, privacy, and censorship).

Online Library Resources Anxiety Open-Ended Questions

Comment on your response to the above question so that the researchers can better understand the context surrounding your level of anxiety using online library resources. For example, if you experience anxiety using online library resources, what is it that causes you to be anxious? If you are not anxious using online library resources, why is this so?

How did the library instruction you received from the librarians affect your level of anxiety using online library

resources? For example, did the library instruction increase your anxiety? decrease it? have no effect? Explain.

Online Library Resources Self-Efficacy Scale

Instructions: When using online library resources, I believe I have the ability to:

OLRSE1. select online library resources (e.g., select specific online library resources to use, such as the library web site, library catalogue or a database like Business Source Complete to find the information that I need).

OLRSE2. use online library resource features (e.g., use the various functions within a specific online library resource, such as the library web site, library catalogue, or a database like Business Source Complete to find the information that I need).

OLRSE3. search for information using online library resources (e.g., when I need to conduct an advanced search, use subject headings, etc.)

OLRSE4. retrieve information from online library resources (e.g., extract and acquire information from an online library resource, such as a journal article, book, etc.)

OLRSE5. evaluate the information I retrieve from online library resources (e.g., assess the relevance, reliability, validity, bias and timeliness of the information I retrieve from online library resources).

OLSE6. assess citations of the information I retrieve from online library resources (e.g., decipher the reference of the information I retrieve from online library resources to see if the information pertains to a book, a book chapter, or a journal article).

OLRSE7. deal with the economic, legal & social issues surrounding the use of online library resources (e.g., consider the issues around the use of the information I retrieve from online library resources such as copyright, privacy, and censorship).

Online Library Resources Self-Efficacy

Open-ended Questions

Comment on your response to the above question so that the researchers can better understand the context surrounding

your level of comfort and confidence using online library resources. For example, if you are (un)comfortable and (un)confident using online library resources, explain why this is so?

How did the library instruction you received from the librarians affect your level of comfort and confidence using online library resources? For example, did the library instruction increase your comfort and confidence levels? decrease them? have no effect? Explain.

Perceived Ease of Use of Online Library Resources Scale

PEOU1. My interaction with online library resources is clear and understandable.

PEOU2. Interacting with online library resources does not require a lot of mental effort.

PEOU3. I find online library resources easy to use.

PEOU4. I find it easy to get online library resources to do what I want them to do.

Perceived Usefulness of Online Library Resources Scale

PU1. Using online library resources improves my academic performance.

PU2. Using online library resources increases my productivity in my course work.

PU3. Using online library resources enhances my effectiveness in my course work.

PU4. I find online library resources useful for my course work.

Intention to Use Online Library Resources Scale

BI1. Given that I have access to online library resources, I intend to use them for my coursework in the future.

BI2. Assuming that I have access to online library resources, I predict that I will use them for my coursework in the future.