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An Empirical Investigation of Student Learning Outcomes of Information Literacy Instruction in a Business School

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Abstract

This study presents and tests a research model of the psychological, behavioral, and benefit outcomes of information literacy instruction (ILI) given to undergraduate business students. This model is based on expectation disconfirmation theory and insights garnered from a recent qualitative investigation by the research team on student learning outcomes from ILI given at three business schools in Canada. The model was tested through a web survey administered to 372 students at one of these schools. The model represents psychological, behavioral, and benefit outcomes as second-order molecular constructs. Results from a Partial Least Squares (PLS) analysis reveal that prior student expectations influence perceived quality and expectation disconfirmations. These in turn affect student psychological outcomes. Further, psychological outcomes influence student behaviors, which in turn affect benefit outcomes. Based on the study's findings, several recommendations are made.

Keywords

Information literacy instruction, student learning outcomes, business education, partial least squares, second-order construct.

INTRODUCTION

For the past decade, the impact of information systems (IS) research on the state of practice has been frequently questioned (Benamati et al. 2007; Benbasat and Zmud 1999; Benbasat and Zmud 2003). For example, there are claims that IS academics investigate outdated issues, concentrate solely on theory, explore trivial phenomena and report findings that have limited practical application (Pearson et al. 2005). As a result, there is a reconcilable difference between the needs of IS professionals and the interests of IS scholars. At the same time, there is a need for empirical research that may help not only explore the theoretical aspects of information systems usage but also generate implications that may be successfully applied in practical settings. This study demonstrates that these objectives may be achieved simultaneously in a single study. It presents a model explicating student learning outcomes of information literacy instruction (ILI) in a business school. Universities invest millions of dollars on subscription to various information resources, most of which are available online. Students also receive information literacy training to be able to fully utilize the available resources. However, a theoretical understanding of the effect of ILI is very limited, and few guidelines for the librarians on how to improve critical

outcomes of ILI exist. This study attempts to fill that void by generating both theoretical knowledge that may be used in future research and recommendations for practitioners (i.e., librarians involved in the development and delivery of ILI).

Information literacy is knowing when information is needed and the ability to locate, evaluate, and use that needed information effectively (ACRL 2006). In today's Internet-enabled world, this translates into being proficient and adept at using various information and communication technologies and multiple kinds of online information retrieval systems. Such skills are vital for success in today's business environment where "information has become the leading business asset" (Kanter 2003, p. 23). As a result, more and more business schools today are offering, or starting to offer, information literacy instruction to their students as a means to better prepare their graduates for success. As such, many business schools are engaged in teaching students how to utilize information technology tools that provide access to high-quality, relevant electronic business information sources; such sources are available to business students through their universities' online library resources (e.g., databases, indexes, journal suites, online catalogs, and library websites).

Five of the seven curricular standards for quality management education put forth by the Association to Advance Collegiate Schools of Business International (AACSB) for undergraduate degree programs are closely tied to information literacy skills, namely: communication abilities, ethical understanding and reasoning abilities, analytical skills, use of information technology, and reflective thinking skills (AACSB 2009). As accreditation with the AACSB becomes a de facto standard vital to a business school's viability, international reputation and long term success, there has been movement within business schools in very recent years to incorporate proper learning outcome measurements as a means of demonstrating the achievement of learning goals – including measures of ILI student learning outcomes. The problem is that though there is ample insight into what the student learning outcomes of information literacy instruction actually are, and the institutional and pedagogical factors that promote successful student learning outcomes (Julien and Boon 2004), there is a lack of evidence explaining the relationships among these outcomes, their cause and effect on one another, and how student perceptions of the instruction received affect the learning outcomes themselves.

The purpose of this study is to address this gap by developing a model based on prior work and testing it via rigorous quantitative analysis techniques. The goal is to ascertain greater insight into the cause and effect relationships among the learning outcomes of ILI, and how student perceptions of the ILI received shape these outcomes. Doing so not only sheds more light on the factors and relationships shaping the effects of ILI student learning outcomes, but also proffers recommendations for practice to improve how such instruction is delivered to students.

LITERATURE REVIEW AND MODEL DEVELOPMENT

Expectation disconfirmation theory (Bhattacharjee 2001; Oliver 1977; Oliver 1980) offers a good starting point to understand the formation of students' ILI perceptions. Prior to being exposed to ILI, each student has his or her own *expectations* of the instruction process, key learnings, and potential benefits. After one or more IL sessions, students develop their actual perceptions of ILI, which they compare with their prior expectations. As a result of this comparison process, either a positive or negative *disconfirmation* occurs that, in turn, influences their level of satisfaction. *Student satisfaction*, which is defined as the overall students' reaction to the state of fulfillment of ILI they received at a particular educational institution (Oliver 1997), is a critical outcome of the entire educational process that has been explored for decades (Feldman and Newcomb 1969; Pascarella and Terenzini 1978; Pascarella and Terenzini 1991). A positive disconfirmation takes place when students' actual ILI experience exceeds their initial expectations resulting in higher satisfaction. In sharp contrast, a negative disconfirmation occurs when students' ILI experience falls short of what they initially expected, which leads to lower satisfaction (Stach and Serenko 2009; Yi 1990).

Perceived quality of ILI also plays a critical role in the expectation disconfirmation – student satisfaction relationship. It is defined as the students' evaluation of ILI based on their actual experience (Athiyaman 1997). Prior research demonstrates that there is a difference between objective and perceived service quality (Zeithaml 1988). The term objective quality describes the actual measurable superiority of the service based on predetermined standards or criteria. In contrast, perceived quality refers to the service assessment based on students' subjective experience and opinion. In service quality studies, the assessment of quality should be approached from a perceptions vantage point. First, it is almost impossible to develop objective service quality measures (Maynes 1976). Second, perceptions play an important role in the application of service quality ratings (Zeithaml 1988). Thus, it is more logical to measure student perceptions of ILI quality by asking students directly.

Prior research demonstrates that expectation disconfirmation has a positive direct effect on student satisfaction. This relationship, however, is partially mediated by perceived quality. In fact, the marketing and education literature suggests that prior expectations have a positive effect on perceived quality that in turn positively

influences satisfaction (Serenko 2010; Turel and Serenko 2006; Turel et al. 2006). As such, the following hypotheses are suggested:

H1: Expectation disconfirmation of ILI has a positive direct effect on perceived quality of ILI.

H2: Expectation disconfirmation of ILI has a positive direct effect on student satisfaction with ILI.

H3: Perceived quality of ILI has a positive direct effect on student satisfaction with ILI.

There are several consequences of perceived quality and student satisfaction with their educational experience, such as retention, loyalty, positive word-of-mouth, improved program reputation, the probability of financial donations in form of scholarships, and personal intellectual development (Ewell 1989; Lampert 1993). In fact, most educators believe that there is a strong positive link between the quality of instruction and student satisfaction, the retention of class material, higher grades, better job opportunities and the ability to succeed in the workforce. For example, satisfied students tend to do well academically (Centra and Rock 1971), and alumni who were satisfied with their higher education experience are also more satisfied with their present jobs (Pike 1994).

Information literacy and educational assessment theories suggest student learning outcomes consist of *psychological outcomes* (changes in attitudes or values), *behavioral outcomes* (changes in actions), and *benefit outcomes*, such as cognitive gains in knowledge, improved program completion rates, and higher grades (Boyer and Ewell 1988; Lindauer 2004; Sims 1992). ILI assessments conducted in specific contexts support the existence of these outcomes. For example, one study found that students who receive ILI increase their searching effectiveness and are able to select more relevant information sources (Emmons and Martin 2002). Another, conducted in Canadian academic library settings, reported that ILI outcomes include increased confidence, improved searching skills, and changed attitudes towards libraries (Julien and Boon 2004). A separate project, conducted at San Jose State University with pre- and post-library instruction surveys, showed that there was a 16 percent decrease in the use of non-library websites, and greater confidence and self-efficacy among students after library instruction was received (Roldan and Wu 2004).

Importantly, the authors of this paper recently conducted a qualitative investigation of the student learning outcomes from ILI given at three Canadian business schools through: i) a series of interviews with business school librarians, library administrators, course instructors and business students, and ii) application and analysis of a standardized information literacy testing instrument called SAILS (www.projectsails.org) that measures student IL competency (Julien et al. 2009a; Julien et al. 2009b). The schools differed with respect to their geographical location, AACSB accreditation histories, IL program components, enrollment, and ILI emphases. In total, 79 interviews (7 librarians; 4 library administrators; 16 teaching faculty; and 52 students) were conducted, taped, transcribed and analyzed using grounded theory techniques to elicit recurring themes and patterns via constant comparative analysis and analytic inductive reasoning of the data, the emergent concepts and relationships (Glaser and Strauss 1967; Strauss and Corbin 1998). Descriptive statistics from the SAILS data were generated.

Results from that study explain how certain key factors of the learning environment, information literacy program components, and student demographics affect ILI student learning outcomes. In terms of psychological outcomes, results suggest that ILI leads to *decreased online library anxiety*, *increased online library self-efficacy*, *improved perceptions of librarians' value*, *improved perceptions of librarians' helpfulness*, *improved perceptions of the value of online libraries*, and *improved perceptions of the value of physical libraries*. With respect to behavioral outcomes, results indicate that ILI leads to *improved/increased use of the online library*, *improved/increased use of librarians*, and *improved/increased use of the physical library*. In terms of benefit outcomes, results show that ILI leads to efficiency gains in the form of *time savings* and *effort reduction*, and effectiveness gains in the form of *higher grades and coursework impact*, and *greater workforce preparation* upon graduation.

Importantly, results also suggest a potential cause-effect chain of relationships may exist where psychological outcomes affect behavioral outcomes which in turn influence benefit outcomes, warranting further investigation. Both the psychology and IS literatures advocate strong support of psychological outcomes (changes in perceptions) affecting behavioral outcomes (changes in action); for example, a person who develops positive perceptions towards a particular information system is more likely to use it (Ajzen 1991; Davis 1989; Fishbein and Ajzen 1975). It is also reasonable to expect that positive changes in behavior (behavioral outcomes) will yield efficiency and effectiveness gains (benefit outcomes).

Note that the components constituting the various aspects of psychological outcomes, behavioral outcomes, and benefit outcomes represent distinct dimensions that are theoretically independent of one another. For example, consider the case of psychological outcomes. A decrease in online library anxiety may have no impact on perceptions of librarians' helpfulness. An increase in perceptions of online library value may have little, if any, effect on perceptions of the physical library, especially for those who mostly rely on online resources. When these personal and perceptual factors are combined under a uniform umbrella of psychological outcomes, they meet statistical and conceptual conditions of presenting the psychological outcomes construct as a second-order factor, composed of six independent first-order constructs (Turel et al. 2007; Turel et al. 2010). It is critical to understand what role psychological outcomes, behavioral outcomes, and benefit outcomes play as a whole, in addition to

understanding the actual contribution each first-order dimension makes to the overall second-order dimension. Based on the above, the following hypotheses are proposed (see Figure 1):

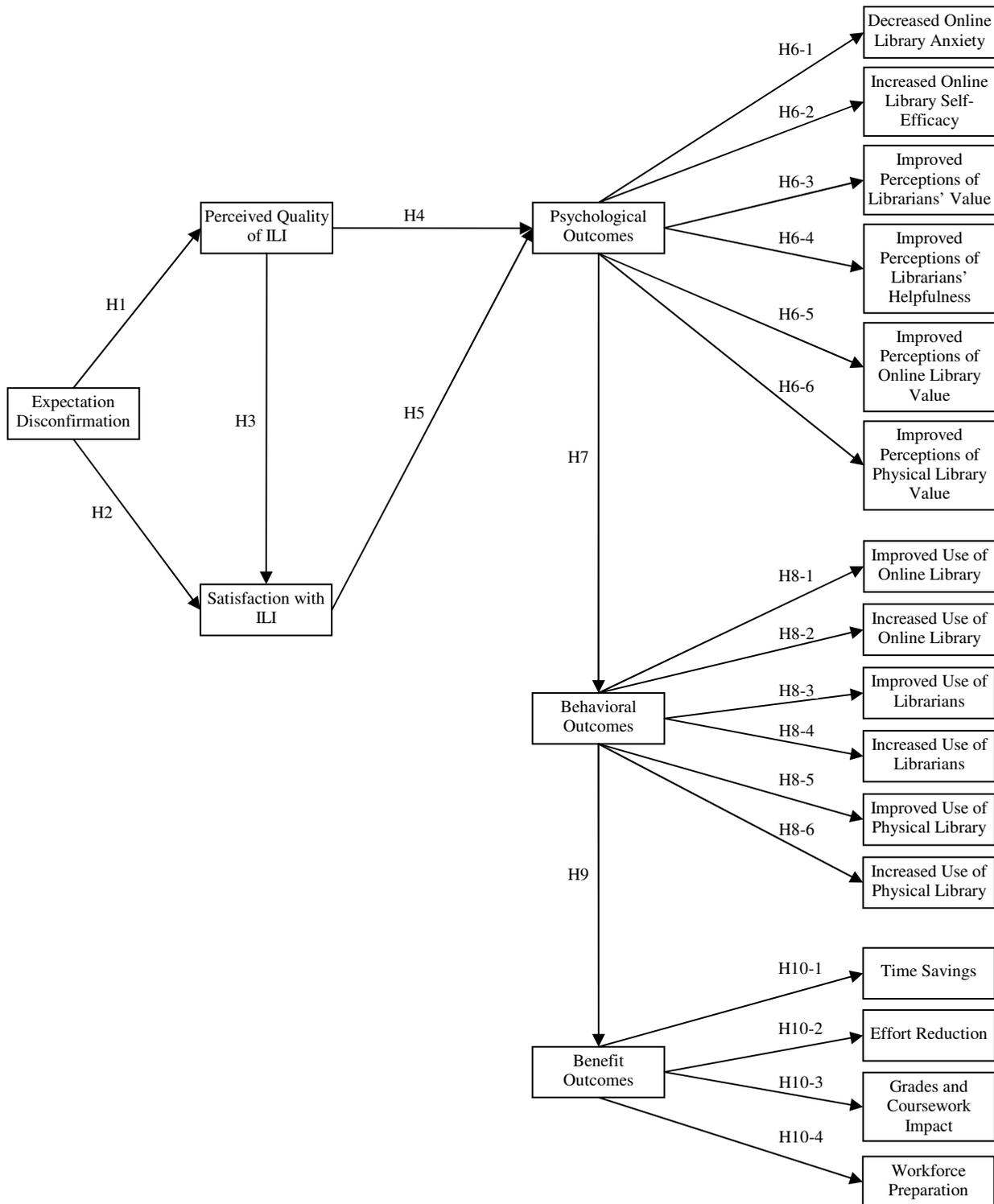


Figure 1: The research model

- H4: Perceived quality of ILI has a positive direct effect on psychological outcomes of ILI.
H5: Student satisfaction with ILI has a positive direct effect on psychological outcomes of ILI.
H6-1: Decreased online library anxiety is an important part of psychological outcomes of ILI.
H6-2: Increased online library self-efficacy is an important part of psychological outcomes of ILI.
H6-3: Improved perceptions of librarians' value are an important part of psychological outcomes of ILI.
H6-4: Improved perceptions of librarians' helpfulness are an important part of psychological outcomes of ILI.
H6-5: Improved perceptions of online library value are an important part of psychological outcomes of ILI.
H6-6: Improved perceptions of physical library value are an important part of psychological outcomes of ILI.
H7: Psychological outcomes of ILI have a positive direct effect on behavioral outcomes of ILI.
H8-1: Improved use of online library is an important part of behavioral outcomes of ILI.
H8-2: Increased use of online library is an important part of behavioral outcomes of ILI.
H8-3: Improved use of librarians' services is an important part of behavioral outcomes of ILI.
H8-4: Increased use of librarians' services is an important part of behavioral outcomes of ILI.
H8-5: Improved use of physical library is an important part of behavioral outcomes of ILI.
H8-6: Increased use of physical library is an important part of behavioral outcomes of ILI.
H9: Behavioral outcomes of ILI have a positive direct effect on benefit outcomes of ILI.
H10-1: Efficiency gains in time savings are an important part of benefit outcomes of ILI.
H10-2: Efficiency gains in effort reduction are an important part of benefit outcomes of ILI.
H10-3: Effectiveness gains in higher grades and coursework impact are an important part of benefit outcomes of ILI.
H10-4: Effectiveness gains in greater workforce preparation are an important part of benefit outcomes of ILI.

METHODOLOGY AND RESULTS

In order to test the study's model and related hypotheses, a survey of full-time undergraduate business students of a Canadian university was conducted. The items measuring expectations, disconfirmations and satisfaction were adapted from Bhattacharjee (2001), and perceived quality from Fornell et al. (1996). Items pertaining to the psychological, behavioral and benefit outcome constructs were developed during this study. First, the IL literature and results from the prior IL project conducted by the research team (Julien et al. 2009a; Julien et al. 2009b) were reviewed to identify all possible dimensions (i.e., first-order constructs) of each outcome and potential questionnaire items. Second, each first-order construct was operationalized with at least four items. Third, items were adjusted based on feedback from several IL researchers. Fourth, a comprehensive face validity assessment of the draft instrument was done by consulting a team of 34 IL academics, practitioners (i.e., librarians), other experts and potential survey participants. Based on their feedback, subsequent changes to the instrument were done. In order to minimize common method bias, 12 negatively worded items were included that is a common approach in survey research (Serenko and Turel 2007). The sample survey is available online at <http://foba.lakeheadu.ca/serenko/ACISquestionnaire.pdf>.

All 2,049 registered full-time commerce students were invited to complete the online survey through an email invitation, followed by three follow-up reminders. In total, 372 usable responses were obtained at the response rate of 18.2%. The results indicate that there were 51% and 49% of female and male students respectively. As a breakdown by year, 26%, 23%, 31% and 20% of these students were enrolled in years 1, 2, 3 and 4 respectively. Their distribution of major was: accounting (36%), finance (20%); marketing (19%); human resources (7%); general management (2%); information systems (1%); and operations research (1%). Fourteen percent of respondents were still undecided on their major. In terms of grades, 20% were in the A- to A+ range, 59% in the B- to B+ range, 16% in the C- to C+ range, and 4% preferred not to say. The profile of the obtained sample is generally representative of the students enrolled in the commerce program at that school.

PLS Graph v.3 was used to assess the measurement and structural models. It was selected since this is the best structural equation modeling tool that supports the use of second-order constructs (Turel et al. 2007; Wetzels et al. 2009). The second-order constructs were presented as molecular factors (Chin and Gopal 1995), and they were operationalized by means of the repeated indicator approach (i.e., the hierarchical component model) (Lohmoller 1989) that is acceptable in PLS. A molecular factor is a higher-order construct which consists of a number of reflective indicators belonging to several distinct lower-order factors. The usage of molecular constructs was selected for three reasons. First, from a theoretical perspective, it was argued that a molecular outcome construct represents the overall students' perceptions of IL outcomes (i.e., behavioral, psychological, or benefit) measured by a specific combination of perceptions of several first-order factors. A change in a student's perception of one first-order factor would mean that his or her overall perception of a particular second-order benefit factor also changes. Second, the correlations of first-order constructs were strong (i.e., averaging at 0.7), which justifies the employment of molecular second-order constructs from an empirical perspective. Third, the conceptualization of second-order constructs as molecular allows determining the relative importance of each first-order factor in reflecting a specific outcome because the contribution of each first-order factor is revealed in its beta coefficient (Chin and Gopal 1995).

An assessment of the reliability and validity of the measurement model demonstrated an acceptable level of the psychometric properties of the constructs. Only three items were removed: EFCR4 because its loading was below the cut-off value of 0.7, and EGTM3 and EGEF3 because they cross-loaded very highly on other constructs. After removing these items, the model was re-estimated. Online Appendix I presents the measurement model assessment (http://foba.lakeheadu.ca/serenko/Appendix_I.pdf). The matrix of cross-loadings is available from the corresponding author. Figure 2 outlines the structural model. All the hypotheses were supported at the 0.001 confidence level.

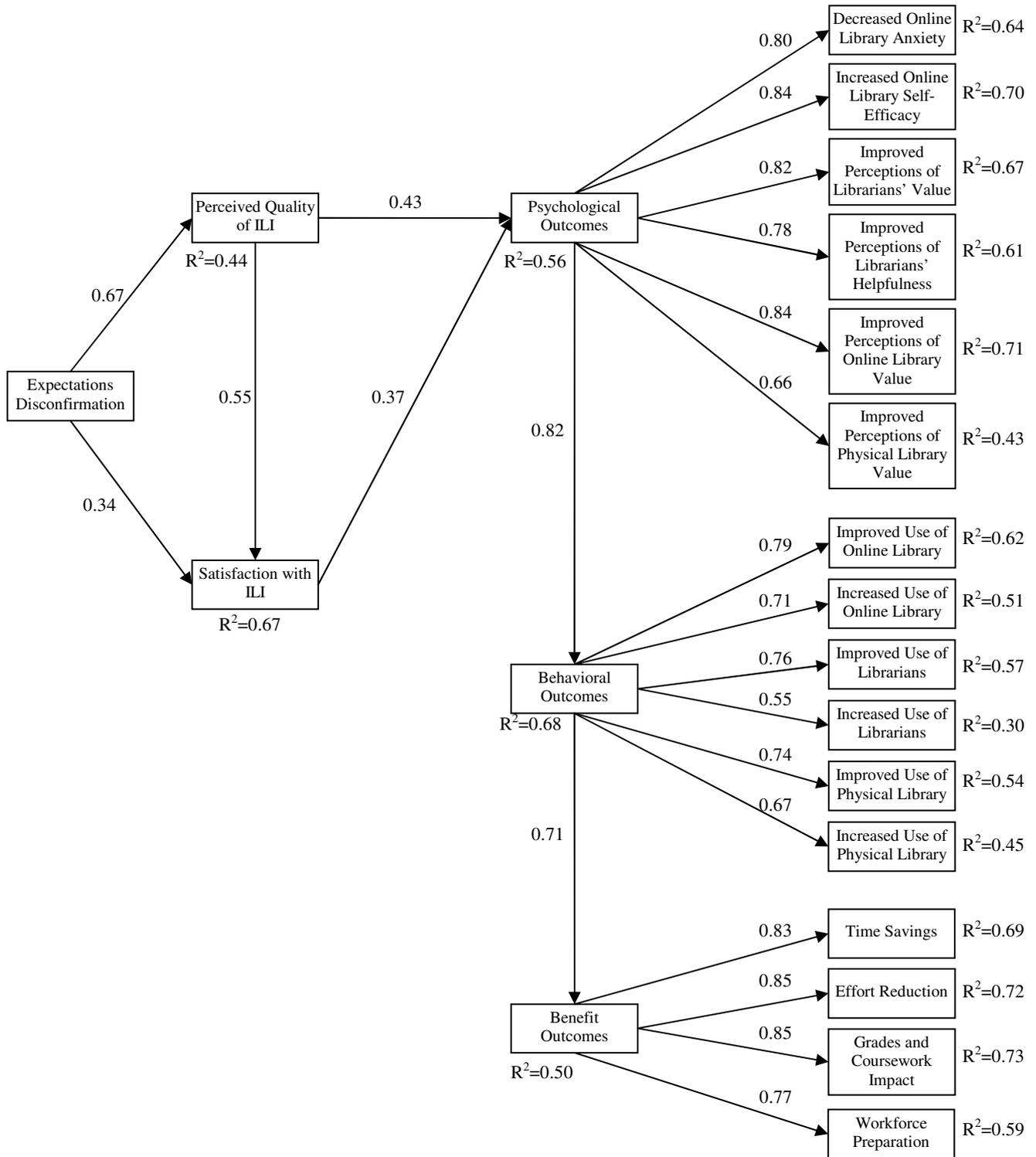


Figure 2: The structural model (all relationships are significant at 0.001 level)

DISCUSSION

The purpose of this investigation was to suggest and empirically test a model describing the consequences of information literacy instruction in an undergraduate business program. During this project, 372 students completed an online survey, and the model was estimated by using PLS Structural Equation Modeling techniques. Based on the findings, several important issues emerged from which key recommendations for practice can be made. They include: appropriate management of initial students' expectations; better overview of physical library facilities during IL sessions; explanation of online support functions; clear communication of the value of utilizing the latest academic findings when making critical managerial decisions; and the applicability of the proposed model to study the effect of IL instruction in various settings.

First, it was demonstrated that expectation disconfirmation theory may be fruitfully applied in the education domain. Specifically, it was found that the impact of expectation disconfirmation on student satisfaction with ILI is partially mediated by perceived quality. The overall strength of the expectation disconfirmation – student satisfaction relationship is 0.71 (0.34+0.67*0.55). It also explains 67% of the variance in the satisfaction construct, which is considered very high in management research. A positive expectation disconfirmation, when students believe that ILI exceeded their initial expectations, facilitates positive quality perceptions and boosts satisfaction. At the same time, a failure to meet initial student ILI expectations may produce low quality perceptions and dissatisfaction with the service, resulting in negative outcomes. Therefore, organizers of ILI in undergraduate business programs should accurately manage the initial expectations of their students. As such, they should provide students with a realistic overview of the ILI curriculum and its benefits, and never oversell what the instruction will offer. For example, some ILI organizers, such as business librarians and administrators, may be tempted to overemphasize the value of IL sessions for their students when they promote library services. On the one hand, this strategy may bring more attendees to the IL tutorials, presentations, and instructional classes. Indeed, having a good level of information literacy skills is critical for succeeding in the contemporary business programs. On the other hand, if some of the expectations of the students remain unmet, their perceptions of ILI quality and satisfaction with ILI will be low, resulting in lower levels of psychological, behavioral and benefit outcomes. This important phenomenon needs to be considered by ILI promoters.

Second, perceived quality and student satisfaction with ILI lead to several critical psychological outcomes. Of these, increased online library self-efficacy, improved perceptions of online library value, improved perceptions of librarians' value, decreased online library anxiety, and improved perceptions of librarians' helpfulness were highly important. Improved perceptions of physical library value were a less significant contributor to the aggregate psychological outcomes component. It is possible that many students learned how to utilize physical libraries before joining the university, and they formed relatively stable perceptions of physical library before attending ILI sessions. A visual inspection of Table 1 in online Appendix I (http://foba.lakeheadu.ca/serenko/Appendix_I.pdf) revealed that the means of the items belonging to the improved perceptions of the physical library value construct were lower than those of the other psychological outcomes items. This suggests a lower effect of ILI on better perceptions of the physical library value. It is possible that some IL instructors underemphasize the value of physical library in their sessions by mostly concentrating on online resources. At the same time, many older journal volumes are still unavailable in the electronic format, and the students may be potentially missing this critical body of knowledge. Therefore, more emphasis should be added to introduce the physical library facilities during IL sessions.

Third, psychological outcomes have a very strong positive direct on behavioral outcomes (beta=0.82) that, in turn, affect benefit outcomes (beta=0.71). With respect to behavioral outcomes, improved use of online library was the most significant component, followed by improved use of librarians, improved use of physical library, increased use of online library, and increased use of physical library. Increased use of librarians was a less important behavioral outcomes component. Many libraries of the Canadian universities have implemented online live support for their students, referred to as the 'virtual librarian.' Therefore, more emphasis should be added to inform the students about this service to ensure that all of them are aware of it and use it more often.

Fourth, efficiency and effectiveness gains, such as a reduction in effort to locate library materials, positive impact on grades and coursework, and time savings are the key ILI benefit outcomes. At the same time, ILI contributes less to students' preparation for entering the workforce. It is possible that some students cannot predict how they may apply their information literacy skills at work. Those who had prior work experience probably noticed that even senior managers rarely employ academic or research materials in their decision making. On the one hand, most managers perceive the academic body of knowledge as very useful and relevant to their needs (Booker et al. 2008). On the other hand, they tend to ignore it (Pearson et al. 2005). Therefore, it is critical for a successful IL program to teach students how they may apply these skills after graduation. For example, examples offered during ILI should relate not only to school assignments but also to potential tasks that the students may be assigned at work. The value of utilizing the latest academic findings when making critical managerial decisions should be clearly communicated.

Fifth, the total effect of perceived quality and student satisfaction with ILI on benefit outcomes was relatively strong, with $\beta=0.47$ (i.e., $0.43*0.71*0.82+0.37*0.71*0.82$). Therefore, it is concluded that the suggested model predicts outcomes of information literacy instruction well, and that it can be used in order to understand the outcomes of ILI instruction in undergraduate business programs.

These findings provide quantitative evidence of the psychological, behavioral, and benefit outcomes of information literacy instruction that prior inductive studies in the information literacy and educational assessment literature suggest. There are many positive outcomes, as listed above, of offering ILI to students. Business educators and academic librarians (the traditional provider of information literacy instruction in college and university settings) should rally behind these findings and use them to spearhead more ILI in their schools since there are ample positive student learning outcomes from offering ILI.

Further, business educators should be aware of the causal effect of ILI on psychological outcomes on behavioral outcomes on benefit outcomes. If student efficiency and effectiveness benefit outcomes are what is ultimately sought through ILI, then steps should be taken to heighten positive student perceptions of, and positive student behaviors with, libraries, librarians, online library resources, and physical libraries. This could be accomplished through marketing campaigns and messages targeted to students that raise positive awareness of information literacy and the benefits that students may derive from IL skills both in academia and workplace.

CONCLUSIONS

The purpose of this study was to address the gap in the educational assessment and information literacy literatures that explains how student perceptions of ILI affect student learning outcomes, the relationships among the various types of student learning outcomes of information literacy instruction (i.e., psychological, behavioral, benefit outcomes), and their cause and effect on one another. This was accomplished by developing a model based on prior work and testing this model via administration of a web survey to commerce students and analyzing the data collected through rigorous quantitative PLS techniques. The results yielded several findings and recommendations, as described above.

This work is important since it furthers our theoretical understanding and knowledge about the learning outcomes of information literacy instruction and provides recommendations for practice. It clearly demonstrates that it is possible to conduct rigorous scholarly research to contribute to theory and practice at the same time. This work is highly relevant to the information systems academic community because a large part of information literacy instruction involves the adoption and use of ICT tools, information retrieval systems, and online library resources (e.g., databases, indexes, journal suites, online catalogs, library websites) and the training of these systems to end users. The authors hope that business librarians, administrators, and educators will be able to employ the recommendations presented in this investigation to improve the promotion and delivery of information literacy instruction in their schools. Future researchers should also ensure the applicability of the suggested model in other settings.

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