

## Student perceptions of information literacy instruction: The importance of active learning

Brian Detlor<sup>a,\*</sup>, Lorne Booker<sup>a</sup>, Alexander Serenko<sup>b</sup> and Heidi Julien<sup>c</sup>

<sup>a</sup>*DeGroot School of Business, McMaster University, Hamilton, ON, Canada*

<sup>b</sup>*Faculty of Business Administration, Lakehead University, Thunder Bay, ON, Canada*

<sup>c</sup>*School of Library & Information Studies, University of Alabama, Tuscaloosa, AL, USA*

Received December 2011

Revised May 2012

This study investigates the merits of employing active learning strategies in the delivery of information literacy instruction (ILI). Traditional approaches to the teaching of information literacy skills – where students are passive recipients of the information they receive – are challenged. Rather, methods that encourage students to actively engage themselves in the learning process are posited to yield heightened student learning outcomes. To test this assumption, a survey was administered to 372 undergraduate students who experienced both passive and active learning ILI opportunities. Results indicate that passive instruction is not an effective style of teaching in yielding positive student psychological, behavioural or benefit outcomes. Rather active instruction yields more positive effects. Importantly, the amount of active ILI received does not matter; a single active learning instructional session may be sufficient to yield significant and sustaining student learning outcomes. This is particularly good news for ILI practitioners working in resource-constrained higher educational environments.

Keywords: Information literacy, information literacy instruction, active learning

### 1. Introduction

In higher educational environments, academic librarians are the traditional providers of information literacy instruction (ILI). Information literacy is “knowing when information is needed and the ability to locate, evaluate, and use that needed information effectively” [1], and information literacy instruction is the teaching of these abilities. When providing ILI, academic librarians typically are invited into the classroom or hold independent workshops to teach students how to use online information resources, evaluate information, and utilize information in ethical and legal ways. To a significantly lesser extent, academic librarians co-teach courses, with subject specialists, focusing on information literacy components [2].

---

\*Corresponding author: Brian Detlor, DeGroot School of Business, McMaster University, 1280 Main Street West, Hamilton, Ontario, L8S 4M4, Canada. Tel.: +1 905 525 9140 x23949; Fax: +1 905 521 8995; E-mail: detlorb@mcmaster.ca.

Though the benefits of receiving information literacy instruction are well-documented [3–6], reports within the library and education literature still describe the general lack of information literacy skills students possess, and the overwhelming reliance by students on non-authoritative information sources, such as Google and Wikipedia [7–9]. It appears that more ILI and/or better ways of delivering ILI are needed to make real and tangible improvements in the information literacy skills of students. Current successful instructional approaches appear to be lacking. Perhaps one of the reasons for this limited success is that most ILI sessions are passive in nature, where information is disseminated through lectures and demonstrations given by librarians of online library resources at the front of the classroom, and students are unengaged recipients of the information they receive.

The delivery of active information literacy instruction may offer hope in this area. Active information literacy instruction is the delivery of ILI in ways that engage students to be fully involved and to participate in the learning process. This style of instruction advocates an “active learning” approach where students are viewed as more than passive empty vessels needing filling. Rather, students are encouraged to use their higher-order thinking skills (e.g., analysis, synthesis, reflection, evaluation) while engaged in activities that help them think critically and explore their own attitudes and values [10–13]. In general, there has been a shift in educational approaches in recent years towards the use of active learning methods, such as problem-based, discovery-based, and inquiry-based learning; these methods challenge students to actively engage with information and resources to solve problems and create knowledge [14–16].

Evidence from the library literature suggests that information literacy instruction may benefit from an active learning approach [17–20]. However, despite these reported benefits, resource constraints in academic settings may limit the potential of doing so. For example, academic librarians in higher education institutions often do not have the time, opportunity, nor staff to deliver active ILI, such as teaching students how to use online library resources via the use of interactive, hands-on training sessions. Librarians in these environments tend to rely on traditional passive learning methods, such as lectures and one-shot library instruction demonstrations, to deliver ILI to students.

Given this context, the purpose of this paper is to investigate the merits of active ILI in higher education. The research questions asked are: i) what are the student learning outcomes of active ILI and passive ILI?; ii) does active ILI result in more positive student learning outcomes than passive ILI?; and iii) how does the amount of active ILI received influence student learning outcomes?

## **2. Theoretical background**

A theoretical model of the factors affecting ILI student learning outcomes developed on the basis of empirical evidence gathered in a previous study by a subset of the

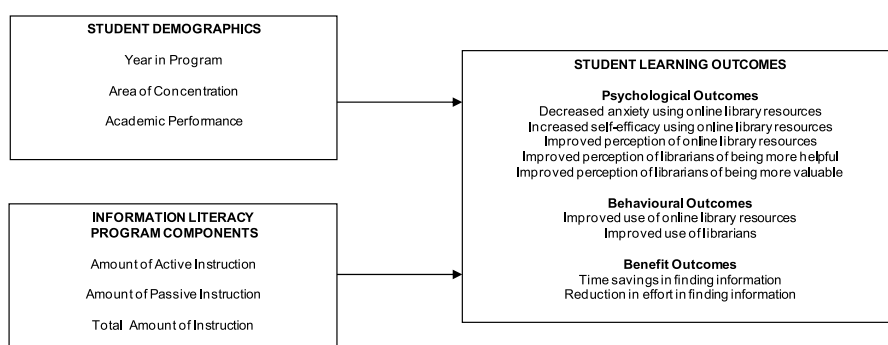


Fig. 1. Abridged theoretical model.

author team was used to guide this research investigation [6]. That model describes how a variety of information literacy program components (e.g., information literacy skills taught, method of instruction, number of instructional sessions given), learning environment factors (e.g., the curriculum, co-curricular learning opportunities, independent learning opportunities), and student demographics potentially impact students' learning outcomes from the information literacy instruction they receive. Student learning outcomes are subdivided into psychological, behavioural, and benefit outcomes. Psychological outcomes are changes in attitudes or values (e.g., both decreased anxiety and increased self-efficacy in using online library resources, improved perceptions of librarians and online library resources). Behavioural outcomes are changes in action (e.g., improved use of online library resources, improved use of librarians). Benefit outcomes are positive outcomes of receiving ILI (e.g., time savings, effort reduction).

Of relevance to this study, the model describes how certain information literacy program components and student demographics potentially affect ILI student learning outcomes. In terms of information literacy program components, the amount of information literacy instruction received is suggested to have a positive effect on yielding positive student learning outcomes. That is, the more ILI received, the more significant the student learning outcomes. Further, active ILI is suggested to yield greater sustained and more significant effects than passive ILI. With respect to student demographics, the following attributes are suggested to be of particular influence: year of study, area of concentration, and academic performance. Specifically, senior students are expected to experience greater student learning outcomes from the information literacy instruction received than junior students; students specializing in areas of concentration within the undergraduate program that receive more ILI tailored to their area of concentration are thought to experience greater student learning outcomes; and, students with better grades are expected to yield greater student learning outcomes from the ILI they receive than students with lower grades.

To test and validate these findings, an abridged theoretical model was produced (see Fig. 1). The model illustrates how certain student demographics (year of study,

area of concentration, and academic performance) and information literacy program components (amount of active instruction received, amount of passive instruction received, and total amount of instruction received) impact students' psychological, behavioural, and benefit outcomes. Psychological outcomes include reduced anxiety and increased self-efficacy using online library resources, improved perceptions of online library resources, and improved perception of librarians in terms of helpfulness and value. Behavioural outcomes include improved use of online library resources and librarians. Benefit outcomes include efficiency gains in time savings and a reduction in effort in finding information.

### **3. Methodology**

To collect data, an online survey was administered to full-time undergraduate business students at a medium-sized Canadian university. All 2,049 registered full-time undergraduate business students were sent an email invitation to complete the online survey. To increase the response rate, three reminders were later sent. To encourage recruitment, survey respondents were eligible to participate in a draw for 100 \$50 gift certificates at the local campus bookstore.

In total, 372 surveys were received and deemed usable for further analysis (an 18% response rate). Respondents comprised 51% female and 49% 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 concentration area 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 was generally representative of the students enrolled in the Commerce program at that school.

Survey questions polled aspects of the study's abridged theoretical model (see Appendix A). Student demographics were captured via responses to categorical-type questions; student learning outcomes were captured via responses to seven-point Likert scaled questions. Measures of student learning outcomes were developed within the study. Construct validity, the extent to which the constructs used measure the phenomenon of interest, was assessed by testing the convergent and discriminant validity of each construct. Tables 1 and 2 show construct and item descriptive statistics and reliability assessment. Overall, an acceptable level of item and construct reliability was achieved. To assess discriminant validity of the measures, the table of cross-loadings was constructed. It revealed that all items, except for one (EGEF3), loaded higher on their respective construct than they cross-loaded on other constructs. Therefore, the item pertaining to efficiency gains in effort (EGEF3) was removed from

Table 1  
Construct and item statistics

Construct	Construct mean	Item code	Item mean	Item standard deviation
Anxiety with using online library resources	5.42	ANX1	5.20	1.24
		ANX2	5.53	1.08
		ANX3	5.46	1.07
		ANX4	5.50	1.19
Self-Efficacy with using online library resources	5.48	SELF1	5.48	1.09
		SELF2	5.45	1.10
		SELF3	5.50	1.16
		SELF4	5.50	1.08
Perception of librarian value	5.48	PLNV1	5.53	1.06
		PLNV2	5.45	1.11
		PLNV3	5.53	1.10
		PLNV4	5.39	1.15
Perception of librarian helpfulness	5.58	PLNH1	5.48	1.06
		PLNH2	5.56	1.01
		PLNH3	5.56	1.04
		PLNH4	5.71	1.17
Perception of online library resources	5.60	PVOR1	5.72	1.01
		PVOR2	5.51	1.10
		PVOR3	5.67	1.03
		PVOR4	5.50	1.14
Improved use of online library resources	5.36	IMPR1	5.62	1.24
		IMPR2	5.51	1.28
		IMPR3	5.58	1.20
		IMPR4	5.55	1.24
		IMPR5	5.19	1.28
		IMPR6	5.18	1.38
		IMPR7	4.91	1.29
Improved use of librarians	4.86	IMPN1	4.86	1.25
		IMPN2	4.82	1.28
		IMPN3	4.85	1.24
		IMPN4	4.92	1.21
Time savings in finding information	5.36	EGTM1	5.39	1.22
		EGTM2	5.44	1.15
		EGTM3	5.29	1.28
		EGTM4	5.32	1.17
Reduction in effort in finding information	5.28	EGEF1	5.45	1.15
		EGEF2	5.34	1.17
		EGEF3	5.32	1.17
		EGEF4	5.04	1.26

further analysis since it did not have adequate discriminant validity. The matrix of cross-loadings is available from the corresponding author.

An additional question on the survey in the form of a  $2 \times 2$  matrix captured the amount of ILI received (i.e., the information literacy program components). The left-most vertical column of the matrix listed all courses in the Commerce program that incorporated an ILI component given by librarians. The upper-most horizontal row of the matrix listed the years in which these courses were offered. Respondents were asked to select cells within the matrix that corresponded to the courses they had

Table 2  
Construct and item reliability

Construct	Cronbach's Alpha	Item code	Item loading	Item-total correlation
Anxiety with using online library resources	0.87	ANX1	0.80	0.66
		ANX2	0.93	0.84
		ANX3	0.92	0.83
		ANX4	0.77	0.60
Self-Efficacy with using online library resources	0.88	SELF1	0.92	0.83
		SELF2	0.92	0.92
		SELF3	0.76	0.62
		SELF4	0.85	0.73
Perception of librarian value	0.95	PLNV1	0.94	0.87
		PLNV2	0.95	0.92
		PLNV3	0.96	0.92
		PLNV4	0.89	0.82
Perception of librarian helpfulness	0.90	PLNH1	0.91	0.82
		PLNH2	0.93	0.88
		PLNH3	0.91	0.83
		PLNH4	0.76	0.61
Perception of online library resources	0.93	PVOR1	0.90	0.71
		PVOR2	0.91	0.72
		PVOR3	0.94	0.82
		PVOR4	0.88	0.75
Improved use of online library resources	0.92	IMPR1	0.83	0.75
		IMPR2	0.87	0.79
		IMPR3	0.88	0.81
		IMPR4	0.87	0.82
		IMPR5	0.85	0.79
		IMPR6	0.72	0.64
		IMPR7	0.69	0.61
Improved use of librarians	0.88	IMP1	0.84	0.71
		IMP2	0.82	0.72
		IMP3	0.90	0.82
		IMP4	0.85	0.75
Time savings in finding information	0.88	EGTM1	0.95	0.83
		EGTM2	0.95	0.86
		EGTM3	0.91	0.59
		EGTM4	0.88	0.74
Reduction in effort in finding information	0.85	EGEF1	0.89	0.72
		EGEF2	0.92	0.80
		EGEF3	0.92	0.80
		EGEF4	0.83	0.65

taken and the year in which they had taken these courses. These responses were then translated into measures of duration of information literacy instruction. This was achieved by means of a cross-reference table provided by the chief librarian of the business school. The table listed the number of minutes of ILI given in each course for each individual year, as well as a breakdown of the number of minutes of active instruction and passive instruction given in each course for each individual year.

To determine the amount of instruction that was active versus passive, the chief librarian was given guidance from the researchers on what type of instruction should

Table 3  
Frequency counts of ILI received by amount and type of instruction

Amount of ILI	Passive instruction		Amount of ILI	Active instruction	
	Count	Percent		Count	Percent
None	0	0	None	99	27.7
Low	99	27.7	Low	213	59.7
Medium	172	48.2	High	45	12.6
High	86	24.1			

be considered active, and what type should be considered passive. The chief librarian was told that active instruction encourages students to engage in activities that require the use of higher order thinking skills such as analysis, synthesis and evaluation, and that some examples of activities commonly used in active instruction include reading, writing, analyzing and discussing, and would involve activities where students were in a computer lab interacting with online library resources on their own or in small groups. Conversely, the chief librarian was told that passive instruction 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, look at slides, or watch the instructor demonstrate the use of an online library resource. The passive mode of instruction seeks to impart knowledge to students primarily by having them listen to or receive information, without students working with this information directly or experiencing any hands-on use with online library resources on their own.

Matrix respondent scores were then grouped into categories. Passive instruction scores were grouped into four categories based on the categories *none* (no instruction), *low* (less than 30 minutes of instruction), *medium* (more than 30 but less than 60 minutes of instruction) and *high* (more than 60 minutes of instruction). Active instruction scores were grouped into three categories based on the categories *none* (no instruction), *low* (less than 30 minutes of instruction) and *high* (more than 30 minutes of instruction). Note that it was impossible to have four categories of active instruction since very few students had over 60 minutes of active instruction. Table 3 provides a breakdown of the amount of ILI instruction received by respondents. Overall, students received much more passive than active instruction.

Prior to administration, survey items were face-validated by consulting a team of 30 volunteers, and modified accordingly over two iterations of review. First, a paper-based version of the survey was face-validated based on feedback from PhD students, librarians, sectional lecturers, and ILI experts. Second, undergraduate commerce students were asked to provide their comments on the survey whether the questions were easy to understand, the writing was appropriate for an undergraduate audience, the questions were clear and unambiguous, and the length of the survey was acceptable.

Analysis of the survey data involved the use of Multivariate Analysis of Variance (MANOVA) techniques and post-hoc tests.

Table 4  
Wilk's Lambda results

Variable	Value	F	Hypothesis df	Error df	Sig.
Year in program	0.831	1.367	42.000	890.709	0.062
Area of concentration	0.700	0.971	112.000	2087.347	0.569
Academic performance	0.847	1.172	42.000	852.145	0.214
Amount of active instruction	0.873	1.646	26.000	608.000	0.024
Amount of passive instruction	0.912	1.105	26.000	608.000	0.328
Total amount of instruction	0.869	0.872	48.000	869.275	0.718

Table 5  
Test of between-subject effects – Year in program

Variable	Type III sum of squares	Mean square	F	Sig.
Increased self-efficacy	18.245	6.082	3.309	0.020
Improved use of librarians	15.652	5.217	2.813	0.039
Improved perception of librarians being more helpful	16.947	5.649	2.881	0.036
Improved perception of librarians being more valuable	26.301	8.767	4.335	0.005
Time savings in finding information	20.644	6.881	3.782	0.011
Reduction in effort in finding information	16.255	5.418	3.146	0.025

#### 4. Findings

MANOVA was undertaken to compare group means of the dependent variables (Decreased Anxiety Using Online Library Resources, Increased Self-Efficacy Using Online Library Resources, Improved Perception of Online Library Resources, Improved Perception of Librarians Being More Helpful, Improved Perception of Librarians Being More Valuable, Improved Use of Online Library Resources, Improved Use of Librarians, Time Savings in Finding Information, and Reduction in Effort in Finding Information) for each independent variable at a time (Year in Program, Area of Concentration, Academic Performance, Amount of Active Instruction, Amount of Passive Instruction, and Total Amount of Instruction). A 90% significance level was employed. According to Table 4, significant between-group effects were present for Year in Program and Amount of Active Instruction only. That is, significant between-group effects were not present for Area of Concentration, Academic Performance, Amount of Passive Instruction, and Total Amount of Instruction. Therefore, these independent variables were excluded from further analysis.

Tests of between-subject effects for Year in Program revealed that significant between-group effects were present for six dependent variables: Increased Self-Efficacy Using Online Library Resources, Improved Use of Librarians, Improved Perception of Librarians Being More Helpful, Improved Perception of Librarians Being More Valuable, Time Savings in Finding Information, and Reduction in Effort in Finding Information (see Table 5). Tukey's post-hoc tests revealed that junior students had lower levels of these variables than students in more senior years (see Table 6). A comparison of the mean scores of these variables by year level revealed that second year students reported the highest level of improvements in each of these



Table 6  
Post hoc analysis – Year in program

Variable	Difference	Mean difference	Sig.
Increased self-efficacy using online library resources	1 <sup>st</sup> Year–2 <sup>nd</sup> Year	–0.639	0.020
Improved use of librarians	1 <sup>st</sup> Year–2 <sup>nd</sup> Year	–0.620	0.027
Improved perception of librarians being more helpful	1 <sup>st</sup> Year–2 <sup>nd</sup> Year	–0.658	0.020
Improved perception of librarians being more valuable	1 <sup>st</sup> Year–2 <sup>nd</sup> Year	–0.778	0.004
	2 <sup>nd</sup> Year–3 <sup>rd</sup> Year	–0.591	0.034
Time savings in finding information	1 <sup>st</sup> Year–2 <sup>nd</sup> Year	–0.641	0.018
	1 <sup>st</sup> Year–3 <sup>rd</sup> year	–0.599	0.018
Reduction in effort in finding information	1 <sup>st</sup> Year–2 <sup>nd</sup> Year	–0.602	0.025
	2 <sup>nd</sup> Year–3 <sup>rd</sup> Year	–0.491	0.066

Table 7  
Test of between-subject effects – Amount of active instruction

Variable	Type III sum of squares	Mean square	F df = 2	Sig.
Decreased anxiety using online library resources	13.179	6.590	6.563	0.002
Increased self-efficacy using online library resources	13.218	6.609	8.043	0.000
Improved perception of online library resources	6.168	3.084	3.733	0.025
Improved use of librarians	7.417	3.708	3.600	0.028
Improved perception of librarians being more helpful	11.322	5.661	6.103	0.003
Improved perception of librarians being more valuable	12.501	6.250	6.014	0.003
Time savings in finding information	19.042	9.521	10.085	0.000
Reduction in effort in finding information	14.000	7.000	8.017	0.000

Table 8  
Post Hoc Analysis – Amount of active instruction

Variable	Difference	Mean Difference	Std. Error	Sig.
Decreased anxiety using online library resources	None – Low	–0.466	0.133	0.001
	None – Med	–0.472	0.189	0.035
Increased Self-efficacy using online library resources	None – Low	–0.481	0.120	0.000
	None – Med	–0.375	0.171	0.074
Improved perception of online library resources	None – Low	–0.328	0.120	0.019
Improved use of librarians	None – Low	–0.361	0.135	0.021
Improved perception of librarians being more valuable	None – Low	–0.466	0.135	0.002
Improved perception of librarians being more helpful	None – Low	–0.426	0.128	0.003
	None – Med	–0.460	0.182	0.031
Time savings in finding information	None – Low	–0.554	0.129	0.000
	None – Med	–0.590	0.183	0.004
Reduction in effort in finding information	None – Low	–0.459	0.123	0.001
	None – Med	–0.552	0.176	0.005

ILI six outcomes than students in other years; this is of particular interest to this study since the second year in this school's Commerce Program is the first time students typically receive their first active ILI session.

Tests of between-subject effects for Amount of Active Instruction revealed that significant between-group effects were present for the same six dependent variables

described above plus two more: Decreased Anxiety Using Online Library Resources and Improved Perception of Online Library Resources (see Table 7). Tukey's post-hoc tests showed that, in most cases, students who received active information literacy instruction reported significantly better ILI outcomes (see Table 8). Specifically, students who received up to 30 minutes or more of active ILI had greater reductions in anxiety using online library resources, higher increases in self-efficacy using online library resources, improved perceptions of online library resources, improved use of librarians, improved perceptions of librarians being more helpful and valuable, and greater time savings and reduction in effort in finding information than students who received no active ILI at all. In contrast, those who received over 30 minutes of active instruction reported the same level of improved outcomes as those who had less active instruction.

## **5. Discussion and conclusion**

The above results provide interesting insights on the study's research questions: i) what are the student learning outcomes of active ILI and passive ILI?; ii) does active ILI result in more positive student learning outcomes than passive ILI?; and iii) how does the amount of active ILI received influence student learning outcomes? Importantly, the results suggest that active ILI has a direct effect on yielding positive student learning outcomes, while passive ILI does not. Specifically, active ILI yields: the psychological outcomes of decreased anxiety/increased self-efficacy using online library resources, improved perceptions of online library resources, and improved perceptions of librarians in terms of helpfulness and value; the behavioural outcome of improved use of librarians; and the benefit outcomes of time savings and effort reduction in finding information. These findings suggest that ILI practitioners may wish to turn attention to the delivery of active ILI, and limit or even eliminate the delivery of passive ILI altogether.

Further, results suggest that the amount of active ILI received does not matter. In most cases, people who received more than 30 minutes of active instruction enjoyed the same level of benefit as those who received up to 30 minutes of active instruction. This suggests that active ILI has a very powerful effect in terms of its initial impact and sustaining influence. Therefore, librarians who teach information literacy instruction would be well advised to offer at least one session of active ILI to their students. This may be particularly good news for those librarians working in higher education environments with ILI resource constraints (e.g., librarians with not enough time, low staff numbers, or who have limited access to computer labs to run hands-on interactive sessions with small groups), as it appears that the delivery of a full suite of active ILI is not required to yield positive student learning outcomes. Just one active ILI session may be sufficient to yield desired results.

It is recognized that the reliability and accuracy of the study's results are constrained by certain limitations. The data were collected from a single business school located

in Canada. The data were collected from participant self-reports. Consequently, findings may not be generalizable. However, steps were taken to mitigate the effects of these constraints. The participant sample was representative of the school's population. A sizeable large sample population was recruited. Extensive efforts were made in the recruitment of participants. The questionnaire included negatively-worded items to minimize common method bias.

Future research in this area should investigate the types of active instruction that are most beneficial, to test whether the same results are achieved across different student samples at different institutions. Future research should also flesh out the impact of Year in Program on ILI student learning outcomes. Although results from this study indicate that senior students yield greater student learning outcomes than junior students, there are a variety of other factors that may explain this result better than the actual year of study in which a person receives ILI. For example, students in senior years tend to be older (more mature), closer to graduation (entering the workforce), and have assignments requiring more intensive information gathering and evaluation than students in more junior years of a program; all these variables and their effect on student learning outcomes need to be investigated.

In conclusion, this paper provides support for the delivery of active information literacy instruction in higher education environments. Recommendations for practice are promising in that they call for the delivery of a modest number of active learning opportunities in order to yield positive student psychological, behavioural, and benefit outcomes. More research in this area will provide greater insights on how best to deliver active ILI and under what circumstances and contexts.

## References

- [1] Association of College and Research Libraries, *Information literacy competency standards for higher education*, Chicago, Illinois, 2000. <http://www.ala.org/ala/mgrps/divs/acrl/standards/standards.pdf>.
- [2] H. Julien, A longitudinal analysis of information literacy instruction in Canadian academic libraries, *Canadian Journal of Information and Library Science* **29** (2006), 289–313.
- [3] C.V.M. Bowers, B. Chew, M.R. Bowers, C.E. Ford, C. Smith and C. Herrington, Interdisciplinary synergy: A partnership between business and library faculty and its effects of students' information literacy, *Journal of Business and Finance Librarianship* **14** (2009), 110–127.
- [4] V. Feast, Integration of information literacy skills into business courses, *Reference Services Review* **31** (2003), 81–95.
- [5] H. Julien and S. Boon, Assessing instructional outcomes in Canadian academic libraries, *Library and Information Science Research* **26** (2004), 121–139.
- [6] B. Detlor, H. Julien, R. Willson, A. Serenko and M. Lavallee, Learning outcomes of information literacy instruction at business schools, *Journal of the American Society for Information Science and Technology* **62** (2011), 572–585.
- [7] E. Randeree and L. Mon, Searching for answers in a Google world, *The Reference Librarian* **52** (2011), 342–351.
- [8] T. Cothran, Google Scholar acceptance and use among graduate students: A quantitative study, *Library & Information Science Research* **33** (2011), 293–301.

- [9] H. Julien, B. Detlor, A. Serenko, R. Willson and M. Lavalley, Preparing tomorrow's decision-makers: Learning environments and outcomes of information literacy instruction at business schools, *Journal of Business and Finance Librarianship* **16** (2011), 348–367.
- [10] J. Dewey, *Experience and Education*, Collier Books, New York, 1963.
- [11] C.C. Bonwell and J.A. Eison, *Active learning: Creating excitement in the classroom*, ASHE-ERIC Higher Education Report No.1, The George Washington University, School of Education and Human Development, Washington, D.C., 1991.
- [12] C. Meyers and T.B. Jones, *Promoting Active Learning: Strategies for the College Classroom*, Jossey-Bas, San Francisco, 1993.
- [13] M.W. Keyser, Active learning and cooperative learning: Understanding the difference and using both styles effectively, *Research Strategies* **17** (2000), 35–44.
- [14] M. Levine, The essential cognitive backpack, *Educational Leadership* **64** (2007), 16–22.
- [15] M. Prince and R. Felder, The many faces of inductive teaching and learning, *Journal of College Science Teaching* **36** (2007), 14–20.
- [16] D.C. Walsh and L. Cuba, Liberal arts education and the capacity for effective practice: What's holding us back? *Liberal Education* **95** (2009), 32–38.
- [17] E.E. Allen, Active learning and teaching: Improving postsecondary library instruction, *Reference Librarian* **24** (1995), 89–103.
- [18] T.E. Jacobson and B.L. Mark, Teaching in the information age: Active learning techniques to empower students, *Reference Librarian* **24** (1995), 105–120.
- [19] M. Lorenzen, Active learning and library instruction, *Illinois Libraries* **83** (2001), 19–24.
- [20] B.D. Quigley and J. McKenzie, J. Connecting engineering students with the library: A case study in active learning, *Issues in Science and Technology Librarianship* **37** (2003). <http://listl.org/03-spring/article2.html>.

## Appendix A – Survey Questions

### 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

### 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

**How well do you typically perform academically at university?**

1. In the A- to A+ range
2. In the B- to B+ range
3. In the C- to C+ range
4. In the F to D+ range
5. Prefer not to say

*Note: all items below were measured on a seven-point agree/disagree Likert-type scale.*

**Anxiety with Using Online Library Resources (ANX)**

As a result of the library instruction I received from the librarians, I feel:

**ANX1.** less anxious using online library resources.

**ANX2.** more comfortable using online library resources.

**ANX3.** more at ease using online library resources.

**ANX4.** more uncertain using online library resources. (negatively worded)

**Self-Efficacy with Using Online Library Resources (SELF)**

As a result of the library instruction I received from the librarians, I feel:

**SELF1.** more competent using online library resources.

**SELF2.** more confident using online library resources.

**SELF3.** less capable using online library resources. (negatively worded)

**SELF4.** more knowledgeable about using online library resources.

**Perceptions of Librarian Value (PLNV)**

As a result of the library instruction I received from the librarians, the librarians seem:

**PLNV1.** more useful.

**PLNV2.** more important.

**PLNV3.** more valuable.

**PLNV4.** more essential.

**Perceptions of Librarian Helpfulness (PLNH)**

As a result of the library instruction I received from the librarians, the librarians seem:

**PLNH1.** more approachable.

**PLNH2.** more available to ask for help.

**PLNH3.** more helpful.

**PLNH4.** less concerned about helping students. (negatively worded)

**Perception of Online Library Resources Value (PVOR)**

As a result of the library instruction I received from the librarians, the online library resources at our university seem:

**PVOR1.** more useful.

**PVOR2.** more important.

**PVOR3.** more valuable.

**PVOR4.** more essential.

### **Improved Use of Online Library Resources (IMPR)**

As a result of the library instruction I received from the librarians:

**IMPR1.** I select online library resources better (e.g., I know better which 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).

**IMPR2.** I use online library resource features better (e.g., I know better how to use the various functions within a specific online library resource, such as the library web site, library catalogue or a database such as Business Source Complete, to find the information that I need. Examples of features include mail, printing, saving, exporting, sorting, refining results using limits such as language, date, publication type, etc.)

**IMPR3.** I search for information using online library resources better (e.g., I know better how to conduct an advanced search, subject headings, etc.)

**IMPR4.** I retrieve information from online library resources better (e.g., I know better how to extract and acquire information from an online library resource, such as a journal article, book, etc.)

**IMPR5.** I evaluate the information I retrieve from online library resources better (e.g., I know better how to assess the relevance, reliability, validity, bias and timeliness of the information I retrieve from online library resources).

**IMPR6.** I assess citations of the information I retrieve from online library resources better (e.g., based on the references that I retrieve from online library resources, I can better decipher if the information pertains to a book, a book chapter, or a journal article).

**IMPR7.** I deal with the economic, legal & social issues surrounding the use of online library resources better (e.g., I am better aware of issues around the use of the information I retrieve from online library resources such as copyright, privacy, and censorship).

### **Improved Use of Librarians (IMPN)**

As a result of the library instruction I received from the librarians, when I approach the librarians at our university for help:

**IMPN1.** I ask better questions.

**IMPN2.** I ask basic questions less often.

**IMPN3.** I ask more advanced questions.

**IMPN4.** I phrase my questions more appropriately.

**Efficiency Gains in Form of Time Saving (EGTM)**

As a result of the library instruction I received from the librarians, the information I need for my course work:

**EGTM1.** takes me less time to find.

**EGTM2.** is faster for me to find.

**EGTM3.** takes me more time to find. (negatively worded)

**EGTM4.** is quicker to search for.

**Efficiency Gains in Form of Effort Reduction (EGEF)**

As a result of the library instruction I received from the librarians, the information I need for my course work:

**EGEF1.** is easier for me to find.

**EGEF2.** takes me less effort to find.

**EGEF3.** takes me more effort to find. (negatively worded) – **REMOVED**

**EGEF4.** requires less energy on my part to find.

AUTHOR COPY