

# Learning Outcomes of Information Literacy Instruction at Business Schools

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**This paper reports results from an exploratory study investigating the factors affecting student learning outcomes of information literacy instruction (ILI) given at business schools. Specifically, the potential influence of student demographics, learning environment factors, and information literacy program components on behavioral, psychological, and benefit outcomes were examined. In total, 79 interviews with library administrators, librarians, teaching faculty, and students were conducted at three business schools with varying ILI emphases and characteristics. During these interviews, participants discussed students' ILI experiences and the outcomes arising from those experiences. Data collection also involved application of a standardized information literacy testing instrument that measures student information literacy competency. Analysis yielded the generation of a new holistic theoretical model based on information literacy and educational assessment theories. The model identifies potential salient factors of the learning environment, information literacy program components, and student demographics that may affect ILI student**

**learning outcomes. Recommendations for practice and implications for future research are also made.**

## **Introduction**

Information literacy is knowing when information is needed and the ability to locate, evaluate, and use that needed information effectively (ACRL, 2000). The ability to access information effectively and efficiently for academic purposes, for daily life (e.g., to address health questions or to access government services online), and in the workplace (e.g., to support problem-solving and decision-making) is critical. In the business context, there is particular recognition of the value of this skill set, where "information has become the leading business asset" (Kanter, 2003, p. 23). For instance, five of the seven curricular standards for quality management education put forth by the Association to Advance Collegiate Schools of Business (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, 2006, p. 71). The business education literature, in particular, supports the need to train students in information literacy skills because

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Received July 26, 2010; revised November 16, 2010; accepted November 17, 2010

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there are strategic advantages over competitors, and significantly enhanced levels of productivity and innovation within organizations, when workers are information literate.

However, teaching business information literacy skills is not without its challenges. The amount of business information available, as well as the sources and methods for accessing such information, has grown enormously in recent years. Further, business faculty have observed that business students have difficulty assessing the quality of information sources, conducting effective and efficient searches, and applying ethical standards when using information sources (Bowers et al., 2009). These observations are in line with reports in the library and education literature describing the general lack of information literacy skills students possess, the need to teach these skills to students, and the overwhelming reliance by students on nonauthoritative information sources, such as Google and Wikipedia. These observations are also consistent with the view of information technology educators who advocate the need for better education of business students in information concepts and technology (Wallace & Clariana, 2005).

In response, a growing number of business schools are offering information literacy instruction (ILI) to their students in order to better prepare their graduates for future success. In this respect, many business schools are actively working with librarians—the traditional providers of ILI—to teach students information literacy skills (Jacobson, 1993; Hawes, 1994; Malu & Yuhfen, 2004; Rutledge & Maehler, 2003; Taylor, 2008). This includes teaching students how to utilize information technology tools that provide access to relevant, high-quality, electronic business information sources available through their universities' online library resources (e.g., databases, indexes, journal suites, online catalogs, and library Websites). This is typically done by having librarians provide lectures and demonstrations of research tools for business courses, developing online tutorials, and, to a lesser extent, team-teaching courses in business research (Bowers et al., 2009; Jacobson, 1993; Orme, 2004; Rutledge & Maehler, 2003). Such collaborations between business professors and librarians can ensure that information literacy skills are appropriately incorporated into courses (Fiegen et al., 2002).

In the business school context, ILI is closely equated with online library resources instruction. In the business school context, many of the online library resources that business students are introduced to in their ILI sessions are in fact the same resources made available to them in the organizations they work for upon graduation. For instance, examples of business library resources students typically would be introduced to in their ILI and expected to use in organizations they traditionally work for upon graduation include, among others:

- *Business Monitor Online* (provides country risk, industry, and competitive intelligence information for 175 countries);
- *EIU* (Economist Intelligence Unit's economic data and commentary on countries around the world);
- *Factiva* (provides full-text access to current and archived news and business information from around the world);

- *GMID* (the Global Market Information Database provides business intelligence information on countries, companies, markets, and consumers around the world); and
- *Mergent Online* (provides business and financial information on 25,000 companies around the world, and country profile information).

Note that these business online library resources are authoritative in nature and business students in their ILI sessions are taught what information these resources provide, how to search and retrieve information from these resources effectively and efficiently, and how to evaluate and use information extracted from these resources. These taught skills align very closely with ACRL standards. Further, many of the information literacy skills taught in the ILI sessions concerning the access and use of business online library resources (i.e., how to search, evaluate, and use information from these sources) are transferable skills that students can apply to general information resources available outside the library itself.

Recent evidence suggests that collaborations between professors and librarians in business courses yield statistically significant improvements in students' research skills and the use of business information sources (Bowers et al., 2009). Despite this success, there are calls in the library and education literature for improvements in the quality and delivery of ILI in general (Cooney & Hiris, 2003; Hawes, 1994), and in business schools specifically. For example, Cooney (2005), in her survey of nearly 400 libraries of colleges and universities accredited by the AACSB, identifies such instruction as still "evolving," where collaboration between librarians and business faculty is "overwhelmingly moderate" and only a third of respondents report incorporating the Association of College and Research Libraries' (ACRL) Information Literacy Competency Standards for Higher Education into their instruction efforts with business students.

Further, as accreditation with the AACSB becomes more vital to the viability, reputation, and success of business schools, there has been an increased focus by business schools to include clearly articulated and appropriate measures of student learning outcomes of information literacy instruction as a means of satisfying AACSB accreditation requirements. Business schools that are looking for ways to incorporate ILI into their curricula need guidance on how best to work with librarians to integrate this instruction successfully and how to adequately assess measures of ILI success.

Although there are insights 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 & Boon, 2004), there is a lack of a holistic model that identifies the salient factors potentially affecting student learning outcomes, specifically in the business school context. Research is needed to better understand the factors affecting student learning outcomes of information literacy instruction provided at business schools.

The purpose of this paper is to address this void by describing and presenting findings from an investigation of the delivery of ILI at three business schools. A conceptual

framework sets the boundaries of investigation. Interviews and the application of a standardized test of information literacy skills constitute the study's data collection methods. Analysis of the data yields a theoretical model showing the student demographics, learning environment factors, and information literacy program components that may affect behavioral, psychological, and benefit student learning outcomes. The goal of this research study is to generate a model that describes and identifies the various factors that may affect ILI learning outcomes in the business school context, and to provide recommendations on the delivery of ILI that better prepares business students for success in their academic studies and in the workplace upon graduation. Future research is expected to validate and substantiate potential cause and effect relationships identified in this model.

### Conceptual Framework

According to Lindauer (2004), any assessment of information literacy instruction should involve "three arenas." The first is the *learning environment* in which ILI occurs. This involves components of the learning context surrounding the delivery of information literacy instruction such as the broader program curriculum, co-curricular learning opportunities, and independent learning opportunities. The second is *information literacy program components*. These are specific features of the information literacy instruction itself, such as courses, workshops, reference desk encounters, instructional learning sessions by appointment, and independent learning opportunities. The third is *student learning outcomes*. These are the effects of information literacy instruction on recipients of that instruction. Assessments of these effects include performance measures on tests and course-embedded assignments, course grades, self-assessment, and surveys of attitudes about the learning environment.

Educational assessment theory provides further clarification on student learning outcomes and suggests that they consist of behavioral, psychological, and benefit outcomes (Boyer & Ewell, 1988; Sims, 1992). *Behavioral outcomes* are changes in action. In terms of ILI, the goal would be to yield positive behavioral outcomes such as improved and increased use of online library resources, improved and increased use of librarians, and improved and increased use of the physical library itself. *Psychological outcomes* are changes in attitudes or values. With respect to ILI, the goal would be to yield positive psychological outcomes such as decreased anxiety and increased self-efficacy using online library resources, and improved perceptions of librarians, online library resources, and the physical library. *Benefit outcomes* are effectiveness and efficiency gains. With regard to ILI, benefit outcomes would be those that yield positive effectiveness and efficiency outcomes, such as cognitive gains in knowledge, time savings, effort reduction, higher grades, improved program completion rates, and being better prepared for the workforce.

Various ILI assessments in the literature support the existence of these outcomes. For instance, one study finds

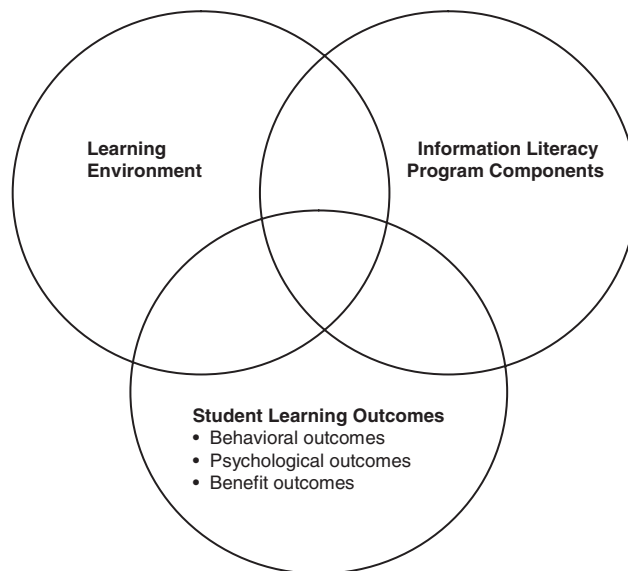


FIG. 1. A high-level representation of the study's conceptual framework.

that students who receive ILI increase their searching effectiveness and are able to select more relevant information sources (Emmons & Martin, 2002). Another investigation reports that ILI outcomes include increased confidence, improved searching skills, and changed attitudes towards libraries (Julien & Boon, 2004). A different study shows a 16% decrease in the use of nonlibrary Websites, and greater confidence and self-efficacy among students after library instruction is received (Roldan & Wu, 2004).

Based on the above theoretical contributions from the information literacy and educational assessment literatures (Boyer & Ewell, 1988; Lindauer, 2004; Sims, 1992), a conceptual framework was developed (see Figure 1 for a high-level representation). This framework was used as a guide for analyzing and interpreting the data collected for this study. The framework set the boundaries of investigation and helped the researchers focus the analysis of the data by providing a theoretical lens from which to glean insights and make discoveries. The framework recognizes the three main arenas of information literacy assessment (the learning environment, information literacy program components, and student learning outcomes) and the key student learning outcomes to consider (psychological, behavioral, and benefit outcomes).

### Methodology

The study incorporated in-depth data gathering at three business schools in Canada. These schools were significantly varied in that they represented different geographical regions of the country, had different-sized student populations, had different histories with AACSB accreditation, utilized different information literacy program components, and placed different emphases on ILI. School A received AACSB accreditation in 2006. This school incorporates information literacy instruction into several of its undergraduate

TABLE 1. Profile of student interviewees.

	N	No. of freshmen/ sophomores	No. of juniors/ seniors	No. of females	No. of international students
School A	18 (34.6%)	6 (33.3%)	12 (66.7%)	8 (44.2%)	4 (22.2%)
School B	14 (26.9%)	0 (0.0%)	14 (100.0%)	7 (50.0%)	3 (21.4%)
School C	20 (38.5%)	6 (30.0%)	14 (70.0%)	9 (45.0%)	1 (5.0%)
Total	52 (100.0%)	12 (23.1%)	40 (76.9%)	24 (46.2%)	8 (15.4%)

courses via close collaboration between the business librarians and course instructors. Instruction is provided through face-to-face group consultation, class presentations, lab tutorials, and reference desk services. Using internal university funding, the business librarians have developed an online information literacy tutorial. A recently hired senior library administrator manages and coordinates instruction across various academic faculties and departments. School B has had AACSB accreditation since 1968. The undergraduate business school program includes compulsory information literacy instruction in a required undergraduate course developed collaboratively with a faculty instructor. Informal instruction occurs via consultation and individual reference service interactions in the library, and through Web-based course-specific research guides integrated into a Web-based learning management system. School C is currently pursuing AACSB accreditation. At this school, there are two core undergraduate courses that include significant information literacy program components, such as tutorials, information problem-solving tasks, and research reports.

Prior to data collection, ethics approval was obtained by the appropriate university ethics board at each of the institutions involved. The same data gathering was used at each study site. Specifically, two data collection and analysis methods were involved.

The first method was a series of one-on-one, open-ended interviews with a variety of stakeholders involved in undergraduate business ILI. At each study site, interviews were conducted with senior library university administrators, business school librarians, business faculty instructors who called upon librarians to give ILI in their courses, and undergraduate business students who had received information literacy training. The interview questions are attached (see Appendix: "Interview Scripts"). These questions were developed jointly by members of the research team via several rounds of iterative review until consensus was reached. Although different interviewers at each school conducted the individual interview sessions, all interviews followed the same agreed-upon interview protocol. Participants were recruited via posters, snowball sampling, classroom announcements, and email requests. The student interviews lasted 10 to 30 minutes, while the others ran approximately 1 hour each. In total, 79 interviews were conducted at the three schools, including

seven librarians, four administrators, 16 course instructors (teaching faculty), and 52 students. Table 1 presents the demographic profile of the 52 students who were interviewed across the three institutions. Informed consent for participation was obtained for all participants at the start of each interview.

Interviews were taped and transcribed and later analyzed by multiple coders using grounded theory techniques (Glaser & Strauss, 1967; Strauss & Corbin, 1998) via the assistance of QSR NVivo text analysis software. The data were initially coded with categories from the study's conceptual framework. In addition, the data were also coded with new categories or "free nodes" as ideas emerged. Categories were combined, integrated, and subdivided through various rounds of coding by the research team into a final hierarchical tree structure. Analysis of these data involved the use of sets and matrix coding queries in QSR NVivo. Sets allowed the data to be grouped by institution (School A, B, or C), interviewee role (librarian, library administrator, faculty member, student), and student demographics (male vs. female, domestic vs. international, freshman/sophomore vs. junior/senior). Matrix coding allowed each of these sets of data to be queried by each individual coding category in the hierarchical tree structure. Setting up the data in this way allowed the research team to ask questions of the data in a rigorous and thorough manner. Each research team member recorded his or her interpretations or insights from these queries in workbooks using standard word processing software. Later, the research team collectively compared and contrasted each individual researcher's notes to identify a final set of predominant themes and patterns across the entire interview dataset.

The second method was the application of a standardized information literacy testing instrument called SAILS (Standardized Assessment of Information Literacy Skills; <https://www.projectsails.org>). Operated by Kent State University Libraries and Media Services, SAILS is an online knowledge test with multiple-choice questions targeting a variety of information literacy skills. The test items are based on the ACRL Information Literacy Competency Standards for Higher Education. The measurement model used by SAILS is item response theory (IRT), specifically the one-parameter Rasch model. IRT calculates scores based on a combination of item difficulty and student performance.

TABLE 2. SAILS test pools.

	N	Year				
		Freshman	Sophomore	Junior	Senior	Other
School A	949	514 (54.2%)	404 (42.6%)	24 (2.5%)	6 (0.6%)	1 (0.1%)
School B	66	56 (84.8%)	9 (13.6%)	1 (1.5%)	0 (0.0%)	0 (0.0%)
School C	72	12 (16.7%)	19 (26.4%)	17 (23.6%)	22 (30.6%)	2 (2.8%)

The process begins with merging data from all institutions into a benchmark file. Student responses to the items on the test are then used to determine the difficulty level of each item. Once that determination is made, student responses are analyzed to determine an average score for each group or cohort. Scores are placed on a scale that ranges from 0 to 1,000. Applying the same measurement instrument to test business student learning outcomes allowed the research team to understand how differences in the learning environment and information literacy program components at the three study sites affected student information literacy skills. Table 2 shows some basic statistics on the sample populations that took the test at each school. Note that the difference in sample sizes between School A and those of Schools B and C is due to the fact that the test was administered as part of a required course at School A, while the test was taken outside of a class setting at Schools B and C.

## Findings

The collection and analysis of interview and SAILS data across the three study sites yielded many results. To present these findings, the study's conceptual framework is used as a guide. That is, the findings are organized in terms of information literacy program components, the learning environment, and student learning outcomes. Within each of these categories, individual results per school are first presented, followed by a description of general findings across the three institutions. Note that the results reported in the Information Literacy Program Components and Student Learning Outcomes subsections below are derived from an analysis of the interview and SAILS data collected from all participant groups (i.e., students, faculty, librarians, and library administrators), while the findings reported in the Learning Environment subsection are mainly based on analysis of the interview data from faculty, librarians, and library administrators only (i.e., student interview data contained little, if any, opinions about factors of the learning environment).

### *Information Literacy Program Components*

At School A, ILI is given to students in all years, particularly in marketing-oriented courses. In students' freshmen and sophomore years these marketing courses are mandatory,

so all students are exposed to ILI. In total, all students attend at least three mandatory ILI sessions in their course work. Most students receive four to five ILI sessions in the undergraduate business program. Students concentrating in marketing get more exposure to ILI than students concentrating in other majors. Faculty tend not to give their own ILI, but rather rely on business librarians to provide information literacy instruction. ILI is highly aligned with classroom assignments. In general, faculty appreciate having the librarians offer ILI to their students since faculty want students to use better information sources in their assignments and reports. Librarians note that most instruction given to date is on the use of the information resources, with little attention being paid to the evaluation of information or the ethical and legal use of information. The ILI teaching approach used in lower-level courses is to have a librarian first give a guest lecture and PowerPoint presentation to students in class. During this lecture, a general overview is provided and key online resources are highlighted. This is followed by smaller-grouped tutorial sessions where students either get a library orientation or hands-on computer instruction. In the hands-on tutorial sessions, ILI is geared to the mechanics of accessing and using online library resources. In upper-year courses the ILI teaching approach differs in that tutorial labs are not given. In all years, prior to ILI guest lectures given by librarians, PowerPoint slides and instructional tutorial materials are posted on the Web for students. Hand-outs are also made available during some ILI. In addition to providing class-specific ILI, the library also offers several award-winning online tutorials on information literacy developed by colleges and universities across North America that students can seek out themselves and take.

At School B, over various courses, librarians come into the classroom and give lectures on the library resources available, how to use them (e.g., use of keywords) as well as how to evaluate the quality of information found. Librarians give general instruction on what the library offers in a first-year mandatory business course, as well as specific instruction on library resources to use for that class. For other courses, librarians come to class and give a lecture on resources to use for that specific class. Librarians often post links to resources specific to a class on a Webpage dedicated to that class. Some faculty give their own information literacy instruction to students. Although students receive information literacy instruction in

the classroom from both librarians and faculty, the majority of the ILI that students receive actually comes in the form of individual/group follow-up sessions with librarians.

At School C, professors tend to give their own ILI to students in class. However, this is not done across the board with all instructors. The ILI given by professors tends to be a quick walk-through of some critical resources with which a particular professor is familiar. Emphasis is on access and use of these resources. One professor actually took his/her students to the library to give students an overview of the resources found there. Another professor recommended students visit the library for additional expert ILI—only one student interviewed indicated that he/she actually followed this advice. At School C, librarians do offer ILI sessions, but these mostly occur outside the classroom. Students must sign up themselves; very few business students take advantage of such offerings. Occasionally, librarians go to the classroom to give a talk about the resources in the library available for use when asked to do so by an instructor. However, this is not a common occurrence. There is no mandatory course where ILI is given by librarians.

In terms of general findings concerning information literacy program components across the three institutions, the following factors were found to be noteworthy.

*Information literacy skills taught/ACRL standards emphasized.* Students highly appreciate ILI that is practical and specific (e.g., how to use and search for information) as opposed to ILI that is general. They appreciate the time savings and the ability to find information they need in shorter amounts of time. There seems to be a disconnect between what faculty desire ILI to be (i.e., how to access and use the online resources, how to evaluate information found, how to treat information ethically) and what ILI actually is or how it is perceived by students (i.e., just about access and the use of online resources).

*Tied/not tied to an assignment.* Interview data suggest that it is important to align ILI with a course assignment, as it rallies student interest and motivation to learn what is taught. Most students interviewed liked having the instruction tightly tied to an assignment, while a very small number of students indicated that a more general orientation not tied to a specific assignment nor an online resource was preferable. Librarians and library administrators reported the need to tightly align ILI to a specific course assignment. Their rationale was that this was required to get students interested and motivated. It was also seen as a “hook” and a method by which to start building a longer-term relationship and appreciation for the library and library staff. Students appreciate learning about online databases that are relevant to their course, and having ILI tied to a course assignment is one way of accomplishing this.

*Timing of ILI.* Timing of ILI is critical. Interview data suggest that ILI ideally should be given “just-in-time” when students are just about to begin their information search.

Librarians and library administrators indicated that timing was very important when aligning ILI with course work. They stated that ILI is most effective when students need to access and use the information resources discussed in the ILI sessions for their assignments. Thus, there was great consensus that ILI is best delivered when students are just about to start looking for information.

*Mandatory/voluntary ILI.* Interview data suggest that offering optional ILI sessions, which are not part of a class, does not appear to rally student interest in or attendance at these sessions. Very few students expressed the need or desire to take voluntary ILI courses.

*Passive vs. active instruction.* Analysis of the interview data suggests that ILI that encourages interactivity and hands-on experimentation (active instruction), such as that found in tutorial-based hands-on computer training, is preferable to ILI where information is disseminated strictly through lectures and/or online demonstrations (passive instruction). Students like the step-by-step instruction offered in a hands-on computer training environment where they can follow along as well as explore on their own. In contrast, students voice displeasure and find little value in receiving ILI in the form of a lecture or a demonstration. Similarly, for librarians, the ideal instructional delivery mechanism is a combination of face-to-face and online delivery, with preference for small groups and active participation.

*Instructional materials available/not available.* Students appreciate reference materials that accompany ILI (e.g., PowerPoint slides, handouts). However, not all students are aware these materials are available.

*Amount of material taught in a session/length of session.* Students indicate that they do not like racing too quickly through the online resources in an ILI session. This occurs when the length of a session is too short to cover the material presented. Students express a need for a balance between the length of the teaching session and the amount of content covered.

#### *Learning Environment*

School A is ahead of the pack in terms of improving and developing its ILI learning environment. At School A, a strong attempt is being made by librarians and library administrators to create an environment where ILI is at the forefront of the library and the services it offers, and to revamp current instructional practices to improve ILI across the board. This is most evident through the recent hiring of a learning librarian and development of in-house professional ILI training and support for librarians. Most students are aware of ILI; computer labs and the development of online tutorials are seen as critical resources for ILI. Librarians cannot keep up with the demand from business faculty to incorporate ILI sessions in their classes. Efforts are being made to

launch a mandatory information literacy course in the first-year undergraduate business program. Evaluation of ILI is done on a regular basis, both through informal observation and annual SAILS testing.

School B has a supportive learning environment, although not as strong as School A's. Emphasis is on developing relationships with business faculty, especially by targeting new faculty, as means to encourage ILI sessions for students. Although there is no specific budget for ILI at School B, students are aware of information literacy instructional opportunities, and computer labs and the development of online tutorials are seen as critical ILI resources. Librarians keep up-to-date on their ILI skills through conferences, job shadowing, and workshops. At School B, ILI assessment is done informally through observation and librarians talking to teaching faculty.

At School C the learning environment is unclear. While the importance of ILI is recognized by librarians, the environment itself is not conducive to ILI promotion or success. Over the years, fewer and fewer business students make use of library services. There is no specific budget for information literacy instruction, and most students do not even know about information literacy instructional opportunities. Librarians indicate that their relationships with business faculty need to be improved. Business faculty report they have little interaction with librarians; several faculty members provide their own rudimentary information literacy instruction to students. Librarians at School C are trying to understand why the library is becoming decreasingly important and more distant for both business students and faculty. The librarians welcome any potential collaboration with these stakeholder groups.

In terms of general findings concerning the learning environment across the three institutions, the following factors were found to be noteworthy.

*Curriculum.* Librarians are aware of the importance and need to incorporate ACRL information literacy standards into curriculum design, and call for the better integration of information literacy skills development in the undergraduate business curriculum, such as through a mandatory information literacy business course where students can learn research basics and source evaluation. Librarians stress the need to teach information literacy skills early on in a student's undergraduate education.

*Evaluation of ILI training.* Regular and rigorous evaluation of the ILI received and information literacy skills taught is a necessary component in ensuring the delivery of high-quality ILI in terms of its overall efficiency and effectiveness. In practice, this is difficult to implement. Benchmarking is required.

*Budgets and resources.* Adequate and sustainable budgets and resources dedicated to the delivery of high-quality ILI are required to guarantee its long-term success and impact on students. Financial constraints that limit the hiring

and training of qualified information literacy instructors, promotion and marketing of information literacy training opportunities, and the delivery of meaningful instructional experiences compromise the transfer and dissemination of information literacy skills to students.

*Attitudes toward the need for ILI.* A supportive culture that embraces and understands the value of students possessing strong information literacy skills is critical to ILI success. Teaching faculty must recognize the value of students learning these skills, and the ability and willingness of librarians to facilitate the learning process. Librarian administrators must be willing to promote ILI and set up librarians for success in this regard. Students need to value and recognize the importance of information literacy skills for school and career success.

*Relationships with librarians.* Positive working relationships with librarians can improve the delivery and promotion of ILI. As such, librarians need to cultivate relationships with both students and faculty. Interactions with students can occur through a variety of ways, such as through face-to-face contact, email, posters, Website advertisements, and the use of social networking technologies. Cultivating relationships with professors from an early stage and through face-to-face interaction is an effective way of gaining faculty awareness and support of ILI. Many librarians recognize that with strong faculty support it is easier to develop relationships with students.

#### *Student Learning Outcomes*

The SAILS test is a useful mechanism by which to assess the information literacy skill levels of students. It provides an assessment of the following eight information literacy skills: i) developing a research strategy; ii) selecting finding tools; iii) searching; iv) using finding tool features; v) retrieving sources; vi) evaluating sources; vii) documenting sources; and viii) understanding economic, legal, and social issues. Standardized scores for students at Schools A, B, and C were compiled by Kent State University, the administrators of the SAILS instrument (see Table 3). Scores are placed on a scale that ranges from 0 to 1,000. The accuracy of the scores reported in Table 3 is affected by sample size and sample variability. Small samples or large sample variability can reduce the accuracy of the score calculation. As such, the true group average score falls between two numbers. Those numbers can be calculated by adding and subtracting the standard error to the reported score. In Table 3, standard error ranges for each information literacy skill for one of Schools A, B, and C that do not overlap with the standard error ranges for the same information literacy skill at the other two schools indicate an information literacy skill at that school that is significantly different from the other two schools (these are bolded and italicized in Table 3). Those standard error ranges that do overlap indicate an information literacy skill at a particular

TABLE 3. Information literacy skills across schools A, B, and C.

	Information literacy skills							
	Developing a research strategy	Selecting finding tools	Searching	Using finding tool features	Retrieving sources	Evaluating sources	Documenting sources	Understanding economic, legal, and social issues
School A	564	541	541	<b>626</b>	560	583	582	534
Standard error	(+/-6)	(+/-9)	(+/-6)	<b>(+/-10)</b>	(+/-11)	(+/-6)	(+/-9)	(+/-7)
Standard error range	558-570	532-550	535-547	<b>616-636</b>	549-571	577-589	573-591	527-541
Within-rank	4	7	6	1	5	2	3	8
School B	572	574	565	572	564	590	586	<b>578</b>
Standard error	(+/-27)	(+/-29)	(+/-27)	(+/-44)	(+/-48)	(+/-25)	(+/-38)	<b>(+/-25)</b>
Standard error range	545-599	545-603	538-592	528-616	516-612	565-615	548-624	<b>553-603</b>
Within-rank	6	4	7	5	8	1	2	3
School C	575	550	518	555	547	580	565	555
Standard error	(+/-23)	(+/-29)	(+/-24)	(+/-35)	(+/-36)	(+/-24)	(+/-30)	(+/-27)
Standard error range	552-598	521-579	494-542	520-590	511-583	556-604	535-595	528-582
Within-rank	2	6	8	5	7	1	3	4

school that is not significantly different from the other two schools.

Overall, the standardized scores received were not strong across all three institutions. Most values fell in the 530-580 range (out of a scale from 0-1,000). This moderate scoring is reflective of the sample populations that took the test that comprised a large representation of first-year students who, prior to taking the test, received little information literacy instruction in their university education. Statistically different scores were obtained on only two skills sets:

- Students at School A performed significantly better than students at Schools B and C on “using finding tool features.” This result probably reflects the focus of ILI at School A on the use of specific databases (tools) for specific class assignments.
- Students at School B performed significantly better than students at School A on “understanding economic, legal, and social issues.” This finding probably reflects the general and broad introductory information literacy training students receive at School B in a first-year mandatory business course where legal and social issues are emphasized.

The best test results for students at School A were obtained on items testing “using finding tool features,” “evaluating sources,” and “documenting sources.” Students at School B performed best at “evaluating sources,” “documenting sources,” and “understanding economic, legal, and social issues.” At School C, students performed best at “evaluating sources,” “developing a research strategy,” and “documenting sources.” It is interesting to note that all students performed relatively well at “evaluating sources.” This finding is inconsistent with the concerns expressed by librarians and teaching faculty during the interview sessions that students lack this skill; however, these data do support students’ apparent lack of concern about developing their evaluation skills. It is also interesting to note that students at all three schools also did well at documenting sources. This may be due to the fact that students are frequently required to cite and use proper bibliographic formats in their written school assignments.

The worst test results for students at School A were “understanding economic, legal, and social issues,” “selecting finding tools,” and “searching.” Students at School B performed worst at “retrieving sources,” “using finding tool features,” and “searching.” At School C, students scored worst at “searching,” “retrieving sources,” and “selecting finding tools.” It is interesting to note that business students across all three institutions had “searching” in their bottom-three ranked skill set list. This corresponds to comments made by students that they recognize they possess poor search skills and wish to improve in this area. Faculty and librarians acknowledge the poor search skills of students in terms of using authoritative online library resources, but point out that students are adept at using search tools such as Google to find general Internet-based information.

In terms of general findings concerning student learning outcomes across the three institutions identified from the interview sessions, the following factors were found to be noteworthy. These are presented in terms of behavioral, psychological, and benefit outcomes.

*Behavioral outcomes.* Most students report improved behavioral changes following ILI. The majority of them want to learn more about the library (both the physical library and the online resources it provides) after receiving ILI. They approach and ask for help from librarians more often after receiving information literacy skills training. Increased student engagement following instruction is also reported by librarians. Librarians indicate that after receiving ILI, students ask more sophisticated questions and start to use library resources earlier in the process of research for assignments. If assignments requiring the use of authoritative library resources are worth a large percentage of a course grade, students’ use of such resources is especially increased. Some students also note that the instruction they experienced increases their information-finding skills, such as specific searching techniques, search planning strategies,



and evaluation skills. A sizeable number of students also report increased usage of the physical library after receiving ILI and better usage of the resources that the physical library offers.

*Psychological outcomes.* Changes in attitudes or values from ILI are largely encouraging. A large portion of the comments from student interviewees involve reports of increased confidence (decreased anxiety) using online library resources. Most comments also indicate improved perceptions in three keys areas: i) online library resources in terms of the quantity and quality available; ii) librarians in terms of their knowledge about finding information, and their approachability and willingness to help students find information in the future; and iii) the physical library itself in terms of the study spaces and physical information resources and tools available there.

*Benefit outcomes.* Students interviewed at all three schools report that ILI results in a reduction in effort to find information. Students appreciate the increased convenience they experience when the information they seek is easier to find and when they are able to save time. Time saved is apparently especially salient for database selection and facility with database interfaces. Students indicate that they receive better grades as a result of instruction, especially when their course assignments require the use of information resources available through the library. Students report increased understanding (cognitive gains in knowledge) of the range of information available via library-supplied databases, and that they are more aware that information provided by the library is relevant, authoritative, and of high quality. Interestingly, students tend not to recognize that the ILI they experienced would be applicable in their daily lives. Their expectations of the application of information literacy skills in their workplaces depend, in students' views, on whether or not they will have access to familiar information resources, and on the specific nature of the jobs they will hold. Thus, students' expectations of the transferability of their information literacy skills to contexts outside of school, or of their ability to use new information sources, are limited. This view is in contrast to those of librarians and faculty that students would be better prepared for their careers having received ILI.

Certain student demographic factors identified from the interview sessions were also found to impact ILI student learning outcomes, as follows.

*Year in program.* Students further along in their academic programs tend to be more appreciative and receptive to ILI. More advanced students are also more inclined to ask reference questions of librarians and to sign up for extra ILI sessions. More senior students tend to report more frequently that the ILI they received results in reduced effort when seeking information, better research skills, improved search skills, positive psychological outcomes, and greater appreciation of the value of library databases. More senior students are also more likely to comment on their improved grades as a result of

these instructional sessions. These findings may indicate that positive psychological outcomes and recognition of the value of instruction may increase over time, as students experience more instruction, and have opportunities to practice their new skills. Of interest, some senior students report that they ended up reverting back to using Google and other Internet search engines to find information for their assignments in lieu of library resources since their confidence in finding and discerning high-quality information from these general sources increases as a result of the ILI they receive.

*Gender.* Analysis of the interview data suggests that female students value the benefit of saving time more than other benefits of ILI (e.g., better grades, a reduction in effort). One possible reason for this is that females tend to conduct longer, more comprehensive, in-depth information searches than males, who are more selective and invest less time in their searching (Hupfer & Detlor, 2006). Thus, time savings resulting from improved information searching skills would be favorable to females more so than to males.

*Domestic/international.* Domestic students were more inclined than international students to see no need for further ILI or no value in the ILI received. Further, domestic students were more inclined to report limited information literacy skills acquisition as a result of instruction.

*ILI relevance to career.* Students were more inclined to indicate that they would use the information literacy skills taught if these students could see potential or practical use of these skills in their future careers. For example, at School A most of the ILI was aligned with marketing courses, and students who indicated a preference for a career in marketing were more inclined to state that they would use the skills taught in their future workplaces.

*Preference for easy-to-use resources and good-enough information.* A small minority of students report no behavioral changes following ILI (i.e., no change in their skills or abilities). These students, however, are those who clearly preferred familiar and convenient sources like Google and Wikipedia, because these provide "good enough" information. These students also report a strong dislike for library-provided database interfaces, finding these to be unnecessarily complex; unsurprisingly, these students report negative experiences with their ILI, or with using online library resources.

*Academic performance.* The interview data suggests that academically low-performing students are less likely to have positive student learning outcomes from the ILI received. That is, this type of student is more likely to not adopt or use online library resources in the future, show an increase in appreciation for librarians or library resources, nor experience efficiency or effectiveness benefit gains as a result of the ILI received.

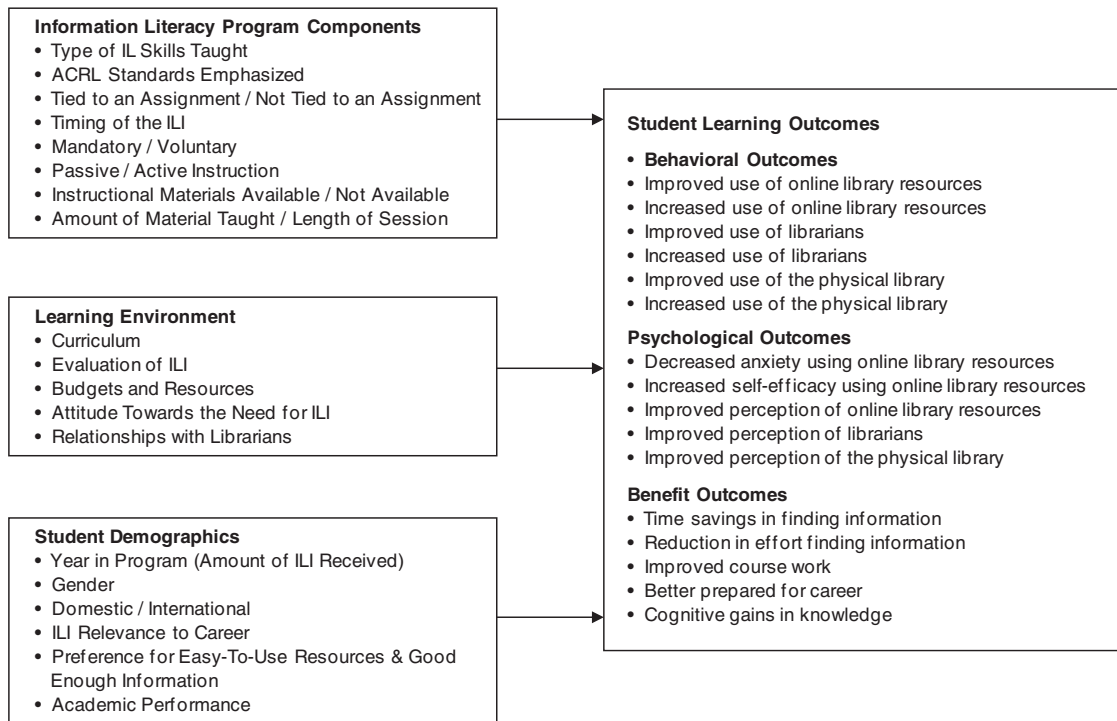


FIG. 2. Factors potentially affecting ILI student learning outcomes.

## Discussion

The findings from the analysis of the interview data and SAILS testing paint a detailed picture of the complexities surrounding the student learning outcomes of information literacy instruction at business schools. Overall, a variety of information literacy program components, learning environment factors, and student demographics were identified and described in terms of how they potentially impact behavioral, psychological, and benefit outcomes (Figure 2).

In terms of information literacy program components, the specific types of IL skills taught and ACRL standards emphasized in the instruction were described as impacting what students learn. Having instruction tied to an assignment, delivering instruction just in time when it is most needed, and mandating instruction all seem to be strong influences in yielding positive student learning outcomes. Active instruction (e.g., the use of hands-on interactive training) and the provision of instructional materials also were shown to be potentially enabling forces. Students, in general, were found to be more receptive to ILI when the length and amount of instruction was kept within reasonable learning limits. All these findings are consistent with reports from college and university educators, and with results from similar types of studies found in the library literature (cf., Cooney & Hiris, 2003; Kember; 2007; Knight, 2010; Orme, 2004; Tice et al., 2005).

With respect to the learning environment, having the undergraduate curriculum designed for successful information literacy skills development throughout a student's entire program of study, especially from first year, were described as yielding positive student learning outcomes. Regular evaluation of the effectiveness of ILI seems to help ensure

high-quality delivery; ample evidence from the library literature supports this finding (cf., Cooney & Hiris, 2003; Julien, 2006a,b; Julien & Boon, 2004). Sufficient and sustainable budgets and resources were noted as factors that could guarantee ILI program success (cf., Feast, 2003; Julien, 2006a). Positive attitudes towards ILI by all campus stakeholders and positive working relationships with librarians by students and faculty appeared to foster positive student learning outcomes as well (cf., Feast, 2003; Julien & Given, 2003; Wu & Kendall, 2005).

In terms of student demographics, students with the following characteristics seemed to be more responsive to ILI and more likely to exhibit positive student learning outcomes from instruction: those who were further along in their undergraduate programs (i.e., received more ILI), those who were international students, those whose career goals meshed well with the subject matter taught in the ILI, and those with stronger grades. Females, in general, were found to more likely appreciate any time-savings benefit that ILI could provide. Students who preferred easy-to-use resources and were satisfied with good-enough information appeared less likely to reap any positive student learning outcomes.

Positive student learning outcomes can be explained in terms of positive behavioral, psychological, and benefit outcomes. Positive behavioral outcomes include improved and increased use of online library resources, librarians, and the physical library itself. Positive psychological outcomes include decreased anxiety with and increased self-efficacy in using online library resources, as well as improved perceptions of librarians, online library resources, and the physical library. Positive benefit outcomes include time savings and

effort reduction in finding information, improved course work (e.g., higher grades), cognitive gains in knowledge in library resources and benefits, and being better prepared for the workforce upon graduation. Note that the behavioral, psychological, and benefit outcomes identified in Figure 2 are simply the learning outcomes that result when students receive ILI; these outcomes should not be interpreted as characteristics of an information literate student, but rather as the effects that happen to a student who receives ILI.

Although described above as a potential list of factors that have effects on a list of student learning outcomes, the model represented in Figure 2 is not intended to imply causality. Rather, the model is meant to be descriptive in nature and a vehicle from which recommendations can be made. Further, the model is probably more complex than drawn. For example, not all factors identified in the model are likely equal in their effect (i.e., some may be more influential than others; some may generate certain student learning outcomes that others do not; some may be necessitating factors that must be in place while others may be optional). Further, there are most likely interactions between these factors that yield compounding and ripple effects on student learning outcomes. More research is needed to determine the more salient factors depicted in the model and the impact these factors actually have on which student learning outcomes. That is, future research should demonstrate and validate causality of the factors listed on the left-hand side of the model (i.e., information literacy program components, learning environment factors, student demographics) on factors listed on the right-hand side of the model (i.e., behavioral, psychological, and benefit outcomes). In response, members of the author team are currently conducting such an investigation via administration of a Web survey to full-time undergraduate business students at one of the participating schools in this study. Survey items are based on an abridged version of the model depicted in Figure 2. Analysis of the data involves both multivariate analysis of variance (MANOVA) and structural equation modeling techniques as means of testing the model quantitatively.

The interplay of factors and their effects on student learning outcomes is evident in the description of the information literacy instruction given at the three participating schools in this study. The schools had various learning environments and information literacy program components, but experienced different student learning outcomes. For instance, School A works hard at integrating various ILI sessions in several required business courses across the curriculum, regularly evaluates student information literacy skills, has a supportive teaching environment, and continues to foster strong relationships with key faculty members. The emphasis is on teaching specific information literacy skills to help students find information they need for targeted class assignments. As a result, students score highly at “using finding tool features” and show great awareness and appreciation of librarians, the library, and its resources. At School B, cultivating relationships with professors is paramount, and one of the key ILI components is general information literacy instruction in a mandatory first-year course not tied to a specific

assignment. As a result, students score highly at “understanding economic, legal, and social issues” (more so than the other two schools) and not as strongly at “using finding tool features.” At School C, the teaching environment is less progressive. The library is losing business students and is unsure of what students need or to what degree they are receiving ILI in the classroom. Overall, there is a greater disconnect between the library and the business faculty at School C, as the learning environment is unclear. As a result, students at School C report less appreciation and use of online library resources than students at Schools A and B.

Several recommendations based on the model depicted in Figure 2 can be made to practitioners involved in the delivery of ILI at academic institutions. These include ensuring ILI is tied to a specific class assignment, is given just in time when the information is needed, is mandatory to attend, involves lots of active instructional opportunities (e.g., hands-on, interactive), and is neither too long in length nor rushed. Further, ILI should be planned out across the entire curriculum, sufficient and sustainable budgets and resources should be in place, and faculty appreciation of information literacy instruction and working relationships with librarians should be fostered.

Although the model depicted in Figure 2 was based on data analysis obtained at business schools, the authors believe that the model can equally be applied to other academic disciplines and not just business. Having said that, future research in this area would benefit from a comparison of this model across other types of faculties and schools to see if any differences or similarities exist. In addition, future research in this area would also benefit from testing this model at other business schools to see if the same or different results would be produced.

It is recognized that the reliability and accuracy of the model is constrained by certain limitations. There is the possibility that some respondents wanted to impress or gain sympathy from the member of the research team (i.e., a faculty member in some instances) who interviewed them. The data were collected from a small sample of business schools (i.e., three). Only Canadian business schools were investigated. Most interviews were conducted with students (i.e., a larger number of interviews with librarians, librarian administrators, and teaching faculty would have been preferred). Data provided by international students were grouped together. At the same time, some variability in the sample of international students is expected. Nevertheless, it is still valuable and interesting to compare the results between domestic and international students since the international group was significantly different from the domestic group itself. Consequently, the findings may not be generalizable. However, steps were taken to mitigate the effects of these constraints. The participating schools in this study were sufficiently varied. Extensive efforts were made in the recruitment of participants. Respondents were informed about their anonymity and confidentiality. None of the respondents was in a power relationship with research team members. A large and sufficient number of interviews were carried out. Several

rounds of intensive analysis of the interview data and SAILS testing were carried out by various members of the research team.

Although Figure 2 presents a single, unified holistic model of the factors potentially affecting ILI student learning outcomes as identified from an analysis of data from a varied set of informants (i.e., students, librarians, library administrators, and faculty), it is noteworthy to point out that different, and often contrasting, opinions and observations were obtained from student and nonstudent participants:

- While most librarians, library administrators, and faculty have high expectations of student learning outcomes as a result of ILI training, student feedback suggests that although there are several positive outcomes from ILI, the magnitude and extent of these outcomes do not match the expectations of librarians, library administrators, and faculty.
- Despite the beliefs of librarians, library administrators, and faculty that ILI teaches students how to evaluate information better, few students acknowledged an improvement in their ability to evaluate information as a result of their training. This benefit seems secondary to the other benefits gained by students.
- Despite librarians', library administrators', and faculty members' beliefs that students are gaining knowledge about how to use the library databases effectively through ILI, the extent to which students recognize or acknowledge this themselves is much less.
- Generally speaking, librarians, library administrators, and faculty believe that students are lacking the necessary information literacy skills. This stands in contrast to the perceptions of many students, who tend to see their skills as well developed or adequate for completing school assignments.
- Students and nonstudents involved in this study have different opinions regarding which information literacy skills students most need to work on. While students often note that they would like to improve their search skills, faculty, librarians, and library administrators believe that students need to work on understanding what constitutes a credible source.
- Students are not aware of the transferability of their information literacy skills outside of school; however, faculty, librarians, and library administrators are well aware that students will benefit in the workplace from the information literacy skills taught.

## Conclusion

Recognizing that business schools are offering information literacy instruction to their students as a means to better prepare their graduates for future success, this paper reports results from an exploratory study investigating the factors affecting student learning outcomes of information literacy instruction given at business schools. Specifically, the potential effects of student demographics, learning environment factors, and information literacy program components on behavioral, psychological, and benefit outcomes were examined. Importantly, analysis yields the generation of a new theoretical model based on information literacy and educational assessment theories that identifies potential key factors of the learning environment, information literacy program

components, and student demographics that may affect ILI student learning outcomes.

It is the hope of the researchers involved in this study that the suggested theoretical model will serve as a basis for future investigations and expose valuable recommendations for practitioners. Such research and practice are needed. The amount of business information, and the sources and methods for accessing such information, continue to grow. Business students have difficulty assessing the quality of information, conducting efficient and effective searches, and applying ethical practices to using information once found. Students need improvement in their information literacy skills. In response, business schools need to launch successful ILI in their curriculums and figure out the best way to work with librarians (the traditional providers of ILI) to do this. Understanding the factors surrounding ILI that yield positive student learning outcomes would help in this regard.

## Acknowledgments

This research is supported by standard research grant 410-07-2289 from the Social Sciences and Humanities Research Council of Canada (SSHRC).

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## Appendix: “Interview Scripts”

### *Interview Script for Students*

1. Are you aware of any opportunities offered by library staff to learn business research skills available?
  - a. If yes, when and how did you hear about it?
  - b. Can you tell me about that?
  - c. Have you participated in any consultations, web/blackboard based course guides, web based subject guides, or class sessions?
2. Have you participated in any opportunities to learn business research skills [define] (e.g., in school, or at university, or through any particular courses)? [if not, go to question 4]
3. If so, can you describe that learning opportunity?
  - a. Was this learning mandatory (e.g., part of a required course) or optional? If optional, what was your primary motivation for engaging in this learning?
  - b. What do you see as the benefits or outcomes of that learning (e.g., psychological, behavioral, cognitive)?
  - c. Did you save time, get better grades, have better understanding of types of business information sources available (e.g., industry studies, corporate reports, market research reports), other benefits?
  - d. What was especially helpful about that learning (e.g., specific topic elements, timing, instructional method, pedagogic techniques)?
  - e. In what respects might that learning have been more helpful?
  - f. Offer specific examples when you actually applied your business research skills in your schoolwork.
  - g. In which courses that you already took were business research skills most useful?
  - h. What skills do you still want to develop further?
4. Do you believe you can find and evaluate business information required to support business decisions? Are those skills going to help you in future? If yes, where and how can you possibly apply them?
5. If you have not received any training in business research skills, do you think that your business research skills are sufficient to allow you to do the academic research you need to do?
6. Can you think of a time when a lack of skills hindered your ability to access or use information for academic purposes?
7. Demographic Questions
  - a. Gender
  - b. Age
  - c. Program of study (HCom, BCom, Engineering with Business Major, etc.)
  - d. Status (part-time, full-time, international student (i.e., on a student visa), foreign exchange student)
  - e. What year of study are you in?

### *Interview Script for Librarians*

1. Do you currently or have you in the past provided information literacy (IL) skills training for Business students? (no go to #5)
2. If so, how does the library promote this training to students?
3. Who initiates IL training? Is it part of the regular library procedures? Do faculties or professors request IL training for their students?
4. Can you describe the nature of that training?
5. Based on your personal opinion, what percentage of Business students do you think experience info literacy training on campus?
6. What aspects of IL training for Business students are especially useful (e.g., specific topic elements, timing, instructional method, pedagogic techniques)?
7. What do you see as the outcomes of training in information literacy skills for Business students (e.g., psychological, behavioral, cognitive outcomes)?
8. Are there ways in which IL training might be improved (e.g., improved outcomes) for this student group?
9. How do you go about developing information literacy training programs? Are there any official or commonly accepted guidelines you use to deliver such programs? Do you benchmark your programs with any other universities? Explain.
10. Comment on the overall level of IL of undergraduate students (if it is too low, what can be done to improve it?)

### *Interview Script for Library Administrators*

1. Are you aware of information literacy [define] training for undergraduate Business students at this university? (yes to #2; no to #4)
2. If so, what can you tell me about the outcomes of that training (e.g., psychological, behavioral, cognitive outcomes)?
3. What aspects of that training are especially useful (e.g., specific topic elements, timing, instructional method, pedagogic techniques)?
4. If not, do you think such training would be useful for this group of students?
5. Do you support training in this skill set for these students? Why or why not?
6. What is the budget allocation for information literacy training?
7. Do you organize training for librarians to deliver information literacy instruction? If so, how? If not, why so?
8. When librarians are hired, what consideration is given (if any) in terms of their ability to deliver information literacy instruction? If so, how does this ability affect the hiring process?
9. How do you go about developing information literacy training programs? Are there any official or commonly-accepted guidelines you use to deliver such programs? Do you benchmark your programs with any other universities? Explain.

### *Interview Script for Teaching Faculty*

You have been asked to participate in this interview because you have involved your students in information literacy [define] training for Business students at this university.

1. Can you tell me about the outcomes of that training (e.g., psychological, behavioral, cognitive outcomes)? Have students used better quality sources/supportive data for assignments?
2. What aspects of that training are especially useful (e.g., specific topic elements, timing, instructional method, pedagogic techniques)?
3. Do you support training in this skill set for these students? Why or why not?
4. What course(s) do you teach to Business students?
5. In the courses taught to Business students (repeat the questions below for each course taught):
  - a. Is this course delivered to undergraduate or graduate Business students?
  - b. In this course, are students required to use any IL skills? If yes, elaborate.
  - c. Describe the IL skills the students entering your course already possess.
  - d. Do you teach any IL skills in this course? If yes, elaborate. If yes, who initiated IL training in this course (i.e., was it part of course description or was it your own initiative)?
6. Based on your personal opinion, in what courses are students required to demonstrate IL skills?
7. Comment on the overall level of IL of undergraduate students (if it is too low, what can be done to improve it?)