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Comparing Information Literacy Needs of Graduate Students in Selected Graduate Programs through the Technology Acceptance Model and Affordance Theory

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ABSTRACT

The aim of this *sequential integrated mixed model design* study was to examine information literacy (IL) levels and needs of graduate students in education, social studies, and humanities at the mid-size Canadian university. This was done through surveying 201 graduate students who volunteered to fill-in a quantitative questionnaire that included supplementary open-ended questions. To triangulate data and as part of the chosen methodological approach, 16 graduate students also took part in the semi-structured follow-up interviews which included observation of the participants' on-task behaviour. In order to consider the IL of graduate students in the larger context of a library information ecosystem, the researcher incorporated the Technology Acceptance Model (TAM) and the Affordance Theory (AT) frameworks.

The quantitative component of the study was based on the modified Beile Test of Information Literacy for Education (B-TILED) survey as an instrument to measure the participants' IL. The survey questions were organized to address the participants' demographic, academic and departmental characteristics. The statistically significant results were found for the B-TILED scores on the following three independent variables: (i) first language of participants (i.e., non-native English speakers performed lower), (ii) minimum course requirements completed for the Master's degree (i.e., students who did not complete the minimum number of courses performed lower), and (iii) the department of study (i.e., Master's of Education and Master's of Social Work students performed lower). The data from the follow-up interviews confirmed that graduate students perceived that they need more IL-related instruction, as well as a discipline-specific instruction.

Findings suggest that graduate students may benefit from differentiated methods for gaining the IL skills, through frequent and more hands-on in-library, in-class, and on-line IL instruction. The conclusion of this study, points out that those who need sophisticated search and research skills, require sustained and individualized support in order to achieve the necessary comfort and mastery in doing so. Thus, with increased technological development of library tools, a generic onetime library instruction, usually given in the first semester of graduate program is not sufficient to provide the most needed IL skills.

DEDICATION

My research is dedicated to my loving family, my wonderful friends and

my supportive colleagues.

Your constant words of encouragement and supportive deeds

have made my entire educational journey

an enjoyable life-changing experience.

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A special note of appreciation goes to Dr. Jonathan Bayley and Gayle Tait for their amazing work and dedication they have shown to me and to all graduate students; my friends Dr. Terry Shields and Christine Williams, who gave me great feedback throughout this process; and all of my librarian survey content judges (Danielle Winn, Robert Elliot, Dr. Brian Owens, Dr. Heidi Jacobs, Peter Zimmerman, Sharon Munro, Daniel Edelstein and Kristi Thompson) whose suggestions were extremely helpful and enlightening. Your dedication towards providing me the needed information as well as enthusiasm was exemplary.

I would like to extend my appreciation to the entire University of Windsor faculty for allowing me to invite graduate students to participate in my study. Furthermore, I am also grateful to all the graduate students who enthusiastically

participated in the study during the challenging semester we all encountered. I was very fortunate to meet many graduate students from various departments who selflessly dedicated their time filling out the survey and participated in the interviews. I am hoping that data from this study will be helpful in creating information literacy programs for all graduate students.

I would like to thank the Leddy Library, Graduate Student Society, and University of Windsor employees, especially Brenda King who was very supportive during this process. I feel very fortunate and honoured that I have had the opportunity to learn and work with such an outstanding group of people.

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CHAPTER 1

Introduction

> Ultimately, information literate people are those who have learned how to learn. They know how to learn because they know how knowledge is organized, how to find information, and how to use information in such a way that others can learn from them. They are people prepared for lifelong learning, because they can always find the information needed for any task or decision at hand (American Library Association Presidential Committee on Information Literacy, 1989, p.1).

Information literacy (IL) is an essential skill to have in today's world. The American Library Association (ALA) Presidential Committee on IL defines IL as a set of abilities whereby an individual is able to recognize the need for information, as well as to locate, evaluate, and use the needed information effectively (ALA Presidential Committee on IL, 1989). More specifically, information literacy can be regarded as "the set of skills needed to find, retrieve, analyze, and use information" (ALA, 2007, para. 1). As the world becomes more technologically advanced and dependent on the quick transfer and retrieval of information, IL will be equated with the ability to formulate informed decisions in many aspects of life. In post-secondary education, IL might be introduced through writing research papers or studying from textbooks; however, IL skills are not adequately obtained simply by doing basic coursework tasks alone (ALA, 2007). According to the Association of College and Research Libraries (ACRL) (2007), IL enables individuals to master content and extend the range of their search in order to become self-directed and obtain better control over their learning. Therefore, IL serves as a foundation for life-long learning in that it can be shared between various learning environments and disciplines (ALA, 2006).

Other terminological inconsistencies in relation to definition of information literacy that exist in this domain are addressed further. In the library field, “information literacy” is a prevalent term (Marshall, 2006), even though many studies do not use this term explicitly but rather generally address information-seeking behaviours or information competencies (Barrett, 2005; Fidzani, 1998; Goetsch & Kaufmann, 1998). Beile O’Neil (2005) pointed out that IL as a concept came into existence in the last 30 years and that during this time the use of this particular term has dramatically changed.

Goetsch and Kaufman (1998) noted that, in 1990, the ALA Presidential Committee on IL was instrumental in promoting the importance of IL in American society as a way of correcting “social and economic inequities” (p. 159). Furthermore, the authors highlighted several problems that have prevented the successful integration of IL programs at institutions of higher learning. One such problem is that librarians have often been held solely responsible for developing IL classes; it was pointed out that faculty should also understand the importance of IL and should integrate IL components into their courses.

One approach to addressing these problems is evident in Marshall’s (2006) invitation to instructors to design higher education courses that promote IL as the object of learning as well as the medium by which student learning can occur. In tandem with Marshall’s views, ALA (2007) suggests that there is a need for an IL parallel curriculum in order to develop a solid base of IL in post-secondary education, but ALA does not elaborate on the meaning of the term “parallel curriculum” with respect to IL.

Need for Investigation of Graduate Students' Perceptions about Library Usage

Sadler and Given (2007) view the academic library as a vital information resource that can serve as a hub for students because it connects them to online materials and provides individualized help and other resources necessary for their academic work. Since undergraduate students represent the majority of the student population on a typical university campus, academic librarians tend to spend more time addressing undergraduate students' needs as opposed to the needs of graduate students. It may be that faculty and librarians share the perception that the less experienced undergraduate students have greater IL needs in comparison to those of the more experienced graduate students (Crosetto, Wilkenfeld, & Runnestrand, 2007).

Although a widespread body of research literature exists on the IL of academics, graduate students have not received nearly as much attention (Barrett, 2005); however, one should not assume that graduate students have experienced any library instruction at the undergraduate level (Williams, 2000). There seems to be a widespread assumption that graduate students are already familiar with university library resources, but such an assumption is unjustified. For example, many graduate students do not necessarily resume their schooling immediately after the completion of their undergraduate degrees, and many graduate students change universities and are thus compelled to learn how to use libraries that they had previously never visited (Sadler & Given, 2007). For these reasons, the IL skills of many graduate students may be outdated or underdeveloped.

In order to improve the research practices of graduate students, Barrett (2005) and Fidzani (1998) advocate for programs at universities designed to increase IL, including bibliographic instruction. In 1998, Fidzani noted that graduate students did not have

adequate training in the use of the library and its services. It is worrisome that, nine years later, Sadler and Given (2007) confirmed that a small sample of eight graduate students in anthropology, economics, education, political science, psychology, and sociology were not aware of IL library services. Additionally, Crosetto et al. (2007) indicated that many graduate students in education were not adequately prepared to do advanced research. For instance, Crosetto et al. described the situation at the Ursuline College in Pepper Pike, Ohio,[1] where graduate students lacked fundamental academic skills such as the ability to locate suitable literature and to critically examine it. Although these graduate students also demonstrated weak writing skills, Crosetto et al. did not report any demographic data or details about how the students' compositions were evaluated. This shortcoming may be a consequence of the fact that the focus of the book chapter by Crosetto et al. in the recent publication on IL was to help develop new literacy instruction and to extend IL knowledge through the existing graduate course, not necessarily to discuss the empirical evidence found.

Problem Statement

Previous literature on the IL (Barrett, 2005; Beile O'Neil, 2005; Fidzani, 1998; Cannon, 2007; Crosetto et. al., 2007; Sadler & Given, 2007), as well as the author's personal experiences (pp.36-38) and observations as an employee at a university library, indicate that gaps exist in IL education of graduate students. The acquisition of appropriate and timely IL skills (i.e., in terms of online courses and online search) are important for graduate students, and the lack of these skills may affect graduate students' success in keeping up with the technologically-oriented demands of their programs (i.e.,

[1] Ursuline College in Pepper Pike, Ohio is one of the oldest women's liberal art colleges in the USA, with 35 undergraduate and 7 graduate programs; for more information visit http://www.ursuline.edu.

on-line courses, on-line research, etc). Indeed, graduate students' lack of adequate IL skills can negatively impact upon their ability to perform research related tasks. While researchers (Barrett, 2005; Beile O'Neil, 2005; Cannon, 2007; Crosetto et. al., 2007; Fidzani, 1998; Sadler & Given, 2007) are in accord that IL skills are important for graduate students, there seems to be little research that clearly details the IL needs of graduate students or that differentiates between the needs of various graduate programs. Thus, there is a need for ongoing investigation of graduate students' IL skills, especially given the continuous evolution of new online technological research tools.

Although academic libraries regularly survey their patrons to establish their needs and levels of satisfaction with regard to services, library-sponsored usability studies focus too narrowly on particular services; thus, the roles of library services are not considered within the larger context of a library information ecosystem. In addition, only a few studies have examined the central role of the academic library where patrons and information systems intermingle inside a wider social frame (Sadler & Given, 2007). For example, focusing solely on interaction with digital resources while excluding other factors does not assess patrons' needs holistically. An ecological model regards technology as part of an ecosystem in which the introduction of an e-journal might not only change the journal selection of patrons, but might also affect the frequency of their visits to the library, or the kinds of interactions they seek from librarians. Therefore, as Sadler and Given (2007) suggest, the ecological approach provides a more holistic view and affords a better understanding of the ways in which patrons locate and comprehend library and research information.

Although literature on IL differs in methodological strengths and weaknesses, it is evident that the current literature on graduate students' IL levels does not provide a holistic view of IL users' needs. For example, recent studies of the IL of graduate students reflect both qualitative and quantitative research methodologies, through interview data collected from small samples of students (Barrett, 2005; Sadler & Given, 2007), and surveys (Fidzani, 1998; Liao, Finn, & Lu, 2007). So far, there has been little research conducted combining quantitative and qualitative methodologies in order to explore IL among a larger sample of graduate students. However, in Beile O'Neil's (2005) study, the quantitative aspect was based on data collected from 172 participants, and the qualitative aspect was based on a total of ten participants—all teacher education students. Moreover, two other mixed methods studies on information-seeking behaviours of graduate students did not contain reports on the validity or reliability of data (Fidzani, 1998; Liao et al. 2007). Therefore, the evident methodological gaps that exist among studies on IL can be overcome in two ways. The first is to conduct a study on IL that would extend the scope of data collection, and the second is methodologically to enrich the study by applying a combination of both qualitative and quantitative methods. This study has attempted to do both. It implements a mixed model approach in accordance with the findings of some qualitative studies on graduate students' information behaviour and information-seeking habits (Barrett, 2005; Sadler & Given, 2007) that recommended extending investigations to various stages of graduate education and to other graduate departments.

Given the limitations in the existing research and the need for more exploration and explanation in this particular domain, this researcher has decided to use a mixed

methodology approach, since such an approach permits the inclusion of both explanatory and exploratory methods that tease out the views of graduate students in selected graduate programs (Creswell, 1994; Creswell, 2003; Tashakkori & Teddlie, 1998, 2003). In this study, graduate students are compared across selected departments, a range of graduate student admission levels, and the number of completed years of graduate study.

Research Questions

There are four major research questions in this study, one quantitative in nature and the others qualitative. In order to answer these questions, the researcher conducted the survey among graduate students by integrating quantitative and qualitative parts.

Phase 1: Integrated QUANTITATIVE[2] *and qualitative part of the study.* The first, integrated, part of this study addressed two research questions, one quantitative and the other qualitative:

1. Which graduate students' profile cluster (demographic, academic level or department) best portrays their IL?
2. What are the graduate students' IL needs based on their perceived usefulness and ease of use of library services?

Phase 2: Qualitative follow-up part of the study. The qualitative aspect of this study, which was informed by the results of the integrated quantitative and qualitative part of the study, was designed to answer the following two research questions (one main question and one sub-question) by conducting interviews:

[2] Capitalization of terms (e.g., *QUANTITATIVE)* points to a greater emphasis or priority that was put on the specific type of data and analysis. In the first phase of this study, the capitalization of the word *QUANTITATIVE,* indicates that a "greater priority or weight" was put on quantitative data and analysis (Creswell, 2003, p. 212).

1. What affordances[3] do graduate students perceive in the academic library context? (Sadler & Given, 2007, p. 118)

1a. What perceptions of library usage play a role in graduate students' information seeking behaviours and awareness about library resources?

Purpose of the Study and Method

The purpose of this study was to provide a more holistic and ecological presentation of graduate students' IL needs. By complementing a B-TILED survey with the elements of Technology Acceptance Model (TAM)[4] and Affordance theories, this study extends the current research literature on IL of students, both theoretically and methodologically.

This study examined the IL of 201 graduate students at a mid-size university in Ontario through (a) a survey instrument with both closed-ended and open-ended questions and (b) 16 semi-structured interviews. The survey consisted of the adapted instrument called "The Beile Test of Information Literacy for Education" (B-TILED) (Beile O'Neil, 2005), which is used to measure student's IL skills. Since IL encompasses components beyond what B-TILED was intended to measure, the instrument was extended by the use of supplementary, open-ended questions based on the Davis, Bagozzi, and Warshaw (1989) TAM.

The follow-up semi-structured qualitative interviews were based on Affordance theory (Gibson, 1977, 1979); more specifically, on a framework for graduate students' information behaviour (Sadler & Given, 2007), as well as the TAM (Davis, et. al, 1989).

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[3] See definitions, p. 13.
[4] See definitions, p. 14.

In this way, this dissertation extends the current IL research literature by using TAM and Affordance theories that complement each other, in an attempt to provide a holistic and ecological presentation of graduate students' IL. In addition, this dissertation contributes to the advancement of IL literature by including Affordance Theory (Gibson, 1977, 1979) and by integrating a more holistic methodological frame of the information gathering behaviour of graduate students. The data from the follow-up interviews confirmed the quantitative findings in terms of graduate students' need for discipline-specific IL instruction.

Library Services and Information Seeking

It is generally accepted that academic libraries are places for graduate students to seek information. Yet, as Fidzani (1998) noted, graduate students in his study lacked the basic skills required to use library services and resources. Apparently, the graduate students did not have adequate training in the use of library services, and some were not aware of the services the library could provide to them. Likewise, the students in the more recent Sadler and Given (2007) and Crosetto et al. (2007) studies were not aware of how to utilize essential library services. Both Marshall (2006) and ALA (2007) recommend certain strategies for developing IL, such as becoming familiar with multiple search strategies (e.g., searching by keyword or subject heading, word truncation, Boolean logic, etc.), and differentiating among various kinds of sources (e.g., primary or secondary sources, popular or scholarly materials). According to Curzon (1997), being familiar with the systematic organization of libraries, information centres, library loan processes, item delivery services, and electronic transmissions is crucial to become *information competent*. Although an individual component in information retrieval does

not have to be an expert, it is necessary for such individuals to be able to comprehend when they need librarian assistance (Wisconsin Association of Academic Libraries Information Literacy Committee, 1998).

Significance of the Study

Based on the previous literature review (Sadler & Given, 2007; Wakimoto, Walker, & Dabbour, 2006) and the researcher's own experience[5], one service in particular, called SFX[6], appears to be unfamiliar to many students. The main purpose of SFX reference linking software (some libraries use a *Get It* button in order to link a user's request to the necessary database) is to save users' time and research effort. However, the majority of graduate students interviewed in Sadler and Given (2007) indicated that students either do not understand this service or do not know of its existence. Unlike the librarians in the study, some students did not perceive the *Get It* button as being self-explanatory (Sadler & Given, 2007). Participants surveyed in the Wakimoto et al. (2006) study regarded the "no full text available" message as an error in the system (p. 113), rather than interpreting SFX as a shortcut for determining library access for that particular online service. Both studies (Salder & Given, 2007; Wakimoto et al., 2006) reveal that students have a blurry understanding of the *Get it* service. However, these studies do not question or explore whether or not students take additional steps to obtain electronic material such as filling out an interlibrary loan request, or contacting a subject librarian in order to obtain the desired material. Do those students assume that there is no full-text accessibility through the library catalogue, and therefore choose not to pursue their search

[5] The researcher was a staff member in an academic library whose duty, among others, was to assist students with electronic search inquires.
[6] SFX provides context-sensitive linking between Web resources in the scholarly information environment (Exlibris, 2010).

further? Hence, the TAM portion of this qualitative study explored graduate information-seeking behaviours and the awareness of graduate students regarding various library resources.

ALA (2006) recommended that an institution acknowledge that various thinking skills are related to different learning outcomes, so that different assessments or methodologies are needed for measuring those outcomes. Currently, librarians from the University of Windsor's Leddy Library are following the Association of College Research Libraries (ACRL)'s *Information Literacy Competency Standards for Higher Education*; however, there is neither an official policy nor guidelines established by the University of Windsor for the IL of graduate students. According to an IL librarian at University of Windsor, this policy will be coming under review in the near future.

This study, therefore, has the potential not only to advance knowledge about the IL of graduate students, but also to informs the practice pertaining to the IL of graduate students. Building on previous knowledge, this study offers methodological rigour by pushing boundaries in new applications of the mixed model approach. Thus, a more comprehensive picture of the IL field is provided by exploring the perceptions of graduate students regarding library use.

The results of this study may serve as an informative guide for determining problematic areas in IL for graduate students. Previous studies of IL behaviour of particular patron groups contributed to the enhancement of library services and literacy programs, as well as reference services (Barrett, 2005; Fidzani, 1998). Thus, the summary of the results of this study will be presented at the Leddy Library of the University of Windsor, since the data were largely collected from graduate students of that university.

The wider impact of this study will lie in its ability to provide a broader ecological model of graduate students' information behaviour, as well as additional components for TAM and Affordance Theory regarding graduate student information literacy. The researcher plans to design research IL workshops, training materials and/or on-line tutorials, and especially to reach part-time graduate students who are often missed in organizing workshops and training sessions during working hours. As previously stated, this study can serve as a model study that can be further implemented at other universities, especially at those universities that belong to the Ontario Council of University Libraries (OCUL) consortium. The consortium allows for cost reduction, a wider scope of access, and the ability to take up larger projects; therefore, the joint collaborative work between libraries, purchases of various databases, and IL-related workshops could be addressed across the whole OCUL consortium.

Dissertation Outline

The remaining chapters of this dissertation are organized in the following way: Chapter 2 is a literature review that describes the conceptualization of the academic library as an ecologically defined educational space, followed by an overview of Information Literacy Competency Standards for Higher Education (ALA, 2006), and a description of issues related to current graduate students' perceptions about library use. This review of the literature on IL makes the case that research in this area is needed, and that new methodological approaches could help fill the gaps in previous research.

Chapter 3 contains a description of the methodological approach chosen for this study and the rational for using it. This chapter introduces the sequential integrated mixed method model as suitable for addressing certain gaps in the aforementioned literature

reviews. Steps undertaken in order to modify and adapt the instruments used in other studies towards the goals of this research are detailed.

Chapter 4 contains results based on the data collected through a questionnaire and follow-up semi-structured interviews. Findings are listed along with the corresponding tables and figures. The qualitative follow-up part of the study includes prominent emerging themes.

Chapter 5 discusses the findings of the study. The summary of the results obtained and justifications for the conclusions are discussed. Overall, the theoretical models used in this study are further discussed, as well as implications for theory and recommendations for future studies.

Definition of Terms

Affordances are perceived opportunities for action in the environment (Gibson, 1979). Also, affordances are defined as perceived potential utilities of an object (Affordances [n.d.], Oxford English Dictionary Online, 2010). Affordances can be based in the visual perceptions of the natural world (Gibson, 1979), as well as industrial design (Norman, 1988), with the notion that our past knowledge and experiences are applicable to our perception about the things around us (Sadler & Given, 2007).

Affordance Theory "states that the world is perceived not only in terms of object shapes and spatial relationships but also in terms of object possibilities for action (affordances) — perception drives action" (Learning Theories Knowledge Base, 2010, para.1). This theory emphasises that perception of the environment directs the course of action (Learning Theories Knowledge Base, 2010).

Information Competency "consists of the skills needed to become information literate" (Marshall, 2006).

Information Literacy is "the set of skills needed to find, retrieve, analyze and use information" (ALA, 2007, para. 1).

Information Ecology is a system of people, practice, technologies, and values in a specific local environment (Nardi & O'Day, 1999).

Information Literacy Competency Standards for Higher Education (referred in this thesis as *Standards*) present a framework for assessing the level of information literacy of an individual.

Preservice teachers are undergraduate students in the teacher education program who are currently being trained to become teachers, either at the elementary or secondary level.

Technology Acceptance Model (TAM) emphasises that beliefs (i.e., perceived usefulness and perceived ease of use) are primary determinants of information technology adoption (Davis et al, 1989).

Acronyms

American Library Association (ALA) is an association based in the United States that promotes library service and librarianships.

Association of College Research Libraries (ACRL), a division of American Library Association, "is a professional body encompassing academic librarians and other interested persons with purchased membership" (ALA, 2006a, para.1).

Association of Research Libraries (ARL) is "largest division of the American Library Association" (ALA, 2006a, para.1).

Ontario Council of University Libraries (OCUL) is consortium of 21 university libraries in Ontario (OCUL, 2010).

English as an Additional Language (EAL) refers to the learning of English by speakers of other languages (Judd, 1981; Knoweldgerush, 2009).

CHAPTER II

Literature Review

This chapter provides a literature review that encompasses the conceptualization of the academic library as an ecologically defined educational space, followed by an overview of Information Literacy Competency Standards for Higher Education (ALA, 2006). The final section of the review deals with issues related to current graduate students' perceptions about library use.

The Academic Library as an Educational Space

One might expect that, with the inception of new networking technologies and electronic storage of information, libraries will eventually become obsolete. However, academic libraries have positioned themselves as "the heart of an institution" (Freeman, 2005, p.3) where patrons can access the new information technologies in combination with the traditional knowledge resources. In order to function successfully as a vital aspect of educational institutions, academic libraries must not only meet the needs, values, and goals of the institution but also facilitate access to vast amounts of information and learning technologies for a variety of users. Based on interviews with 21 faculty and librarians, Given's (2007) study emphasised "the importance of having welcoming spaces on campus to facilitate students' information behaviors" (p.180). Providing "comfortable" working areas with appropriate lighting, spacious tables, and flexible soft furniture that could be re-arranged, creates desirable library environment that supports students' academic work. The study participants noted a need to pay more attention to the physical setup of the learning spaces and its effects on students' academic achievements and failures. Given mentioned the need for both noisy and quiet spaces as

the most emerging theme of the 21 interviewed faculty and librarians at that particular academic library. Although faculty members acknowledge the dual role that academic libraries have, such as providing students with access to information and space to study, they also acknowledge that academic libraries serve as social spaces for students' collaboration and information sharing (Given, 2007). Both conceptually and physically, libraries combine old technology (e.g., historical evidence and print collections) with new technology (e.g., electronic resources/databases). This duality enbles academic libraries to remain as intellectual centres of higher education in the new era (Freeman, 2005). Not surprisingly, students still view libraries as places where they can obtain useful life skills transferable to situations they will encounter even after graduation**.**

Information Literacy Competency Standards for Higher Education

For academic libraries, it is important to stand at the forefront of technological advancements. One way this role can be realized is through oversight organizations that guide and inform libraries in planning and decision-making processes. One example of such an oversight is the Association of College and Research Libraries (ACRL), a division of the American Library Association (ALA). The ACRL is a professional body whose membership includes academic librarians and other interested persons. Its statement of purpose describes the ACRL as being "dedicated to enhancing the ability of academic library and information professionals to serve the information needs of the higher education community and to improve learning, teaching, and research" (ALA, 2006a, para.1).

In 2000, the Board of Directors of the ACRL approved the *Information Literacy Competency Standards for Higher Education* (referred in this paper as *Standards*). These

Standards present a framework for assessing the IL level demonstrated by an individual. The competencies encompass five standards and 22 performance indicators. The *Standards* specifically focus on the needs of students in higher education at all levels, suggesting a range of outcomes for assessing student progress towards developing IL. According to the ALA (2006), these outcomes may serve as guiding principles for faculty, librarians, and others designing methods that assess IL and foster student development in this area. Furthermore, ALA recommends that faculty and librarians should assess not only the basic IL skills, but should also collaborate in developing assessment instruments and strategies geared towards specific disciplines because IL is present in all disciplines to support knowledge creation, scholarly activity, and the publication process (see Appendix A).

Librarian and Faculty Perceptions of ACRL Standards

Julien (2005) surveyed 199 academic (university or college) library employees in Canada with primary responsibility to provide information literacy instructions. One in five participants indicated that "librarian bore no responsibility for teaching how to think critically in general" (p.310). Without stating an exact percentage, a significant number of participants noted that "librarians had no responsibility to teach an understanding of some ethical, economic, and socio-political information issues" (p.310), the stand that Julien interpreted as being at odds with the ACRL standards. One of the major difficulties noted were institutional challenges, such as lack of cooperation with teaching faculty and inadequate resources. Julien concluded that ACRL pedagogical recommendations are undermined and that the ACRL standards are not widely accepted in Canada.

Contradictory to Julien's (2005) conclusion, Gullikson (2006) noted that librarians in universities and colleges in Canada and the United States have generally accepted the ACRL *Standards*. As a consequence, many librarians base their IL instruction programs and assessments on these *Standards*. Gullikson's (2006) two-phase survey study with 117 faculty members from different institutions and various Canadian university departments examined what teaching faculty thought of the *Standards,* and, more specifically, how important each of the 87 outcomes listed in the five *Standards* were to them. One of the reasons for conducting the survey was that current literature provided little information as to which aspects of the *Standard*s faculty members are most interested in integrating into their curricula. In the survey, the faculty rated the importance of outcomes on a four-point scale ("not important," "somewhat important," "important," and "very important," and an optional "don't know"). In addition, the participants were asked to specify at which academic level they expect their students to possess each particular skill. The data showed that the faculty rated most of the IL outcomes as highly important; however, for six of the ten top-ranked outcomes, the majority of faculty respondents reported expectations for students to possess these outcomes in their first year of university or earlier. Although the results of the study could not be widely generalized, and there was no mention of the reliability and validity of the data, the lack of agreement was noted among faculty members in terms of the academic level at which IL outcomes should be achieved by students. Furthermore, Gullikson (2006) indicated that IL outcomes are ambiguous, specifically noting that certain outcomes could be taught over the years in order to address the IL needs of students. In addition, the survey participants encountered difficulties with the language

used to describe the IL outcomes, and they frequently asked for further clarification of terms, suggesting that they felt that certain terms were vague or inappropriate. Accordingly, Gullikson called for more in-depth research on how faculty members comprehend and interpret the *Standards* outcomes, as well as for more valid and reliable maps of these outcomes, whereby faculty could then specify those which they considered most and least important.

In 1998, Goetsh and Kaufman recommended collaborative work among faculty and librarians for the purpose of defining *information competency* and creating assessment guidelines for programs in higher education designed to teach these skills. Eight years later, Gullikson (2006) suggested updating the *Standards* based on experiences reported by faculty and librarians who were familiar with them. Yet, as of 2010, nothing has changed, and ACRL (ALA, 2006, 2007) still relies on the original *Standards*, which were approved almost a decade ago. Thus, although there has been serious study of the issue of IL from the perspective of competency and assessment, along with recommendations for change, the need for IL has increased, even though methods of assessing have not changed.

The following literature review addresses the change in the use and meaning of the IL term by encompassing quantitative studies', qualitative studies', and recent dissertations' literature reviews.

Literature Review of Quantitative Studies

The literature review of quantitative studies includes a chronological review of three studies related to the information-seeking behaviours (Fidzani, 1998; Liao et al., 2007) and information competency (Marshall, 2006) of graduate students.

Information Seeking Behaviours of Graduate Students. The purpose of Fidzani's (1998) study was to determine the information needs of graduate students as well as their awareness of available library services. A total of 144 students from nine Master's programmes completed a questionnaire that collected both quantitative and qualitative data. The four-section questionnaire contained open-ended and close-ended questions regarding the information needs and information-seeking behaviours of graduate students. Section 1 elicited demographic information, Section 2 focused on information-seeking behaviours and needs of the graduate students, Section 3 pertained to library instruction and services, and Section 4 sought the participants' general opinions of library services. A total of 20.1% of surveyed respondents indicated that they had never received instruction on the use of the library at either the graduate or undergraduate level, while 22.2% (n = 199) had never received any instruction at the graduate level. During their undergraduate studies, 50% of the participants were given such instruction only once, while 54.9% were given instruction on library use once during their graduate level. The least used library resources were abstracts and indexes, with 33% of the respondents reporting they had never used these resources. Additionally, 26% of the respondents reported they had never used CD-ROMS. A total of 18.8% of the respondents indicated that they did not use CD-ROMS because of difficulties encountered in working with them. It should be noted that 26% of the participants never sought help from a subject librarian. The study suggested that students should be taught how to utilize available library services and resources, as it was apparent from their responses that they did not have an adequate understanding of how to use the library. Fidzani did not report on the validity or reliability of his data, nor did he make any attempt to validate the research

questions. The study did not investigate the relationship between the students' ability to use library services and resources and the students' performance in their field of study. However, Fizdani (1998) recommended the creation of the following: (i) an information needs assessment questionnaire for the first year graduate students, (ii) an information marketing strategy between the subject librarian and the corresponding department to promote resources, (iii) the establishment of an information literacy skills course committee for each program, (iv) the development of a structured IL course that would take into consideration the information needs of students in different academic programmes, and (v) the creation of an IL course that would address topics on the use of library retrieval tools. Although Fizdani focused on the graduate students of the University of Botswana, his study did not mention the international graduate student population.

Contrary to Fizdani, Liao et al. (2007) did consider the population of international students (even though 28.9% of the 315 participants were international students) by positing that, in order to develop and implement an effective service, university libraries should take into account the multicultural character of relevant user or patron groups. The study by Liao et al. of information-seeking behaviours and information needs of graduate students ($N_{American} = 224$; $N_{International} = 91$) compared how American and international graduate students selected and used various information sources. This study focused on gaining insights into international graduate students' information-seeking behaviours, as well as finding the differences and similarities in information-locating patterns compared to those of American graduate students. Liao et al. used *Survey Monkey,* a web-based anonymous questionnaire to design a survey which consisted four sections: (i)

demographics, (ii) an examination of the general information about searching patterns, (iii) library activities information, and (iv) open-ended questions for final comments. Demographics indicated that participants of the survey closely represented the demographic distribution of graduate students at that particular institution. In addition, 29.7% of international participants had been in the United States less than two years, while 49% of participants indicated that they had been in the United States between two to five years, compared to 20.9% of students who had been present over five or more years. A total of 70.5% of American graduate students had library instruction/orientation, compared to 61.5% of the international graduate students. Although 34.9% of students never thought of asking a reference librarian for help, 16.5% of international graduate students did not know "what a reference librarian does" (p.18-20). Language barriers and cultural differences were used to explain international graduate students' (7.7%) minimal use of the reference service, a difficulty which American graduate students did not encounter (Chi-square = 17.622, df = 1, $p < 0.001$). International participants obtained higher mean scores for the usefulness of the library in their information-seeking process, compared to American participants ($M = 4.65$, as compared to $M = 4.28$). The researchers concluded that 85.7% of international graduate students involved viewed the academic library as central to their information-seeking needs, but that these students had not obtained enough education about library services. Consequently, the first choice of search strategy for international students was the Internet, a finding which was in stark contrast to the behaviour of American students, who generally began their information searches using the library's electronic resources. This particular group of international students needed some additional instruction on how to conduct more sophisticated searches. These

students needed to develop competency skills in order to define research problems and locate and organize necessary resources pertaining to academic research. Another difference that Liao et al. (2007) found between the international and American graduate student populations was that the bonds between international graduate students and their departments were tighter, compared to the bonds between American graduate students and their departments. Liao et al. pointed out that librarians should be aware that the department may play an important role in building relationships, especially with international graduate students. Although the article did not contain the questionnaire, reports of validity or reliability of data, or in-depth statistical analysis, this study uniquely examines the IL of the international graduate student population.

Information competency. Education for IL is an important component of higher education because through such education the learner is exposed to a broad spectrum of learning resources. Ultimately, undergraduate and graduate students should possess the characteristics of information literate individuals in order to obtain the skills necessary for life-long learning processes (Marshall, 2006). Goetsch and Kaufman (1998) argued that, as a skill, IL is not sufficient because students should be able to *demonstrate* information competency. Students should have the ability to think in a critical and integrated approach about their information needs, and have "the knowledge of how to find, evaluate the quality, use, and manage what they need" (p.159). Other authors also distinguish between information competency and IL. For Marshall (2006), the distinction between the two is that information competency skills are those needed to become information literate. Breivik (1998) described information-competent individuals as life-long learners, while Marshall (2006) emphasized the need for the development of

information competency in higher education and suggested that students should be able to learn from broad information resources in order to become information literate.

Marshall (2002, as cited in Marshall, 2006)[7] reviewed the criteria of multiple programs in developing IL such as the ALA *Information Literacy Competency Standards for Higher Education, IL Competencies and Criteria for Academic Libraries* in Wisconsin, the California State University Work Group's *Set of Core Competencies*, and the Booth Library of Eastern Illinois University's *Standards Regarding Information Competencies*. Marshall used these various criteria as the foundation for developing the Information Competency Assessment Instrument (ICAI). The ICAI encompasses ten discrete areas that are important for one to be information competent: a student should have the ability to (i) identify a topic accurately, (ii) establish source requirements, (iii) know how to seek required information, (iv) discover and retrieve the information, (v) assess the information, (vi) combine and categorize the information, (vii) comprehend ethical, legal, and socio-political issues of the information, (viii) aptly utilize mass media for information, (ix) communicate the information, and (x) "learn from feedback and apply to other projects" (Marshall, 2006, p.13). The seven-point Likert-type scale used in this instrument required that participants rate each statement from "strongly disagree" to "strongly agree." The ICAI survey was administered to two different groups of participants on two separate campuses. In each case, the 40-item scale had a high internal consistency (*Cronbach's alpha* = .90) and the 40 questions encompassed 10 areas of information competency listed above. The first application of the ICAI produced a *Cronbach's alpha* = .90 and, at the semester's end, total scores for the ICAI (*alpha* = .92, N = 106) were correlated with grade point averages (GPA) on the assigned major course

[7] The researcher was unable to obtain the copy of Marshall's (2002) paper.

project in order to determine the predictive validity of ICAI. A significant result (*rho* = .29, p <. 01) yielded a low correlation with a weak relationship between grades and ICAI scores, suggesting that there is a slight relationship between GPA and ICAI with little value in prediction between these two variables. In the second application of ICAI on a different campus (*N = 520*), Cronbach's alpha was .90, with significant correlation with GPA (*rho* = .109, *p* < .05), indicating the predictive validity of the ICAI instrument in relation to the GPA and ICAI scores. Comparing the mean score (*M = 170.65*) of the first study with the mean score (*M = 170.23*) of the second study, done with different participants, shows the stability of the instrument itself. Marshall (2006) noted that this instrument measures mainly information competency skills, but that IL extends beyond what ICAI can measure. For these reasons, Marshall recommends combining the ICAI instrument with qualitative research in order to acquire a better understanding of what is entailed in becoming an information literate individual. Although this instrument is designed to measure information competency, the participants only state the degree to which each statement applies to them (strongly disagree to strongly agree). Moreover, in Marshall's (2006) study, participants' IL skills were not thoroughly tested; rather, the questionnaire elicited responses indicative of participants' feelings about the given statements. Thus, it would be beneficial to develop an instrument that will more objectively test the students' IL skills and not just record their attitudes about and feelings towards IL.

Literature Review of Qualitative Studies

The literature review of qualitative studies includes a review of information-seeking habits (Barrett, 2005), information-seeking behaviour of international and

domestic graduate students (Morrisey & Given, 2006; Liu & Winn, 2009; Sadler & Given, 2007), and Crosetto's (2007) IL experiences of graduate students.

Information-seeking habits, and graduate students' information-seeking behaviour. Barrett's (2005) study on the information-seeking habits of graduate students in Humanities at the University of Western Ontario explored to what extent those graduate students constituted a patron group distinct from faculty members as a group, and undergraduate students as a group. Ten participants (three English, three History, two Philosophy, one Classical Civilization and one Music major), who were at various stages of their graduate programs (including one recent graduate), were interviewed. The interviews were based on the following five categories of documented behavioural patterns: (i) approach to and comfort with information technology—whereby participants indicated learning about electronic resources through supervisors and colleagues, (ii) interpersonal contact, (iii) information sources, (iv) information retrieval patterns, and (v) process of initiating research projects, for example, through coursework, supervisors, or finding gaps in the current literature. In this study, Barrett (2005) does not consider graduate students to be a single patron group. Instead, Barrett views graduate students as a stratified group consisting of individuals who are at unique stages of development. For instance, graduate students follow predictable patterns as they progress through the stages of the program. The in-depth interviews indicated that, besides colleagues, project supervisors, because of their frequent contact with students, played a crucial role in assisting students to learn about electronic resources. The graduate students emphasized the importance of primary sources for validating theories or hypotheses, whereas citation chasing served as a tool for gaining subject experience. Barrett points out that graduate

students display different needs at different stages of their studies, and therefore recommends differentiation between the four stages of graduate studies: (1) the first year of a Master's or doctoral program; (2) the thesis/dissertation initiation stage of Master's and doctoral programs; (3) the PhD level comprehensive examination; and (4) a wider post-initiation/pre-defence stage for Master's and doctoral programs.

Morrisey and Given (2006) explored the information-seeking behaviour of Chinese graduate students at the University of Alberta. Using a grounded theory approach, the authors interviewed a total of nine international students (enrolled in the Master's or PhD programs) of Chinese descent who were studying at a Canadian university for the first time. This study encompassed the students' information literacy skills by examining the students' information behaviours in the context of the ACRL's Standards. The participants were asked questions pertaining to their assignments and their information search processes. The key finding in the study were related to Standards 1, 2 and 5. The Chinese graduate students did not evaluate the quality of the online resources and did not comprehend the role of the university librarians. In addition, the participants stated that their assignments in Canada were more challenging than in China, that they mostly relied on the Google search engine to meet their research needs. Also, only few participants were aware about the legal and ethical aspects of information access. Morrisey and Given (2006) suggested that a more detailed examination of international graduate students' behaviour in the context of the Standards would be beneficial.

Another Canadian study by Liu and Winn (2009), also examined the information seeking behaviours of Chinese graduate students at the University of Windsor. A total of 12 Chinese graduate students participated in in-depth qualitative interviews. The

interview questions consisted of a mix of open- and close-ended questions, focusing on demographic data, exploration of library experiences in China, the usage of the current academic library and participants' understanding of library terminology and library services. The authors note that their current academic library "may need to better promote its services to this particular group of students" (p.570). The problem is that these international graduate students were unaware of the library terms, services and resources.

Ecological psychology as a theoretical framework. The principal founder of Ecological Psychology, and the chief promulgator of Affordance Theory, James Gibson, argued that one's behaviour (including information-seeking behaviour) should be studied in the context of one's environment (Sadler & Given, 2007). In *The Ecological Approach to Visual Perception*, Gibson (1979) described the fundamental components of affordance:

> The *affordance* of the environment are what it *offers* the animal, what it *provides* or *furnishes*, either for good or ill. The verb to *afford* is found in the dictionary, but the noun *affordance* is not. I have made it up. I mean by it something that refers to both the environment and the animal in a way that no existing term does. It implies the complementarity of the animal and the environment. (p.127)

Gibson claims the *world* consists simply of things perceived by an organism in its environment. Thus, for Gibson the world consists of affordances or opportunities for action. For instance, a large rock might be perceived by a reptile in a desert as a place to sunbathe, while for a human, that rock might be perceived as a building material. Hence, there is no accurate use for the rock except for the affordance supposed by those who

perceive it. The core concept of affordance lies in the relationship between an organism and the environment (Gibson, 1979; Sadler & Given, 2007).

While Gibson's views of affordance are based in the visual perception of the natural world, Norman's (1988) views of affordance are associated with industrial design (Sadler & Given, 2007). Norman supports the notion that our past knowledge and experiences are applicable to our perception about the things around us. Ten years later, Norman (1999) observed that individuals are able to interact with thousands of objects even though they might have only encountered them once before, explaining that the appearance of an object can provide crucial signs necessary for its operation. This perspective suggests the necessity of distinguishing between the intended use (or real affordances) of an object and its perceived affordances. For instance, affordances presented by a knife are defined by the individual who uses it, not necessarily by its designer. More specifically, although a designer envisaged the knife as a cutting tool, the user might not utilize the knife for cutting. While Gibson (1979) suggests that the knife does not have any affordance on its own, except when an individual has attributed a meaning to it, Norman suggests that the designer's real or intended affordance for the knife was for cutting purposes. Although there are debates in the field of ecological psychology about the nature of affordances (distinction and overlays between intended and perceived affordances), affordance perspectives are a crucial area in the study of usability (Sadler & Given, 2007).

Sadler and Given's (2007) exploratory study covers the behaviour of a small group of eight students (two full-time Master's and six doctoral students) at the University of Alberta, and three academic librarians at the same university. Their in-

depth interviews indicate a disparity between experiences and expectations of affordances (perceived opportunities for actions), a disparity which portrays graduate students as an underserved population in the context of their research. More specifically, this disparity was especially noted in the library's outreach efforts toward graduate students. Two particular differences in affordances were found in the IL instructions and communications with students regarding new library services. For instance, librarians intended to use the library website for instructing graduate students on issues of IL, but the graduate students were not aware of this service, nor had they read any notices or announcements about the use of the library website (see Figure 1). Figure 1, based on Sadler and Given's (2007) affordance categories, illustrates this discrepancy between affordances intended by the librarians and affordances that were perceived by the students.

Intended by library but not perceived by students	Perceived by students but not intended by library	Intended by library and perceived by students
-students unaware of information literacy instruction - students do not see new icons or announcements	- unauthorized distribution of journal articles to friends - students' fear of technology dependence	- online catalogue - reference librarians - journal databases - inter-library loan

Figure 1. Summary of Findings for Intended vs. Perceived Affordance Categories

Salder and Given's (2007) study implements affordance theory to frame graduate students and librarians' expectations regarding library services with the intent to improve current library-patron communications. Sadler and Given emphasise the importance of IL instructions as an inclusionary means to enhance communication channels between a library and its patrons. Although this study explored the feasibility of an ecological model

in terms of the academic library environment, expanding this approach with the inclusion of graduate students from other departments, as well as within the context of a larger qualitative study, could create a more comprehensive ecological model of the information behaviours of graduate students.

A pilot IL graduate course. Based on their experience in co-teaching a pilot IL course in the Educational Department of Ursuline College[8] Education Department, Crosetto et al. (2007) noted that graduate students in Education rely extensively on library resources, library instructions, and interlibrary loans as a result of their research and thesis requirements. Yet despite the needs of these graduate students, there has been no substantive research on graduate students' IL since early 2000 (Crosetto et al). Moreover, according to Crosetto et al., librarians at the 2005 ACRL Conference expressed concern regarding limited resources available for teaching IL to graduate students, although the need for such instruction was clear. Unfortunately a more substantial discussion relating to issues of graduate need and librarian resource limits was not provided by Crosetto et al. The authors also suggested that many graduate students in Education were not adequately prepared to do advanced research. For instance, students lacked the ability to locate suitable literature and to examine literature critically. Although these students also demonstrated weak writing skills, the authors offered no details as to how they evaluated the students' writing. Consequently, in order to improve graduate students' information literacy abilities, the director of the program and librarians designed a discipline-specific credit course with structured sessions and assignments. After the pilot IL graduate course in Education was delivered and evaluated through the survey, Crosetto et al. indicated that participants reported the skills learned in the course

[8]Ursuline College is one of the oldest Catholic women's liberal arts colleges in United States.

useful. However, the authors did not elaborate on methods of data collection, data analysis, and other results of their study, except to note that they found significant improvement in scores between pre-course and post-course. It seems that the focus of their work was to promote new literacy instruction and describe the pilot graduate course, rather than to provide a discussion of the data collected from the students based on empirical evidence. In conclusion, the authors expressed hope that their course would be adopted by other graduate schools.

Reviews of Recent Dissertations on IL

This section contains reviews of recent dissertations on IL, in particular works of Morner (1993), Beile O'Neil (2005), and Cannon (2007). These three dissertations also illustrate development of the field, as each completed dissertation served as a foundation for another subsequent dissertation. Although all three dissertations focus on students in Education, in their concluding chapters the authors recommend that further studies extend investigations into other graduate departments as well.

In 1993, Morner designed a test of library research skills for doctoral students in Education. Morner rationalized that prior to her study there was no appropriate instrument constructed that examined whether doctoral students in education are well equipped to conduct dissertation literature reviews. The study started with pilot interviews with ten doctoral students. The purpose of this pilot study was to obtain more information about doctoral students' patterns of library use and their attitudes towards the library, especially their knowledge of information research tools. Furthermore, this informal pilot study aided in the creation of the assessment instrument—the test of library research skills. The central question regarding test contents was this: "What do doctoral

students in education need to know to conduct library research effectively?" (Morner, 1993, p.57). The demographic, attitudes, and personal issues surfaced in this pilot study became the basis for the selection of the independent variables implemented in the final test, called the Morner Test of Library Research. The second part of the study consisted of piloting the instrument on a sample of 15 doctoral students, followed by testing clusters of randomly selected doctoral students from three universities (*N = 149*). Test reliability was .72, with the Education students answering an average of about a half of the items correctly (*M = 21.95, SD = 5.35, SE = 2.8*). The item difficulty ranged from 8.1% to 91.3%, while the test scores ranged from 6 to 36 out of a possible 41. Based on these scores, Morner (1993) suggested that many of the Education doctoral students recruited for the study were not prepared to do library research at the doctoral level. Since this part of the study used a small sample of ten students, a larger sample could provide better data. One of Morner's (1993) suggestions for further research is to modify this test for Master's students in Education as well as doctoral students in all social sciences, which could diminish some possible problems with the test itself.

The Morner Test of Library Research contains an assessment scale of doctoral Education students' library research skills (Morner, 1993). Since this test was created before the ACRL IL standards, it was based on the skills that were perceived as crucial by experts in the field at that time. The basis for the test items was found in documents published by Education librarians. These documents described important library knowledge areas for undergraduate and graduate students (ACRL-EBSS-BIE, 1992). In addition to the questions developed during the pilot study, the test items were written according to eight content clusters: (i) general knowledge—how literature is generated

and communicated, (ii) intellectual access – development and refinement of a research problem, (iii) intellectual access—selecting appropriate content sources, (iv) intellectual access —selecting appropriate bibliographic sources, (v) intellectual access—manipulation of access points, (vi) knowledge of standards—knowing the parts of citations, (vii) application of knowledge—patterns of physical access, and (viii) critical approach—evaluation of information sources. Morner acknowledged that, since several of the content clusters encompassed wide areas of library research, using only five items for each content cluster might be insufficient to capture the knowledge level in each of the given clusters. Since Morner's dissertation, many technological innovations have emerged as well as the *Standards*, which were incorporated in the next dissertation presented here.

Beile O'Neil (2005) derived a conceptual framework for her thesis from the following works: (i) IL construct according to ACRL (2000) which further encompassed the characteristics of the construct of IL by incorporating ACRL and International Society for Technology in Education (ISTE) standards (which included National Educational Technology Standards for Teachers [NETS*T] clusters), (ii) IL assessments (Educational Testing Service [ETS], 200, Project Standardized Assessment of Information Literacy Skills [SAILS, 2001]; and (iii) Morner's Test of Library Research (1993). The study occurred in two phases. In the first, the project SAILS was developed; in the second, the final instrument emerged. Beile O'Neil (2005) noted that, at the time of her dissertation, there were no rigorous instruments that measured the IL skills of teacher candidates; thus, her study describes the development and validation of the Beile Test of Information Literacy for Education (B-TILED). The items in this test were based on

existing IL standards, reviewed by students and content experts in the field, piloted on a small group of students, and revised before it was administered to Education students. The major part of the sample encompassed a total of 172 pre-service teachers who completed a 22-item test (*M = 11.97, SD = 3.74, SE = .28*), and 13 demographic and self-perception questions. The scores on the test part ranged from 2 to 20 out of a possible 22. A total of 92 electronic and 80 print-administered surveys were collected. These two different data collection methods did not produce results that differed greatly with respect to the range, the standard deviation, or the standard error of measurement.

In addition, the in-library test was derived from the written test in order to assess the criterion-related validity of the questions. The participants' results were fairly consistent between these two tests, on which 78.8% of the eight in-library test items were answered consistently by the 10 students. A total of 12.5% of students changed their answers from correct to incorrect, while 8.7% changed their answers from incorrect to correct. The scores on the in-library test ranged from 36% to 86% correct, with five students' having test scores below the mean score of 54%. One of the limitations of the study was that the target population belonged to one institution only. The author called for further development of scale. Two years later, Cannon (2007) used the B-TILED test in his dissertation.

Cannon (2007) assessed the IL knowledge of general and special education graduate students as well as their readiness to integrate IL into their classroom teaching. A total of 126 Education graduate students from two private universities[9] were surveyed

[9] This California teacher accreditation program is offered at the graduate level, which provides students an opportunity to earn both general education (primary or secondary) teaching credentials, as well as a Master's degree (Master's of Arts in Teaching or Master's of Science in Curriculum and Instruction). Those students who pursue the Special Education program specialize in teaching students with disabilities.

over a three-week period. The results from the two previously piloted instruments: B-TILED (Beile O'Neil, 2005) (maximum possible score of 100) and Readiness to Integrate the Knowledge of Information Literacy into Teaching survey (Cannon, 2007) (maximum possible score of 105), indicated that graduate students in the two programs did not markedly differ in any of the measured scores. The general education graduate students (n = 81, M = 57.19, SD = 14.71) and special education graduate students (n = 45, M = 60.36, SD = 16.77) did not significantly differ in their IL knowledge (t = -1.10, p = 0.27). In their readiness to integrate IL knowledge into instruction, general education graduate students (M = 74.42, SD = 12.77) and special education graduate students (*M = 70.22, SD = 14.13*) did not significantly differ (*t = 1.71, p= .27, SD = 12.77*). Cannon (2007) also looked into differences among students who taught in schools that differ in their socioeconomic status. Although the t-test was not significant (*t = -1.09, p = .027*) between those graduate students who taught in higher socioeconomic schools and those who taught in lower socioeconomic schools, the students who taught in the higher socioeconomic schools obtained higher scores on B-TILED (*M = 62.14, SD = 15.74*) as compared to those who taught in lower socioeconomic schools (*M = 57.89, SD = 14.83*). There was no correlation in the scores on two instruments between the general and special education graduate students. Cannon (2007) indicated that one limitation of the study was that more than half (64%) of the participants were graduate students in general education. Also, another limitation was that, since data collection occurred in the latter part of the day, it is possible that participants were not mentally prepared for a survey, or that they were uncomfortable self-rating themselves on the second part of the survey. Cannon concluded by recognizing the importance of academic and research librarians in

enhancing IL instructions in graduate programmes as a way of improving the IL of students.

Table 1 contains the chronological account of IL literature that summarizes major features of the listed studies for easy comparison. The instruments and recommendations from these studies guided the process of building a methodology for the present study

Table 1
Summary of Chronological IL Literature Review

Study	Participants	Purpose	Method	Results	Limitation	Recommendations
Morner (1993)	Education doctoral students (N = 149)	Assess library research skills.	Multiple choice tests, interviewing educational doctoral students in the pilot stage; test-retest.	Education doctoral students are not equipped for doctoral-level library research.	Sites of data collection were not diverse, random sample goal was not achieved, small test-retest group.	Modify test for Master's in education students as well as doctoral students in all social sciences.
Fidzani (1998)	Graduate students from various departments (N = 144)	Determine information-seeking behaviour and use of information resources.	Questionnaire contained both open and closed-ended questions.	Graduate students do not possess adequate training in library usage.	No reports of validity or reliability of data.	Apply questionnaire during the first year of program, establish collaboration between subject librarian and department, and introduce IL course geared towards specific program.
Barrett (2005)	Graduate students from various departments (N = 3 MA, N = 7 PhD)	Are humanities graduate students a distinct patron group?	Grounded theory, open-ended interviews.	Certain information-seeking behaviours distinguish this group from other patron groups.	Small sample size. Some departments were represented with one participant.	Explore different levels of MA and PhD degrees.

Study	Participants	Purpose	Method	Results	Limitation	Recommendations
Beile O'Neil (2005)	Teacher education students (N = 172) & follow-up in-library interview (N = 10)	Develop and validate an IL assessment instrument.	35-item multiple choice test.	The B-TILED instrument is valid for assessment.	Population from one institution.	Develop the scale further.
Marshal (2006)	Undergraduate and graduate students Study 1 (N = 276 at beginning of semester, N = 106 after completion of program) Study 2 (N = 520)	Develop and validate the Information Competency Assessment Instrument.	Testing of ICAI considers two separate studies with two different samples.	Development of an instrument to measure information competency.	IL actually goes beyond what ICAI tends to measure	Combine instrument with qualitative research to better understand what it entails to become an information literate individual.
Morrissey & Given (2006)	International graduate students (N = 9)	Examine the library behaviour of Chinese graduate students & address the ACRL Standards.	Grounded theory approach with interviews.	International graduate students are in need of information literacy programs.	Small sample of international students.	Conduct a more complete examination of the international students' information seeking behaviour in the context of the Standards.
Cannon (2007)	General (N = 81) and special education (N = 45) graduate students (total N = 126)	Assessment of IL knowledge and readiness to integrate IL into teaching.	Multiple choice self-rating scale.	B-TILED and Readiness to Integrate the Knowledge of IL into Teaching survey.	Unequal representation of two populations.	Enhance IL instructions in graduate programs.

Study	Participants	Purpose	Method	Results	Limitation	Recommendations
Crosetto et al. (2007)	Graduate students – number not specified	Develop new literacy instruction through a graduate course.	Open-ended survey questions.	Graduate students lack the ability to locate suitable literature and critically examine literature.	No demographic data. No empirical evidence.	Apply the course in other graduate schools.
Liao et al. (2007)	American graduate students and international graduate students (N = 315)	Assess information-seeking behaviour and information needs.	Comparative study, web-based *Survey Monkey*.	International graduate students are ill-informed about library services.	No reports of validity or reliability of data.	International students need additional IL instruction.
Sadler & Given (2007)	Social science graduate students (N = 6 PhD, N = 2 MEd)	Apply an ecological concept of affordance to information behaviour in the academic library.	Grounded theory with in-depth semi-structured interviews and task-based computer explorations.	There exists disparity between expectations and experiences of graduate students.	Small sample of social science graduate students.	Expand the project to other institutions; complete the ecological model of graduate students' information behaviour.
Liu & Winn (2009)	Chinese graduate students (N = 12)	Examine the information seeking behaviours of Chinese graduate students	In-depth qualitative interviews.	The academic library needs to better promote its services.	Small sample of international students.	A qualitative study would extend the findings.

Not all the IL researchers agree that the *Standards* are a straightforward assessment tool. For example, Dunn (2002) notes that the *Standards* encompass broad, largely idealistic statements, instead of using concrete measurements of needed skills. In her description of research done at California State University (CSU), she indicates that most IL tests "cannot assess the effectiveness of student search skills in real life situations" (p. 27). Dunn recommends the use of real-life scenarios during one-on-one interviews as a multi-faceted assessment strategy. The benefit of implementing such information-seeking scenarios is in the shifting of assessment away from static tests with multiple-choice or fill-in-the-blank responses towards the application of knowledge in practice. This is a feature that has been rarely used in studies of IL. Dunn (2002) used six information-seeking scenarios that corresponded to six of seven CSU Core IL Competencies; in there she asked interviewees to choose between the two randomly selected optional searching scenarios. Dunn's approach was also incorporated into the methodological design of this study.

Author's Reflections on IL-Related Events during the PhD Program

This section contains the reflective notes of the researcher as a student in the Joint PhD Program. For this reason, this section is written in the first person.

As a student in the Joint PhD Program[10], I had many opportunities to interact with other graduate students and to use research-related resources through the libraries at the three participating universities. Here I describe three events that occurred during the first two years of the doctoral program, as I remember them.

[10] The Joint PhD Program is a collaborative initiative of Brock University, Lakehead University and University of Windsor.

Scenario #1 –Year 1. As one of my first assignments, I had to conduct a literature review and include references according to the American Psychological Association (APA 5.0) style. Together with four other students, I went to the library to gather the necessary literature. Besides downloading the chosen articles, I was importing information into Refworks[11]. However, the other four colleagues were typing their references manually. Realizing that the others were unaware of Refworks, I showed them some main features suitable for use in the assignment. After the course was completed, all students from the group contacted librarians at their home institutions to learn more about Refworks.

Scenario #2 – Year 2. Being aware that they might not have been familiar with some information research tools, a group of students requested a library workshop. Although a university librarian organized the workshop, I was able to contribute to it, knowing both the features of the software for research and the workshop audience. Since participation in the workshop was voluntary, not all students attended. During the workshop, the librarian introduced various research tools such as Scopus, Web of Science, Foxy Leddy LibX Toolbar, and others. Several students (including the University of Windsor students) indicated that although they felt confident with their research skills, they were surprised that they had never encountered these timesaving features, especially the students who came into the program after taking a break from school and needed to update their research skills.

Scenario #3 – Year 2. As part of my course assignment, I gave a presentation about open access publishing (academic articles freely available on the Internet) and

[11] This is a web-based tool that creates list of references by directly importing them from library databases. This program automatically generates a bibliography formatted in any of the major bibliographic styles.

Securing a Hybrid Environment for Research Preservation and Access (SHERPA). During the presentation, I asked the audience if they were using peer-reviewed journal materials. There was a silence in the classroom. One after another, the students indicated that they were unaware of the kind of research literature they were collecting. In addition, the students did not know about the feature that allows for display of only peer-reviewed journals.

Situations like the three scenarios I described here not only provide anecdotal evidence related to the IL capabilities of graduate students; they also encouraged me to pursue further research in IL. This intention was strengthened after I performed a thorough literature review in this domain.

Technological solutions are not flawless. Although technology, when it works properly, can be very useful in many ways, it is far from being perfect and totally reliable. Certain databases mistakenly indicate that certain journals are peer-reviewed when they are not, or certain reference tools such as Refworks might not produce accurate APA 5.0 references. For instance, according to the Wilson Web database, the Hashway & Austin's (2007) article is not peer-reviewed, while the ERIC database classifies it as peer-reviewed.

The following two sections include literature review about a Web-based survey for libraries and recent teaching approaches in instruction of the graduate students' IL.

LibQUAL+™.

LibQUAL+™[12] offers a Web-based survey for libraries, which was used internationally in over 500 libraries in the United States, Canada, the United Kingdom

[12] *"LibQUAL+® is a suite of services that libraries use to solicit, track, understand, and act upon users' opinions of service quality"* (Association of Research Libraries (ARL), 2009, para. 1).

and in Europe (Association of Research Libraries [ARL], 2009). This survey is intended to measure student and faculty satisfaction with library services and collections. The purpose of this section is briefly to review the LibQUAL+™ results at three universities in Ontario, Canada (University of Windsor, University of Western Ontario and Carleton University), to look specifically at the LibQUAL+™ Canadian graduate student responses and explain the need for additional methodologies that could be implemented alongside the LibQUAL+™.

LibQUAL+™ and Three LibQUAL Canadian University Reports. In 2004 and 2007 the undergraduate and graduate students, faculty, and staff at the University of Windsor filled out the LibQUAL survey. Since the data results from the 2007 University of Windsor survey were not available, the following discussion will address only the 2004 survey results. The 2004 survey consisted of 22 core questions rated on a scale from 1 (low) to 9 (high). The respondents were asked to assess the *minimum* level of library service expected, their *desired* level of library service, and their *perceived* level of library service provided. Furthermore, the LibQUAL+™ survey encompassed three dimensions: affect of service, library as a place, and information control. This survey also encompassed five local questions and questions relative to user satisfaction, information literacy, and usage patterns. The participants were also provided with sections where they could write additional comments regarding to local library services. Out of approximately 13 000 surveys sent out at the University of Windsor, a total of 840 were returned (70% from undergraduate students, 18% from graduate students, 8% from faculty and 4% from staff). The summary of quantitative results indicated that this particular library's performance was "slightly better than the minimum expected level of services" (Ball,

2005, Summary: Core Question section, para.1). Furthermore, both graduate students and faculty expressed concern about the outdated and incomplete library collection. In the final summary report, qualitative comments from graduate students and faculty were grouped together. These comments indicated that the area of concern seemed to be the collection, specifically, a need for more books and journals was suggested. In conclusion, the *LibQUAL+™ Spring 2004: Leddy Library* report pointed to several areas that required improvement: users wanted more full-text articles, information about resources and services, and improvement in several aspects of the library environment, including furniture, study space arrangements, cleanliness, reduction of noise levels, and increase in the number of computers available (Ball, 2005). In future, it would be beneficial to compare findings to the latest LibQUAL results.

Based on the LibQUAL+™ 2007 survey, the University of Western Ontario (Western Libraries, 2009) produced the *LQ 2007 Action Report*. A total of 1300 comments were analyzed in the report, which is divided into the following three sections: (i) You told us, (ii) What we're doing about it, and (iii) Completed. For instance, one of the suggestions was to improve the website (You Told Us). The report indicated that the Next Generation Website Implementation Team (NGWIT) was redesigning the website (What We're Doing About It), and the launch date was scheduled for August, 2008 (Completed). This report is very informative since the users and participants are able to follow-up on how their recommendations for improvements are being addressed.

Carleton University posted its LibQUAL+™ 2006 and 2007 survey results on its website. In 2006, 340 graduate students participated (*N = 910* faculty, undergraduate students, graduate students, and staff members), compared to the 2007 survey in which

209 graduate students participated (*N = 805* faculty, undergraduate students, and graduate students). Although respondents noted that the library needs to create more quiet zones, increase the fund for print as well as electronic collections, and add more computers, the respondents also noted that the library needs to simplify access to electronic resources. The report lists the rankings of the *desired* library services stratified by undergraduate student, graduate student, and faculty responses. Tables 2 and 3 contain summary data of the 2006 and 2007 graduate students' rankings of the *most important (highest desired levels)* and *furthest from meeting desired levels* of library services.

Table 2

Graduate students' rankings of most important library services (highest desired levels)

2006 Ranking	2007 Ranking	Most Important Library Services
1	2	Making electronic resources accessible from my home or office
2	1	Print and/or electronic journal collections I require for my work
3	3	The electronic information resources I need
4	4 (tied with 5)	A library Web site enabling me to locate information on my own
5	5 (tied with 4)	Easy-to-use access tools that allow me to find things on my own

Note: Most important ranked as 1; based on LibQUAL+™ 2006 and 2007 surveys.

Table 3

Graduate students' rankings of library services that are furthest from meeting desired levels

2006 Ranking	2007 Ranking	Furthest From Meeting Desired Levels
1	1	Library space that inspires study and learning
2	2	Quiet space for individual activities
3	5	The printed library materials I need for my work
4	4	Print and/or electronic journal collections I require for my work
5	3	A getaway for study, learning, or research

Note: Furthest ranked as 1; based on LibQUAL+™ 2006 and 2007 surveys.

Furthermore, the Carleton's LibQUAL+™ report states what the library is going to do in response to the 2006 and 2007 surveys (similar to the University of Western Ontario report). Both reports further suggested they will be comparing their LibQUAL+™ results to the results of the surveys done by other libraries that participated in the Canadian consortium of libraries (Carleton University, 2009). It should be noted that the University of Windsor 2004 LibQUAL+™ results overlap with some suggestions in the 2007 University of Western Ontario and 2006/2007 Carleton University LibQUAL+™ reports. What particularly stood out as a difference was that users at the University of Windsor indicated that they would like to be more aware of the library resources and services, whereas Carleton University users were satisfied with information about resources and services, but identified their need for simplified access to electronic resources.

The 2007 LibQUAL+™ Canada (ARL, 2007) report results from university students. The data examined graduate student responses ($N_{masters} = 5{,}320$; $N_{doctoral}$ =

2,602; $N_{undecided}$ = 347) in both American English and Canadian French LibQUAL+™ versions across various disciplines, regarding the library use summary (both electronically and on the premise), and the use of non-library information through different gateways (Google™ and Yahoo™). The data indicated that 38.92% (*N = 3218*) of graduate students accessed library resources *daily* through a library webpage compared to 72.29% (*N = 5978*) of graduate students' *daily* usage of Google™ and Yahoo™, or other non-library gateways for information (ARL, 2007). However, this study could have been more comprehensive if it had included statistics of any of these users who may have registered through Google Scholar preference library links to obtain any daily results.

LibQUAL+™ and What Does It All Mean? Thompson, Cook, and Kyrillidou (2005) investigated the validity of the LibQUAL+™ scores with particular interest in how total and subscale LibQUAL+™ scores were associated with self-reported library-related satisfaction and outcomes scores. In 2004, a total of 88,664 students and faculty completed LibQUAL+™. The satisfaction questions pertained to general feelings and perceptions (i.e., "In general, satisfied with the way I am treated at the library", p. 518), while the outcomes questions focused on personal benefits from the use of the library, such as the library's role in aiding academic advancement or informing development in a particular field. The outcomes captured items pertaining to perceived values and academic pursuits (i.e., "Library enables me be more efficient in my academic pursuits," p. 518). As indicated previously, LibQUAL+™ consisted of 22 items and participating libraries were allowed to add five additional questions. This particular study reported similar results among the graduate students, undergraduate students, and faculty groups

with equivalent validity across those participant groups. It was concluded that the results of LibQUAL+™ more accurately measure satisfaction than outcomes.

Saunders (2007) pointed out that ARL implemented LibQUAL+™ as a standard survey instrument to be used in academic libraries. Two listed advantages of the survey were that individual libraries were able to compare their own results with peer institutions, and that libraries would be able to save on expenses by using a tested online survey instrument. However, LibQUAL+™ has its downfalls. Respondents commented that the survey was too long and that it could not be submitted unless all of the questions had been answered. Although LibQUAL+™ is based on the perceptions of participants, it is unclear what objective values contribute to those perceptions.

In order to increase library effectiveness, other methods could accompany LibQUAL+™ such as "interviews, observation, content analysis and the analysis of existing statistics" (Edgar, 2006, Conclusion section, para.1). Utilized jointly, these methods could contribute to long-term advances, not only in academic libraries, but also in various scholarly disciplines.

Recent Approaches in IL Teaching of Graduate Students

The following section contains recent approaches in IL teaching of graduate students in Canada and the United States. Both of the following approaches have overlapping themes, and indicate their current commitment towards addressing graduate students' IL needs and gaps.

Even though IL graduate student workshops are not straightforward to create, Hoffmann, Antwi-Nsiah, Feng, and Stanley (2008) from the University of Western Ontario did organize such an initiative for students in the areas of engineering, health

sciences, medicine and dentistry, and science. First, the graduate students provided the needs assessment data (*N = 274*, with 16% response rate on online survey), after which three focus groups for graduate students (*N = 33*) and one for faculty (*N = 8*) were organized. Both the survey and focus groups were to provide feedback about the perceived usefulness and relevance of the IL workshop. While the survey contained items to rate the usefulness of the workshop, participants' past experience with library instructions, challenges with finding information, and preferred methods of workshop delivery, the focus groups looked for missed or unnecessary items in the workshop description. In order to further understand graduate student IL needs, the participating faculty members were selected among those who had either supervised or taught graduate students. Furthermore, there was an overlap between questions asked on the survey and guided discussion during the focus group.

It is notable, that although 35% of graduate participants obtained a Bachelor's degree and 15% obtained a Master's degree from another country, the results for this group were not reported separately. Graduate students from all four faculties indicated difficulties pertaining to the following: (i) choosing key words and search terms; (ii) narrowing searches and results; and (iii) sorting through results in order to find relevant information. The majority of graduate students opted for online workshops (67%) and preferred workshops run by both librarians and faculty members rather than those run by just librarians (47% vs. 43%). The faculty group indicated a preference for students to have an opportunity for hands-on-experience, but they also recognized the need for collaboration between faculty and librarians as an imperative step towards teaching research skills. The faculty suggested organizing an IL credit course or presenting a

certificate for attending all workshops in a specific series, as an incentive for graduate students. Both the survey and focus group noted that graduate students should have an option between basic and advanced levels of workshops. However, 85% of graduate students indicated a preference towards subject-specific workshops as a means of addressing library research skills geared towards their disciplines.

The most popular workshops among graduate students were *Introduction to RefWorks, Keeping Current with Scholarly Literature*, as well as those related to advanced search techniques. One difference between the perceptions of graduate students and those of faculty was that faculty members emphasized instruction "on knowledge of copyright, plagiarism and intellectual property" (Hoffmann, et. al., 2008, Choice of Workshop Topics, para. 5), while graduate students generally were not inclined to attend workshops pertaining to the *Ethical Use of Information*. The common theme amongst all graduate students, in all above listed faculties, was that they did not obtain standardized library instruction and that they encountered similar challenges with finding relevant information. While Hoffmann et al. (2008) suggested that a common program for all graduate students would be acceptable; the graduate students indicated a preference for subject-specific instructions. The authors concluded that future research could include graduate students' perceptions of their IL needs and give more detailed attention to different needs of international versus Canadian students. Although this study did not provide more detailed statistical data, its suggestions should be taken into account in designing IL workshops/courses for graduate students from other disciplines.

Recognizing the need for IL instruction, Rempel and Davidson (2008) created literature review workshops for a broad range of subject disciplines. First, in order to

advance graduate student services, a graduate student service coordinator was appointed. The coordinator reviewed the literature, compared various universities' library websites, and surveyed new graduate students. As a consequence, a graduate committee was formed to organize library-based instruction for graduate students in the area of literature review; this program was considered especially important for their IL development. The unexpected outcome of the workshop was that only 25% of graduate students, who had been registered for three years or more, attended the offered workshop. In addition, the attendees were evenly split among Master's and doctoral students (*N = 226*) from various disciplines. Although no statistical data were provided in the article, the feedback from workshops indicated that graduate students were not up-to-date with the most recent library tools. Even though graduate students were aware of Google Scholar, they were unfamiliar with more multifaceted library tools, and Web 2.0 tools (for instance RSS feeds). Thus, they did not use those tools to keep up with the literature. Rempel and Davidson (2008) suggest that, in order to adequately approach different student learning abilities, future workshops should be offered at beginner, intermediate, and advanced levels, preferably at different times of the day. Also, specialized workshops should be scheduled in order to reach distance and international students. Furthermore, the authors concluded that finding a suitable way to address faculty's perceptions and expectations would be beneficial.

An online tutorial titled, "Publish Not Perish: The Art and Craft of Publishing in Scholarly Journals," is offered by the librarians of the University of Colorado for graduate students and junior faculty. Besides becoming familiar with the opportunity to expand publication strategies, the graduate students as well as the junior faculty were

exposed to open access publications. The feedback survey at the end of the tutorial was overwhelmingly positive in many aspects (in the high 90%) range. Many participants noted the benefit of having such a tutorial online, as well as learning about publication strategies (Knievel, 2008).

Overall, the recent publications by Hoffmann et. al. (2008), Rempel and Davidson (2008), and Knievel (2008) note the importance of providing IL instructions to graduate students. These three teaching approaches, although different in many aspects, give credence to the importance to graduate students' input regarding IL instruction. However, more substantial statistical reports would be beneficial for researchers in this domain.

This review of related literature is followed by Chapter III, which contains descriptions and rationales for the methodological approach chosen for this dissertation. More specifically, it introduces the sequential integrated mixed method model as suitable for addressing certain gaps in the aforementioned literature reviews. Furthermore, the reader is presented with the detailed steps that have been undertaken in order to modify and adapt the instruments used in other studies for the goals of this research.

CHAPTER III

Methodology

The previous chapter provided a review of literature on IL, making the case that research in this area is needed and that selected methodological approaches could help fill the gaps in previous research. This study builds methodologically on Beile O'Neil's (2005) B-TILED survey and uses a *sequential integrated mixed model design*. It draws on two theories, the Technology Acceptance Model[13] (TAM) and Affordance Theory[14] (Gibson, 1979; Norman, 1988; Sadler & Given, 2007), to explore graduate students' IL needs, including their personal perceptions and acceptances of specific technologies. The following section, elaborates upon the justification for the sequential integrated mixed model.

Justification for the Sequential Integrated Mixed Model Design

Sequential mixed model design allows research questions of the second phase to emerge from the inferences made in the first phase. The first phase of the study includes data collection, data analysis, and inferences utilizing one methodological approach. The second phase includes new data collection, new data analysis, and inferences utilizing a second approach (Tashakkori & Teddlie, 2003). This research design incorporates explanatory/exploratory mixed method designs (i.e., sequential exploratory, sequential explanatory, and sequential transformative designs) as described in Creswell, Clark, Gutmann and Hannson (2003a). Two of the most recognized authors in the mixed method

[13] Technology Acceptance Model (TAM) (Davis et al, 1989). This model emphasises that beliefs (i.e., *perceived usefulness* and *perceived ease of use*) are primary determinants of information technology adoption. TAM is incorporated into open-ended questions in both the survey and interview sections.
[14] Affordance Theory, as used in the study of Sadler and Given (2007), is part of the qualitative portion of the study. This theory was previously used in various explorations of information behaviour of graduate students in social science departments.

domain, Tashakkori and Teddlie (2003) recommend that, when no suitable design exists for the project, the researcher might need to develop a new mixed method design. Furthermore, the authors noted that the design might also change during the study, especially if one type of data set turned out to be more vital as the study progressed. Based on the literature review (Creswell, 2003; Creswell 2005; Tashakkori & Teddlie, 1998; Tashakkori & Teddlie, 2003), the *sequential mixed model* seemed suitable as the foundation model for this study, but required further development to adequately address all research questions. For the purposes of this study, the *sequential mixed model design* proposed by Tashakkori and Teddlie (2003, Figure 26.8, p. 688) was extended to the *sequential integrated mixed model design* (see Figure 2).

The objective of the *sequential integrated mixed model design* developed for this study was to obtain quantitative and qualitative data through a survey of graduate students from specific departments and follow-up interviews with selected graduate students. Quantitative data were gathered through the B-TILED survey (Beile O'Neil, 2005) accompanied by TAM based open-ended questions in the survey instrument. Additional qualitative data were collected through follow-up interviews, using questions informed by Affordance Theory and TAM. This approach recognized the 2006 ALA statement regarding the importance and effect of different levels of thinking skills in relation to different learning outcomes, and argued for the need for a variety of assessments or methods to measure those outcomes. Currently, librarians at the university where the study was conducted follow the ACRL's *Information Literacy Competency Standards for Higher Education*. Thus, integration of the B-TILED instrument, which incorporates multiple academic programs' criteria in developing IL, as well as the use of

TAM and Affordance Theory components, provides a more holistic approach in assessing graduate students' IL.

In a *sequential integrated mixed model design*, questions for the qualitative component (interviews) emerged from the inferences made based on the quantitative component (survey). Although the interview questions by Sadler and Given (2007) served as a guide, a selection of the real-life scenarios suggested by Dunn (2002) were added after the quantitative data had been analysed for each group of participants surveyed. For instance, when in the quantitative part of the study one group of students did not do well in one of the IL standards (e.g., Standard One), that particular standard was addressed in the qualitative follow-up for that particular group of students.

The strength of such a *sequential integrated mixed method* model is that, when unexpected results arise in the first part of data collection (B-TILED and TAM), the researcher is able to explore these concerns further in the second, qualitative part (Creswell, 2003). In addition, the research model (see Figure 2, p. 54) employed an equal "priority or weight" (Creswell, 2003, p. 212) strategy implementation in both the quantitative and qualitative components of the study. Both methodological contributions were equally dominant as they were assigned equal weight by the researcher (Creswell, 2003a; Tashakkori & Teddlie, 2003).

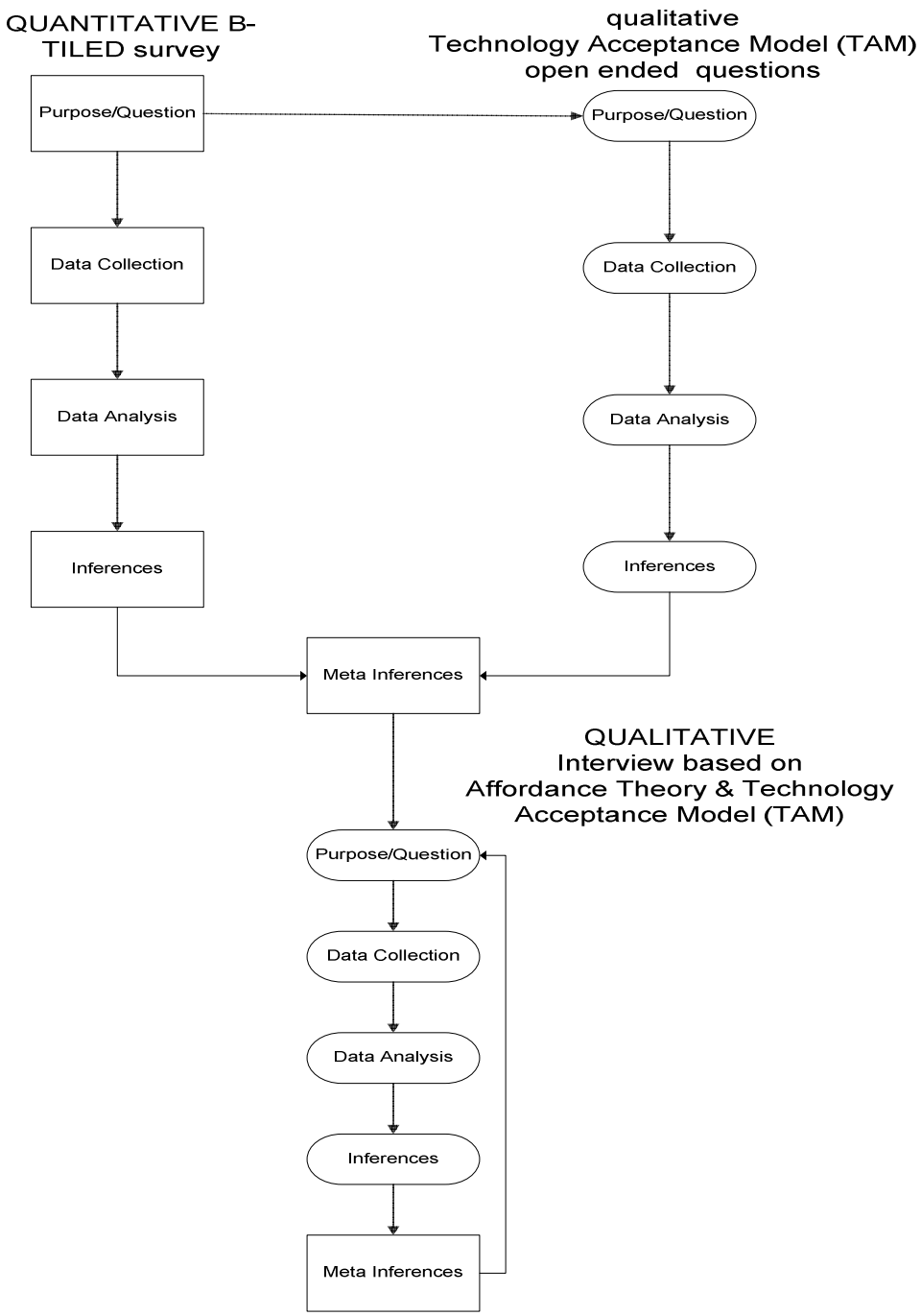


Figure 2. Sequential Integrated Mixed Model Design employed in this study

- "+" indicates a simultaneous or concurrent form of data collection
- "→" indicates a sequential order of steps in data collection process

Phase 1: Integrated QUANTITATIVE and qualitative Part of the Study

There are two major research questions in this study, one quantitative in nature and the other qualitative.

QUANTITATIVE question (based on B-TILED survey):

1. Which graduate students' profile cluster (demographic, academic level, or department) best portrays their IL?

qualitative question (based on TAM):

2. What are the graduate students' IL needs based on their perceived usefulness and ease of use of library services?

In order to answer these questions, a survey was conducted among graduate students. This survey was derived from the *Standards*-based Beile Test of Information Literacy for Education (B-TILED) (Beile O'Neil, 2005), which was revised and adapted for this study. This process is explained further in the text.

Survey Instrument. The chosen instrument for this study is the *Standards*-based Beile Test of Information Literacy for Education (B-TILED) (Beile O'Neil, 2005). This particular test measures a participant's IL level. In the first phase of this test's development, Penny Beile O'Neil designed instrument items, then in the second phase, she validated the test items. This test was originally developed for undergraduate pre-service teachers, but it has been used for graduate students as well (Cannon, 2007). The original instrument consists of 35 multiple-choice questions, out of which 13 questions are demographic (see Appendix B), and takes approximately 30 minutes to complete.

Beile O'Neil's (2005) B-TILED instrument was judged by five content experts who validated 22 test items through a procedure in which each of the items were rated on a

scale of 0 (low) to 3 (high) by assigning a rating for: (i) accuracy-how accurately does the item reflect the ACRL objective? (ii) clarity-how clearly written and understandable is the item? and (iii) institutional objectivity-does any of the content of the item reflect local arrangement or can the item be applied across multiple settings? The mean scores for these items were 2.67 for accuracy, 2.47 for clarity, and 2.85 for institutional objectivity, which was described by Beile O'Neil as "consistently excellent" (2005, p. 98). Criterion-related validity was established by comparisons of the results on a 22-item B-TILED written test with the results on an 8-item, in-library test developed originally by Morner (1993). Morner (1993) noted that criterion-related validity was established by showing the consistency between students' test answers and their actual performance on a given task in the library. A total of 10 participants were chosen from the pool that scored in the top 20% and the bottom 20% of the Morner Library Research Skills Test (MLRST). Out of 41 items on the paper-and-pencil, a total of 22 items were selected from the MLRST for their measurability by observing the actual behaviour in the library, as well as representing the content categories. Out of the 10 participants selected for this test, a total of 73% of the items did not change between tests; however, 15% of the participants' answers changed from correct to incorrect, while 12% of answers changed from incorrect to correct. It was concluded that the paper-and-pencil test was a stable indication of participants' in-library performance.

In Beile O'Neil's (2005) study, no correlation coefficient data were reported for the 10 student participants, but 78.8% of the 8-item in-library test answers were consistent with the written test.

The participants in the Beile O'Neil's study were 172 undergraduate students enrolled in a teacher education program (N = 12 freshmen; N = 10 sophomore; N = 48 junior; N = 80 senior; while the status of 22 students was not specified). Using the variants of the Angoff method, in which a number of experts through an iterative process make judgments about test items and a passing score (Norcini, Lipner, Langdon, & Strecker, 1987), the panel of experts in Beile O'Neil's study agreed on the estimation that a passing score of 55.5% was an acceptable level of IL; however, based on individual percentage adjustments in order to include the test error measurement and minimize the false negative scores, a final score of 57.5% was taken as an accepted level of competency in IL for undergraduate students only. A total of 76 out of 172, or 44.19% of students, achieved that goal (Beile O'Neil, 2005).

Whereas Beile O'Neil (2005) created the instrument to test the IL of pre-service teachers from one university, Cannon's (2007) content experts, well-versed in IL, verified this instrument for use with graduate education students. The experts indicated that, in this case, students in undergraduate and graduate teacher Education programs would have equivalent IL knowledge base because the teacher credential programs in the state of California are combined at the pre-service and graduate level. Since B-TILED was modeled after the Morner (1993) study and contains a number of general items, there was a need to develop an instrument that contained more subject-specific items. Morner (1993) recommended modifying the test for doctoral students in social sciences, while Beile O'Neil (2005) recommended further development of the scale. One intention of the present study was to expand the B-TILED test to survey a range of Social Sciences graduate departments. Consequently, necessary adaptations were made in order to

develop and validate the extended test such as taking into account different graduate levels (i.e., Master's and PhD) (Barrett, 2005), the population of international students (Morrissey & Given, 2006; Liao et al., 2007; Liu & Winn, 2009), different institutions (Sadler & Given, 2007), and to extend the process with a qualitative component to understand better what it entails to become an information literate individual (Marshall, 2006).

Reliability and Validity. According to Hunter and Brewer (2003) "two qualities most central to assessment of the 'goodness' of a measurement are its reliability and validity" (p. 581). In this sense, reliability refers to the extent to which the individual score from a given instrument should be similar or stable on repeated administration of the instrument (Creswell, 2005). The original B-TILED survey instrument stability was measured by a test-retest procedure that encompassed the administration of the written test twice. A total of eleven students completed the second test under similar conditions to the first test. The mean change was 2.4 items out of 22, resulting in 74% item stability from one test administration to the next (Beile O'Neil, 2005). In the current study, overall Cronbach's alpha was .631, as various graduate departments did obtain different Cronbach's alpha results. For instance, Cronbach's alpha for Master's of Education participants was .682 (removing B-TILED question #26 would result in .702), for Master's of Social Work was .658, while for Master's of Arts was .582. The Master of Arts participants from various departments were combined into one category since certain departments did have a lower number of participants. This could be a possible reason for a lower Cronbach's alpha, since Cronbach's alpha for Master's of Political Science participants before they were combined into Master's of Arts category was .707.

According to Creswell (2005), validity refers to a researcher being able to draw meaningful inferences from scores based on a population sample. The content validity of the revised instrument implemented in this study was evaluated by experts in the field (i.e., the experts were university librarians with expertise in particular subjects and were responsible for providing service and overseeing the library subject collections). The expert judges determined if the items in the test measured the intended objectives of IL. They also suggested modification of items in view of the context and purpose of this study. This method is described in detail in the modification of survey instrument section listed below. In order to validate the credibility of the qualitative research findings member checking, or triangulation, was implemented. All interviewed participants underwent the member checking procedure, in which the researcher asked each the interviewee to check the accuracy of the interpretation of his or her responses to the open-ended questions from the first part of the study. All questions for which participants provided inaccurate answers were further discussed in order to understand the participant's view of the particular IL interpretation. Following Martinovic's (2004) study, the triangulation process of confirming evidence using different groups of individuals (i.e., different departments), types of data (i.e., interview transcripts and observational notes during completion of the research tasks), and methods of data collection (e.g., open-ended survey questions and interviews) contributed to more accurate findings in this research. Overall, triangulation of the mixed method design was based on the application of both qualitative methods (interviews) and quantitative instruments (surveys), while merging the results of various data collection methods in the final stages of research contributed to better understanding of a research problem.

Modification of Survey Instrument. In order to use and modify the B-TILED test, permission was sought and obtained from Dr. Beile O'Neil. Originally, certain questions (items #8, #10, and #18) needed to be changed in order to focus on graduate students, while other questions (items #23 and #26) needed to reflect Canadian content (see Appendix B). Leddy Library specialists from education, information literacy, social science, social work, English, university archives, data, and library data management agreed to verify the appropriateness of the changed items and contributed to the final modification of items. Some survey questions were modified to accommodate the following 10 graduate departments: (i) Communication and Social Justice, (ii) Education, (iii) English, (iv) History, (v) Philosophy, (vi) Political Science, (vii) Psychology, (viii) Social Work, (ix) Sociology, and (x) Visual Arts.

The first survey to be modified pertained to the graduate students in Education. After the Education and information literacy librarians approved the modifications to the test, the data librarian and library data manager approved the survey. This survey, which can be found in Appendix C, served as the basis for all other modifications. Through meetings with the rest of the content expert librarians, questions #7, 8, 10, 12, 13, 15, 18, 19, 20, 21, 23, 24, and 26 were slightly modified in order to reflect relevant content geared towards certain graduate departments (see Appendix D) and to target appropriate standards, performance indicators, and outcomes.

The following section (see also Appendix D) explains how and why those particular questions were chosen. Question #7, for example, includes the popular database choice specific to each of the departments. One of the reasons for choosing those particular databases was that they were listed on the library website under the

heading, “Journal Articles and Research Tools by Subject” as the first and recommended choices by subject librarians. Question #8 originally contained the “whole language learning term” that needed to be modified for each department. For instance, according to the social work librarian, a more appropriate and often used research term for social work graduate students would be the term “child development.” Thus, as an option (d) the following format, “A social work encyclopedia, such as *Encyclopedia of Child Development*,” was used to reflect the appropriate content. In addition, the librarians thought that shortening option (b) in question #8 to “A journal article” would be more appropriate and clear for the participants, instead of describing the article. Lastly, an option (c) “General website (via Google)” was added since the original B-TILED item was repetitive, including two questions about encyclopaedias and not addressing the online option of searching. In addition, a question about Google was added as suggested by the Education librarian to find out if Google is a preferred choice when it comes to looking for journal articles. The LibQUAL+™ Canada (ARL, 2007) survey also contained a question about Google.

Question #10 was modified to address the use of the databases particular for each department. For instance, PsychInfo would be an appropriate choice for the psychology majors. Options (a), (b) and (c) of question #12 were modified to mention specifically the department name, while question #13 was changed accordingly to refer to specific research topics. For communication graduate students, it was more appropriate to phrase the question as, “You have been assigned to write a short class paper on the effect of Hollywood’s media”; while for Education graduate students, it was more appropriate to keep the original wording of, “You have been assigned to write a short class paper on

effective instruction techniques for teaching." Question #15 was changed to reflect Canadian terminology, including the term "university students," since the participants of this study were university students. In addition, question #15 was modified according to the results obtained from databases particular for each department. For example, the term "group work" would be inputted in one database, and the synonym returned by the database was used as a correct answer for students whose department used this database. For example, for the Visual Arts graduate students, the chosen database called Arts & Humanites @ Scholar Portal returned over 25,000 items. For certain graduate departments the term "group work" was replaced by the more suitable term "political parties."

Question #19 is dependent on the preferred citation style of each graduate department. Thus, the English subject librarian found an appropriate MLA citation, and the question was further changed to reflect an option (d), "Work in an anthology or compilation." For each department, the citation style guidelines were followed. The Modern Language Association (MLA) citation style guide is used in English, Philosophy, and the Visual Arts department, while the American Sociological Association (ASA) style is used in Sociology. Although the *Chicago Citation Style Guide* can be a preferred style for social sciences, including political science and history, it was not mentioned in this survey. After contacting various departments, getting feedback from professors and librarians, and reviewing thesis citation style of graduate students, the researcher decided that political science graduate students more often use American Psychological Association (APA) style, which was the norm for graduate students from Education,

psychology and social work. Similarly, question #20 was adapted to reflect the preferred citation styles for each department.

Question #21 was tailored to include the conference paper reference according to the database used by each department. Since the answer to question #21 required participants to identify the reference as a conference paper, the researcher and the content judge chose the conference that was listed in the departmental database rather than the original reference that may have not been familiar to the graduate students from that particular department. Questions #23, 24, and 26 were modified across all ten departments. Question #23 was adapted to reflect the Canadian legislative system, while question #24 was further clarified by adding a year and a citation to option (4), "To address these issues, Hunter (2005) has proposed that 'students should work in groups with the computer peripheral and the teacher acting as a facilitator' (p. 25)." Finally, question #26 was tailored to reflect Ontario provincial government content.

TAM Theory. In the formulation of a theoretical view for studying the IL and information competency of graduate students, TAM (Davis et al., 1989) provides a useful model. TAM also includes a behavioural component in order to explain the end-user's behaviours when confronted with the use of a wide range of computing technologies.

The assumption behind TAM is that specific beliefs (i.e., perceived usefulness and perceived ease of use) are primary determinants for the adoption of information technology and information systems (IT/IS) (Lu, Yu, Lio, & Yao, 2003). Perceived usefulness is defined as the extent to which one believes that utilizing the system will improve one's performance, whereas perceived ease of use reflects the belief that utilizing the system will be free of effort (Davis et al., 1989; Venkatesh & Davis, 2000).

A key goal of TAM is to measure the impact of external variables on internal beliefs, attitudes, and intentions (Davis et al., 1989; Lu, Yu, Lio, & Yao, 2003) (see Appendix E). This model is used for predicting user acceptance of technology. Ten years after TAM was first introduced, the Institute for Scientific Information's Social Science Citation index (2000) lists 424 citations for the two introductory TAM journal articles by Davis (1989) and Davis et al. (1989). In addition, various empirical studies have noted that TAM aids in explaining a considerable portion of the variance (approximately 40%) in usage intention and behaviours. However, researchers did note that the generality of TAM does not provide more meaningful information on users' personal views about specific technological systems. Integrating TAM with other Information Technology (IT) acceptance models, or incorporating it with additional factors, might minimize its current limitations (Venkatesh & Davis, 2000). Thus, by integrating TAM questions (see Appendix F) with a modified B-TILED instrument and Affordance Theory questions the quest for more meaningful information on graduate students' intentions, behaviours, and opinions about library technology systems might be realized.

Phase 2: Qualitative Follow-up Part of the Study

The qualitative part of this study, which was informed by the results of the previously described survey, was designed to answer two research questions*:*

Qualitative question (based on Affordance Theory):

1. What affordances do graduate students perceive in the academic library context? (Sadler & Given, 2007, p. 118)

Qualitative sub-question (based on TAM):

1a. What perceptions of library usage play a role in graduate students' information seeking behaviours and awareness about library resources?

The researcher used interviews as the main data collection method.

Interview instrument. In the formulation of a qualitative theoretical framework for studying graduate student IL, the Affordance Theory and TAM provided useful models. Both of these models take into account behaviours as well as the perceptions of participants. Thus, the interview questions addressed both of these aspects.

Affordance Theory was utilized to investigate to the extent to which the academic library environment is perceived as useful by graduate students. Sadler and Given's (2007) study stated that using only one source of information as an indication of graduate students' needs, for example, the World Wide Web "hit" statistics are insufficient. It is essential that such information is collected through multiple methods such as interviews, questionnaires, focus groups, and other means of communication with patrons. Taking an ecological approach by viewing the academic library as educational space, as well as implementing a mixed model approach to explore graduate students' usage of library tools and services, the researcher obtained a more complete representation of graduate students' IL. Thus, the role of the library in supporting graduate students' research-related activities was explored by administrating the modified version of Sadler and Given's (2007) *Interview Guide for Graduate Student Interviews* (see Appendix G).

The interview guide questions were modified according to the results of the quantitative part of this study. Based on the analysis of the quantitative data, real-life IL scenarios were presented to participants (Dunn, 2002). For example, if questions

belonging to the ACRL performance indicators, relating to Standard Three, were not answered correctly, this issue was addressed in the real-life scenario interview process. In her study, Beile O'Neil (2005) used 57.5% as the cut-off score for the students to be considered information literate. Since the questions pertaining to the performance indicators in this study were not equally distributed (i.e., ranging from 2 to 11 per performance indicator), a legitimate concern arose regarding the use of a general cut-off score that might not properly address students' issues with particular Standards. For these reasons, expert librarians were sought to inform research decisions such as how to weigh students' knowledge on each Standard. If a graduate student's skills in two or more ACRL Standards were unsatisfactory in the quantitative section, the interviewee was invited to choose between two real-life scenarios (Dunn, 2002). For example, some students may be more comfortable answering questions pertaining to Standard Two (dealing with access to the information), rather than Standard Five (dealing with issues of a social, legal, or economic nature).

The Ecological or System Lens

Schram (2006) views an ecological perspective as constructed upon the general notion that individuals are placed in and affected by a social context that influences their behaviour. Ecologically or system-oriented researchers believe that a system as a whole cannot be comprehended fully by analysing its components separately. The researcher in this particular type of research tends

> neither to be informed by the inquirer's personal experience in interaction with study participants (as in an interpretivist or critical approach) nor to be transformative or deliberately educative (as in critical approach). Ecologically or

> systems-minded researchers instead proceed with a definitive and relatively detached (from study participants) grasp upon the tasks of description and analysis aimed at identifying those contextual factors with the greatest influence on individual or institutional behaviors. (Schram, 2006, pp. 50-51)

As part of the sequential integrated mixed method study design, the second part of the data collection is informed by the results of the first part. Thus, the researcher used her judgment to explore any emerging concerns further in the second, qualitative part of the study.

During the interview process, the researcher did not engage in discussions with the participants regarding to the accuracy of their answers (e.g., if a participant inaccurately claims that the *Get it* button always brings in the full-text article). Rather, the researcher aimed at identifying the contextual factors (i.e., previous experience, graduate level, etc) that most influence individual behaviours in the use of library resources. The series of questions and scenarios presented to the study participants enabled them to reflect and report on their IL-related experiences.

Study Participants

Previous studies (Barrett, 2005; Morner, 1993) recommended that IL research should include social science students and should distinguish between different levels of graduate degrees (i.e., such as course work level, thesis/dissertation level). The participants in this study consisted of graduate students recruited from selected graduate programs at the University of Windsor. According to the 2007 University of Windsor Graduate Calendar, graduate students are admitted under one of the following five categories:

(i) *Regular Admission (M2)*—a student who holds a four-year degree or equivalent in the discipline.

(ii) *Master's Qualifying Admission (M1)*—a student who holds a three-year undergraduate degree in the discipline or a four-year degree from another discipline, pending a request with a recommendation for advancement towards a M2 level, depending upon the achievement of qualifying courses and grades obtained. A qualifying student is not considered a graduate student since s/he is not a candidate for a degree.

(iii) *Transitional Admission (M2)*—a student who holds a four-year degree in another discipline to which s/he is applying. This student is required to complete up to five additional undergraduate courses in addition to the graduate requirement of the program.

(iv) *Probationary Admission (M2)*—a student who does not currently satisfy the minimum departmental program admission requirements, and is required to complete at least two specified graduate courses in order to waive the probationary conditions.

(v) *Ph.D.*—a student who holds a Master's degree or, in extraordinary circumstances, a four-year Bachelor's degree.

Table 4 presents the total enrolment numbers in graduate programs at the University of Windsor. Certain graduate programs do not have a large number of graduate students; thus, those programs were clustered in a Master's of Arts (MA) category (e.g., English, Visual Arts, Philosophy majors), while Faculty of Education Master's students were compared to Master's of Social Work students as the numbers of

students were comparable in those departments. Though only 110 participants for the quantitative portion of the study were suggested by Beile O'Neil (2005), a total of 201 students participated in this study. For the qualitative portion of the study, two participants per department were initially desired, but, since some departments had a small number of students, it was recognized that this goal might not be achieved.

Table 4

Total Enrolment Numbers in Selected Graduate Programs

List of Graduate Programs	# of Students in Each Department	Gender Information		# Part Time Students	# Full Time Students	# International Students
		F	M			
Communication and Social Justice (MA)	25	13	12	0	20	5
Education (MEd)	71	56	15	48	23	0
Education (PhD)	19	14	5	11	8	1
English (MA)	33	25	13	2	31	2
History (MA)	26	13	13	0	26	1
Philosophy (MA)	13	6	7	2	11	1
Political Science (MA)	40	28	12	4	36	5
Psychology (MA)	32	3	29	0	32	2
Psychology (PhD)	74	60	14	0	74	7
Social Work (MSW)	77	67	10	4	73	0
Sociology (MA)	36	25	11	3	33	3
Sociology (PhD)	15	11	4	0	15	3
Visual Arts (MFA)	9	4	5	0	9	1
Total:	470	325	150	74	391	31

Participants in this study had either full-time or part-time status. The University of Windsor offers 54 Master's and doctoral programs in the following disciplines: Arts and Social Sciences, Business Administration, Education, Engineering, Human Kinetics, Nursing, and Science, all of which are listed in Appendix H (University of Windsor Faculty of Graduate Studies, 2007). Since graduate programs are divided among eight

faculties, this study focused on the graduate programs in the Faculty of Arts and Social Sciences (FASS) and from the Faculty of Education (Appendix H).

The reasons for choosing these two faculties are as follows: (i) some of the courses in the FASS are cross-listed in the Faculty of Education (for instance, cross-listing can be found between certain Psychology and Education courses), and (ii) graduate students in the FASS and the Faculty of Education tend to compete for similar scholarships and awards (e.g., the Social Science and Humanities Research Council scholarships).

Contrary to Sadler and Given's (2007) study, Economics graduate students were not included in this study since the Economics Department at the University of Windsor is part of the Faculty of Science, not of the Faculty of Arts and Social Sciences. One of the limitations of the Beile O'Neil (2005) study was that its target population belonged to one institution only. The Faculty of Education doctoral students belong to the Joint PhD in Educational Studies program (in which graduate students from Brock University and Lakehead University are enrolled concurrently with University of Windsor students). This particular diversity of graduate students' enrolment partially addresses that limitation of Beile O'Neil's (2005) study.

Besides Sadler and Given's (2007) familiarity with resources in the social sciences disciplines, the reasoning behind their selection of the social science disciplines such as anthropology, economics, education, political science, psychology, and sociology was that they expected that graduate students from these social science disciplines would use a wider range of academic library resources. Although Sadler and Given (2007) had a limited number of participants from each discipline and no contrast group, the authors

indicated that graduate students' knowledge of library resources was typical for those disciplines, though they failed to note how they arrived at such a conclusion.

To summarize, the intent of this study was to determine the level of IL of graduate students in the Faculty of Arts and Social Sciences and the Faculty of Education of a mid-size Canadian university (including the Joint PhD in Educational Studies), according to the ACRL standards (using modified B-TILED), and to explore the current graduate students' perceptions in terms of usefulness, the ease of use, and support features in library usage, using the Technology Acceptance Model (TAM) and Affordance Theory.

Ethics and Data Collection and Analysis

In compliance with the Tri-Council Policy (Appendix I), and after receiving approval from the University of Windsor Research Ethics Board, data collection began during the summer of 2008 and continued through the Winter 2009 semester. Data collection was interrupted as a consequence of the University of Windsor Faculty Association labour dispute period from Sept. 17th to Oct. 6th, 2008.

Upon the researcher's obtaining permission from deans, professors, and the Secretariat of the Joint PhD in Educational Studies program, and obtaining the graduate class size information from departmental secretaries, 24 graduate classes were visited and a brief presentation on the research and collection of data was given. In some cases, when graduate classes were small (i.e., Communication Studies, English, Visual Arts and Philosophy), permission was obtained to contact the graduate students, via an e-mail invitation forwarded by the department secretary. During initial contact with the potential participants, explanations were given as to the purpose of the study, procedures, potential risks and benefits, remuneration for participation, confidentially, participation and

withdrawal rights, feedback on the results of the study, the rights of the research subjects and the voluntary nature of graduate student's participation. After the presentation, those participants who agreed to take part in the study were given a letter of "Invitation to Participate in a Research Study" (Appendix J), the consent form (Appendix K), and the questionnaire (Appendix L). Since most of the data collection occurred after classes, 48 participants requested to complete the survey at a later time. Those students were provided with a stamped envelope. It should be noted that a total of 40 envelopes were distributed after the strike period. A total of 29 out of 48 stamped envelopes were returned to the researcher.

In this type of study, a small completion rate was possible due to reasons such as participants' intimidation by IL performance-related activities, or participants' disinterest in the topic. However, obstacles in achieving targeted participation levels in this study were not encountered, except during and after the fall 2008 labour dispute. A total of 21 students explained verbally that they were not able to participate as class times had been extended to compensate for time lost during the labour dispute. Seven students did not complete the survey since it was not online, and surveys were returned incomplete. The Visual Arts graduate students were invited twice to participate in the study, but only one student responded.

The questionnaire included the following: (i) demographic information, (ii) B-TILED, and (iii) TAM open-ended questions. Conducting data collection procedures required on average 20-30 minutes, after which the signed consent forms and completed questionnaires were collected. Participants had the option of providing contact information to indicate their willingness in participating in a qualitative follow-up study.

All of the interviews except one were held at the Faculty of Education graduate seminar room at the University of Windsor. One interview was held in a nearby campus location. Before each of the interviews occurred, the interviewee was required to sign the consent form (Appendix M), and consent for an audio taping of the interview (Appendix N).

Procedures for Quantitative and Qualitative Data Analysis and Interpretation

All quantitative data were inputted in SPSS 17.0 for statistical analyses. Interpretation of results was guided by the recommendations of Green and Salkind (2005) from *Using SPSS for Windows and Macintosh: Analyzing and Understanding Data*, as were the selection of statistical techniques, considerations of the underlying assumptions for data analyses, and proper APA formatting.

Recommendations from Bogdan and Biklen's (2003) on the collection and interpretation of qualitative data followed before and after the data collection. These included inputting all qualitative open-ended responses into a Microsoft Word document, and initial coding categories were noted and filed chronologically. The participants' responses were coded into activity, event, or strategy, and afterwards classified according to the assigned descriptive codes based on the commonalities between used words. After all the qualitative data were inputted, the undisturbed amounts of time were set aside to read the data at least twice (Bogdan & Biklen, 2003), followed by a one week break in order to re-read the data twice again. The data was then re-ordered according to graduate students' departments, as coded data aided in categorizing information at different levels. Since there were fewer than 500 pages of qualitative data, hands-on experience of analysis with qualitative data enabled a thorough examination of the data without the intrusion of a machine (Creswell, 2005).

The purpose of the follow-up qualitative interview was to extend and additionally comprehend the quantitative findings through member checking (Tashakkori & Teddlie, 1998) of quantitative and qualitative data. Before each interview, the quantitative data were analyzed in order to find the questions that the student did not answer correctly. Thus, for those students who chose to further participate in the study, the survey questions that were not answered correctly, and the answers for which the researcher required clarification about, were addressed during the interviews. These follow-up interviews were digitally recorded (via an Olympus DS-40) and stored on a local personal computer in order to list and interpret data; all interviews were coded. Interview data were arranged chronologically, and then by department, to identify for similar themes. The surveys and data reside in a fireproof locked file cabinet, and are accessible only to the researcher for a period of three years, at which point they will be destroyed.

The next chapter contains summaries of major integrated quantitative and qualitative data analyses. The qualitative follow-part of the study includes prominent emerging themes.

CHAPTER IV

Results

This study examined the IL of graduate students at a mid-size university in Ontario through a quantitative questionnaire that included supplementary open-ended questions, and semi-structured interviews. This chapter reviews the results of this study.

Phase 1: Questionnaire

The questionnaire consisted of the following three parts: (i) questions suitable for establishing a profile of a graduate student; (ii) B-TILED instrument (Beile O'Neil, 2005); and (iii) open-ended questions (Technology Acceptance Model [TAM], Davis et al., 1989). Part 1 of the survey contained 12 questions, capturing the demographic, academic, and departmental profiles of graduate students. Part 2 of the survey contained questions related to the students' perceived ability to search library databases and the Internet to find information, and students' past experience with library instruction. Part 3 of the survey included the TAM open-ended questions.

Results Based on the B-TILED Scores. In order to answer the first research question, "Which graduate students' profile cluster (demographic, academic level or department) best portrays their IL?" the *Standards-based Beile Test of Information Literacy for Education* (B-TILED) (Beile O'Neil, 2005) was used to measure the participants' IL level. A brief summary of the B-TILED survey results is presented, followed by the graduate students' profile cluster results.

To accommodate other researchers who may want to develop the B-TILED survey further, Appendix O contains percentages of incorrect and correct answers on the B-TILED test, grouped into standards.

In order for the researcher to include the survey in the data analysis, a respondent would have to have answered the multiple-choice section of the questions. It should be noted that the correct answers were coded as 1, and that incorrect answers were coded as 0. Also, the answers were treated as incorrect in cases when the participants wrote on the multiple choice questions section that they did not know the answer, wrote down a question mark next to the question(s), or wrote alternative answers next to the presented answers. The first time the survey was distributed, three participants asked the researcher verbally if they should skip questions to which they did not know the answer. Pursuant to that, all participants were asked to specify they did not know the answer (either by writing down that they did not know or by putting a question mark next to the question), instead of skipping the question. All survey questions identified by participants as being unable to answer were noted in the comment section of the spreadsheet codebook for further analysis. Table 5 contains the percentage of correct responses for each Standard (e.g., Standard 1= [((question #8 + question #12 + question #14)/3)*100] where the overall average was first calculated for each participant). For example, on average, the participant students answered 57.88% questions correctly for Standard One. Such presentation was done in percentages in order to indicate the overall average of correct responses for each Standard. The intent was to compare scores of graduate students on these four Standards, and also to establish which Standards were most problematic overall for graduate students to reach. The individual percentage results per Standard were also used in preparation of customised interviews, when the researcher wanted to specifically investigate difficulties that the interviewees had with particular Standards.

Table 5

Descriptive Statistics for Correct Reponses of Each Standard (N=201)

Standard[15]	# of Questions	Minimum Score Per Standard Per Person	Maximum Score Per Standard Per Person	B-TILED *M* Per Standard	B-TILED *SD* per Standard	Percentage of Correct Responses Per Standard*
Standard One	3	0	3	1.74	.797	57.88 %
Standard Two	11	0	11	7.16	2.148	65.08 %
Standard Three	2	0	2	1.06	.641	53.23 %
Standard Five	6	1	6	4.05	1.157	67.50 %

Note. * The percentage of correct responses for each Standard was calculated based on the following formula: [(Sum of the Correct Responses in the Standard / Total # of Questions in the Standard)*100].

The paired sample t-test was conducted in order to see if there was any difference between the B-TILED means of percentages of correct responses for each Standard. There was a significant difference between the mean percentage scores on Standards One and Two, $t(200) = -3.597$, $p < .001$, Standards Three and Five $t(200) = -5.848$, $p < .001$, Standards One and Five, $t(200) = -4.689$, $p < .001$ and Standards Two and Three, $t(200) = 4.878$, $p < .001$. There were no significant differences between the mean scores on Standards One and Three, $t(200) = 1.676$, $p = .095$; and Standards Two and Five $t(200) = -1.503$, $p = .134$. As previously mentioned, Standard Four was not conducive to

[15] See APPENDIX A for more detailed description of the Standards. For instance the following standards are summarized:
Standard One: The information literate student determines the nature and extent of the information needed.
Standard Two: The information literate student accesses needed information effectively and efficiently.
Standard Three: The information literate student evaluates information and its sources critically and incorporates selected information into his or her knowledge base and value system.
Standard Five: The information literate student understands many of the economic, legal, and social issues surrounding the use of information and accesses and uses information ethically and legally.

the web-based, multiple-choice item format, and thus was not included into the B-TILED survey.

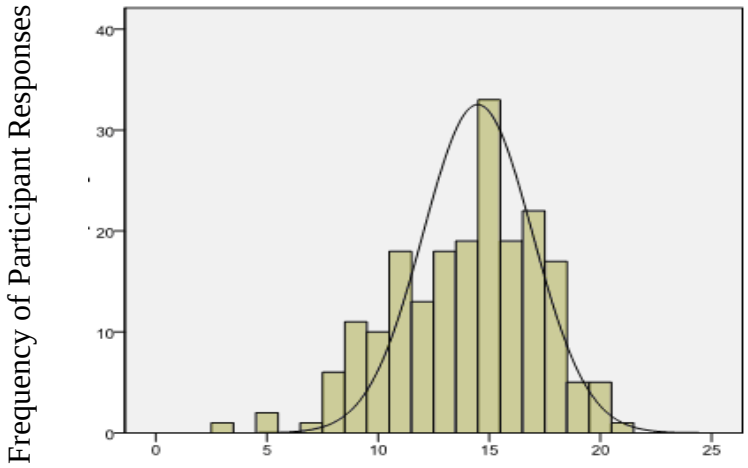
In Beile O'Neil's (2005) study, undergraduate participants needed to achieve a score of 57.5% to be regarded as "acceptably competent" (p. 124). Cannon (2007) used the same score as an accepted level for graduate teacher education programs. Also, in this study, scores of 57.5% were regarded as constituting an acceptable criterion level for graduate student participants.

Table 6 presents the descriptive statistics of B-TILED scores for 201 graduate student participants. For each participant, the B-TILED score was calculated by finding the number of correct answers to questions #7-#28. The results indicated that the lowest obtained score was 3 while the highest score was 21 out of a possible 22 (see Appendix P). Furthermore, the mean and median (M = 14.01, Mdn = 15.0) of the B-TILED scores for the whole sample were close to each other (see Figure 3) with a standard deviation of about three questions (SD = 3.28). A fairly normal distribution was noted with a negative skewness of -.459. Based on the Kurtosis value of -.023, a slightly platykurtic distribution was noted.

Table 6

Descriptive Statistics of B-TILED Scores (N = 201)

Descriptive Measure	Value
Mean	14.01
Std. Error of Mean	.231
Median	15.0
Mode	15.0
Std. Deviation	3.277
Skewness	-.459
Std. Error of Skewness	.172
Kurtosis	-.023
Std. Error of Kurtosis	.341
Minimum	3
Maximum	21



M=14.01

SD = 3.28

N = 201

B-TILED % Score = M/Total Number of Questions
B-TILED % Score = 14.01/22= 63.7%

Figure 3. Distribution of B-TILED scores for all graduate students in the sample[16].

[16] The previous study by Beile O'Neil (2005) utilized the B-TILED instrument and included the graphical representation of the distribution of scores.

In order to determine whether the graduate students in this study would obtain significantly different B-TILED scores compared to the undergraduate pre-service students in Beile O'Neil's (2005) study, the researcher conducted further tests. The chosen 22-item B-TILED instrument in this study pointed to an average of 63.7% (M = 14.01; SD = 3.28; N = 201) correct responses. This mean score result was higher compared to the one recorded in Beile O'Neil's (2005) study, in which pre-service students' IL results averaged to 54.4% (M = 11.97, SD = 3.74, N = 172) correct responses. The unpaired t-test results of $t(371) = 56.145$, $p < .001$ revealed a significant difference among B-TILED results between this study and Beile O'Neil's study. This result supports the researcher's expectation that this group of students, as more educated, would have higher level of IL than the pre-service teachers in the Beile O'Neil study. There was an expectation that this population of graduate students would have been exposed to a wider variety of information databases and sources.

Demographic, academic and departmental clusters. Part 1 of the survey included demographic, academic, and departmental variables. Table 7-9 shows the descriptive statistics with respect to B-TILED scores for each cluster, including the detailed descriptions of variable groupings.

The *demographic cluster* consisted of five questions: questions #1 (gender), #7 (age range), #8 (international student status), #11 (library related position), and #12 (English as a first language) (see Table 7); the *Academic cluster* consisted of questions #2 (student status), #5 (program of study for the Master's students only), #6a (minimum course requirements completed for the Master's program), #6a (minimum course requirements completed for the Doctoral program) (see Appendix Q), and #9 (last

completed degree)(see Table 8). The *Departmental cluster* consisted of question #4a (Department) (see Table 9). Table 7-9 shows all the descriptive variable statistics with respect to B-TILED scores, including detailed descriptions of variable groups, percentages, means, and standard deviations.

As previously mentioned, the mean B-TILED score for this study was 14.01 (*SD* = 3.28). The initial observation of the demographic information presented in Table 7 indicates that 71.6% participants were females (*N* = 144). The majority of the participants (63.7%, N = 128) were within the age range of 20-29. A total of 21% of participants (N = 44) who indicated that English was not their first language obtained the lowest mean B-TILED scores (*M* = 12.77, *SD* = 3.50). The answers to the academic cluster of survey questions indicated that 80.1% of participants were full-time students (*N* = 161).

Table 7

Descriptive Statistics for Demographic Cluster

Item #	Demographic Variables	Group	*N*	%	B-TILED *M*	B-TILED *SD*
1	Gender	Male	57	28.4%	13.91	3.67
		Female	144	71.6%	14.05	3.12
7	Age Range	20-29	128	63.7%	14.33	3.20
		30-39	37	18.4%	14.00	3.12
		40-60+	36	17.9%	12.89	3.53
8	International Student Status	Yes	10	5%	13.80	2.93
		No	191	95%	14.02	3.30
11	Library-Related Position	Yes	5	2.5%	15.20	2.68
		No	196	97.5%	13.98	3.29
12*	English as First Language	Yes	157	78.1%	14.36	3.13
		No - EAL (English as an Additional Language)	44	21.9%	12.77	3.50

Note. *Statistically significant difference found and described in Appendix R and further discussed in detail in the following quantitative section.

Table 8

Descriptive Statistics for Academic Cluster

Item #	Academic Variables	Group	*N*	%	B-TILED *M*	B-TILED *SD*
2	Student status	Full-Time	161	80.1%	14.04	3.34
		Part-Time	40	19.9%	13.90	3.02
5	Program of study (Master's students only)	Course work only	39	25.8%	13.56	3.135
		Course work and special research project (Major Paper)	67	44.4%	14.03	3.191
		Course work and thesis	45	29.8%	13.64	3.581
6a*[17]	Minimum course requirements completed for the Master's program	No – for Master's	109	73.65%	13.40	3.480
		Yes – for Master's	39	26.35%	14.77	2.400
6b	Minimum course requirements completed for the Doctoral program	No – for PhD	42	85.7%	14.26	3.321
		Yes – for PhD	7	14.3%	16.71	1.254
9	Last completed degree	Undergraduate	147	73.1%	13.79	3.27
		Graduate	54	26.9%	14.61	3.23

Note. *Statistically significant difference found and described in Appendix R and further discussed in detail in the following quantitative section.

[17] A total of 4 graduate students had already obtained a graduate degree. Three students were completing different Master's degrees and one student was completing the second doctoral degree. Since detailed course requirements regarding their past degrees were unknown to the researcher, three participants' data were removed from the analysis of minimum course requirements completed for the Master's program, and one participant's data were removed for the purpose of the analysis of minimum course requirements completed for the doctoral program.

Table 9

Descriptive Statistics for Departmental Cluster

Item #	Departmental variables	Group	N	%	B-TILED M	B-TILED SD
4	Department	MEd	33	16.4%	13.18	3.55
		PhD - Education	40	19.9%	14.15	3.34
		MA - Psychology	16	8.0%	15.13	1.82
		PhD - Psychology	7	3.5%	16.86	1.34
		PhD - Sociology	3	1.5%	16.33	1.15
		MA - English	6	3.0%	14.67	3.44
		MA - History	14	7.0%	15.07	2.89
		MA – Political Science	25	12.4%	12.92	3.76
		MSW – Social Work	44	21.9%	13.57	3.34
		MA - Communication	6	3.0%	14.50	3.01
		MA - Philosophy	2	1.0%	14.00	.000
		MA - Sociology	4	2.0%	15.50	1.73
		MA - Visual Arts	1	.5%	10.00	.
4a*	Department[18]	MEd	33	16.4%	13.18	3.55
		PhD – Education (PhDEd)	40	19.9%	14.15	3.34
		MA	74	36.8%	14.20	3.10
		PhD - Psychology & Sociology (PhDSS)	10	5%	16.70	1.25
		MSW	44	21.9%	13.57	3.34
	Total		201	100%	14.01	3.277

Note. *Statistically significant difference found and described in Appendix R and further discussed in detail in the following quantitative section.

[18] The groupings that contained a small number of participants were combined into categories. The Department variable originally containing the following 13 values: (i) MEd, (ii) PhD-Education, (iii) MA-Psychology, (iv) PhD-Psychology, (v) PhD-Sociology, (vi) MA-English, (vii) MA-History, (viii) MA-Political Science, (ix) MSW – Social Work, (x) MA-Communications, (xi) MA-Philosophy, (xii) MA-Sociology, and (xiii) MA-Visual Arts, was organized into the following five clusters: MEd, MA, MSW, PhD-Education and PhD-Social Science. Master of Arts programs were combined into one category (MA consisted of the following: Psychology, English, History, Political Science, Communication, Philosophy, Sociology and Visual Arts). The PhD students from the Faculty of Arts and Social Sciences were sorted into another cluster (PhD–Psychology and PhD–Sociology), thus leaving PhD–Education, MEd and MSW as separate categories. The grouped variables were used in all calculations.

QUANTITATIVE Research Question: *Which graduate students' profile cluster (demographic, academic level or department) best portrays their IL?*

In order to answer this research question, 11 one-way analyses of variance (ANOVA) were performed for significance at the .05 confidence level (see Appendix R). If a significant independent variable had consisted of more than two levels, the Tukey HDS (honestly significant difference) test for post-hoc comparisons was performed.

In regards to the demographic cluster, after performing five one-way ANOVAs, there were no significant differences between group performances on the test with respect to gender $F(1, 199) = .070$, $p = .791$, age range $F(2, 198) = 2.757$, $p = .066$, international student status $F(1, 199) = .043$, $p = .836$, and library-related position $F(1, 199) = .675$, $p = .412$. However, a one-way ANOVA indicated a significant difference of $F(1, 199) = 8.323$, $p < .05$ between those participants who spoke English as a first language and those who had English as an additional language (EAL). As indicated in Table 10, EAL graduate student had a significantly lower mean B-TILED value ($M = 12.77$) than graduate students for whom English was the first language ($M = 14.36$).

In regards to the academic cluster, after performing five one-way ANOVAs (see Appendix R), there were no significant differences between group performances based on student status $F(1, 199) = .056$, $p = .813$; program of study (Master's students only) $F(2, 148) = .312$, $p = .732$; minimum course requirements completed in the current program for the doctoral program $F(1,47) = 3.675$, $p = .061$; and last completed degree grouped $F(1, 199) = 2.503$, $p = .115$. However, there was a statistically significant difference in the B-TILED scores between students who completed minimum course requirements for the Master's program and those students who did not complete the minimum course

requirements F(1, 146) = 5.121, MSE = 10.460, p < .05. Participants who completed the minimum course requirements for the Master's program obtained higher B-TILED scores (*N* = 39, *M* = 14.77, *SD* = 2.400).

After performing a one-way ANOVA (see Appendix R), a significant difference was found in B-TILED scores based on students' departmental degree *F*(4, 196) = 2.572, MSE = 10.413, p < .05. Post-hoc pairwise comparisons using the Tukey HSD test (p<.05) indicated a significant between-group difference between the following graduate student groups: PhD in Social Science (Psychology and Sociology) and Master of Education, and PhD in Social Science (Psychology and Sociology) and Master of Social Work, but no significant difference between any other variations of degrees (see Appendix S). The effect size, η^2 = .049, was moderate. In addition, after performing two one-way ANOVAs for graduate programs according to participants' graduate level, there was no significant difference *F*(2, 148) = 1.256, *p* = .288 among Master's programs (*N* = 33, *M* = 13.18, *SD* = 3.557 for MED; *N* = 74, *M* = 14.20, *SD* = 3.105 and for MA; *N* = 44, *M* =13.57, *SD* = 3.344). However, a significant difference F(1,48) = 5.534 was found in B-TILED scores based on students' doctoral program (*N* = 40, *M* = 14.15, *SD* = 3.348 for PhDEd; *N* = 10, *M* = 16.70, *SD* = 1.25 for PhDSS).

Part 2 of the survey contained six questions on the graduate student's self-perceived ability to do electronic searches and on his or her past experience with library instruction at the current institution. These six questions of the survey (see Appendix C) are presented in Table 10a and Table 10b. The first two questions rated on a scale 1 to 5 the user's perceived ability to search library databases and to use the Internet to find information (see Table 10a). This five-unit scale was further reduced to a two-unit scale

in order to separate participants with perceived high ability (levels 4 and 5) in performing electronic searches from those with perceived low ability (levels 1 to 3). The following four questions (questions #3 to #6) in this part of the survey pertained to the user's past experience with library instruction, especially his or her familiarity with the library either through a tour, library instruction held in the classroom or the library, or one-on-one instruction with a librarian (see Table 10b) at the current institution.

The majority of participants did not obtain *library instruction* (53.7%). There were 33.8% of participants who indicated that classroom library instruction was not organized for them (see Table 10b). More detailed statistical tests were performed in the following section regarding how undergraduate and graduate library instruction was obtained.

Table 10a

Descriptive Statistics based on the Graduate Students' Self-Perceived Ability to Conduct Electronic Searches

Item #:	Variable	Value	*N*	%	B-TILED *M*	B-TILED *SD*
1	Ability to search library databases	1 and 2 and 3	70	34.8%	13.40	3.83
		4 and 5	131	65.2%	14.34	2.90
2	Ability to search the Internet	1 and 2 and 3	33	16.4%	13.73	4.27
		4 and 5	168	83.6%	14.07	3.05
	Total		201	100%	14.01	3.277

Table 10b

Descriptive Statistics based on the Graduate Student's Past Experience with Library Instructions at the Current Institution

Item #:	Variable	Value	*N*	%	B-TILED *M*	B-TILED *SD*
3	Library Organized Tour	Yes	104	51.7%	14.04	3.43
		No	97	48.3%	13.98	3.11
4	Library Classroom Instruction	Yes	84	41.8%	14.33	3.29
		No	49	24.4%	13.29	3.26
		None was organized	68	33.8%	14.13	3.23
5	Library Instruction	Yes	93	46.3%	14.28	2.94
		No	108	53.7%	13.78	3.53
6*	One-on-one instructions with librarian	Yes	31	15.4%	12.94	2.82
		No	170	84.6%	14.21	3.32
	Total		201	100%	14.01	3.277

* Statistically significant difference found and described in Appendix U.

In the second part of the survey, two one-way ANOVAs (see Appendix T) indicated that there were no statistically significant differences found between groups based on their perceived ability to search library databases $F(1, 199) = 3.722$, $p = .054$, or perceived ability to search the Internet $F(1,199) = .293$, $p = .589$. In regards to graduate students' past experience with the library instructions at the current institution, four one-way ANOVAS (see Appendix U) indicated there were no statistically significant differences found between groups based on their attendance at the current instutions'organized library tours $F(1, 199) = .016$, $p = .899$, classroom instruction on library use $F(2, 198) = 1.664$, $p = .192$, and in-library instruction $F(1,199) = 1.173$, $p = .280$. However, there was a statistically significant difference between the mean B-TILED scores of graduate students who did receive one-on-one library instruction as

opposed to those who did not $F(1, 199) = 3.999$, MSE = 10.581, $p < .05$. The participants who had one-on-one instruction ($N = 9$ MSW; $N = 8$ MA; $N = 5$ MED; $N = 8$ PhDEd; $N = 1$ PhDSS) with a librarian obtained the lower mean B-TILED scores ($M = 12.94$) compared to those who did not obtain one-on-one instruction ($M = 14.21$). This seemingly paradoxical situation, namely that those who received one-on-one attention performed worse than those who did not, perhaps indicates that those with perceived weaknesses are more likely to search out library assistance.

Qualitative Research Question

1. What are the graduate students' IL needs based on their perceived usefulness and ease of use of library services?

As previously mentioned in Chapter III, the researcher had an opportunity to immerse herself into the qualitative data collection following Bogdan and Biklen's (2003) recommendations. All qualitative open-ended responses were inputted into a Microsoft Word document, and initial coding categories were developed, noted, and filed chronologically. The participants' responses were coded into activity, event or strategy and afterwards classified according to the assigned descriptive codes based on commonalities between used words. Since there were fewer than 500 pages of qualitative data, this hands-on experience in analysis of qualitative data enabled the researcher to be close to the data without intrusion of the machine (Creswell, 2005). In order to examine further the qualitative research question stated above, the researcher also included the quantitative statistical representation of the qualitative data. This strategy was based on therecommendation of Tashakkori and Teddlie (2003), as the quantitative representation of data turned out to be vital in supplementing qualitative analysis.

Part 3 of the survey encompassed open-ended questions on the usefulness and ease of use of library services in general. Respondents were asked to elaborate on these elements: (i) the perceived usefulness of undergraduate and graduate library instructions; (ii) the graduate students' needs for instruction on the use of library resources and services; and (iii) the use of specific library resources. The following section contains a detailed analysis of graduate students' responses. First, the graduate students' responses were organized by the department in order to identify specific themes; second, common themes were sought across departments.

(i) The Undergraduate and Graduate Library Instructions Perceived Usefulness

Most graduate students had exposure to either undergraduate or graduate library instruction. However, a total of 23.88% of participants had never received instruction at the undergraduate level, while 32.83% had never received instruction at the graduate level. A total of 118 (83%, N = 142) graduate students found their undergraduate library instruction useful, compared to 95 (76%, N = 125) students who found graduate library instruction useful. As a result of the instructions they received as graduate students, participants noted that they were able to learn better search techniques, increase their base library electronic and print searching knowledge, and enhance their prior library electronic and print search knowledge. Although the students did find library instruction useful, some participants reported that some instructions lacked adequate detail, such as the narrowing of search terms, the provision for hands-on experience, and the development of in-depth research skills. One student explained that "They never determined a starting point or pre-tested our knowledge," and another commented that instructions "need more depth or how to properly use database in library."

(ii) The Graduate Students' Needs for Instructions in Use of Library Resources and Services

The participants answered three questions overall in the instructional needs section of the survey. The first question asked about the respondent's needs for instruction; the second question was about library services and resources that are most needed; and the third question pertained to the most often used resources in the subject area.

In regards to the first question (i.e., "Do you think that graduate students need instruction on how to use library information resources in their subject areas?"), 83.58% of the respondents (N = 168) indicated that graduate students need instruction on how to use library information resources in their subject area (see Table 11). While the general feedback was that technology has changed since the last time they were in school, respondents felt that there are many research skills which they would like to learn, and a trained researcher was recommended by a few students to be a facilitator of this process. For instance, the following PhD Education graduate students wrote:

> "[we need instructions] by a trained researcher. We can always pick up hints from those with experience." (participant #23)
>
> "THIS is VERY important as it is a 1st step prepares us for becoming researchers." (participant #28)
>
> "….there must be individualized assessment of needs." (participant #28)
>
> "Databases are changing, technology is always changing; librarians are the gatekeepers of information, they are the cutting edge of ways to get that information out to the public." (participant #41)

Thirty-three students (B-TILED *M* = 14.64, *SD* = 2.848) indicated that graduate students do not need instruction on how to use library information resources in their subject area. Most of these participants indicated that graduate students should have the research skills by now (especially if they had done thesis work), but the information outlining where to look for information would be helpful for new students. Among that group were 20 MA graduate students (N = 7 MA Political Science; N = 6 MA History; N = 5 MA Psychology; N = 2 MA Sociology).

Over 90% of doctoral students in both PhDEd (N = 37) and PhDSS (N = 9) indicated a need for instruction on how to use library information resources in their subject areas, followed by over 80% of MEd (N = 29) and MSW (N = 39) graduate students (Table 11). In addition, a chi-square test of independence was significant, $\chi^2(4, N = 201) = .041$, $p < .05$ for the department variable and instructional needs. This difference may be attributable to the Master of Arts students, a large number of whom, as can be seen in Table 11, indicated they did not require instruction in library resource-related instruction.

Table 11

Crosstabulation Results for Library Resource-Related Instructional Needs of Graduate Students based on Department

		Department					Total	Percentage %
		MEd	PhDEd	MA	PhDSS	MSW		
Instructional Needs	Yes	29	37	54	9	39	168	83.58%
	No	4	3	20	1	5	33	16.42%
Total		33	40	74	10	44	201	100%

Table 12 shows descriptive statistics by department for only the graduate students who indicated the need for instruction on how to use library information resources in their subject areas. The MEd graduate students obtained the lowest B-TILED scores (*M = 12.86*). After performing a one-way ANOVA (see Table 13) only for students who indicated the need for more instruction on how to use library information resources in their subject areas, the researcher found a significant difference in B-TILED scores based on students' department F (4, 163) = 2.542, $p < .05$. Post-hoc pairwise comparisons using the Tukey HSD test ($p<.05$) indicated a significant between-group difference between the graduate student groups, PhDSS (Psychology and Sociology) and MEd; but no significant difference between any other variations of degrees (see Appendix V). The effect size, η^2 = .059. The two-way ANOVA (5X2) was not implemented as a result of the small cell sizes.

Table 12

Descriptive Statistics by Department for only the Graduate Students who indicated the Need for Instruction

Department Grouped	*N*	%	B-TILED	B-TILED SD
MEd	29	17.26%	12.86	3.662
PhDEd	37	22.02%	14.24	3.362
MA	54	32.14%	13.98	3.141
PhDSS	9	5.36%	16.67	1.323
MSW	39	23.21%	13.54	3.417
Total	168	100%	13.89	3.349

Table 13

ANOVA Results for Department Grouped Variable for only the Graduate Students who indicated the Need for Instruction

	SS	df	Mean Square	*F*	Sig.
Between-Groups	109.918	4	27.480	2.541	.042*
Within-Groups	1762.933	163	10.816		
Total	1872.851	167			

*p < .05

In regards to the second question (i.e., "Which library services and resources do you need the most help with to meet your graduate student information needs?"), 98 graduate students' responses were categorized under the *database/online journals* descriptive code, which noted their need for help in becoming familiar with various *database/online journals* (see Table 14). Some specific qualitative responses in this descriptive code category noted a need for help in searching peer-reviewed journals, searching various Internet journals, getting off-campus access, using *Refworks*, and narrowing search terms. One graduate student even suggested issuing a periodical newsletter of new library services, since keeping up with new tools and services was challenging. What follows are sample comments from graduate students. For instance, a PhD-Psychology graduate student remarked:

> "[I need help with] Finding out new (faster & easier) ways to search for articles & books, conferences, etc." (participant #28)
>
> "Online resources! I need everything ever published within psychology (within reason) to be available online. I often won't read something if it isn't available online." (participant #171)

Similar responses were given by Master's students:

> I need to know more about the databases available and how they work. I get by with what I know, but I have a feeling there is a lot more I could be doing/using in my research. I need to be able to talk to an actual person via e-mail, phone or in person when I have a complicated question that cannot be answered through FAQ or online. (MA Communication - participant #171)

Forty-two students' responses were categorized as *general help* (see Table 14). Some specific qualitative responses in this descriptive code category noted a need for help in increasing their confidence with doing research, logging onto the system, locating personalized help, using photocopies/computers, and finding specific items. To keep up with changes, an occasional refresher course was recommended. Only 16 graduate students were interested in the library print collection, while five history graduate students wanted to know more about the archives. One English student indicated that better labelling is needed across the library. Eight students were *not sure* what particular area they needed help with. This information is summarized in Table 14.

Table 14

Library Services and Resources Graduate Students Need Most Help With

Question	Need Most Help with Following Library Services and Resources*	*N*
(b) Which library services and resources do you need the most help with to meet your graduate student information needs?	Database/online journals	98
	General searching of monographs/serials and in-library instructions	42
	Print materials and physical organization	16
	Not sure	8
Total		164

Note. * *Need Most Help with Following Library Services and Resources* categories are mutually exclusive.

(iii) Use of Specific Resources

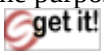
The following section discusses the use of specific library resources, such as *Get It*, *RefWorks*, and the *Foxy Leddy LibX* toolbar. Through the questionnaire, the graduate students noted whether these library resources were easy to use and made suggestions for the improvement of library services to better suit their needs.

(a) *Get It* Button 

The purpose of this section in the survey was to establish if the function of "Get it" button was self-explanatory and if graduate students interpreted SFX as a shortcut for access to that particular online service. A total of 178 graduate students responded to this section, for which 45 students' responses were coded as *know the purpose*. Some qualitative responses in this descriptive code category included "finding access to information/article/citation through various formats either through database or if not available ordering it through RACER." One hundred and twelve graduate students' responses were coded as they *partially know the purpose*. Some qualitative responses in this descriptive code category included descriptions such as "retrieving only full-text online articles, pdf articles or the ability to purchase an article." Two respondents indicated that the service does not always lead them to getting the full-text article and therefore, they thought it does not work. Twenty-one respondents were coded as *not sure* since they were unfamiliar with the button, had never used it, or were new to the school and had never seen it before (see Table 15).

Table 15

Responses regarding familiarity with the "Get It" Button

Question:	Familiarity with "Get It" Button	N
(a) Explain the purpose of the "Get It" button as in  ?	Know the purpose	45
	Partially know the purpose	112
	Not sure/Do not know	21
	Total	178

(b) Explanation of when the "Get It" Button Does Not Lead to Full Text

Thirty-one graduate students indicated that if the "Get It" button does not bring them to the full-text of the article, they would use *RACER* to order the needed material. The majority of students (*N* = 134) claimed that in such a case they would *look for other article* or databases, abandon the search, or try a different article with a related topic. Among those 134 students, 19 students would still search for the same article in the library and contact a librarian for help. Two students indicated that they would give up and look for other articles, as they did not know why the article was unavailable (see Table 16).

Table 16

Students' Perceived Activity if the Full-Text of the Article is not Available

Question	Activity Undertaken by Graduate Students after "Get It" button does not lead to full-text	N
(b) You click on the "Get It"  button and receive the following message: "No full-text available." What do you do next?	Use RACER	31
	Look for other article	134
	Not sure/Does not know	16
	Total	181

(c) Use of *RefWorks*

Forty-six (22.9%, *N = 46*) students stated that they use *RefWorks*, and 41 of these students specified that they use RefWorks for *citation* purposes (see Table 17). Although 155 (77.1%) of graduate students indicated that they do not use RefWorks, five students indicated a general dislike of this feature because it is confusing and unreliable; eight graduate students had never used it, whereas one was hoping to get instruction on it soon.

Table 17

Use and Purpose of RefWorks

Questions:	RefWorks Usage	*N*	%
(c) Do you use RefWorks – Online Research Management, Writing and Collaboration Tool?	Yes	46	22.9%
	No	155	77.1%
	Total	201	100 %
	Purpose of Refworks Usage	Frequency	%
If yes, for what purpose do you use RefWorks?	Citations	41	73.21%
	Other	5	12.5%
	Not sure/Not used yet	8	14.29%
	Total	56	100%

(d) Use of *Foxy Leddy LibX* Toolbar

A large majority of students (96.5%) indicated that they do *not* use *Foxy Leddy LibX* Toolbar, whereas two students indicated that they did not know about the toolbar (see Table 18).

Table 18

Use and Purpose of Foxy Leddy LibX Toolbar

Question:	Foxy Leddy Usage	*N*	%
(d) Do you use the Foxy Leddy LibX Toolbar – a toolbar that allows you to quickly search the University of Windsor's Library resources?	Yes	7	3.5%
	No	194	96.5%
	Total	201	100%
	Purpose of Refworks Usage	Explained *N*	%
If yes, for what purpose do you use the Foxy Leddy LibX Toolbar?	Described usage	3	60%
	Did not know	2	40%
	Total:	5	100%

(e) Ease of Access and Use of Library Resources

Table 19 indicates that 44 students (21.89%) did not find library resources easy to access or use (B-TILED $M = 12.95$, $SD = 3.90$), compared to 153 graduate students who found library resources easy to access and use (B-TILED $M = 14.32$, $SD = 12.95$). Three students' responses were not taken into account, since those students indicated that they were new to the institution or they had never used the library resources. After performing the one-way ANOVA (see Table 20), there was a significant difference in B-TILED scores based on the graduate students' answers regarding the ease of use and access to library services $F(1, 196) = 6.016$, MSE = 10.578, $p < .05$.

Table 19

Descriptive Statistics of Responses on Ease of Access and Use of Library Resources

Question:	Ease of Access and Use of Library Services:	N	%	*M*	*SD*
(e) Do you find library resources easy to access and use?	Yes	154	76.61%	14.32	3.05
	No	44	21.89%	12.95	3.90
	New Student - Unknown	3*	1.5%		
	Total	201	100%	14.02	3.29

Note. * Three new students' responses not taken into account due to unfamiliarity with resources

Table 20

Ease of Access and Use of Library Resources ANOVA Results

Ease of Access and Use of Library Resources	BG WG	*SS*	df	Mean Square	*F*	Sig
	BG	63.636	1	63.636	6.016	.015*
	WG	2073.318	196	10.578		
Total	198	2136.955	197			

*$p < .05$.

Forty-six graduate students specified that they encountered some difficulties in regards to ease of access and use of library resources. A total of 18 students' responses were categorized as expressing difficulties with *research/search instruction*; they noted that they did know not how to find specific information, that they lacked relevant library instruction, and that they found getting certain information to be cumbersome. Eleven students' responses were coded as expressing difficulties with lack of *available full-text* for articles, as well as the limited library collection and not being able to order recent books (less than one year old) through an interlibrary loan. Six graduate students' responses were coded as expressing issues with *library space/organization*, more specifically that the library was disorganized, and that it was difficult to locate certain

items. Eleven students who were unfamiliar with the library were categorized as new to the university library and unfamiliar with the library website and library instruction, which made it more difficult to access and use library resources for them (see Table 21).

Table 21

Main Difficulties Encountered with Library Resources

Question	Main Difficulties Encountered*	*N*
…please specify some main difficulties you have encountered.	Research/Search Instructions	18
	Available Full-text Articles	11
	Library Space/Organization	6
	Unfamiliarity with Library	11
	Total	46

Note. * *Main Difficulties Encountered* categories are mutually exclusive.

(f) Ways to improve library services to better suit graduate students' needs

A total of 83 graduate students listed the ways in which library services could be improved to better suit their needs (Table 22). Thirty-six students' responses were coded as falling under the *research/search instruction* category. Some of the responses included that they should be provided with better workshops, and hands-on and online training, especially offered earlier in the semester when this instruction can be used in upcoming coursework. Some of the written comments are provided below in terms of research/search instruction:

"Incorporate the service into classes." (PhD Psychology – participant #188)

"Better training & knowledge about services and how to use them. Many people don't know if there are dedicated reference librarians to help them." (MEd - participant #77)

"FIND US, TEACH US!" (MA – History - participant #92)

Eleven students described a lack of *availability* of online full-text resources as one aspect that needed to be improved upon, and one student indicated that the online full-text journal article search should be marked by full-text availability, instead of waiting for the *Get it* button to load up. Among participants, there was a general preference for online journals as well as online information:

> "Get more licences for more online journals." (PhD Psychology - participant #75)
>
> "Info page for each dept, on how & where to find info (e.g.,- use this databases [sic] to find conferences, etc.)." (PhD Psychology - participant #76)

Fourteen graduate students' responses were coded under *library space and organization* since the students recommended improvements *to library space and organization* by providing better positioned signs, longer hours of operation and more photocopiers, organizing virtual tours on the Library website, and allowing online access to certain departmental librarians. For example, students made theses recommendations:

> "Poster on how to search for journal should be displayed in library, so student can use it when the librarians are not available." (MEd students - participant #197)
>
> "More signs, or virtual tours of library resources. A visual way of helping students locate resources when inside library." (MA Political Science - participant #109)

Lastly, fifteen students did not have recommendations, as they were either too new to the university or were happy with the services they had received. Their responses were coded as *other* category.

Table 22

Ways to Improve Library Services to Better Suit Graduate Students' Needs

Question	Recommendations to Improve Library Services	N
(f) List the ways in which you think library services could be improved to better suit graduate students' needs.	Research/search instructions	36
	Availability and support options	18
	Library space/organization	14
	Other	15
	Total	83

Note. * *Recommendation to Improve Library Services* categories are mutually exclusive.

Phase 2: Qualitative Follow-up Part of the Study

As previously stated, the purpose of the follow-up qualitative interviews was to further extend and additionally comprehend the quantitative findings through member checking (Tashakkori & Teddlie, 1998). In order to address certain outcomes, the researcher analyzed quantitative data before each interview to find which questions the student did not answer correctly. The follow-up interviews were digitally recorded (via an Olympus DS-40) and the resulting files were stored on a personal portable hard drive. Each interview was individually coded as the quantitative and qualitative analyses took place. As unexpected results arose in the first phase of the data collection (B-TILED and TAM), the researcher was able to explore them further in the second part. After all of the materials were coded, similar codes were gathered and sorted to form major themes and minor themes. Through this process, the interviews addressed the following two qualitative questions:

1. What affordances do graduate students perceive in the academic library context? (Sadler & Given, 2007, p.118)

1a. What perceptions of library usage play a role in graduate students' information seeking behaviours and awareness about library resources?

Using an ecological lens (Schram, 2006), the researcher interviewed 16 graduate students in an attempt to answer these two research questions. Sadler and Given's (2007) study defined the term "use" as "in the context of library resources, including the library building itself, physical books and journals, communication with librarians, and online services provided by the library system" (p.118). This study builds on Sadler and Given's (2007) definition by supplementing it with further exploration of graduate students` perceived affordances in the context of an academic library, and by examining the role of library usage perceptions in graduate students' information-seeking behaviours.

Table 23 provides background information of 16 participants. For the purpose of confidentiality each participant was assigned a number. The participants' age range was about 40 years; there were three males and 13 females in the sample. A total of 14 Master's degree students participated, compared to two doctoral students. Both doctoral students were from Education, with no available doctoral students from Psychology, Sociology or Master's students from Visual Arts. However, two participants did obtain their undergraduate degrees with double majors, one of which was in Visual Arts. In order to protect the identity of two international students, their data are not separately presented; however, a total of three English as an Additional Language (EAL) graduate students who participated obtained below the overall average mean B-TILED score (M = 9.67) compared to English as a first language graduate students (M = 14.38).

Table 23

Background Information of the Sixteen Interviewed Graduate Students (N=16)

Participant#	Age Group	Gender	Program	Number of Courses Completed	EAL	B-TILED Score
#178	20-29	Female	MA – Communications	4	No	15.0
#189	20-29	Female	MA – Communications	4	No	13.0
#120	20-29	Female	MA – Political Science	0	No	19.0
#117	30-39	Female	MA – Political Science	4	Yes	11.0
#65	20-29	Female	MA – Psychology	0	No	14.0
#70	20-29	Male	MA – Psychology	0	No	15.0
#191	20-29	Female	MSW	0	No	13.0
#136	60+	Male	MSW	4	Yes	8.0
#1	20-29	Female	MED	5	No	9.0
#10	20-29	Female	MED	0	No	15.0
#36	30-39	Female	PhD – Education	0	No	13.0
#25	20-29	Female	PhD – Education	4	Yes	10.0
#62	20-29	Female	MA – English	5	No	15.0
#103	20-29	Male	MA – History	3	No	17.0
#179	20-29	Female	MA – Philosophy	0	No	14.0
#193	20-29	Female	MA – Sociology	5	No	15.0
						M= 13.50

Perceived Affordances of Graduate Students in the Context of the Academic Library

The following section encompasses graduate students' perceived affordances in the academic library context. As previously mentioned, Sadler and Given's (2007) study defined the term *use* as utilizing the physical building and materials, communication with librarians, and the library online services. Guided by this approach, the researcher explored graduate students' perceptions of the physical environment of the academic library, followed by their perceptions of the online library environment/resources, and their views on communication with librarians, which are described last.

Graduate Students' Perception of Physical Academic Library Environment

During the interviews, six graduate students made specific comments pertaining to the use of library space. Two students indicated the need for more library graduate carrels and one student specified the long, discouraging waiting list to obtain a library graduate carrel. One MEd student, who had completed her Bachelor of Education degree at the same institution, noted that the Education library section was in need of new and updated resources. She found that particular section uninviting, and related that it did not create an environment for teacher candidates, and that she was under the impression that the area was not originally designed as the Education area. Her concern was that it was and still is seriously lacking resources for the professional development of teachers. In her own experience, she had to purchase a lot of children's books and materials during her Bachelor of Education training since she was not able to find relevant materials. Another Faculty of Education doctoral student noted that, for her research, she found the physical space around microfiche was not user-friendly. Since the printer and the microfiche machine were not in the same room, every time she needed to pick up the printed materials in the hallway, she had to pack up her stuff and carry it around. One history graduate student found all of the areas in the library noisy and suggested strict enforcement of rules to ensure quiet floors. He suggested: "Enforce a no-speak and no music/headphone policy…. Library is way too loud" (participant #103). One Master of English student made the following comment:

> Now that grad students have their own computer labs, we no longer have to search one out in Leddy, which is phenomenal. It is also much quieter and easier to concentrate. One-on-one help from librarians comes in very handy – their

> extended hours are a boon. Again, the physical journal collection is difficult to search – if there was a staff member who specialized in that, we could ask for their help when we can't find the article we're looking for on our own. Or perhaps just better labelling would help. (participant #62)

However, most of the graduate students did visit the library and used library resources and print material on a need-to-use basis. The two part-time graduate students indicated that they had used the library physical space more during their undergraduate degree at the same institution, whereas now, as a result of the limited amount of time they spent on campus, they use the graduate lounge provided by their department since most of their time is spent studying at home and accessing online campus resources.

Graduate Students' Perception of Online Academic Library Environment/Resources

All interviewed graduate students were able to demonstrate their use of online library resources by going to the library website and finding journal articles and research tools by subject. The graduate students were appreciative of the speedy delivery of full-text articles when available, and they used both online and physical campus resources. However, a general frustration remained with the "Get It" button and not being able to retrieve the full-text articles. For instance, one MA-Sociology student said: "It is frustrating when an article says it's there, but it is not really" (participant #193). Overall, graduate students found the "Get it" feature misleading. General confusion remained regarding why full-text was not always available through the "Get it" feature. However, one MA-English graduate student recommended the following:

> Mark results of a journal article search by whether they are available in full-text online or not right on the first results page, so that we don't have to spend a lot of

> time clicking and waiting with the “get it” button to see if we can read it or not. (participant #62)

Although the interlibrary loan option was available and very much praised among graduate students, those who were pressed for time would often abandon their search and opt for another library item.

In regards to other electronic resources, only two students used Foxy Leddy, while four students used *RefWorks* for their citations. Another 12 students did not use *RefWorks*, either as a result of its lack of accuracy, or their lack of experience with it, or the inconvenience of remembering one more password. For these reasons, they preferred to use alternatives such as Reference Manager, NoodleBib, or EndNotes. One student used the Kindle wireless reading device in order to obtain the desired material. The most often used databases depended on the department. Although Scholars Portal was most commonly used as a database, the students from each department tended to search for articles in their specific areas, such as ERIC@ Scholars Portal for Education students and PsychINFO for the psychology graduate students.

Graduate Students’ Perception of Communication with Librarians

A total of five graduate students were not aware of the existence of the subject librarian in their area of study; however, 11 students reported having interactions with librarians. Besides visiting the library to obtain help from librarians, self-initiated/self-sought help and the online chat were also used by graduate students as alternate options to obtain convenient help. One part-time student and one full-time student both noted that receiving an electronic update on new resources or current events in the library would be

very beneficial. Two part-time MEd students felt that they miss a lot of important information since many events occur mostly during daytime of the working week.

One political science graduate student noted her positive interaction with a librarian:

> "Librarian was very helpful during her presentation; she offered to help us with our research project design, which I think will be beneficial." (participant #120)

A MEd graduate described her experience with librarian:

> Librarian was extremely knowledgeable and well spoken. Good people skills and enthusiastic. I believe he should have been asked by faculty in the Education department [sic] to present/offer a workshop series to graduate students in the program on the library (in the actual library). Many of my colleagues didn't ever know he existed. (participant #10)

One MSW participant described negative experience with two librarians, neither of whom were subject librarians in her field of study. She was in a need of sophisticated technological search; she sought help on two different occasions, but was not able to get it. Based on that experience, she recommended the hiring of a graduate librarian who specializes in graduate information literacy needs. In her opinion that would be somebody who is technologically savvy and who has completed extensive research. Overall, graduate students noted that they required contact information for a librarian, especially one for their department; however, they all noted a need for more advanced searching techniques in their own subject area.

Role of Library Usage Perceptions in Graduate Students' Information Seeking Behaviours and Awareness about Library Resources

The following section includes discussions pertaining to graduate students' instructional needs, focusing on their information-seeking behaviours and awareness about library resources. It is followed by a description of the graduate students' perceptions of Google and Google Scholar, and further elaboration of unclear terminology as perceived by the graduate students.

Instructional Needs of Graduate Students in Regard to Library Services

A total of 14 graduate students who found library resources easy to use obtained a higher mean B-TILED score (M = 13.64) compared to two students who did not find library resources easy to use (M = 12.50). However, 15 graduate students who indicated that graduate students need instruction on how to use library information resources in their subject area obtained below the average mean B-TILED score (M = 13.40). As a consequence of the small cell size, no statistical tests were conducted. Three students specifically noted the need for workshops and tutorials or a refresher course especially in the beginning of the program. One MEd student noted:

> I still struggle with searching databases for articles (mainly with defining my search terms and narrowing my search). Keeping up with new tools and services is also challenging. Help here would be nice. Perhaps, a newsletter of new library service through e-mail? (participant #10)

She added:

> It is often assumed that graduate students were provided with this instruction in undergrad, when in my experience it is not. Additionally, being provided with

> instruction relevant to your program of study would be beneficial. One's undergrad program may not be their same as their grad program and therefore may require them to use different resources (example: undergrad program: psychology; graduate program: education). (participant #10)

Similar comments were made by four social science graduate participants (MA – Philosophy, two MA – Political Science, MA – Psychology):

> "I'm still not confident with how to best search for journal articles….teach us how to search for information more effectively." (MA – Philosophy).
>
> "I haven't been in an academic setting in 3 years. My grad program is different than my undergrad…. Some things have changed. It helps to have a refresher." (MA – Political Science)
>
> "Hold a mandatory meeting at the beginning of the school year and go over basic information with the students. Provide students with contact information in case they require further assistance." (MA – Political Science)
>
> "Have a tutorial for 1st year Master's students in the first couple weeks." (MA – Psychology)

One graduate student pointed out that consideration should be given for students from developing countries where access to the Internet and various library resources is limited, as there are many resources about which students are not aware. He suggested offering a workshop for students from developing countries.

Six graduate students clearly indicated the need for additional instruction with hands-on training pertaining to narrowing searches and scopes, or terms in databases.

This need is reinforced by the fact that only 25% (*N* = 4) of interviewed participants correctly answered question #11 about advanced searches.

Although all 16 students knew where on the library webpage to search for the resources (see Figure 4), only four interviewed students (25%) answered question #20 correctly in the first part of the survey. In order to find the journal article, only four graduate students knew that they needed to type in the catalogue the title of the journal (see Figure 5), not the name of the author or the article title. The same rule applied for browsing and searching online resources (see Figure 6). However, in order to find the same article in the journal database (for our purpose Scholars Portal was chosen) four students were aware of the advanced search feature where a drop-down window was available to search for the name of the article directly under the title (e.g., Scholars Portal search), which was not applicable for the library catalogue search (see Figure 7).

Figure 4. Leddy Library's Website Area for Searching Resources[19]

[19] Permission to use this image has been provided by the Leddy Library.

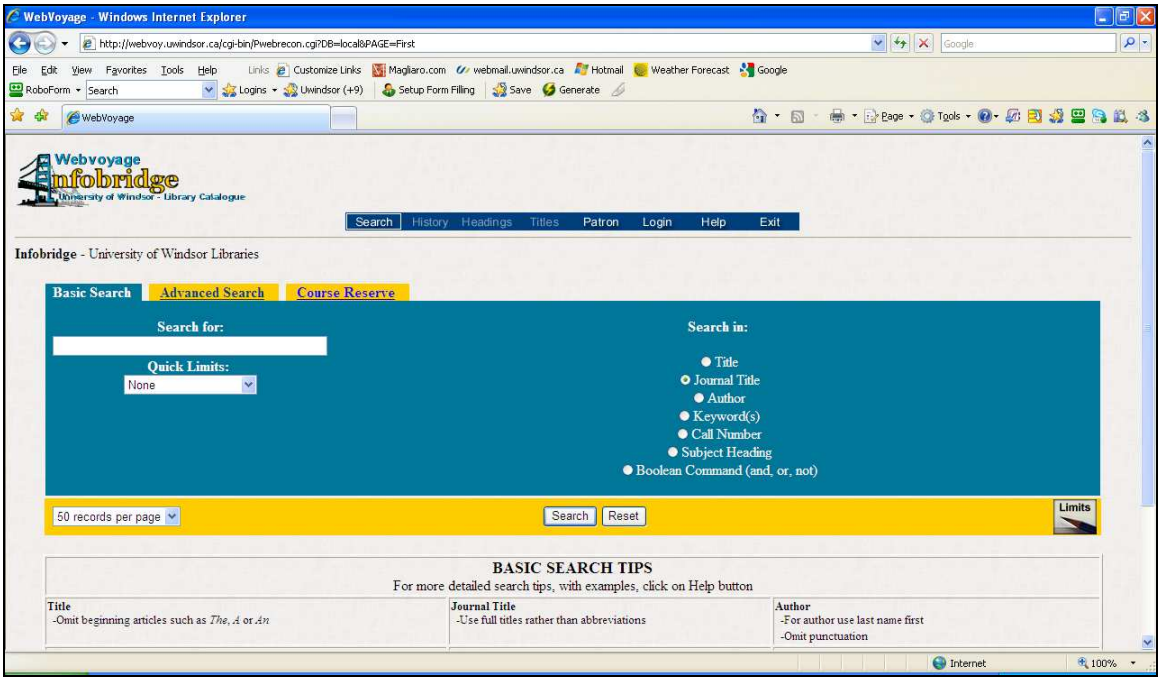


Figure 5. Searching for a Journal Title from the Library Catalogue[20]

Figure 6. Browse or Search for Online Journals[21]

[20] Permission to use this image has been provided by the Leddy Library.
[21] Permission to use this image has been provided by the Leddy Library.

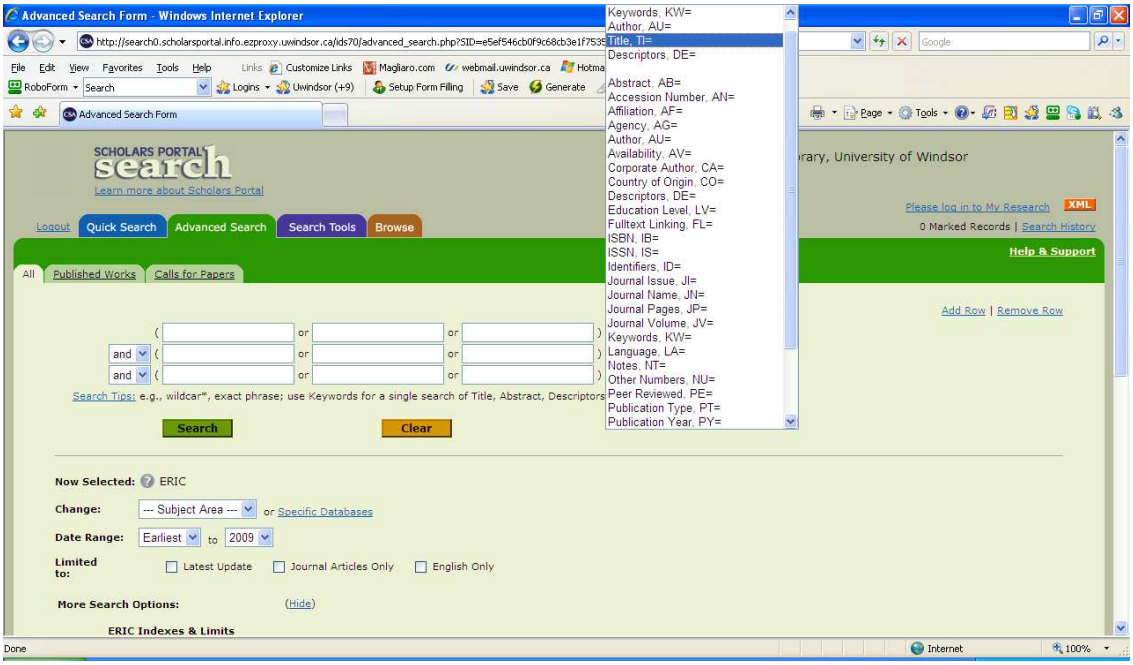


Figure 7. Scholars Portal Advanced Search[22]

When starting a database search, graduate students were confused about the full-text icon description (see Figure 8). One sociology student in particular questioned if Social Science @ Scholars Portal (Fulltext) contained only full-text articles, especially since Sociological Abstracts also leads to the same Scholars Portal interface. One MA – Communication graduate student found that, when she was searching under the Communication Subject Area, the Social Sciences @ Scholars Portal (Fulltext) information icon for Communication did not work properly, which left the student wondering about the purpose of the resource (Figure 9).

[22] Permission to use this image has been provided by the Leddy Library.

Figure 8. Social Science @Scholars Portal (Fulltext) Option[23]

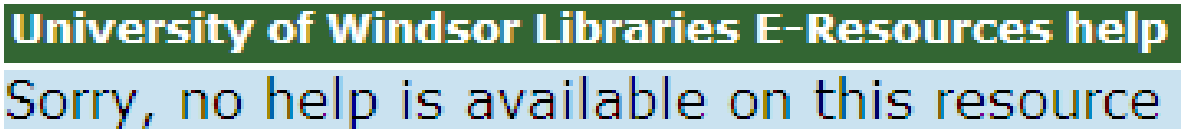


Figure 9: Information Icon without Description of the Resource[24]

In terms of exploring further information-seeking behaviours and awareness about library resources, none of the interviewed students demonstrated proficiency with Scholars Portal Search Tools, especially the Thesaurus option which enables further searches for alternate keywords in Scholars Portal.

[23] Permission to use this image has been provided by the Leddy Library.
[24] Permission to use this image has been provided by the Leddy Library.

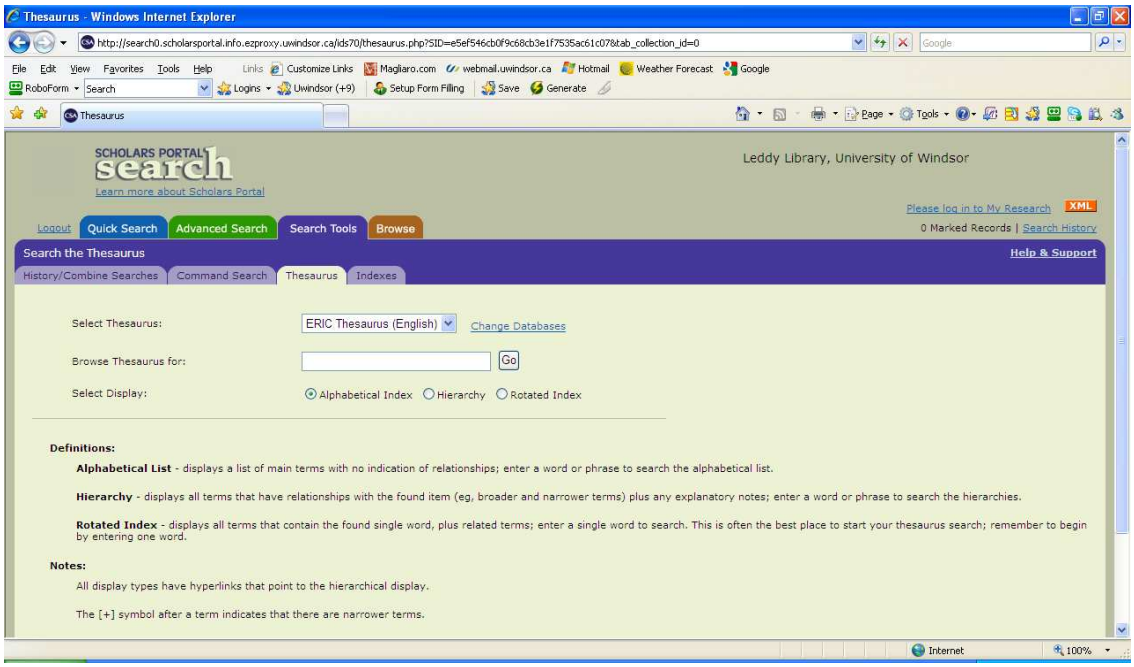


Figure 10: Scholars Portal–Search Tools–Thesaurus[25]

Google and Google Scholar

Ten graduate participants constantly used Google and Google Scholar as a starting point for search. The two international students pointed out that Google was easier to use compared to the library databases. They explained how Google corrected misspelled words and offered alternative spellings, while many library databases do not offer similar features. Also, through Google, the students were able to find open access articles. One EAL student was excited when the Google search brought up some articles that were in her native language, which she later used for her research. The local students also praised usability of Google; they found it more effective and helpful for obtaining ideas on any topic. For instance, a MA graduate student noted that Google search can be broadened by including different synonyms, some of which the library databases do not have. The

[25] Permission to use this image has been provided by the Leddy Library.

student reflected that, during her search on Google, while looking for "environmental movement" articles, she was able to retrieve articles related to "going green."

Although Google (e.g., http://scholar.google.ca/intl/en/scholar/librarylinks.html) indicates that it collaborates with libraries to provide links to the library's subscribed electronic resources, none of the 16 graduate students ever used Google Scholar's Scholar Preferences (see Figure 11) setup for their own library availability search. Instead, the students would start their search in Google, then find the reference to the article of their choice, which they used afterwards to search the library database to see if the library subscribed to the resource. Furthermore, it should be noted that none of the 16 graduate students used the advanced features of the Digital Object Identifier (DOI) and its search benefits.

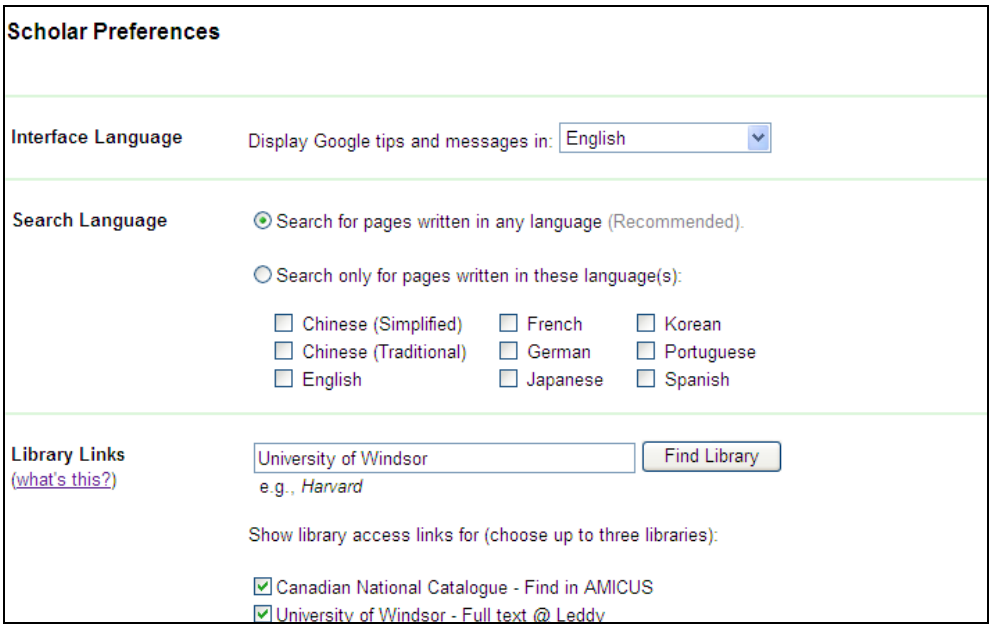


Figure 11: Google Scholar's Preference-Library Links[26]

[26] Permission to use this image has been provided by the Leddy Library.

Unclear Terminology as Perceived by the Graduate Students

During the interview process, standard questions from the first part of the survey were explored, when there was a low percentage of correct responses. These questions included such topics as website ownership, confirming the reputations of online resources, and clearly understanding the concept of copyright and fair use.

The 22nd question in the first part of the survey asked about the owner of a website, and was answered incorrectly by nine graduate students (56.3%, *N = 16*). After further examination of their answers, it was apparent that these nine graduate students did not differentiate between the business, university, and government agency website domain names. This finding was also confirmed during the interview process.

The 23rd question required verification of the reputations of online publishers, and was answered incorrectly by seven graduate students (43.8%, *N = 16*). Although all interview participants were aware of the existence of the peer-reviewed journals, there was a general assumption that, if the journals were published in the specific library databases (e.g., MLA), they must be peer-reviewed and therefore reputable sources. Although the international graduate students preferred using open access journals because they are freely available, domestic students lacked understanding of the difference between open access and commercial journals. However, all students preferred online access as an option. Two students that had submitted their work to be published in the journals were not aware of the copyright agreements that the particular journals were offering. One student indicated that her professor had chosen the journal, while another student was not at all clear about publishing guidelines.

The 26th question referred to copyright permission if the resource is from a government agency. Fifty percent of interviewed students answered the question correctly, indicating that half of the students were not aware that permission was not needed to distribute reports from a government agency. Also, 62.5% of interviewed graduate students were not aware of the concept of fair use or fair dealing (question #28) under which it is legally possible to reproduce portions of works for educational purposes without permission.

Table 24 contains the summary of graduate students' perceptions described in the previous section of the text.

Table 24

Summary of Graduate Students' Perceptions in Relation to Library Use

Not Perceived by the Students	Perceived IL Needs	Perceived Alternatives to Library Resources	Perceived Library Resources
-clarity of IL instructions	- IL workshops or instructions (e.g., narrowing of terms)	- Google Scholar	- online catalogue
- copyright, fair use dealing and publishing	- hands-on training	- Kindle	- librarians
- open access vs. commercial journals	- evening workshops (for part-time students)	- Reference Manager	- journal databases
- “Get it” button and Foxy Leddy	- organizing references (RefWorks found as not reliable)	- NoodleBib	- inter-library loan
	- monthly or quarterly e-news letter update about library resources	- EndNotes	- RefWorks
			- some library instructions

This chapter described the results based on data collected through a questionnaire and follow-up semi-structured interviews. The findings were listed along with the corresponding tables and figures. Detailed discussion summaries of the integrated quantitative and qualitative data findings are given in Chapter V.

CHAPTER V

DISCUSSION

This study was designed to provide a more holistic and ecological presentation of graduate students' IL needs in a midsize Ontario university. A *sequential integrated mixed model design* approach was utilized with the implementation of the revised B-TILED (Beile O'Neil, 2005) questionnaire. The questionnaire was extended with supplementary open-ended questions. Additionally, the research design included a semi-structured interview protocol with the elements of TAM and Affordance theories.

Phase 1 of the Study

One of the recommendations given in Beile O'Neil's (2005) dissertation was to develop further the B-TILED instrument, a tool that she developed for the purpose of her study. Accordingly, in this study, the B-TILED instrument was further developed by taking into account a wide variety of the literature review recommendations, as well as the recommendations by librarians at the home university with specific subject area expertise. The following recommendations were applied in this process: to involve students at different levels of Master's and PhD degrees (Barrett, 2005), to address the needs of international students' population (Morrrissey & Given, 2006; Liao et al., 2007; Liu & Winn, 2009), as well as to develop an instrument for the social science students (Beile O'Neil, 2005; Cannon, 2007; Morner, What follows are inferences made as a result of this process.

Demographic, Academic and Departmental Clusters

In order to answer the first research question, *Which graduate students' profile cluster (demographic, academic level or department) best portrays their IL?*, participant

information was analyzed from the three angles, based on their demographic, academic and departmental characteristics. Each cluster had one significant variable (demographic cluster consisted of five variables, academic cluster consisted of four variables while departmental cluster consisted of one variable). Thus, the following attributes, one related to each cluster, were significant in portraying graduate students' information literacy: having English as first language, finished minimum course requirements for the Master's program and department the graduate student is enrolled in.

In regards to the demographic cluster (see Appendix R), one-way ANOVA revealed a significant difference for B-TILED scores between those participants who spoke English as a first language, and those who spoke English as an additional language (EAL, see Table 7). Although three EAL students were interviewed, the research instrument did not allow for further investigation of EAL participants and the specific reasons that they did not perform as well. For example, based on the survey, one cannot determine when those students first learned English, if these graduate students were recent immigrants to Canada, or if any of these students first had international student status before obtaining domestic student status. However, there was no significant difference on B-TILED scores based on international student status. It is possible that the international students obtained higher B-TILED scores because in order to enrol at the university they had to provide proof of English language proficiency (i.e., Test of English as Foreign Language score). All other variables in the demographic cluster (gender, age, and library-related position) were not significant among participants, which was consistent with the previous literature in regards to gender and age (Morner, 1993;

Barrett, 2005; Beile O'Neil, 2005; Cannon, 2007; Fidzani, 1998; Marshall, 2006; Sadler & Given, 2007).

In regards to the academic cluster, Barrett's (2005) recommendations were followed in differentiating between participants at different stages of graduate studies. To avoid confounding, the two data sets from Master's students and PhD students were analyzed separately. Statistically higher B-TILED scores[27] among graduate students who completed minimum course requirements for the Master's program compared to those who did not, suggest that exposure to more graduate courses improves B-TILED score. The participants in this study did obtain significantly higher B-TILED scores compared to the participants in Beile O'Neil's (2005) study. This finding could be because participants in this study had completed more courses at the graduate level.

Suggestions from some previous studies (Morner, 1993; Beile O'Neil, 2005; Cannon, 2007) were to investigate the IL of graduate students enrolled in different departments, including Education. Both post-hoc tests indicated a significant between-group difference between the IL of graduate students enrolled in doctoral studies in the Social Sciences (Psychology and Sociology) and Master of Education graduate students (see Appendix S). It was expected that doctoral students might do better in the B-TILED test. Examining the descriptive data in Table 9, the reader should note that PhD Psychology students obtained the highest B-TILED mean score (M = 16.86, N = 7). Furthermore, without inferential claims, at the Master's level, the lowest scores were obtained by the Master's of Political Science graduate students (M = 12.92, N = 25), and the highest scores were obtained by the Master's of Psychology graduate students (M = 15.13, N = 16). Thus, the Psychology graduate students both in the Master's and doctoral

[27] The higher score suggests a higher level of Information Literacy.

programs obtained the highest average B-TILED score. It should be noted that, in the first phase of their program, the Psychology doctoral graduate students are required to complete a Master's degree with thesis (University of Windsor Graduate Calendar, 2009), through which they obtain extensive research experience in preparation for the doctoral program. This is contrary to other programs investigated in this study, which may accept students to doctoral programs with course-based projects or a major paper Master's degree.

Graduate Students' IL needs based on their Perceived Usefulness and Ease of Use of Library Services

In order to answer the second research question, *What are the graduate students' IL needs based on their perceived usefulness and ease of use of library services?*, graduate students' patterns of use of library resources and their perceptions of library services were investigated.

The majority (between 76%-83%, depending on the level of study) of graduate students reported that both library instruction at the undergraduate level and graduate level was useful. In Fidzani's (1998) study on information-seeking behaviours of graduate students, 20.1% of graduate students indicated that they had never received instruction on the use of the library either at the graduate or at the undergraduate level, compared to 22.2% students who had not received any library instruction at the graduate level. Similarly to Fizani's study, the data from this study indicated that 23.88% of students never received library instructions at the undergraduate level, while 32.83% students never received it at the graduate level. Furthermore, more than half of the graduate students (53.7%) reported they had not received any library instruction during

their current program of study (see Table 10b). In addition, 58.2% of graduate students had not been exposed to library classroom instruction at the current institution. Thus, their IL skills are likely not current. Those 31 students who received, at some point, one-on-one library instructions with a librarian obtained below the average B-TILED mean scores, perhaps indicating that those with perceived weakness are more likely to search out library assistance. This finding suggests that these individuals did not receive enough training to become skilled and independent users of academic library resources.

Those participants who had received library instruction to build their IL indicated the need for instruction which include opportunities to test or experience the variety of search tools available through the library, more practice of information searching techniques, hands-on demonstrations of the search tools, and a complementary guide book to support the oral instructions given. Similar to this finding, Rempel and Davidson (2008) noted that graduate students' knowledge of most search tools had not remained current in terms of changing/new library resources meant to inform information literacy. These findings raise several questions related to graduate students' lack of IL. Is the lack of knowledge related to a lack of instruction, lack of awareness of the existence of the tools, the quality of the instruction, or the complexity of tools, that is, are the tools too difficult to locate and decipher?

Graduate students' needs for library instructions. A total of 83.58% (N = 168) graduate students indicated that they need instructions on how to use library information resources in their subject area (see Table 11). This was similar to findings in the Hoffman et al. (2008) study, in which graduate students also indicated a preference for subject-specific instruction. In this study, the students required the greatest assistance in learning

about various database/online journals, such as searching for peer-reviewed and Internet journals, obtaining off-campus access, learning about novel library tools (such as RefWorks), and how to conduct more advanced searches as well as narrow search terms.

This study investigated graduate students' perceived library needs for instruction alongside with their answers to B-TILED survey questions and Standards of IL. It became apparent that, for example, on the B-TILED survey questions #11 (about advanced searching) and #20 (what to type in the library's catalogue), the majority of graduate students did not have the correct information (see Appendix O). Questions #11 and #20 belong to Standard Two, which describes information literate students as those who can access needed information effectively and efficiently. This lack of knowledge was again apparent in the answers given by the majority of graduate students for question #23 (reputation of the Internet source), which is classified under the Standard Three (being able to evaluate information and its sources critically); and questions #26 (copyright choice) and #28 (reproducing portions of works), which are classified under Standard Five (being able to understand many of the economic, legal, and social issues pertaining to use of information and access information ethically and legally). In addition, question #8 (…first choice to consult) that was classified under Standard One (being able to determine the nature and extend of the needed information), was the least correctly answered question. Thus, future instructions in regard to accessing information on the Internet efficiently and effectively, evaluating information and its sources critically, and understanding ethical and legal aspects of information seeking need to be taken into account by instructors, especially to further explore how they fit into each IL Standard in order to address the graduate students' IL needs. Although in the Hoffman et

al. (2008) study the graduate students were not inclined to attend a workshop on the *Ethical Use of Information,* Knieve (2008) provided online tutorial on publishing which was well received. Providing alternative instruction (face-to face, online, or blended) might be appealing to different groups of graduate students.

Ease of use, access to library resources and students' recommendations for improvements of library services. It terms of ease of access and use of library resources, about one-fifth of graduate students did not find library resources easy to access and use. The findings indicate a significant difference in B-TILED scores based on graduate students' answers regarding the ease of access and use of library services. Those students who found library resources easy to access and use obtained higher B-TILED scores compared to those who did not (see Table 20). Some of the most often mentioned difficulties with access and use were following research/search instructions and finding full-text articles. There were also issues with the set up of the physical library space, and general unfamiliarity with the library materials and processes.

In regard to the study participants' responses to the open-ended survey questions, most recommended improvements to existing library services. The most common suggestion was the need for workshops, hands-on and online training on how to conduct *research and search*. The common theme was that graduate students should be provided with instructions, instead of letting them inquire about instructions. This common feeling was expressed by one student who wrote, "FIND US, TEACH US." It was felt that these learning opportunities would be particularly useful if offered early in the semester, to provide timely support for upcoming assignments, or incorporated directly into the coursework. These responses are consistent with what Rempel and Davidson (2008)

recommended, including the creation of library use-related workshops at the beginner, intermediate and advanced levels, preferably at different times of the day as well as to schedule more specialized workshops in order to reach distance and international students.

Other difficulties noted in graduate students' responses, which include finding full-text articles and lack of familiarity with the library, could be addressed in these workshops or through online instructions for those who are off campus. Since online journal search seems to be the prevalent research activity among graduate students, a further explanation of the *Get It* button is necessary at all levels of graduate studies, not only for the first year students.

In this particular academic library, the *Get It* button is made available on certain database web sites which links a user's request to the particular database. As with research conducted by Sadler and Given (2007), and Wakimoto et al., (2006), the results of this study suggest that graduate students either do not understand the *Get It* button service, do not know of its existence, or do not perceive it as being self-explanatory (Sadler & Given, 2007). For example, a total of 112 graduate students in this study had a blurred understanding of the *Get It* service, since they were under the impression that, after clicking on the *Get It* button, they would receive a full-text of the article (see Table 15). After not getting a full-text of the article in this process, some students (N = 31) would use RACER; however, the majority of students (N = 134) would either look for another article, abandon the search, or try a different database (see Table 16). Similar to findings in the Wakimoto et al. (2006) study, graduate students in this study regarded the "no full-text available" message as an error in the system, rather than interpreting SFX as

a shortcut for determining library access for that particular article. This confusion resulted in frustration with the offered service. Thus, the misunderstanding around the use and purpose of the “Get It” button in this study was prevalent, indicating that students indeed had a blurred perception of such a service.

With respect to other online services, about one-fifth of the participants used *RefWorks* mainly for citation purposes as part of their research and found it very useful for organizing citations and references. The rest of students did not use this service, which some described as confusing and unreliable, to the extent that they preferred to use alternative methods of citation referencing. Although, in this study, data were not collected on the extent to which graduate students received instruction on *RefWorks*, it is worth noting that Hoffmann et al. (2008) reported that the most popular workshops among graduate students were *Introduction to RefWorks*. Further studies should examine the extent to which graduate students who obtained instruction around *RefWorks* found it useful as a research tool.

Lastly, 96.5% of graduate students in this study did not use *Foxy Leddy LibX* Toolbar. Future studies should examine whether students were not aware of the service or why did not find this particular service useful (see Table 18). Rempel and Davidson (2008) indicated that graduate students are unfamiliar with the more multifaceted library tools. As mentioned previously, one explanation offered by the authors is that students may be unaware of the benefits that these tools can provide. It is quite possible that graduate students in this study may not be aware of the increasing range of services suitable to fulfill their information literacy needs.

Another difficulty noted by the graduate students was related to the physical lay out of library space. Providing alternative to sources of how library material is organized either in print (e.g., posters) or online (e.g., interactive maps and virtual tours), would be beneficial for many students. Furthermore, obtaining a dedicated alterative study place or learning commons in the library would be a definite asset for graduate students.

Implications for Technology Acceptance Model Theory

In conceptualizing the IL of graduate students, TAM (Davis et al., 1989) provides a useful model for several reasons. First, the TAM explains the end-user's behaviours when using a wide range of computing technologies. For instance, users in this particular study encountered the above mentioned difficulties with the *Get It* service. These difficulties may have a negative impact each time they use that particular service in combination with another service, for example, *RefWorks*. If graduate students fully understand the use of the *Get It* button, they will be aware that they might or might not obtain the article in full-text. However, they will always be able to obtain the required abstracts or article citations. Knowing this, if a student is working on a large research project or dissertation, he or she will have an opportunity to download citation information into *RefWorks* for the requested articles. Each time the student needs to access the article it can be retrieved by using the *Get It* button (Figure 12 – Arrow #1) from their individualized *RefWorks* account. Through their *RefWorks* accounts, the students can access other services, such as *Author Profile* (Figure 12 – Arrow #2) or alternative services like *RefMobile* (Figure 12 – Arrow #3), and social utility tools such as *Facebook* or *Twitter*. While graduate students may not be using all of these services,

being aware of them and perceiving these services as easy to access and use will open up opportunities for use.

Arrow #1 = *Get It* Button
Arrow #2 = *Author Profile*
Arrow #3 = *RefMobile* and other services (*Facebook* & *Twitter*)

Figure 12. RefWorks Account Example[28]

The major assumption behind TAM is that specific beliefs (i.e., *perceived usefulness* and *perceived ease of use*) are primary determinants of the information technology and information systems adoption (Lu et al., 2003). In this sense, perceived

[28] Permission to use this image has been provided by the Leddy Library.

usefulness is defined as the extent to which one believes that utilizing the system will improve one's performance; whereas perceived ease of use is the belief that utilizing the system will be free of effort (Davis et al., 1989; Venkatesh & Davis, 2000). If graduate students perceive that *Get It* and *RefWorks* tools will effortlessly improve their performance, then this technology is more likely to be fully accepted by them (see Figure 13). However, because these tools are connected and can be used in conjunction, if graduate students do not perceive the *Get It* tool as useful, they might not perceive *RefWorks* as useful either. Students in this study did indicate that they disliked the *RefWorks* because it was confusing and unreliable. If graduate students perceive that *RefWorks*, "an online research management, writing and collaboration tool" (RefWorks, 2009, para.1), does not provide accurate citation styles, they should be encouraged to provide their feedback. Their feedback will be useful in addressing various software issues and troubleshooting the difficulties encountered with the tool. If the time is taken to develop such a sophisticated tool, there must be a way for improving it based on a feedback from its users.

A key goal of TAM is to measure the impact of external variables on users' beliefs, attitudes, and intentions (Davis et al., 1989; Lu et al., 2003) (see Appendix C). Since TAM is used in this study for predicting the library users' acceptance of online library tools, one needs to consider the library instructions received as an external variable in the model (see Figure 13). For instance, the majority of graduate students did not obtain library instruction at their current institution, thus they might be relying on instructions obtained at the previous institution. However, these skills, even if gained at some point in time, become in time outdated and inadequate.

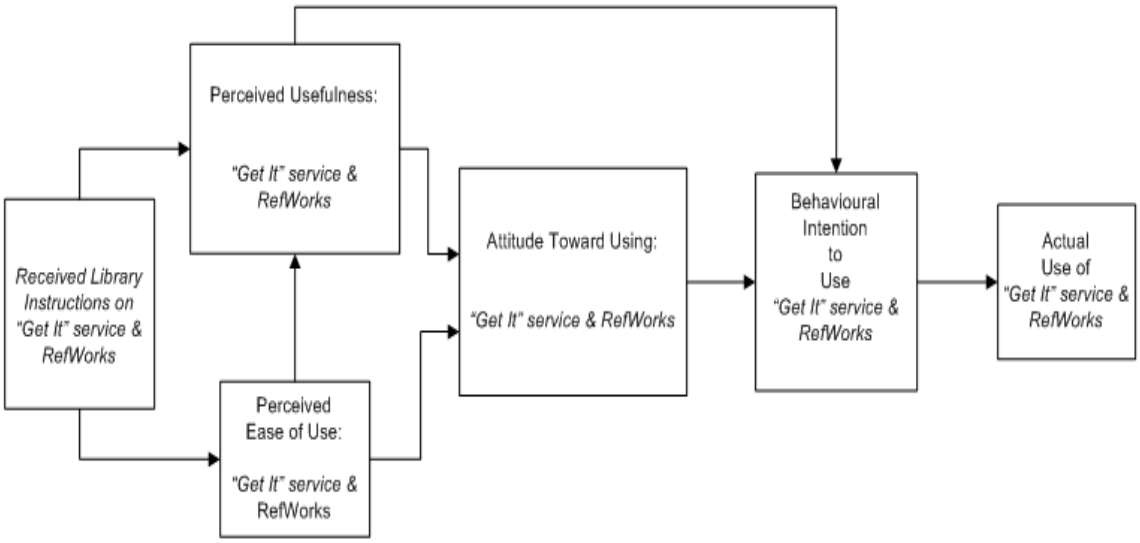


Figure 13. Technology Acceptance Model (TAM) Applied on Selected Online Library Service and Resources

It has been noted that previous research cautions that the generality of TAM does not provide for more meaningful information on users' personal views about specific technological systems. In an attempt to build upon the capacity of TAM as a model for technology adoption, in this study graduate students' personal views were sought in follow-up qualitative interviews. Attempts to minimize the recognized limitations of TAM were sought, by integrating it with other IT acceptance models and incorporating additional approaches to gather meaningful information (Venkatesh & Davis, 2000). Therefore, integration of TAM questions (see Appendix F) with a modified B-TILED instrument and Affordance Theory questions in the qualitative follow-up interviews provided more meaningful information about graduate students' intentions, behaviours, and opinions about library technology systems.

Phase 2 of the Study

The Phase 2 of the study was qualitative and informed by the results of the previously described survey. It was designed to answer the two remaining research questions: *What affordances do graduate students perceive in the academic library context?* (Sadler & Given, 2007, p. 118); and, *What perceptions of library usage play a role in graduate students' information seeking behaviours and awareness about library resources?*

These questions were answered by organizing follow-up interviews with 16 graduate students. Before each interview, quantitative data were analyzed to identify the questions each of the 16 graduate students did not answer correctly. In doing so, the researcher found that it was possible to explore further the results from the first part of the study in the second, qualitative, part. Based on the percentages of incorrect answers on the B-TILED test (see Appendix O), as well as emerging themes in the answers to open ended questions based on TAM, contextual factors were identified (i.e., received library instructions) that most influence individual behaviours in the use of library resources.

Perceived Affordances for Graduate Students in the Context of Academic Library

The contextual factors were addressed through the use of ecological psychology as a theoretical framework, in which one's behaviour was studied along with one's environment (Sadler & Given, 2007). Accepting the notion that the world consists simply of things *perceived* by an organism in its environment (Gibson, 1979), the researcher implemented Affordance theory to investigate to what extent graduate students perceive the academic library environment as useful. The following section encompasses the

related responses from 16 full-time and part-time graduate students along with Hoffman's et al. (2008) recommendations.

First, although graduate students mostly tend to use the study space provided in their departments, the full-time students expressed interest in using the physical library space for the same purpose. They requested that the long waiting list for the library graduate carrels was discouraging, and students reported that they opted to use of the shared space offered by departments. Those who used the library space on a regular basis emphasized the need for the strict enforcement of silence on the floors as well as a need for more user-friendly space for microfiche users. These findings were similar to Given's (2007) findings, where the need for both quiet and noisy spaces was expressed by the faculty and librarians, who also emphasised the importance of having welcoming spaces on campus to assist students during research and utilization of information behaviour.

Second, with regard to communicating with librarians, graduate students expressed the need for having contact information of librarians, especially those assigned to their department (i.e., subject area experts). Following the Hoffman's et al. (2008) suggestion to differentiate between the needs of international vs. Canadian students, the researcher specifically paid attention to the former group of students. Only five interviewed graduate students were unaware of the existence of the subject librarian, including two international graduate students. One graduate student who was performing sophisticated online searches recommended having a graduate librarian that specializes in graduate information literacy needs. In this student's opinion that should be somebody who is both technologically savvy and skilled in research. However, all graduate students interviewed noted a need for more advanced searching techniques in their own subject

area. This finding was similar to Hoffman et al., in which graduate students indicated a preference for subject-specific instructions.

Information-seeking behaviours in using online library environment/resources. This section addresses graduate students' use of online library resources such as the *Get it* button, *RefWorks* and *Google Scholar Preferences*.

All interviewed graduate students were asked to demonstrate the use of online library resources by going to the library website and finding articles and research tools by subject. The general frustration was with the not so clear understanding of the *Get It* button and their inability to retrieve the full-text articles with this service. These findings were similar to the quantitative part of this study as well as with other previously mentioned studies (Salder & Given, 2007; Wakimoto et al., 2006), where it was revealed that students had problems understanding the *Get It* service. Although one-quarter of graduate students used *RefWorks* mainly for citation purposes, overall the students did find this service very useful, especially for organizing citations and references. Those students who described this service as confusing and unreliable noted their preferences the use of alternative methods of citation referencing such as *EndNotes* and *NoodleBib*. Hoffmann et al. (2008) noted that the most popular workshops among graduate students were *Introduction to RefWorks*; however, this study did not examine if these students had attended RefWorks workshop or how they learned about this service.

Morton and Clovis (2002) noted that the Internet holds "coveted spot as the important pedagogical technique" (p. 2). Similar to Liao's et al. (2007) and Morrissey and Given (2006) studies, the first choice of search for two international students and eight domestic students was the Internet, more specifically in this case was the *Google*

database due to its ease of use. The students found that *Google* databases allow for correcting misspelled words and offer alterative spelling, the features that they did not find in library databases. However, none of the interviewed graduate students were aware of *Google Scholar's Preferences* (see Figure 11) tools through which they could link *Google* databases with their library search. Similar findings were noted by Rempel and Davidson (2008), who mentioned that the graduate students were aware of Google Scholar, but were unfamiliar with more multifaceted library tools.

Perceived Need for Library Instructions. The interviewed participants confirmed findings from the survey, namely that they need instruction on how to use library information resources in their subject area (see Table 24). These needs include hands-on training on how to narrow down the search keywords, how to use Boolean functions to limit the scope of investigation, and which terms to use in different databases. Students were also not aware of the more efficient ways for searching databases (see Figures 7, 10 & 11), as well as tools such as the Thesaurus option (as part of alternative searches). This was also voiced in the comments such as, "I'm still not confident how to best search for journal articles." The most common complaint voiced during the interviews was that there exists an assumption that graduate students have been provided with instructions on library use during their undergraduate studies, which was not everybody's experience. It was clear that the interviewed graduate students think that such assumptions are counterproductive and that they indeed have needs for advanced library instructions in their subject area, preferably at the start of each semester.

Implications for Affordance Theory and TAM

Although the first part of this study did not provide in-depth information on participants' views about specific library tools, follow-up interviews provided meaningful information on their perceptions, behaviours, and opinions through integration of the Affordance Theory and TAM.

Through the use of ecological psychology as a theoretical framework, the researcher studied the behaviour of graduate students' in the physical and online library environment was studied. The results of this study point to the deficiencies in IL practices of graduate students. However, satisfying these IL needs should not solely be the responsibility of the librarians, but of the course instructors as well.

Universities can use a model described in Rempel and Davidson (2008), in which workshops for students were organized on a broad range of subject disciplines. In order to advance graduate student services, a student service coordinator was chosen to review the literature, compare various universities' library websites and survey new graduate students. The graduate committees organized library-based instruction for graduate students on conducting literature reviews. Another informative example of interventions to increase the IL needs of students is given in Crossetto et al. (2007), in which the authors described the creation of their discipline-specific credit course. In order to improve graduate students' IL abilities, the director of the program and librarians designed a discipline-specific credit course with structured sessions and assignments. Thus, collaboration between librarians and the faculty members could be used as a model of instruction (see Figure 14).

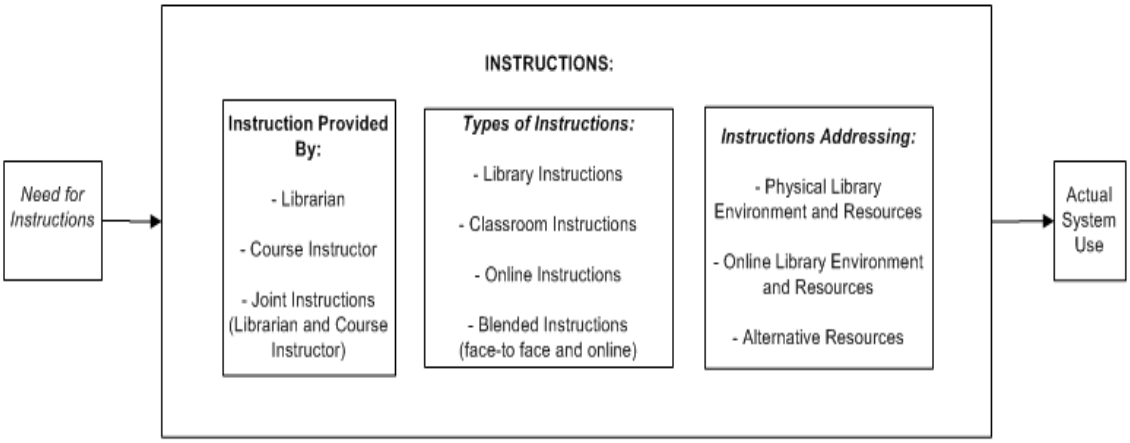


Figure 14. Model Incorporating Need for Instructions on Library Use

In conclusion, both TAM and Affordance Theory serve as useful models in studying IL of graduate students. Both of these models take into account behaviours as well as perceptions of the users of information systems. Since TAM did not provide more in-depth information on users' personal views about library technological tools, the Affordance Theory was implemented to investigate to what extent the academic library environment is perceived useful by the graduate students. The approach taken in this dissertation could be further utilized as a model for future studies of IL.

Implications for the IL field

In this study, the researcher implemented a very broad approach to further investigation of IL needs of graduate students in selected graduate programs through the Technology Acceptance Model and Affordance Theory. The following three points provide implications for the IL field.

First, this study can be viewed as extension of previous IL dissertations. For instance, similar to Beile O'Neil's (2005) and Cannon's (2007) dissertations, this study implemented the B-TILED survey. However, this study extends B-TILED survey to other

social science fields based on recommendations coming from previous studies. In addition, the methodological approach of this study could be extended to investigate graduate students' IL needs in other fields, such as sciences.

Second, the combination of TAM and Affordance theory in this study presents an alternative method of combining different theories to explore IL. This approach is aligned with Venkatesh and Davis' (2000) recommendation to integrate TAM with other IT acceptance models or incorporate additional factors. Sadler and Given's (2007) research that utilized Affordance theory as a framework to study graduate students' information behaviour served as a leading example.

Third, since this study utilized the *sequential integrated mixed model* design, it serves as an example of how the research methods from one discipline (e.g., education, psychology, or computer science) can be adopted and applied in another field (e.g., library science – IL). Overall, the above mentioned approaches utilized in this dissertation can serve as a model in further research of related disciplines, while the findings from the study will inform further studies of IL.

Limitations

One limitation of this study is that the B-TILED survey might not access the full breadth of skills and knowledge expected of graduate students (Beile O'Neil, 2005). It should be further noted that Standard Four was not conducive to the web-based, multiple-choice item format, and thus was not included into the B-TILED survey.

Similar to the study by Cannon (2007), who did not use equal group sizes in general and special credential programs for graduate students' comparison, this study only surveyed groups representative of two faculties. Even though the sample size in this

study was large and included students from various backgrounds, the sample was voluntary and convenience, so it might not be representative of the entire population of graduate students from social sciences and education departments in Ontario. Although for the qualitative portion of the study, the researcher intended to obtain two students per department, this sampling was not feasible in smaller departments (e.g., Visual Arts). One the of concerns about this study was the length of the questionnaire, where a fatigue factor could have been present. The participants might have grown tired during the first part of the survey which encompassed both multiple choice and open-ended questions.

There was no further quantitative examination of students whose English is an additional language, such as to find when they learnt English if they were recent immigrants, or if any of them were international students before obtaining a domestic student status. Future studies should further explore such issues.

Another limitation of this study is that a complete ecological model of graduate students' information behaviour may not be provided due to the integration of only Affordance Theory and TAM, especially where there might be other factors that can be further studied through the implementation of other Information System theories. Future studies should also involve librarians and faculty members, since both of these groups play a crucial role in development IL of graduate students.

Recommendations for practice. This study examined IL of graduate students at a mid-size university in Ontario through (a) a survey with 201 participants, and (b) semi-structured interviews with 16 of them. The study encompassed ACRL's *Standards*, and Sadler and Given's (2007) affordance framework in order to provide more information on

graduate students' IL needs. This section addresses means that could be used to improve IL of graduate students:

(i) Provide a sign-up notification service as well as regular e-mail updates on resources for graduate students.

It is generally accepted that the academic library is fundamentally a place for information seeking. Thus, it is still problematic, when Fidzani (1998) and recent studies such as Sadler and Given (2007), and Crosetto et al. (2007), as well as this study note that graduate students do not receive adequate training in the use of library services and are even not aware of some services that are available.

(ii) Provide workshops to graduate students that are developed and delivered collaboratively by librarians and faculty members.

In 1998, Goetsh and Kaufman recommended the need for collaborative work among faculty and librarians with the purpose of defining information competency and creating assessment guidelines for higher institution programs designed to teach these skills. The students in this study noted the need to have workshops as a part of their classroom experience.

(iii) Establish official guidelines for support of the IL needs of graduate students for institution, by including graduate student representatives and researchers in the area of IL, as the part of the committee.

As stated earlier, ALA (2006) recommended that an institution should acknowledge that various thinking skills are related to different learning outcomes, thus different assessments or methodologies are needed for measuring those outcomes. Julien (2005) pointed out that the ACRL practices and Standards that include wide range of

pedagogical recommendations are not promoted nor utilized among the Canadian academic librarians. In order to start promoting the ACRL practices, one of the first steps could be following a Gullikson's (2006) suggestion of updating the *Standards* in accordance with faculty and librarians' past experiences with the *Standards*. However, as of 2010, nothing has been changed and ACRL (ALA, 2006, 2007) continues to use the original *Standards* which were approved almost a decade ago. Currently, the librarians at the university where the study was conducted follow ACRL's *Information Literacy Competency Standards for Higher Education*; however, there is no official IL policy or guidelines established for IL of graduate students. It is essential when creating such a policy to include various members (including graduate students) that could contribute alternative points of view.

(iv) Provide at least one standardized IL instruction for all graduate students as well as subject-specific IL instruction, face-to-face, online and/or blended.

There is a need for IL workshops, training materials and/or on-line tutorials in order to reach part-time graduate students who are often missed in organizing workshops and training sessions during working hours of the day. In Hoffmann's et al. (2008) study, the majority of graduate students opted for online workshops and preferred workshops run by both librarians and faculty members compared to those run by just librarians. The authors further suggested that graduate students should have an option between basic and advanced levels of workshops. The data from Hoffmann et al. (2008) as well from this study indicate graduate students' preference towards subject-specific workshops as a means of enhancing library research skills geared towards their disciplines. Rempel and Davidson (2008) suggest that in order to adequately approach the different student

learning abilities, workshops should be offered at beginner, intermediate and advanced levels, preferably at different times of the day as well as specialized workshops in order to reach distance and international students. Thus, graduate students should be exposed to workshops with different levels of difficulty. Based on data from this study special attention needs to be given to those students who have not completed minimum course requirements, the international students, and those graduate students for whom English is an additional language.

(v) Send/Post LibQUAL+™ graduate students' results as well as solicit graduate students' feedback about academic library services.

The report based on LibQUAL+™ 2007 at the University of Western Ontario (Western Libraries, 2009) includes the following three sections: (i) "You told us", (ii) "What we're doing about it", and (iii) "Completed". For instance, since one of the suggestions was to improve the Web site ("You told us"), the Next Generation Website Implementation Team (NGWIT) was redesigning the Web site ("What we're doing about it"), which was launched in August, 2008 ("Completed"). This report is very informative since the users are able to follow-up on how their recommendations were addressed. In this study, including graduate students' recommendations about *RefWorks* could improve the software further. Another way to address graduate students' needs would be to consult the Graduate Student Society, as well as those who are conducting research on graduate students' IL needs.

Recommendation for theory. The following two recommendations pertain to theory.

(i) Provide a broader ecological model of graduate students' information behaviour by including faculty, librarians, and graduate students from various disciplines.

In previous studies, Sadler and Given (2007) included librarian perspectives; subsequently, Hoffmann et al. (2008) included faculty perspectives. Since these studies did not have a large sample, future research should include librarians' and faculty's views on IL issues. Hoffmann et al. (2008) included students from engineering, health sciences, sciences such as medicine and dentistry, in which graduate students provided the needs assessment data and feedback about IL workshops. Future studies should include graduate students from other disciplines and ask students to provide feedback about perceived usefulness and relevance of the IL workshops.

(ii) Provide a further modification of instruments and organize focus group meetings among graduate students, faculty, librarians, and IL researchers.

The B-TILED instrument could be further developed to include other departments. The focus group meetings could be organized twice, once for graduate students at the beginning of their program of studies and then towards the end of their studies, to collect their feedback on their IL experiences. As Hoffmann et al. (2008) included focus groups for graduate students and faculty members, further studies should explore the option of including librarians.

Conclusion

Nowadays library patrons, including graduate students, require alternative technologies to practise and obtain IL skills. To support this ever-evolving phenomenon,

both librarians and educators need to provide instructions in graduate schools, and offer alternative paths for reaching their patrons' needs. When addressing graduate students' IL needs, it is important to consider methods to improve both practice and theory. First, the practical implications need to be addressed at the institutional and the faculty levels. The institutional level could address the exact library services that could be provided to graduate students, as well as make more transparent use of evaluative information (e.g., showcase the results of national and international surveys, such as the LibQUAL). At the faculty level, the culture of use of IL technologies should be further examined. The faculty administration needs to recognize the need for IL courses and workshops or integrate IL as part of curriculum. This provision could be addressed as part of the courses, through IL-related assignments and instructions, or through regular visits of librarians as guest-speakers. It is important to note that although faculty members and librarians should both work towards developing the information literate graduates, they are often not on the same path on how to accomplish this (Leckie & Fullerton, 1999). Julien and Given (2002/03) also noted the complexity of relationship that exists between faculty members and librarians. Although the cooperation between faculty and librarians is most desirable, the librarians were split between training faculty to train students, collaborating with faculty to teach students, and solely training students. Some librarians indicated the unequal position that they have compared to professors with doctorate degrees. Similarly, in the later Julien and Pecoskie's (2009) study, the librarians again pointed to the unequal power relationship with the faculty members. However, these and other noted obstacles in "good" professional collaboration between faculty and librarians should be addressed in order to achieve a common goal of benefiting the information

literacy levels of faculty members and students. As one library participant noted: “We librarians, along with our colleague professors have failed to instil in our students the joy of real research. We’ve made the whole process look so stuffy and difficult, or else we’ve provided so little real help in our one-shot sessions” (Julien & Given, 2002/03, p.82). Although the above quote might not be and is not applicable in every situation, a large majority of graduate student participants in the current study indicated a need for the subject-specific instruction.

Recognition of these eventual obstacles is important in the implementation of future collaborative programs. The first step towards creative collaboration between faculty and librarians could be the establishment of official guidelines for support of IL as well as to further explore the role of Standards, in order to address the graduate students’ IL needs.

Second, from the theoretical perspective, results of this study are based not only on perceptions but also on actual performances of graduate students. The mixed methods approach also adds to the validity and reliability of study. In addition, this study was built on the recommendations of nine other studies (Barrett, 2005; Beile O’Neil, 2005; Cannon, 2007; Crosetto et al., 2007; Fidzani, 1998; Lio et al., 2007; Marshall, 2006; Morner, 1993; Sadler & Given, 2007). It sought to fill gaps in these studies as well as extending the scope of study by including graduate students in social sciences.

In conclusion, the results of this study may serve as an informative guide for determining problematic areas in IL of graduate students (e.g., *Get It* service). Previous studies of IL behaviour of particular patron groups contributed to the enhancement of library services, literacy programs, as well as reference services (Barrett, 2005; Fidzani,

1998). The wider impact of this study will lie in its ability to provide a broader ecological model of graduate students' information search and research behaviours as well as to provide additional components to TAM and Affordance Theory in regards to graduate students' IL. Thus, the researcher plans to initiate, develop and run the IL workshops, provide training materials and/or on-line tutorials in collaboration with librarians and faculty members. The goal of the workshop based on findings from this study will be to provide further IL skills for all graduate students, especially for EAL students as well as those students who did not complete their minimum course requirements. Finally, this study can serve as a model study that can be further implemented at other universities, especially at those universities that belong to the Ontario Council of University Libraries (OCUL) consortium, which this particular university is part o

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APPENDIX A:

ACRL Information Literacy Competency Standards for Higher Education

Standards, Performance Indicators, and Outcomes

Standard One

The information literate student determines the nature and extent of the information needed.

Performance Indicators:

1. The information literate student defines and articulates the need for information.
   Outcomes Include:
   a. Confers with instructors and participates in class discussions, peer workgroups, and electronic discussions to identify a research topic, or other information need
   b. Develops a thesis statement and formulates questions based on the information need
   c. Explores general information sources to increase familiarity with the topic
   d. Defines or modifies the information need to achieve a manageable focus
   e. Identifies key concepts and terms that describe the information need
   f. Recognizes that existing information can be combined with original thought, experimentation, and/or analysis to produce new information

2. The information literate student identifies a variety of types and formats of potential sources for information.
   Outcomes Include:
   a. Knows how information is formally and informally produced, organized, and disseminated
   b. Recognizes that knowledge can be organized into disciplines that influence the way information is accessed
   c. Identifies the value and differences of potential resources in a variety of formats (e.g., multimedia, database, website, data set, audio/visual, book)
   d. Identifies the purpose and audience of potential resources (e.g., popular vs. scholarly, current vs. historical)
   e. Differentiates between primary and secondary sources, recognizing how their use and importance vary with each discipline
   f. Realizes that information may need to be constructed with raw data from primary sources

3. The information literate student considers the costs and benefits of acquiring the needed information.
   Outcomes Include:
   a. Determines the availability of needed information and makes decisions on broadening the information seeking process beyond local resources (e.g., interlibrary loan; using resources at other locations; obtaining images, videos, text, or sound)

   b. Considers the feasibility of acquiring a new language or skill (e.g., foreign or discipline-based) in order to gather needed information and to understand its context
   c. Defines a realistic overall plan and timeline to acquire the needed information

4. The information literate student reevaluates the nature and extent of the information need.
   Outcomes Include:
   a. Reviews the initial information need to clarify, revise, or refine the question
   b. Describes criteria used to make information decisions and choices

Standard Two

The information literate student accesses needed information effectively and efficiently.

Performance Indicators:

1. The information literate student selects the most appropriate investigative methods or information retrieval systems for accessing the needed information.

   Outcomes Include:
   a. Identifies appropriate investigative methods (e.g., laboratory experiment, simulation, fieldwork)
   b. Investigates benefits and applicability of various investigative methods
   c. Investigates the scope, content, and organization of information retrieval systems
   d. Selects efficient and effective approaches for accessing the information needed from the investigative method or information retrieval system

2. The information literate student constructs and implements effectively-designed search strategies.
   Outcomes Include:
   a. Develops a research plan appropriate to the investigative method
   b. Identifies keywords, synonyms and related terms for the information needed
   c. Selects controlled vocabulary specific to the discipline or information retrieval source
   d. Constructs a search strategy using appropriate commands for the information retrieval system selected (e.g., Boolean operators, truncation, and proximity for search engines; internal organizers such as indexes for books)
   e. Implements the search strategy in various information retrieval systems using different user interfaces and search engines, with different command languages, protocols, and search parameters
   f. Implements the search using investigative protocols appropriate to the discipline

3. The information literate student retrieves information online or in person using a variety of methods.
   Outcomes Include:
   a. Uses various search systems to retrieve information in a variety of formats
   b. Uses various classification schemes and other systems (e.g., call number systems or indexes) to locate information resources within the library or to identify specific sites for physical exploration
   c. Uses specialized online or in person services available at the institution to retrieve information needed (e.g., interlibrary loan/document delivery, professional associations, institutional research offices, community resources, experts and practitioners)

   d. Uses surveys, letters, interviews, and other forms of inquiry to retrieve primary information

4. The information literate student refines the search strategy if necessary.

   Outcomes Include:

   a. Assesses the quantity, quality, and relevance of the search results to determine whether alternative information retrieval systems or investigative methods should be utilized
   b. Identifies gaps in the information retrieved and determines if the search strategy should be revised
   c. Repeats the search using the revised strategy as necessary

5. The information literate student extracts, records, and manages the information and its sources.

   Outcomes Include:

   a. Selects among various technologies the most appropriate one for the task of extracting the needed information (e.g., copy/paste software functions, photocopier, scanner, audio/visual equipment, or exploratory instruments)
   b. Creates a system for organizing the information
   c. Differentiates between the types of sources cited and understands the elements and correct syntax of a citation for a wide range of resources
   d. Records all pertinent citation information for future reference
   e. Uses various technologies to manage the information selected and organized

Standard Three

The information literate student evaluates information and its sources critically and incorporates selected information into his or her knowledge base and value system.

Performance Indicators:

1. The information literate student summarizes the main ideas to be extracted from the information gathered.

   Outcomes Include:

   a. Reads the text and selects main ideas
   b. Restates textual concepts in his/her own words and selects data accurately
   c. Identifies verbatim material that can be then appropriately quoted

2. The information literate student articulates and applies initial criteria for evaluating both the information and its sources.

   Outcomes Include:

   a. Examines and compares information from various sources in order to evaluate reliability, validity, accuracy, authority, timeliness, and point of view or bias
   b. Analyzes the structure and logic of supporting arguments or methods
   c. Recognizes prejudice, deception, or manipulation
   d. Recognizes the cultural, physical, or other context within which the information was created and understands the impact of context on interpreting the information

3. The information literate student synthesizes main ideas to construct new concepts.

   Outcomes Include:

   a. Recognizes interrelationships among concepts and combines them into potentially useful primary statements with supporting evidence
   b. Extends initial synthesis, when possible, at a higher level of abstraction to construct new hypotheses that may require additional information
   c. Utilizes computer and other technologies (e.g. spreadsheets, databases, multimedia, and audio or visual equipment) for studying the interaction of ideas and other phenomena

4. The information literate student compares new knowledge with prior knowledge to determine the value added, contradictions, or other unique characteristics of the information.

   Outcomes Include:

   a. Determines whether information satisfies the research or other information need
   b. Uses consciously selected criteria to determine whether the information contradicts or verifies information used from other sources
   c. Draws conclusions based upon information gathered
   d. Tests theories with discipline-appropriate techniques (e.g., simulators, experiments)
   e. Determines probable accuracy by questioning the source of the data, the limitations of the information gathering tools or strategies, and the reasonableness of the conclusions
   f. Integrates new information with previous information or knowledge
   g. Selects information that provides evidence for the topic

5. The information literate student determines whether the new knowledge has an impact on the individual's value system and takes steps to reconcile differences.

   Outcomes Include:

   a. Investigates differing viewpoints encountered in the literature
   b. Determines whether to incorporate or reject viewpoints encountered

6. The information literate student validates understanding and interpretation of the information through discourse with other individuals, subject-area experts, and/or practitioners.

   Outcomes Include:

   a. Participates in classroom and other discussions
   b. Participates in class-sponsored electronic communication forums designed to encourage discourse on the topic (e.g., email, bulletin boards, chat rooms)
   c. Seeks expert opinion through a variety of mechanisms (e.g., interviews, email, listservs)

7. The information literate student determines whether the initial query should be revised.

   Outcomes Include:

   a. Determines if original information need has been satisfied or if additional information is needed
   b. Reviews search strategy and incorporates additional concepts as necessary
   c. Reviews information retrieval sources used and expands to include others as needed

Standard Four

The information literate student, individually or as a member of a group, uses information effectively to accomplish a specific purpose.

Performance Indicators:

1. The information literate student applies new and prior information to the planning and creation of a particular product or performance.
   Outcomes Include:
   a. Organizes the content in a manner that supports the purposes and format of the product or performance (e.g. outlines, drafts, storyboards)
   b. Articulates knowledge and skills transferred from prior experiences to planning and creating the product or performance
   c. Integrates the new and prior information, including quotations and paraphrasings, in a manner that supports the purposes of the product or performance
   d. Manipulates digital text, images, and data, as needed, transferring them from their original locations and formats to a new context

2. The information literate student revises the development process for the product or performance.
   Outcomes Include:
   a. Maintains a journal or log of activities related to the information seeking, evaluating, and communicating process
   b. Reflects on past successes, failures, and alternative strategies

3. The information literate student communicates the product or performance effectively to others.
   Outcomes Include:
   a. Chooses a communication medium and format that best supports the purposes of the product or performance and the intended audience
   b. Uses a range of information technology applications in creating the product or performance
   c. Incorporates principles of design and communication
   d. Communicates clearly and with a style that supports the purposes of the intended audience

Standard Five

The information literate student understands many of the economic, legal, and social issues surrounding the use of information and accesses and uses information ethically and legally.

Performance Indicators:

1. The information literate student understands many of the ethical, legal and socio-economic issues surrounding information and information technology.
   Outcomes Include:
   a. Identifies and discusses issues related to privacy and security in both the print and electronic environments
   b. Identifies and discusses issues related to free vs. fee-based access to information
   c. Identifies and discusses issues related to censorship and freedom of speech
   d. Demonstrates an understanding of intellectual property, copyright, and fair use of copyrighted material

2. The information literate student follows laws, regulations, institutional policies, and etiquette related to the access and use of information resources.
   Outcomes Include:
   a. Participates in electronic discussions following accepted practices (e.g. "Netiquette")
   b. Uses approved passwords and other forms of ID for access to information resources
   c. Complies with institutional policies on access to information resources
   d. Preserves the integrity of information resources, equipment, systems and facilities
   e. Legally obtains, stores, and disseminates text, data, images, or sounds
   f. Demonstrates an understanding of what constitutes plagiarism and does not represent work attributable to others as his/her own
   g. Demonstrates an understanding of institutional policies related to human subjects research
3. The information literate student acknowledges the use of information sources in communicating the product or performance.
   Outcomes Include:
   a. Selects an appropriate documentation style and uses it consistently to cite sources
   b. Posts permission granted notices, as needed, for copyrighted material

APPENDIX B:
Beile Test of Information Literacy (B-TILED) /ACRL
Performance Indicators
(Beile O'Neil, 2005, pp.196-204)

The library is gathering information to evaluate the effectiveness of its instruction program. This questionnaire consists of demographic questions and a library and information skills quiz. Fill in the most correct choice on your Scantron form.

1. Overall, how would you rate your ability to search library databases to find information?
a. excellent
b. good
c. average
d. poor

2. Overall, how would you rate your ability to search the Internet to find information?
a. excellent
b. good
c. average
d. poor

Please indicate whether you have attended any of the following since you began your studies at UCF.
3. Have you attended a tour or physical orientation of the library?
a. yes
b. no
c. don't know

4. Have you attended a library instruction session held in your classroom?
a. yes
b. no
c. don't know

5. Have you attended a library instruction session held in the library?
a. yes
b. no
c. don't know

6. Have you had one on one intensive instruction with a librarian?
a. yes
b. no
c. don't know

ACRL Performance Indicator 2.4.1.2

7. Which of the following characteristics best indicates scholarly research?

a. available in an academic library
b. indexed by ERIC
c. reviewed by experts for publication
d. written by university faculty

ACRL Performance Indicator 1.1.3.2

***8**. Your professor has assigned a paper on the whole language movement. You are not familiar with the topic, so you decide to read a brief history and summary about it. Which of the following sources would be best?

a. a book on the topic, such as *Perspectives on whole language learning: A case study*
b. a general encyclopedia, such as *Encyclopedia Britannica*
c. an article on the topic, such as "Whole language in the classroom: A student teacher's perspective."
d. an education encyclopedia, such as *Encyclopedia of Education*

ACRL Performance Indicator 2.1.3

9. Research or periodical databases are designed to include items based on which of the following criteria?

a. found on the Internet
b. not found on the Internet
c. owned by your library
d. relevant subject matter

ACRL Performance Indicator 2.3.2.3

***10**. ERIC is the most appropriate database to search to locate:

a. education article citations and documents
b. education publications from 1877 to current
c. full-text education articles
d. US Department of Education statistics

ACRL Performance Indicator 2.2.5.2

11. Most research and periodical databases have basic and advanced searching interfaces. Which of the following can you do ONLY in advanced searching?

a. add Boolean or search connectors between terms
b. enter multiple search terms
c. search by keyword
d. search multiple terms by field

ACRL Performance Indicator 1.2.2.4

12. Research studies in education are generally first communicated through:

a. books published by education associations
b. education encyclopedia entries
c. newsletters of education associations
d. professional conferences and journal articles

ACRL Performance Indicator 2.1.3.10

13. You have been assigned to write a short class paper on effective instruction techniques for teaching English as a Second Language (ESL) students. Your professor indicated three recent scholarly sources would be sufficient. Which strategy is best to locate items?

a. search a general academic and an education database for journal articles
b. search an education database for journal articles
c. search the library catalog for books
d. search the library catalog for encyclopedias

ACRL Performance Indicator 1.2.2.3

14. Select the set of search terms that best represent the main concepts in the following:

What are the health risks associated with the use of drug therapy for hyperactive students?
a. drug therapy, health risks, hyperactivity
b. drug therapy, health risks, students
c. drug therapy, hyperactivity, students
d. drugs, hyperactivity, therapy

ACRL Performance Indicator 2.2.2.3

15. Select the set that best represents synonyms and related terms for the concept "college students."

a. colleges, universities, community colleges…
b. Gen X, students, undergraduates…
c. graduate students, freshmen, sophomores...
d. university, adult learners, educational attendees...

ACRL Performance Indicator 2.2.4.2

16. While researching a paper on character education, you find that it is also sometimes called *values education* or *moral education*. You decide to look for information on the subject in a research database, and to save time you write a search statement that includes all three terms. Which of the following is the best example to use when you have fairly synonymous terms and it does not matter which of the terms is found in the record?

a. character and values and moral
b. character or values or moral
c. character, values and moral
d. character, values or moral

ACRL Performance Indicator 2.2.4.7

17. You are using a research database that uses an asterisk (*) as its truncation symbol. When you type in *read** you would retrieve records that contained which of the following words?
a. examine, peruse, reader, reading
b. peruse, read, reader, reading
c. read, reader, reads, readmit
d. read, reader, reading, reapply

ACRL Performance Indicator 3.7.2.1

***18**. You have a class assignment to investigate how group work impacts student learning. A keyword search in ERIC on "group work" has returned over 600 items. To narrow your search, which of the following steps would you next perform?

a. add "impacts" as a keyword
b. add "student learning" as a keyword
c. limit search results by date
d. limit search results by publication type

ACRL Performance Indicator 2.3.1.3

19. The following citation is for:

Massaro, D. (1991). Broadening the domain of the fuzzy logical model of perception. In H. L. Pick, Jr., P. van den Broek, & D. C. Knill (Eds.), *Cognition: Conceptual and methodological issues* (pp. 51-84). Washington, DC: American Psychological Association.
a. a book
b. a chapter in a book
c. a journal article
d. an ERIC document

ACRL Performance Indicator 2.2.4.1

20. Your professor suggested you read a particular article and gave you the following citation:

Shayer, M. (2003). Not just Piaget, not just Vygotsky. *Learning and Instruction, 13*(5), 465-485.
Which of the following would you type into the library's catalog to locate the actual article?
a. author search: Shayer
b. journal title search: *Learning and Instruction*
c. journal title search: Not just Piaget, not just Vygotsky
d. subject search: Piaget and Vygotsky

ACRL Performance Indicator 2.3.2.4

21. The following item was retrieved from an ERIC database search. What kind of source is it?

Title: Pre-service Elementary Teachers' Self-Efficacy Beliefs
Author(s): Cakiroglu, Jale; Boone, William J.
Publication Year: 2001
Abstract: The purpose of this study was to examine pre-service elementary teachers' self-efficacy beliefs in teaching science.
Notes: Presented at the Annual Meeting of the American Educational Research Association (Seattle, WA, April 10-14, 2001).
Number of Pages: 24
ERIC Number: ED453084
a. a book
b. a book chapter
c. a conference paper
d. a journal article

ACRL Performance Indicator 5.3.1.2

22. Using this result from an Internet search engine, who is the "owner" of this Web site?

State policies on planning, funding, and standards. Does the state have technology requirements for students?
http://www.edweek.org/reports/tc98/states/fl.htm
a. business or commercial entity
b. college or university
c. other organization
d. state government agency

ACRL Performance Indicator 3.2.1.4

***23**. While developing a lesson plan on the U.S. legislative system, you find the following story on the Internet:

Congress Launches National Congress-Awareness Week
WASHINGTON, DC—Hoping to counter ignorance of the national legislative body among U.S. citizens, congressional leaders named the first week in August National Congress Awareness Week. "This special week is designed to call attention to America's very important federal lawmaking body," Speaker of the House Dennis Hastert said. The festivities will kick off with a 10-mile Walk for Congress Awareness.
The item is from a newspaper Web site, which states it is "America's Finest News Source." Given this, the following action is in order:
a. you can use the story as it's obviously from a reputable news source
b. you decide to investigate the reputation of the publisher by looking at their Web site
c. you decide to investigate the reputation of the publisher by looking at other Web sites
d. you should not use the story because Web information is not always trustworthy

ACRL Performance Indicator 5.2.6

24. Based on the following paragraph, which sentence should be cited?

(1)Technology use in the schools is often characterized as a potentially dehumanizing force.
(2)Perhaps the fear that the virtual world may lead to passivity and isolation, at the expense of literal social interaction, is valid.
(3)Certainly, educators must ask *which* uses of technology result in increased learning and a better quality of life.
(4)To address these issues, Hunter has proposed that students work in groups with the computer peripheral to the group and the teacher acting as facilitator.
a. 1
b. 2
c. 3
d. 4

ACRL Performance Indicator 5.1.4

25. When is it ethical to use the ideas of another person in a research paper?

a. it is never ethical to use someone else's ideas
b. only if you do not use their exact words
c. only when you give them credit
d. only when you receive their permission

ACRL Performance Indicator 5.1.4

***26.** You are planning an open house for your students' parents. Browsing the Internet, you find the report *Child Safety on the Internet*, which is a US Department of Education publication. If you distribute 30 copies of the report to parents at the open house, which of the following copyright choices is the proper action?

a. permission is not needed as the report is from a government agency.
b. permission is not needed as the report was found on the Internet.
c. permission is not needed as you are only distributing 30 copies.
d. permission to distribute 30 copies of the report must be acquired.

ACRL Performance Indicator 5.2.5

27. You have an assignment that requires you to use course management software to practice setting up a class grade book. Your school has purchased the software and loaded it in the computer lab, but you have a difficult time getting to the lab due to work conflicts. A friend loans you the software and you load it on your computer. Is this legal?

a. no, because this action constitutes a violation of copyright.
b. yes, because it is already freely available in the lab.
c. yes, because it is education software and therefore able to be shared.
d. yes, because your friend owns it and can share as he wants.

ACRL Performance Indicator 5.1.4

28. Browsing a weekly news magazine, you come across an article that discusses the future of space exploration. As you are teaching this topic you decide to make copies of the article and share it with your class. Which of the following concepts makes it legally permissible to reproduce portions of works for educational purposes without permission?

a. copyright
b. fair use
c. freedom of information
d. intellectual freedom

29. Which of the following most closely describes the level you want to teach?
a. early childhood
b. elementary
c. middle school
d. high school

30. What is your student classification?
a. freshman
b. sophomore
c. junior
d. senior

31. How long have you been continuously enrolled at UCF?
a. less than 1 year
b. 1 to 2 years
c. 3 to 4 years
d. more than 4 years

32. Have you ever attended another university or college?
a. yes (go to question 33)
b. no (skip to question 34)

33. How long ago did you attend another university or college?
a. 0-1 year
b. 2-3 years
c. 4-5 years
d. more than 5 years

34. What is your gender?
a. male
b. female

35. Please indicate those racial or ethnic groups that apply to you.
(Select all that apply.)
a. White or European American
b. Hispanic or Latino
c. Black or African American
d. Asian or Asian American
e. Other (write in on Scantron)

Thank you!
Test Key
7. C
8. D
9. D
10. A
11. D
12. D
13. B
14. A
15. C
16. B
17. C
18. B
19. B
20. B
21. C
22. C
23. C
24. D
25. C
26. A
27. A
28. B

***Certain questions (such as items #8, #10, and #18) were changed in order to emphasise focus on graduate students, while other questions (items #23 and #26) were be changed to reflect Canadian content**

APPENDIX C: PART 2 SURVEY MODIFICATIONS[29]

Part 2 contains an example of first modified survey for the graduate students in education.

Part 2: Please circle the answer that best applies to you

1. Overall, on a scale 1-5, where **1 means low ability** and **5 means high ability**, how would you rate your ability to search library databases to find information? (Circle one)

1…….2……..3……4……5

2. Overall, on a scale 1-5, where **1 means low ability** and **5 means high ability**, how would you rate your ability to search the Internet to find information? (Circle one)

1…….2……..3……4……5

Please indicate whether you have experienced any of the following since you began your studies at the University of Windsor[30].

3. Have you attended an organized tour of the academic library?
   a. Yes
   b. No

4. Have you attended a library instruction session held in your classroom?
   a. Yes
   b. No
   c. None was organized.

5. Have you attended a library instruction session held in the academic library?
   a. Yes
   b. No

6. Have you had one-on-one intensive instruction with a librarian?
   a. Yes
   b. No

---

7. Which of the following characteristics best indicates scholarly research? (Circle one)
   a. Available in an academic library
   b. Indexed by ERIC
   c. Reviewed by experts for publication
   d. Written by university faculty

[29] All other surveys contain modified wording that was build on this survey.

[30] PhD - Faculty of Education students had the following wording added: **or in the Joint PhD in Education Program.**

8. In a graduate course you are examining the topic of 'whole language learning'. You are not familiar with this topic and you want to find a brief history and summary about it. Which of the following sources would be your first choice to consult?

a. A book on the topic, such as *Perspectives on whole language learning: A case study.*
b. A journal article
c. General web site (via Google)
d. An education encyclopedia, such as *Encyclopedia of Education.*

9. Research or periodical databases are designed to include items based on which of the following criteria?

a. Found on the Internet
b. Not found on the Internet
c. Owned by your library
d. Relevant subject matter

10. ERIC is the most appropriate database to search to locate:

a. Education article citations and documents
b. Education publications from 1877 to current
c. Full-text education articles
d. Ontario Ministry of Education Statistics

11. Most research and periodical databases have basic and advanced searching interfaces. Which of the following can be done ONLY in advanced searching? (Circle one)

a. Add Boolean or search connectors between terms
b. Enter multiple search terms
c. Search by keyword
d. Search multiple terms by field

12. Research studies in education are generally first communicated through (Circle one):

a. Books published by education associations
b. Education encyclopedia entries
c. Newsletters of education associations
d. Professional conferences and journal articles

13. You have been assigned to write a short class paper on effective instruction techniques for teaching English as Second Language (ESL) students. Your professor indicated three recent scholarly sources would be sufficient. Which strategy is best to locate items? (Circle one)

a. Search a general database for journal articles
b. Search an education database for journal articles
c. Search the library catalog for books
d. Search the library catalog for encyclopedias

14. Select the set of search terms that best represent the main concepts in the following: "What are the health risks associated with the use of drug therapy for hyperactive students?"

a. Drug therapy, health risks, hyperactivity
b. Drug therapy, health risks, students
c. Drug therapy, hyperactivity, students
d. Drugs, hyperactivity, therapy

15. Select the option that best represents synonyms and related terms for the concept "university students."

a. Universities, adult learners, community colleges…
b. Gen X, students, undergraduates…
c. Graduate students, undergraduate students, post-secondary students...
d. University, adult learners, educational attendees...

16. While researching a paper on character education, you find that it is also sometimes called *values education* or *moral education*. You decide to look for information on the subject in a research database, and to save time you write a search statement that includes all three terms. Which of the following is the best example to use when you have fairly synonymous terms and it does not matter which of the terms is found in the record?

a. Character and values and moral
b. Character or values or moral
c. Character, values and moral
d. Character, values or moral

17. You are using a research database that uses an asterisk (*) as its truncation symbol. When you type in *read** you would retrieve records that contained which of the following words?

a. Examine, peruse, reader, reading
b. Peruse, read, reader, reading
c. Read, reader, reads, readmit
d. Read, reader, reading, reapply

18. You have a class assignment to investigate how group work impacts student learning. A keyword search in ERIC on "group work" has returned over 600 items. To narrow your search, which of the following steps would you perform next?

a. Add 'impacts' as a keyword and combine with 'group work'
b. Add 'student learning' as a keyword and combine with 'group work'
c. Limit search results by date
d. Limit search results by publication type

19. The following citation is for:
Massaro, D. (1991). Broadening the domain of the fuzzy logical model of perception. In H. L. Pick, Jr., P. van den Broek, & D. C. Knill (Eds.), *Cognition: Conceptual and methodological issues* (pp. 51-84). Washington, DC: American Psychological Association.

a. A book
b. A chapter in a book
c. A journal article
d. An ERIC document

20. Your professor suggested you read a particular article and gave you the following citation: Shayer, M. (2003). Not just Piaget, not just Vygotsky. *Learning and Instruction 13*(5), 465-485. Which of the following would you type into the library's catalog to locate the actual article?

a. Author search: Shayer
b. Journal title search: *Learning and Instruction*
c. Journal title search: Not just Piaget, not just Vygotsky
d. Subject search: Piaget and Vygotsky

21. The following item was retrieved from an ERIC database search. What kind of source is it?

Title: Pre-service Elementary Teachers' Self-Efficacy Beliefs
Author(s): Cakiroglu, Jale; Boone, William J.
Publication Year: 2001
Abstract: The purpose of this study was to examine pre-service elementary teachers' self-efficacy beliefs in teaching science.
Notes: Presented at the Annual Meeting of the American Educational Research Association (Seattle, WA, April 10-14, 2001).
Number of Pages: 24
ERIC Number: ED453084

a. A book
b. A book chapter
c. A conference paper
d. A journal article

22. Using this result from an Internet search engine, who is the "owner" of this Web site?
State policies on planning, funding, and standards. Does the state have technology requirements for students? http://www.edweek.org/reports/tc98/states/fl.htm

a. Business or commercial entity
b. College or university
c. Other organization
d. State government agency

23. While developing a lesson plan on the Canadian legislative system, you find the following story on the Internet:

BMJ 2001; 322:1200 (19 May)

Canada's parliament calls for tighter water standards

Alarmed by growing fears of widespread pollution of drinking water, Canada's parliament has passed a resolution calling for a national law setting out enforceable national standards for water quality. Forty six people have recently become infected with cryptosporidium in the small farming town of North Battleford, Saskatchewan, and three deaths were at first thought to have been caused by the parasite. The province's chief medical health officer later said that cryptosporidium was not the cause of two of the deaths but may have played a minor part in the third.

(Source: The BMJ is published by BMJ Publishing Group Ltd, a wholly owned subsidiary of the British Medical Association)

Given this, the following action is in order:

a. You can use the story as it is obviously from a reputable news source
b. You decide to investigate the reputation of the publisher by looking at their Web site
c. You decide to investigate the reputation of the publisher by looking at other Web sites
d. You should not use the story because Web information is not always trustworthy

24. Which of the next four sentences may be used as a citation?
(1)Technology use in the schools is often characterized as a potentially dehumanizing force.
(2)Perhaps the fear that the virtual world may lead to passivity and isolation, at the expense of literal social interaction, is valid.
(3)Certainly, educators must ask *which* uses of technology result in increased learning and a better quality of life.
(4)To address these issues, Hunter (2005) has proposed that "students should work in groups with the computer peripheral and the teacher acting as a facilitator" (p.25).

a. 1
b. 2
c. 3
d. 4

25. When is it ethical to use the ideas of another person in a research paper?

a. It is never ethical to use someone else's ideas
b. Only if you do not use their exact words
c. Only when you give them credit
d. Only when you receive their permission

26. You are planning an 'open house' for your students' parents. Browsing the Internet, you find the report "Child Abuse: Recognize it, Report it, Prevent it" by the Ontario's provincial government. If you distribute 30 copies of the report to parents at the open house, which of the following copyright choices is the proper action?

a. Permission is not needed as the report is from a government agency.
b. Permission is not needed as the report was found on the Internet.
c. Permission is not needed as you are only distributing 30 copies.
d. Permission to distribute 30 copies of the report must be acquired.

27. You have an assignment that requires you to use course management software to practice setting up a class grade book. Your school has purchased the software and loaded it in the computer lab, but you have a difficult time getting to the lab due to work conflicts. A friend loans you the software and you load it on your computer. Is this legal?

a. No, because this action constitutes a violation of copyright.
b. Yes, because it is already freely available in the lab.
c. Yes, because it is education software and therefore able to be shared.
d. Yes, because your friend owns it and can share as he wants.

28. Browsing a weekly news magazine, you come across an article that discusses the future of space exploration. As you are teaching this topic you decide to make copies of the article and share it with your class. Which of the following concepts makes it legally permissible to reproduce portions of works for educational purposes without permission?

a. Copyright
b. Fair use
c. Freedom of information
d. Intellectual freedom

APPENDIX D:

MODIFED SURVEY QUESTIONS

Question #	*Department:*	*Modification:*
7	Communication and Social Justice	b. Indexed by Communication Abstract
7	English	b. Indexed by MLA
7	History	b. Indexed by Historical Abstracts
7	Philosophy	b. Indexed by Philosopher's Index
7	Political Science	b. Indexed by Social Sciences @ Scholars Portal
7	Psychology	b. Indexed by PsycINFO
7	Social Work	b. Indexed by Social Service Abstracts
7	Sociology	b. Indexed by Sociological Abstracts
7	Visual Arts	b. Indexed by Arts & Humanities @ Scholars Portal (Fulltext)
8	Communication and Social Justice	8. In a graduate course you are examining the topic of 'whole language learning'. You are not familiar with this topic and you want to find a brief history and summary about it from communication studies perspective. Which of the following sources would be your first choice to consult? d. A communication encyclopedia, such as *Encyclopedia of Communication*
8	English	8. In a graduate course you are examining the topic of 'whole language learning'. You are not familiar with this topic and you want to find a brief history and summary about it. Which of the following sources would be your first choice to consult? c. A language encyclopedia, such as *Encyclopedia of English Language*
8	History	8. In a graduate course you are examining the topic of '19th Century Romanticism'. You are not familiar with this topic and you want to find a summary about it from a historical perspective. Which of the following sources would be your first choice to consult? a. A book on the topic, such as *Romanticism and the Rise of the Mass Public* d. A history encyclopedia, such as *Encyclopedia of Romanticism*

Question #	*Department:*	*Modification:*
8	Philosophy	8. In a graduate course you are examining the topic of 'philosophy of rationalism". You are not familiar with this topic and you want to find a brief history and summary about it. Which of the following sources would be your first choice to consult? a. A book on the topic, such as *Rationalism in Greek Philosophy* *c.* A language encyclopedia, such as *Encyclopedia of Philosophy*
8	Political Science	8. In a graduate course you are examining the topic of 'Canadian-American relations'. You are not familiar with this topic and you want to find a brief history and summary about it from a political science perspective. Which of the following sources would be your first choice to consult? a. A book on the topic, such as *Canadian-American Companies* d. A political science encyclopedia, such as *Encyclopedia of International Relations*
8	Psychology	8. In a graduate course you are examining the topic of 'whole language learning'. You are not familiar with this topic and you want to find a brief history and summary about it from a psychological perspective. Which of the following sources would be your first choice to consult? d. A psychology encyclopedia, such as *Encyclopedia of Psychology*
8	Social Work	8. In a graduate course you are examining the topic of 'child development'. You are not familiar with this topic and you want to find a brief history and summary about it from a social work perspective. Which of the following sources would be your first choice to consult? a. A book on the topic, such as *Child development: A case study.* d. A social work encyclopedia, such as *Encyclopedia of Child Development*
8	Sociology	8. In a graduate course you are examining the topic of 'urban schools'. You are not familiar with this topic and you want to find a brief history and summary about it from the sociology point of view. Which of the following sources would be your first choice to consult? a. A book on the topic, such as *Perspectives on urban schooling: A case study.* d. A sociology encyclopedia, such as *Encyclopedia of Sociology Online.*

Question #	*Department:*	*Modification:*
8	Visual Arts	8. In a graduate course you are examining the topic of 'arts education'. You are not familiar with this topic and you want to find a brief history and summary about it. Which of the following sources would be your first choice to consult? a. A book on the topic, such as *Perspectives on arts education: A case study*. d. A language encyclopedia, such as *Encyclopedia of Arts Education*
8	All departments	b. A journal article c. General web site (via Google)
10	Communication and Social Justice	10. Communication and Mass Media Complete database is the most appropriate database to use to locate: a. Communication article citations and documents b. Communication publications from 1877 to current c. Full-text communication articles
10	English	10. MLA is the most appropriate database to search to locate: (Circle one) a. English Language & Literature article citations and documents b. English Language & Literature publications from 1877 to current c. Full-text English Language & Literature articles
10	History	10. America: History and Life database is the most appropriate database to use to locate: a. History article citations and documents b. History publications from 1877 to current c. Full-text history articles
10	Philosophy	10. Philosopher's Index database is the most appropriate database to search to locate: (Circle one) a. Philosophy article citations and documents b. Philosophy publications from 1877 to current c. Full-text philosophy articles
10	Political Science	10. Public Affairs Information Service (PAIS) International database is the most appropriate database to use to locate: a. Political science article citations and documents b. Political science publications from 1877 to current c. Full-text political science articles

Question #	*Department:*	*Modification:*
10	Psychology	10. PsycINFO is the most appropriate database to use to locate: a. Psychology article citations and documents b. Psychology publications from 1877 to current c. Full-text psychology articles
10	Social Work	10. Social Service Abstracts is the most appropriate database to use to locate: a. Social work article citations, publications and documents b. Social work publications from 1877 to current c. Full-text social work articles
10	Sociology	10. Sociological Abstracts is the most appropriate database to search to locate: a. Sociology article citations and documents b. Sociology publications from 1877 to current c. Full-text sociology articles
10	Visual Arts	10. Arts & Humanities @ Scholars Portal database is the most appropriate database to search to locate: (Circle one) a. Arts and Humanities article citations and documents b. Arts and Humanities publications from 1877 to current c. Full-text Arts and Humanities articles
10	All departments	d. Ontario Ministry of Education Statistics
12	Communication and Social Justice	12. Research studies in communication studies are generally first communicated through (Circle one): a. Books published by communication studies associations b. Communication encyclopedia entries c. Newsletters of communication studies associations d. Professional conferences and journal articles
12	English	12. Research studies on English Language & Literature are generally first communicated through (Circle one): a. Books published by English Language & Literature language associations b. English Language & Literature encyclopedia entries c. Newsletters of English Language & Literature associations

Question #	*Department:*	*Modification:*
12	History	12. Research studies in history are generally first communicated through (Circle one): a. Books published by history associations b. Communication encyclopedia entries c. Newsletters of history associations d. Professional conferences and journal articles
12	Philosophy	12. Research studies on `philosophy` are generally first communicated through (Circle one): a. Books published by `philosophy` associations b. `Philosophy` encyclopedia entries c. Newsletters of `philosophy` associations
12	Political Science	12. Research studies in political science are generally first communicated through (Circle one): a. Books published by political science associations b. Communication encyclopedia entries c. Newsletters of political science associations
12	Psychology	12. Research studies in psychology are generally first communicated through (Circle one): a. Books published by psychological associations b. Psychology encyclopedia entries c. Newsletters of psychological associations
12	Social Work	12. Research studies in social work are generally first communicated through (Circle one): a. Books published by social work associations b. Social work encyclopedia entries c. Newsletters of social work associations
12	Sociology	12. Research studies in sociology are generally first communicated through (Circle one): a. Books published by sociology associations b. Sociology encyclopedia entries c. Newsletters of sociology associations
12	Visual Arts	12. Research studies on Visual Arts are generally first communicated through (Circle one): a. Books published by Visual Arts associations b. Visual Arts encyclopedia entries c. Newsletters of Visual Arts associations

Question #	*Department:*	*Modification:*
13	Communication and Social Justice	13. You have been assigned to write a short class paper on the effect of Hollywood's media on Canadian telecommunication. Your professor indicated three recent scholarly sources would be sufficient. Which strategy is the best to locate items? (Circle one) b. Search a communication database for journal articles
13	English	13. You have been assigned to write a short class paper on effective instruction techniques for teaching Hamlet to English as a Second Language (ESL) students. Your professor indicated three recent scholarly sources would be sufficient. Which strategy is best to locate items? (Circle one) b. Search an English Language & Literature database for journal articles
13	History	13. You have been assigned to write a short class paper on women's roles in Canada in the early twentieth century. Your professor indicated three recent scholarly sources which would be sufficient. Which strategy is best to locate items? (Circle one) b. Search a history database for journal articles
13	Philosophy	13. You have been assigned to write a short class paper on effective instruction techniques for explaining pragmatism to English as a Second Language (ESL) students. Your professor indicated three recent scholarly sources would be sufficient. Which strategy is best to locate items? (Circle one) b. Search a philosophy database for journal articles
13	Political Science	13. You have been assigned to write a short class paper on the origins of Canada's political parties. Your professor indicated three recent scholarly sources would be sufficient. Which strategy is best to locate items? (Circle one) b. Search a political science database for journal articles
13	Psychology	13. You have been assigned to write a short class paper on effective instruction techniques for teaching psychology to English as a Second Language (ESL) students. Your professor indicated three recent scholarly sources would be sufficient. Which strategy is best to locate items? (Circle one) b. Search a psychology database for journal articles

Question #	*Department:*	*Modification:*
13	Social Work	13. You have been assigned to write a short class paper on effective instruction techniques for explaining child welfare to English as Second Language (ESL) students. Your professor indicated three recent scholarly sources would be sufficient. Which strategy is best to locate items? (Circle one) b. Search social work and education databases for journal articles
13	Sociology	13. You have been assigned to write a short class paper on how English as a Second Language (ESL) learners enculturate to their new schools. Your professor indicated three recent scholarly sources would be sufficient. Which strategy is best to locate items? (Circle one) b. Search a sociology database for journal articles
13	Visual Arts	13. You have been assigned to write a short class paper on effective instruction techniques for teaching drawing to English as a Second Language (ESL) students. Your professor indicated three recent scholarly sources would be sufficient. Which strategy is best to locate items? (Circle one) b. Search an Arts and Humanities database for journal articles
15	All Departments	15. Select the option that best represents synonyms and related terms for the concept "university students." a. Universities, adult learners, community colleges… b. Gen X, students, undergraduates… c. Graduate students, undergraduate students, post-secondary students... d. University, adult learners, educational attendees...
18	Communication and Social Justice	18. You have a class assignment to investigate how group work impacts student learning. A keyword search in Social Sciences @ Scholars Portal database on "group work" has returned over 13 000 items. To narrow your search, which of the following steps would you perform next?
18	English	18. You have a class assignment to investigate how group work impacts student learning. A keyword search in Arts & Humanities @ Scholars Portal database on "group work" has returned over 600 items. To narrow your search, which of the following steps would you perform next?
18	History	18. You have a class assignment to investigate how political parties impacts school curriculum. A keyword search in Canadian Business and Current Affairs (CBCA) database on "political parties" has returned over 100 items. To narrow your search, which of the following steps would you perform next?

Question #	*Department:*	*Modification:*
18	Philosophy	18. You have a class assignment to investigate how political parties impacts school curriculum. A keyword search in Philosopher's Index database on “political parties” has returned over 100 items. To narrow your search, which of the following steps would you perform next?
18	Political Science	18. You have a class assignment to investigate how political parties impacts school curriculum. A keyword search in Social Sciences @ Scholars Portal database on “political parties” has returned over 100 items. To narrow your search, which of the following steps would you perform next?
18	Psychology	18. You have a class assignment to investigate how group work impacts student learning. A keyword search in PsycINFO on “group work” has returned over 600 items. To narrow your search, which of the following steps would you perform next?
18	Social Work	18. You have a class assignment to investigate how group work impacts student learning. A keyword search in Social Service Abstracts on “group work” has returned over 600 items. To narrow your search, which of the following steps would you perform next?
18	Sociology	18. You have a class assignment to investigate how group work impacts student learning. A keyword search in Social Sciences @ Scholars Portal on “group work” has returned over 25,000 items. To narrow your search, which of the following steps would you perform next?
18	Visual Arts	18. You have a class assignment to investigate how group work impacts student learning in arts classes. A keyword search in Arts & Humanities @ Scholars Portal database on “group work” has returned over 25 000 items. To narrow your search, which of the following steps would you perform next?
19	Communication and Social Justice	d. A Communication and Mass Media Complete database document
19	English Philosophy Visual Arts	19. The following citation is for: Cogswell, Fred. "The Leaf." The Poets of Canada. Ed. John Robert Columbo. Edmonton: Hurtig, 1978. 148-149. b. Work in an anthology or compilation d. A MLA document

Question #	*Department:*	*Modification:*
19	History	19. The following citation is for: Nathan, Peter E. and Raymond S. Niaura. 1987. "Prevention of Alcohol Problems." Pp. 333-354 in Treatment and Prevention of Alcohol Problems: A Resource Manual, edited by W.M. Cox. Orlando, FL: Academic Press, Inc. d. A JSTOR database document
19	Political Science	d. A JSTOR database document
19	Psychology	d. A PsycINFO document
19	Social Work	d. A Social Service Abstracts document
19	Sociology	19. The following citation is for: Massaro, Dominic. 1991. “Broadening the Domain of the Fuzzy Logical Model of Perception”. Pp. 51-84 in *Cognition: Conceptual and methodological issues*, edited by H. L. Pick, Jr., P. van den Broek, & D. C. Knill . Washington, DC: American Psychological Association.
20	English Philosophy	20. Your professor suggested you read a particular article and gave you the following citation: Shayer, Michael. “Not just Piaget, not just Vygotsky.” Learning and Instruction 13.5 (2003): 465-485. Which of the following would you type into the library’s catalog to locate the actual article?
20	Sociology History	20. Your professor suggested you read a particular article and gave you the following citation: Shayer, Michael. 2003. “Not just Piaget, not just Vygotsky.” *Learning and Instruction* 13.5: 465-485. Which of the following would you type into the library’s catalog to locate the actual article?
20	Visual Arts	20. Your professor suggested you read a particular article and gave you the following citation: Wallace, M. “Defacing History.” Art in America 78.12 (1990): 120-129. Which of the following would you type into the library’s catalog to locate the actual article? a. Author search: Wallace b. Journal title search: Art in America c. Journal title search: Defacing History d. Subject search: History and Art.

Question #	*Department:*	*Modification:*
21	Communication and Social Justice	21. The following item was retrieved from a Social Sciences @ Scholars Portal database search. What kind of source is it? Title: Learning Messages Notification System to Mobile Devices Author Jimenez, M. Lourdes Publication Year: 2005 Abstract : The work presents a new method to send educational messages in e-learning systems. Notes: Presented at International Conference on Technology in Teaching and Learning in Higher Education (China, 2005)
21	English	21. The following item was retrieved from an Arts & Humanities @ Scholars Portal database search. What kind of source is it? Title: A Pragmatic Approach to the Teaching of Discourse/English for Special Purposes Author: Nyyssonen, Heikki Source: Fifth International Congress of Applied Linguistics (AILA), 1978 Abstract: Presented here is a survey of work on discourse analysis. The main concern is with linguistic pragmatics & work relating to sentence processing. A modified communicative syllabus is described; this modified syllabus aims at greater sophistication & flexibility & leaves more room for the abilities learners already have. Publication Year: 1978 Accession Number: 78S00277 Notes: Presented at the Fifth International Congress of Applied Linguistics (AILA)
21	History	21. The following item was retrieved from Social Sciences @ Scholars Portal database search. What kind of source is it? Title: Elections Matter. A Longitudinal Study of the Mobilizing Effects of Elections Author: Stromback, Jesper; Johansson, Bengt Publication Year: 2006 Abstract : This paper investigates political interest, party identification, media consumption and satisfaction through the electoral cycles between 1986 and 2004. Notes: Presented at the fifth Accounting History International Conference (Sweden, 2006) Number of Pages: 1

Question #	*Department:*	*Modification:*
21	Philosophy	21. The following item was retrieved from an Arts & Humanities @ Scholars Portal database search. What kind of source is it? Title: A Pragmatic Approach to the Teaching of Discourse/English for Special Purposes Author: Nyyssonen, Heikki Source: Fifth International Congress of Applied Linguistics (AILA), 1978 Abstract: Presented here is a survey of work on discourse analysis. The main concern is with linguistic pragmatics & work relating to sentence processing. A modified communicative syllabus is described; this modified syllabus aims at greater sophistication & flexibility & leaves more room for the abilities learners already have. Publication Year: 1978 Accession Number: 78S00277 Notes: Presented at the Fifth International Congress of Applied Linguistics (AILA)
21	Political Science	21. The following item was retrieved from Social Sciences @ Scholars Portal database search. What kind of source is it? Title: Elections Matter. A Longitudinal Study of the Mobilizing Effects of Elections Author: Stromback, Jesper; Johansson, Bengt Publication Year: 2006 Abstract : This paper investigates political interest, party identification, media consumption and satisfaction through the electoral cycles between 1986 and 2004. Notes: Presented at the International Communication Association Conference (Sweden, 2006) Number of Pages: 1
21	Psychology	21. The following item was retrieved from a PsycINFO database search. What kind of source is it? Title: Learning styles as predictors of self-efficacy and interest in research: Implications for graduate research training. Author: West, Crystal R.1; Kahn, Jeffrey H.2; Nauta, Margaret M. Publication Year: 2007 Abstract: The authors discuss implications for improving graduate research training by encouraging student self-assessment and by providing instruction using balanced pedagogies. Notes: Presented at the Annual Meeting of the Midwestern Psychological Association, 2002, Chicago, IL, US) Number of Pages: 9

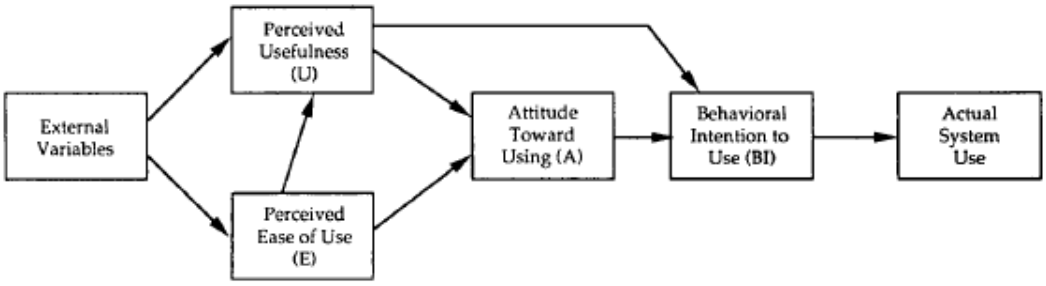
Question #	*Department:*	*Modification:*
21	Social Work	21. The following item was retrieved from a Social Service Abstracts database search. What kind of source is it? Title: Public Attitudes towards Multiculturalism and Bilingualism in Canada Author(s): Dasko, Donna. Publication Year: 2003 Abstract: The purpose of this study was to examine Canadian public attitudes toward multiculturalism and bilingualism. Notes: Presented at the Annual Conference – Canadian and French Perspective on Diversity (Ottawa, April 10-14, 2003). Number of Pages: 24
21	Visual Arts	21. The following item was retrieved from an Arts & Humanities @ Scholars Portal database search. What kind of source is it? Title: Indigenous Cultural and Intellectual Property Author: Browne, Delia Source: Fourth National Aboriginal and Torres Strait Islander Visual Arts Conference Abstract: Indigenous culture and intellectual property means Indigenous' peoples rights to their cultural heritage. Heritage comprises all objects, sites, knowledge, the nature and use of which has been transmitted, or continues to be transmitted, from generation to generation and which is regarded as pertaining to a particular Indigenous group or territory. Publication Year: 2002 Notes: Presented at the Fourth National Aboriginal and Torres Strait Islander Visual Arts Conference

Question #	*Department:*	*Modification:*
23	All Departments	23. While developing a lesson plan on the Canadian legislative system, you find the following story on the Internet: *BMJ* 2001; 322:1200 (19 May) Canada's parliament calls for tighter water standards Alarmed by growing fears of widespread pollution of drinking water, Canada's parliament has passed a resolution calling for a national law setting out enforceable national standards for water quality. Forty six people have recently become infected with cryptosporidium in the small farming town of North Battleford, Saskatchewan, and three deaths were at first thought to have been caused by the parasite. The province's chief medical health officer later said that cryptosporidium was not the cause of two of the deaths but may have played a minor part in the third. (Source: The BMJ is published by BMJ Publishing Group Ltd, a wholly owned subsidiary of the British Medical Association) Given this, the following action is in order:
24	All Departments	(4)To address these issues, Hunter (2005) has proposed that "students should work in groups with the computer peripheral and the teacher acting as a facilitator" (p.25).
26	All Departments	26. You are planning an 'open house' for your students' parents. Browsing the Internet, you find the report "Child Abuse: Recognize it, Report it, Prevent it" by the Ontario's provincial government. If you distribute 30 copies of the report to parents at the open house, which of the following copyright choices is the proper action?

APPENDIX E:

Technology Acceptance Model (TAM)

(Davis et al., 1989, p.985)[31]



$$BI = A + U$$

$$A = U + E$$

$$U = E + EOU$$

- U = Perceived usefulness
- E = Perceived ease of use
- A = attitude towards using the system
- BI = Behavioural intention to use
- EOU = External Variables

[31] "Reprinted by permission, (Davis, Bagozzzi, & Warshaw), (User acceptance of computer technology: A comparison of two theoretical model), (Management Science), volume (35), number (8), (1989). Copyright (1989), the Institute for Operations Research and the Management Sciences, 7240 Parkway Drive, Suite 300, Hanover, Maryland 21076 USA."

APPENDIX F: TAM Open-Ended Questions

Part 3: Please elaborate on your experiences with library services in general.

Usefulness and Ease of use

1) Library Instructions

How many times have you been given instruction on how to use library resources by librarians?

At the undergraduate level: 0 1 2 3+

At the graduate level: 0 1 2 3+

2) If you were given library instruction at the undergraduate level:

(a) What kind of instruction did you receive?

……..

……..

(b) Did you find the instruction useful? (Elaborate)

……..

……..

2a) If you were given library instruction at the graduate level:

(a) What kind of instruction did you receive?

……..

……..

(b) Did you find the instruction useful? (Elaborate)

……..

……..

3) Library Experience

Circle the number that best reflects your experience with academic library resources and services.

1	**2**	**3**
little experience (limited use)	**some experience (moderate use)**	**extensive experience (frequent use)**

(a) Describe some of the experiences you have had with academic library services and resources:

……..

……..

……..

……..

4) Instructional Needs

(a) Do you think that graduate students need instruction on how to use library information resources in their subject areas?

YES_____ NO ____

Please explain.

……..

……..

(b) Which library services and resources do you need the most help with to meet your graduate student information needs?

……..

……..

(c) What library resources do you use most in your subject area (e.g. WilsonWeb, Scholars Portal, Project Muse, CBCA, etc)?

……..

5) Specific software use:

(a) Explain the purpose of the "Get It" button as in 

?

……..

(b) You click on the "Get It" 

button and receive the following message: "No full-text available." What do you do next?

……..

……..

(c) Do you use RefWorks – Online Research Management, Writing and Collaboration Tool?

YES _____ NO_____

If yes, for what purpose do you use RefWorks?

……..

(d) Do you use the Foxy Leddy LibX Toolbar – a toolbar that allows you to quickly search the University of Windsor's Library resources?

YES _____ NO_____

If yes, for what purpose do you use the Foxy Leddy LibX Toolbar?

……..

(e) Do you find library resources easy to access and use?

YES _____ NO_____

If not, please specify some main difficulties you have encountered.

……..

……..

(f) List the ways in which you think library services could be improved to better suit graduate students' needs.

……..

……..

……..

Voluntary contact information:

If you wish to participate in a qualitative follow-up study, please leave your name, phone number or email:

Name: _____

Telephone number: _____

E-mail:_____

Thank you!

APPENDIX G:

Interview Guide for Graduate Student Interviews
(Sadler & Given, 2007, pp.138-140)

The interview will consist of three sections. In the first part, demographic information will be collected about the participant. In the second part, the user will be asked about their favorite tools available on the library web site. In the third part, the user will be directed to the "Get It" reference linking software and will be asked some questions about how the use it, or how they think they might use it.

*** Over the course of the interview, it is expected that various opportunities for action will be discussed. Whenever one of these features is encountered in the conversation, some or all of the following questions will be asked:**

(1) Do you remember how you first became aware of this feature? (Prompt: Did someone recommend it? Did you read about it somewhere?)
(2) How well would you say this feature works? Does it behave the way you expect it to?
(3) **How easy would you say it is to access?** How easy is it to use? Do you need any special knowledge to use it?
(4) How strongly would you be motivated to use it? **Do you think it is useful?** Is it worth the effort?
(5) How would you rate yourself as a user of this kind of tool? Are you a beginner, or do you feel like you know it very well?
(6) Do you feel you have the support you need to use this it? (Prompt: Technical support? Training? Documentation?) **Is there anything that would keep you from using this tool?**

****Section 1: Demographic questions***

(1) Tell me about yourself: Where did you grow up? **How old are you? What were your experiences of libraries like where you grew up?**
(2) How comfortable are you using computers? When were you introduced to computers? **Do you remember when you started using computers in libraries?**
(3) I would like to know more about your academic background. **Where did you do your undergraduate degree?** What did you major in?
(4) **And what degree are you working on now? In what department? What stage of your degree are you currently working on (e.g. coursework, thesis, dissertation)?** What areas do you like the best? Do you have a specialty?
(5) Do you currently have other work in your academic area? Are you someone's research assistant? Do you teach?

Note: Questions about affordance were developed, in part, with the guidance of Dr Stan Ruecker, Humanities Computing Program, University of Alberta.

Section 2: Information seeking preferences

(1) How often do you use library resources? Which kinds of resources do you use the most (e.g. books, journals, reference librarian, computer labs, study space).
(2) How often do you use the library web site to find resources for your coursework/thesis? (Prompt: All the time? Only for unfamiliar topics?)
(3) Has there ever been a time, either in the physical library or on the library web site, when you couldn't find what you were looking for? Could you tell me about that?
(4) **Has there ever been a time when something didn't work the way you thought it would? Could you tell me about it?
(5) **What is one tool available on the library web site that you couldn't live without?** (Prompt: A "tool" could be a list of resources, or a search feature, or a subject database. . . almost anything that lets you do something.)
(6) **Ask affordance questions about any tools the user identifies.
(7) Where do you go off of the main page of the library web site? Could you point at places you remember going, and places you go regularly?

Section 3: Reference linking software

(1) **Have you ever used the journal databases?** If so, how do you use them? What are they good for? What are they not good for?
(2) I'm going to use one of the databases available through the library web site to search for journal articles about a certain subject. [Let user pick database and subject, if they have a preference. If not, have sample ready.] Now, when you look at this article that we've found, **do you see this button that says "Get it"? What do you think that does? (Prompt: Does it always get full text? What happens if the library doesn't have the full text in a digital format? What happens if the library doesn't have the full text even in paper?)**
(3) If I wanted to make sure I was looking at all the relevant journal articles on this subject, what should I do next? (Prompt: Do I need to search other databases, or have I searched them already?)
(4) **Ask general affordance questions outlined above.

** The interview was focused on the indicated bolded sections*
*** Section 2 (questions #4 and 6) and Section 3 (question #4) were discussed in combination with B-TILED survey and TAM open-ended questions.*

APPENDIX H:

List of Graduate Programs – University of Windsor

#.	List of Graduate Programs:
1.	Biological Sciences (PhD and MSc)
2.	Business Administration (MBA, MBA/LLB and MM)
3.	Chemistry and Biochemistry (PhD and MSc)
4.	Civil Engineering (PhD, MASc and MEng)
5.*	Communication and Social Justice (MA)*
6.	Computer Science (PhD and MSc)
7.	Earth Sciences (PhD and MSc)
8.*	Economics (MA)
9.*	Education (PhD and MEd)*
10.	Electrical Engineering (PhD, MASc and MEng)
11.	Engineering Materials (PhD, MASc and MEng)
12.*	English (MA)*
13.	Environmental Engineering (PhD, MASc and MEng)
14.	Environmental Science (PhD and MSc.)
15.*	History (MA)*
16.	Human Kinetics (MHK)
17.	Industrial Engineering (MASc and MEng)
18.	Industrial and Manufacturing Systems Engineering (PhD)
19.	Mathematics and Statistics (PhD and MSc)
20.	Mechanical Engineering (PhD, MASc and MEng)
21.	Nursing (MSc and MN)
22.*	Philosophy (MA)*
23.	Physics (PhD and MSc)
24.*	Political Science (MA)*
25.*	Psychology (PhD)
26.*	Social Work (MSW)
27.*	Sociology (PhD and MA)
28.*	Visual Arts (MFA)

* Indicates graduate programs that will be considered for this study

APPENDIX I:

Tri-Council Policy Certificate of Completions

Certificate of Completion

This is to certify that

Jelena Magliaro

has completed the Interagency Advisory Panel on Research Ethics'
Introductory Tutorial for the
Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans (TCPS)

Issued On: November 27, 2007

APPENDIX J:

INVITATION TO PARTICIPATE IN A RESEARCH STUDY

Title of Study: **Comparing Information Literacy Levels and Exploring Perceptions about Library Usage of Students in Selected Graduate Programs by Using Technology Acceptance Model and Affordance Theory**

You are invited to participate in a research study conducted by **Jelena Magliaro**, a PhD student from **the Faculty of Education**, University of Windsor. Your participation in this study will help me **fulfil the research requirements for obtaining the doctoral dissertation.**

If you have any questions or concerns about the research, please feel free to contact Jelena Magliaro at (519) 253-3000, extension 3200 or e-mail me at: jelena@uwindsor.ca. This study is done under the supervision of Dr. Dragana Martinovic. If you have further questions about this study, feel free to contact her at (519) 253-3000, extension 3962; or e-mail her at dragana@uwindsor.ca.

PURPOSE OF THE STUDY

The purpose of this study is to determine and compare information literacy levels of graduate students in the selected graduate programs at the University of Windsor. In addition, the research will explore the graduate students' perceptions about library usage.

PROCEDURES

If you volunteer to participate in this study, we would ask you to do the following things:

- Read the consent form, sign it, and return one copy of it. You will keep this information letter as well as one copy of the consent form,
- There are two phases for the study: a survey followed with a follow-up interview.
- Participating in the survey requires approximately 20 minutes
- If you would like to take part in a follow-up interview, please leave your contact information (phone number and your name on the last page of the survey. I will then contact you to schedule an interview at the mutually convenient time and place at the University of Windsor.

POTENTIAL RISKS AND DISCOMFORTS

There are no known risks involved with this study.

POTENTIAL BENEFITS TO SUBJECTS AND/OR TO SOCIETY

The results of this study may serve as an informative guide for determining problematic areas in information literacy for graduate students. The results may be used to modify the University of Windsor research methods courses to better meet the needs of the graduate students. The summary of the results will be presented to the Leddy Library employees at the University of Windsor and may be used to improve educational services pertaining to information literacy.

PAYMENT FOR PARTICIPATION

No payment will be received for participation in this study.

CONFIDENTIALITY

Any information that is obtained in connection with this study and that can be identified with you will remain confidential and will be disclosed only with your permission. Once the surveys are received from the participants, the accompanying consent form will be kept in a locked file cabinet that will be only accessible to the researcher and her advisor. After contacting the students who are willing to participate in the follow-up interview, the portion of the survey that includes their contact information will be torn away and destroyed. The data will be destroyed 3 years after the investigator has defended her doctoral dissertation.

PARTICIPATION AND WITHDRAWAL

You can choose whether to participate in this study or not. If you volunteer to participate in this study, you may withdraw at any time without consequences of any kind. You may also refuse to answer any questions you do not want to answer and still remain in the study. The investigator may withdraw you from this research if circumstances arise which warrant doing so.

FEEDBACK OF THE RESULTS OF THIS STUDY TO THE SUBJECTS

A permanent copy of the completed research work will be available in the thesis collection of the Leddy Library at University of Windsor. On July 1st, 2009 the results of this study will be posted on the University of Windsor Research Ethics Board website at: http://www.uwindsor.ca/reb

SUBSEQUENT USE OF DATA

This data will used in subsequent studies.

RIGHTS OF RESEARCH SUBJECTS

You may withdraw your consent at any time and discontinue participation without penalty. If you have questions regarding your rights as a research subject, contact: Research Ethics Coordinator, University of Windsor, Windsor, Ontario N9B 3P4; Telephone: 519-253-3000, ext. 3948; e-mail: ethics@uwindsor.ca

SIGNATURE OF INVESTIGATOR

These are the terms under which I will conduct research.

_____ _____

Signature of Investigator Date

Revised November 2007

APPENDIX K:

CONSENT TO PARTICIPATE IN RESEARCH

Title of Study: **Comparing Information Literacy Levels and Exploring Perceptions about Library Usage of Students in Selected Graduate Programs by Using Technology Acceptance Model and Affordance Theory**

You are invited to participate in a research study conducted by **Jelena Magliaro**, a PhD student from **the Faculty of Education**, University of Windsor. Your participation in this study will help me **fulfil the research requirements for obtaining the doctoral dissertation.**

If you have any questions or concerns about the research, please feel free to contact Jelena Magliaro at (519) 253-3000, extension 3200 or e-mail me at: jelena@uwindsor.ca. My faculty advisor at the University of Windsor is Dr. Dragana Martinovic. If you have further questions about this study, feel free to contact her at (519) 253-3000, extension 3962. Her e-mail address is dragana@uwindsor.ca.

PURPOSE OF THE STUDY

The purpose of this study is to determine and to compare information literacy of graduate students in the selected graduate programs at the University of Windsor. In addition, the research will explore the graduate students' perceptions about library usage.

PROCEDURES

If you volunteer to participate in this study, we would ask you to do the following things:

- Read the consent form, sign it, and return one copy of it. You will keep this information letter as well as one copy of the consent form,
- There are two phases for the study: a survey followed with a follow-up interview.
- Participating in the survey requires approximately 20 minutes
- If you would like to take part in a follow-up interview, please leave your contact information (phone number and your name on the last page of the survey. I will then contact you to schedule an interview at the mutually convenient time and place at the University of Windsor.

POTENTIAL RISKS AND DISCOMFORTS

There are no known risks involved with this study.

POTENTIAL BENEFITS TO SUBJECTS AND/OR TO SOCIETY

The results of this study may serve as an informative guide for determining problematic areas in information literacy for graduate students. The results may be used to modify the University of Windsor research methods courses to better meet the needs of the graduate students. The summary of the results will be presented to the Leddy Library employees at the University of Windsor and may be used to improve educational services pertaining to information literacy.

PAYMENT FOR PARTICIPATION

No payment will be received for participation in this study.

CONFIDENTIALITY

Any information that is obtained in connection with this study and that can be identified with you will remain confidential and will be disclosed only with your permission. Once the surveys are received from the participants, the accompanying consent form will be kept in a locked file cabinet that will be only accessible to the researcher and her advisor. After contacting the students who are willing to participate in the follow-up interviews, the portion of the survey that includes their contact information will be torn away and destroyed. The data will be destroyed 3 years after the investigator has defended her doctoral dissertation.

PARTICIPATION AND WITHDRAWAL

You can choose whether to be in this study or not. If you volunteer to be in this study, you may withdraw at any time without consequences of any kind. You may also refuse to answer any questions you do not want to answer and still remain in the study. The investigator may withdraw you from this research if circumstances arise which warrant doing so.

FEEDBACK OF THE RESULTS OF THIS STUDY TO THE SUBJECTS

A permanent copy of the completed research work will be available in the thesis collection of the Leddy Library at University of Windsor. On July 1st, 2009 the results of this study will be posted on the University of Windsor Research Ethics Board website at: http://www.uwindsor.ca/reb

SUBSEQUENT USE OF DATA

This data will used in subsequent studies.

RIGHTS OF RESEARCH SUBJECTS

You may withdraw your consent at any time and discontinue participation without penalty. If you have questions regarding your rights as a research subject, contact: Research Ethics Coordinator, University of Windsor, Windsor, Ontario N9B 3P4; Telephone: 519-253-3000, ext. 3948; e-mail: ethics@uwindsor.ca

SIGNATURE OF RESEARCH SUBJECT/LEGAL REPRESENTATIVE

I understand the information provided for the study **Comparing Information Literacy Levels and Exploring Perceptions about Library Usage of Students in Selected Graduate Programs by Using Technology Acceptance Model and Affordance Theory** as described herein. My questions have been answered to my satisfaction, and I agree to participate in this study. I have been given a copy of this form.

_____
Name of Subject

_____ _____
Signature of Subject Date

SIGNATURE OF INVESTIGATOR

These are the terms under which I will conduct research.

_____ _____
Signature of Investigator Date

APPENDIX L:

Survey Instrument – for Graduate Students

This questionnaire aims to compare the information literacy skills of graduate students in the selected graduate programs. The questionnaire is divided into three parts**:**
Part 1- we ask you to provide background information about yourself.
Part 2- we ask you to indicate the answer that best applies to you **(see Appendix B).**
Part 3- we ask you to elaborate on your experiences with library services **(see Appendix D).**

Part 1: Demographics

Please complete the following by **placing a checkmark (√)** in the appropriate spaces:

1. Gender: Male _____ Female _____

2. Student Status: Full-Time _____ Part-Time _____

3. Year of Study: 1___ 2____ 3____ 4+ _____

4. Program of Study - Department: _____
(e.g. MA - Psychology, PhD - Education)

5. Program of Study: (use checkmark √)**:**

Course work only _____

Course work and special research project _____

Course work and thesis _____

6. Total **number of courses currently** completed in this programme _____

7. What is your age range?

_____ 20-29
_____ 30-39
_____ 40-49
_____ 50-59
_____ 60+

8. Are you an **international student?** YES ___ NO ____

9. Year of completion of your last degree: _____

Indicate your **last completed** degree: _____

10. Start year of your current degree: _____

11. Do you work or have you worked (in the last 5 years) in a library-related position?

YES ___ NO ____

12. Is English your first language?

YES ___ NO ____

(Note: Part 1: Questions #3 to #7 were modified from Fidzani, 1998 survey)
Part 2: see Appendix C & D (questions #7-#28), and Part 3: see Appendix F

APPENDIX M:

CONSENT TO PARTICIPATE IN RESEARCH

(for interview participant)

Title of Study: **Comparing Information Literacy Levels in Selected Graduate Programs through the Technology Acceptance Model and Affordance Theory**

You are invited to participate in a research study conducted by **Jelena Magliaro**, a PhD student from **the Faculty of Education**, University of Windsor. Your participation in this study will help me **fulfil the research requirements for obtaining the doctoral dissertation.**

If you have any questions or concerns about the research, please feel free to contact Jelena Magliaro at (519) 253-3000, extension 3174 or e-mail me at: jelena@uwindsor.ca. My faculty advisor at the University of Windsor is Dr. Dragana Martinovic. If you have further questions about this study, feel free to contact her at (519) 253-3000, extension 3962. Her e-mail address is dragana@uwindsor.ca.

PURPOSE OF THE STUDY

The purpose of this study is to determine and to compare information literacy of graduate students in the selected graduate programs at the University of Windsor. In addition, the research will explore the graduate students' perceptions about library usage.

PROCEDURES

If you volunteer to participate in this portion of the study, we would ask you to do the following things:

- Read the consent form for participation in an interview, sign it, and return one copy of it. You will keep this information letter as well as one copy of the consent form.
- Upon your signing the permission for audio-recording, the interview will be audio-recorded for further reference and transcribing.
- During the interview, you will be asked about 22 questions. The length of the interview will be no more than 45 minutes.
- The interview will take place at the university, your or my graduate office, or some other place at the university you find most convenient. The time of the interview will be mutually convenient for both you and the investigator.
- Later on, you might be asked for some clarifications (especially if the recording is not clear enough), most likely through the e-mail (unless you specify some more convenient way of communication).

POTENTIAL RISKS AND DISCOMFORTS

There are no known risks involved with this study.

POTENTIAL BENEFITS TO SUBJECTS AND/OR TO SOCIETY

The results of this study may serve as an informative guide for determining problematic areas in information literacy for graduate students. The results may be used to modify the University of Windsor research methods courses to better meet the needs of the graduate students. The summary of the results will be

presented to the Leddy Library employees at the University of Windsor and may be used to improve educational services pertaining to information literacy.

PAYMENT FOR PARTICIPATION

No payment will be received for participation in this study.

CONFIDENTIALITY

Any information that is obtained in connection with this study and that can be identified with you will remain confidential and will be disclosed only with your permission. After the study is completed and the investigator has defended her thesis, all hard copies of data will be erased (tapes) and the documents will be shredded. Electronic copies of data will be kept in the stand-alone computer with password protected access. All the data will be destroyed 3 years after the investigator has defended her doctoral dissertation.

PARTICIPATION AND WITHDRAWAL

You can choose whether to be in this study or not. If you volunteer to be in this study, you may withdraw at any time without consequences of any kind. You may also refuse to answer any questions you do not want to answer and still remain in the study. The investigator may withdraw you from this research if circumstances arise which warrant doing so.

FEEDBACK OF THE RESULTS OF THIS STUDY TO THE SUBJECTS

A permanent copy of the completed research work will be available in the thesis collection of the Leddy Library at University of Windsor. On July 1st, 2009 the results of this study will be posted on the University of Windsor Research Ethics Board website at: http://www.uwindsor.ca/reb

SUBSEQUENT USE OF DATA
This data will used in subsequent studies.

RIGHTS OF RESEARCH SUBJECTS

You may withdraw your consent at any time and discontinue participation without penalty. If you have questions regarding your rights as a research subject, contact: Research Ethics Coordinator, University of Windsor, Windsor, Ontario N9B 3P4; Telephone: 519-253-3000, ext. 3948; e-mail: ethics@uwindsor.ca

SIGNATURE OF RESEARCH SUBJECT/LEGAL REPRESENTATIVE

I understand the information provided for the study **Comparing Information Literacy Levels in Selected Graduate Programs through the Technology Acceptance Model and Affordance Theory** as described herein. My questions have been answered to my satisfaction, and I agree to participate in this study. I have been given a copy of this form.

_____
Name of Subject

_____ _____
Signature of Subject Date

SIGNATURE OF INVESTIGATOR

These are the terms under which I will conduct research.

_____ _____
Signature of Investigator Date

APPENDIX N:

CONSENT FOR AUDIO TAPING

Research Subject Name: _____

Title of the Project: **Comparing Information Literacy Levels in Selected Graduate Programs through the Technology Acceptance Model and Affordance Theory**

I consent to the audio-taping of interviews.

I understand these are voluntary procedures and that I am free to withdraw at any time by requesting that the taping be stopped. I also understand that my name will not be revealed to anyone and that taping will be kept confidential. Tapes are filed by number only and store in a locked cabinet.

I understand that confidentiality will be respected and that the audio tape will be for professional use only.

_____ _____

(Research Subject) (Date)

APPENDIX O:

Percentages of Incorrect and Correct Answers on B-TILED Test Grouped into Standards

Standard	Question #	Accuracy of Answer	Frequency *N*	Percentage %	Easiness [32]	Discrimination[33]
Standard One	#8*	Incorrect	151	75.1%		
		Correct	50	24.9%	.249	.152
	#12	Incorrect	30	14.9%		
		Correct	171	85.1%	.851	.251
	#14	Incorrect	73	36.3%		
		Correct	128	63.7%	.637	.212
Standard Two	#7	Incorrect	71	35.3%		
		Correct	130	64.7%	.647	.313
	#9	Incorrect	68	33.8%		
		Correct	133	66.2%	.662	.351
	#10	Incorrect	84	41.8%		
		Correct	117	58.2%	.582	.044
	#11*	Incorrect	120	59.7%		
		Correct	81	40.3%	.403	.237
	#13	Incorrect	38	18.9%		
		Correct	163	81.1%	.813	.117
	#15	Incorrect	23	11.4%		
		Correct	178	88.6%	.886	.259
	#16*	Incorrect	93	46.3%		
		Correct	108	53.7%	.537	.349
	#17	Incorrect	57	28.4%		
		Correct	144	71.6%	.716	.414
	#19	Incorrect	57	28.4%		
		Correct	144	71.6%	.716	.250

[32] Beile O'Neil (2005) termed this item "difficulty". In this study "difficulty" was changed to "easiness" as a higher score in "easiness" better relates to higher percentage of correct responses for each question. "Easiness" describes the percentage of participants who answered these questions correctly, where Easiness score multiplied by 100 gives the percentage of correct scores (i.e., score of 1.0 Easiness = 100%). For instance, Standard Three comprised of two questions: question #18, answered correctly by 146 participants (72.6% = .726 Easiness) and question #23, answered correctly by 68 participants (33.8% = .338 Easiness). A total of 35 students got both questions wrong in Standard Three, compared to 48 students who got both questions right. The Easiness level of choosing the correct responses ranged for the 22 items, from 24.9% answering question #8 correctly to 89.6% selecting the correct answer for question #25.

[33]"Discrimination" stands for the item discrimination index or point biserial correlation, which "compares the performance on a given item from top scoring students with performance from students in the bottom group" (Beile O'Neil, 2005, p.93). Although question #10, #23 and #29 had discrimination values below .10, the researcher decided not to delete the items after careful examination of previous Beile O'Neil's (2005) study with content judges. Same as in Beile O'Neil's (2005) study, the author "decided not to delete or revise the items since it was believed [that] the items did discriminate among knowledge levels" (p. 94).

Standard	Question #	Accuracy of Answer	Frequency *N*	Percentage %	Easiness	Discrimination
	#20*	Incorrect	121	60.2%		
		Correct	80	39.8%	.398	.102
	#21	Incorrect	40	19.9%		
		Correct	161	80.1%	.801	.325
Standard Three	#18	Incorrect	55	27.4%		
		Correct	146	72.6%	.726	.193
	#23*	Incorrect	133	66.2%		
		Correct	68	33.8%	.338	.090
Standard Five	#22*	Incorrect	90	44.8%		
		Correct	111	55.2%	.552	.279
	#24	Incorrect	22	10.9%		
		Correct	179	89.1%	.891	.167
	#25	Incorrect	21	10.4%		
		Correct	180	89.6%	.896	.242
	#26*	Incorrect	105	52.2%		
		Correct	96	47.8%	.478	.049
	#27	Incorrect	28	13.9%		
		Correct	173	86.1%	.861	.218
	#28*	Incorrect	126	62.7%		
		Correct	75	37.3%	.373	.157

* *Questions #8, #11,# 16, #20, #22, #23, #26, and #28 were below the cut score of 57.5%..*

Note. Complete text of the survey is given in Appendix C and D.

APPENDIX P:

Frequency Distribution[34] of B-TILED Scores

Total Score	Frequency N	Percent %
3	1	.5%
5	2	1.0%
7	1	.5%
8	6	3.0%
9	11	5.5%
10	10	5.0%
11	18	9.0%
12	13	6.5%
13	18	9.0%
14	19	9.5%
15	33	16.4%
16	19	9.5%
17	22	10.9%
18	17	8.5%
19	5	2.5%
20	5	2.5%
21	1	.5%
Total	201	100.0

[34] Previous study by Beile O'Neil (2005) included similar frequency distribution of B-TILED scores.

APPENDIX Q:

Minimum Course Requirements for the Master's Degree

Group	Min. Course Requirement	Additional Courses	Stream
MA – Political Science	4	0	Thesis
		2	Major Paper
MA – Comm. Studies	4	0	Thesis
		2	Major Paper
MA - Philosophy	4	0	Thesis
		2	Major Paper
		4	Course-Based
MA - History	5	0	Major Paper
MEd	6	0	Thesis
		2	Major Paper
		4	Course-Based
MA - Sociology	6	0	Thesis
		2	Course-Based
MA - English	6	0	Thesis
		3	Course-Based
MSW – Social Work	6	0	Thesis or Internship
MA - Visual Arts	6		Thesis with Studio and Creative Exhibition
MA – Psychology	6	3	Thesis with Practicum

Minimum Course Requirements for the Doctoral Degree

Group	Min. Courses	Portfolio/Proposal Or Comprehensive Exam	Dissertation
PhD - Education	5	1	X
PhD - Sociology	5	1	X
PhD - Psychology	5	1 (with Practicum)	X

APPENDIX R

ANOVA Results for Demographic, Academic and Departmental Clusters (Between Groups = BG, Within Groups = WG, Sum of Squares = SS, Mean Square = MS)

Demographic Variable	**BG WG**	**SS**	**df**	**MS**	**F**	**Sig**
Gender	BG	.759	1	.759	.070	.791
	WG	2147.221	199	10.790		
Age Range	BG	58.206	2	29.103	2.757	.066
	WG	2089.774	198	10.554		
International Student Status	BG	.464	1	.464	.043	.836
	WG	2147.516	199	10.792		
Library-Related Position	BG	7.262	1	7.262	.675	.412
	WG	2140.718	199	10.757		
English as First Language	BG	86.227	1	86.227	8.323	.004*
	WG	2061.753	199	10.361		
Academic Variables						
Student Status	BG	.604	1	.604	.056	.813
	WG	2147.376	199	10.791		
Program of Study (Master's Students Only)	BG	6.795	2	3.397	.312	.732
	WG	1609.841	148	10.877		
Minimum course requirements completed in the current program for the Master's Degree	BG	53.561	1	53.561	5.121	.025*
	WG	1527.162	146	10.460		
Minimum course requirements completed in the current program for the Doctoral Degree	BG	36.085	1	36.085	3.675	.061
	WG	461.548	47	9.820		
Last Completed Degree	WG	468.870	48	9.768		
	BG	26.684	1	26.684	2.503	.115
	WG	2121.296	199	10.660		
Departmental Variables						
Department Grouped	BG	107.116	4	26.779	2.572	.039*
	WG	2040.864	196	10.413		
Total	201	2147.980	200			

APPENDIX S

Tukey HSD – Multiple Comparisons for Departmental Cluster: MEd (Master of Education), PhDEd (Doctor of Philosophy in Education), MA (Master of Arts), PhDSS (Doctor of Philosophy in Psychology and Doctor of Philosophy in Sociology) and MSW (Master of Social Work)

(I) Department Grouped (MEd-MA-MSW-PhDEd-PhDSS)	(J) Department Grouped (MEd-MA-MSW-PhDEd-PhDSS)	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
MED	PhDEd	-.968	.759	.706	-3.06	1.12
	MA	-1.021	.675	.556	-2.88	.84
	PhDSS	-3.518*	1.165	.024	-6.73	-.31
	MSW	-.386	.743	.985	-2.43	1.66
PhDEd	MA	-.053	.633	1.000	-1.80	1.69
	PhDSS	-2.550	1.141	.171	-5.69	.59
	MSW	.582	.705	.923	-1.36	2.52
MA	PhDSS	-2.497	1.087	.150	-5.49	.50
	MSW	.635	.614	.840	-1.06	2.33
PhDSS	MSW	3.132*	1.130	.048	.02	6.24

*The mean difference is significant at the 0.05 level[35].

[35] Because of the possibility of the inflated Type I error rate, resulting from the use of the multiple tests, Bonferroni post-hoc tests were performed. Following that criteria, significance was found between the MEd and PhDSS group.

APPENDIX T

Graduate Students' Perceived Ability to Search Library Database & Internet ANOVA Results

Variable	BG WG	SS	df	Mean Square	F	Sig
(1) Ability to search library databases	BG	39.959	1	39.959	3.772	.054
	WG	2108.021	199	10.593		
(2) Ability to search the Internet	BG	3.155	1	3.155	.293	.589
	WG	2144.825	199	10.778		
Total	201	2147.980	200			

APPENDIX U

Graduate Students' Past Experience with Library Instructions at the Current Institution

ANOVA Results

Variable	**BG WG**	**SS**	**df**	**Mean Square**	**F**	**Sig**
(3) Library Organized Tour	BG	.175	1	.175	.016	.899
	WG	2147.805	199	10.793		
(4) Library Classroom Instruction	BG	35.505	2	17.752	1.664	.192
	WG	2112.475	198	10.669		
(5) Library Instruction	BG	12.582	1	12.582	1.173	.280
	WG	2135.398	199	10.731		
(6) One-on-one instruction with librarian	BG	42.315	1	42.315	3.999	.047*
	WG	2105.665	199	10.581		
Total	201	2147.980	200			

APPENDIX V

Tukey HSD – Multiple Comparisons for Departmental Variable for only the Graduate Students who Indicated the Need for Instruction : MEd (Master of Education), PhDEd (Doctor of Philosophy in Education), MA (Master of Arts), PhDSS (Doctor of Philosophy in Psychology and Doctor of Philosophy in Sociology) and MSW (Master of Social Work)

					95% Confidence Interval	
(I) Group-MEd-MA-MSW-PhDEd-PhDSS	(J) Group-MEd-MA-MSW-PhDEd-PhDSS	Mean Difference (I-J)	Std. Error	Sig.	Lower Bound	Upper Bound
MEd	PhDEd				-3.63	.87
	MA	-1.119	.757	.578	-3.21	.97
	PhDSS	-3.805*	1.255	.023	-7.27	-.34
	MSW	-.676	.806	.918	-2.90	1.55
PhDEd	MA	.262	.702	.996	-1.67	2.20
	PhDSS	-2.423	1.222	.279	-5.80	.95
	MSW	.705	.755	.883	-1.38	2.79
MA	PhDSS	-2.685	1.184	.161	-5.95	.58
	MSW	.443	.691	.968	-1.46	2.35

* The mean difference is significant at the 0.05 level.

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