INFORMATION LITERACY AT WORK:
PERCEPTIONS OF INFORMATION LITERACY SKILLS
BY EMPLOYERS AND STUDENTS IN THE UBC ARTS CO-OP

by

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ABSTRACT

Despite acknowledgement by scholars that information literacy skills are essential for success in today’s workplace, studies in the area are still relatively rare. Furthermore, research in this field indicates that, although employers value information literate employees, the specific skills that define the term are not well recognized in the workplace setting.

This study examines perceptions about the importance of information literacy skills in the workplace with a sample population of students and employers in the UBC Arts Co-op Program. The Arts Co-op program provides the opportunity for students to alternate between work and study, integrating multiple full-time, four-month work terms with their university degree. Three surveys were conducted for this study: a longitudinal survey of students (one survey before they entered the work term and another as they finished the work term) and a survey of employers mid-way through the students’ work term.

The study determined that, overall, Arts Co-op students are meeting employer expectations with respect to information literacy skills. Findings also indicated that students’ perceptions of the importance of information literacy skills changed very little during the course of their work terms and that students and employers, while ranking the same set of skills as important, differed significantly in terms of the level of importance they assigned to each skill. Other findings include a list of the common duties involved in these work placements, the specific skill areas students wish to improve, and student strengths from the employer perspective.

In addition to the implications this study has for the UBC Arts Co-op program and university librarians and faculty, it also provides a valuable contribution to the formative body of research that connects information literacy skills to the workplace environment.
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CO-AUTHORSHIP

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CHAPTER 1
INTRODUCTION

According to researchers at the University of California at Berkeley, print, film, magnetic, and optical storage media produced approximately 5 exabytes of new information in 2002—enough information to fill 37,000 libraries the size of the Library of Congress (Lyman and Varian 2003). The same study estimated the World Wide Web to be about 167 tetrabytes in size, approximately equivalent to 17 times the size of the Library of Congress’ print collection.

Results from an earlier study indicate that the Web grows at a rate of 7.3 million pages per day (Lyman and Varian 2000), that approximately 31 billion emails are sent daily, and that instant messaging is estimated to produce about 5 billion messages per day.

With the information explosion we are faced with in current society, the question arises whether the abilities of today’s students to navigate and critically evaluate this information are keeping pace. Breivik (2005) argues that today’s graduates are less prepared to navigate their 21st century world of information than students of previous generations were for theirs. Despite their ease with computers and the Internet, and their familiarity with powerful information retrieval tools, many students are satisfied with the information they can obtain quickly, without consideration for the reliability, currency, and relevance of the information they find (21).

Similarly, Oman (2001) argues that skills taught in the academic environment are not sufficient for the workplace, and that there is a growing awareness among employers of the importance of hiring staff who are able to manage information effectively (35).

Ironically, the information explosion is not translating into better educated or better informed graduates—in fact, the ease with which information can be retrieved has impacted

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1 These estimates are of the “surface” web—the static, publicly available web pages that represent a relatively small portion of the entire Web.
traditional models of information seeking behaviour by emphasizing the critical step of
evaluating the relevance of the search results (i.e. Wathen and Burkell 2002; Rieh 2002).

Thompson (2003), for example, explains that college students have become reliant on the
Internet for their academic research needs, with little regard for the authority of the information
they find (260). The major attraction for students in search engine tools such as Google is that
they save time. A few minutes on the Internet produces all of the information a student needs to
meet the number of references required for an assignment.

The skills that Breivik, Oman and Thompson refer to are known as information literacy
and are broadly defined as the ability to locate, evaluate, and use information effectively. A
popular definition of the concept comes from a 1989 report released by the American Library
Association describing information literate persons as skilled in “knowing when they have a
need for information, identifying information needed to address a given problem or issue, finding
needed information, evaluating the information, organizing the information, [and] using the
information effectively to address the problem or issue at hand” (American Library Association
Presidential Committee on Information Literacy, 7). This concept is widely recognized within
the library community as a critical skill set in today’s knowledge-based economy. Academic
librarians have placed a great deal of emphasis on the development and implementation of
information literacy programs in order to foster these important skills in students. Initiatives
include in-class instruction programs, library workshops, integration of information literacy
components into the curriculum, and in some cases, credit courses devoted to developing
information literacy skills and lifelong learners (Jacobson and Mark 2000).

Despite such efforts, however, it is possible in some university programs for students to
graduate without ever setting foot in a library or attending training to develop even basic
information literacy skills. Instructors provide resources for each course with little need for information seeking and retrieval, or critical thought on the part of the student. Such students are often referred to as “text-book taught” (Rodrigues 2001, 180). What happens, then, to such students when they enter the workplace lacking these critical skills? As Breivik explains, “their value in the workforce [is] significantly reduced when no one is there to prepackage information for them” (25). In a fast-paced society where the right information can give a company the strategic advantage in a competitive market, quick Google searches no longer fit the bill.

Finding employment upon graduation is undoubtedly a top priority for most students. With the rising cost of education, finding a job upon graduating is not just an expectation but a necessity. Indeed, 45% of Canadian graduates are leaving school with a debt of approximately $19,500 (Statistics Canada 2004), significantly increasing the financial pressures to find work. If information literacy skills can provide students with a competitive edge in the job market, this may add to their incentive to better develop these skills in university where skilled librarians are available to support them. However, despite acknowledgement by scholars that information literacy skills are essential for success in today’s workplace (Goad 2002, 1), studies in the area are still relatively rare (Bruce 2000, 212). Furthermore, research in this field indicates that, although employers value information literate employees, the specific skills that define the term are not well recognized in the workplace setting. Solid evidence supporting the importance of information literacy skills for workplace success could provide added incentive for students to devote time to developing these skills during their undergraduate programs.

Recognizing the lack of research around information literacy skills beyond the academic environment, the following study investigates perceptions of these skills in the workplace context by surveying employers and students enrolled in the University of British Columbia Arts
Co-op program. The Arts Co-op program provides the opportunity for students to alternate between work and study, integrating multiple full-time, four-month work terms with their university degree. In order to participate in the program, students must be full-time 2nd or 3rd year UBC students within a B.A., B.F.A, or B.Music degree program and must go through an interview/selection process. Work opportunities for Arts Co-op students include positions across Canada and internationally at workplaces such as government and non-profit agencies, academic institutions, and tourism, health, and retail organizations. This population provides an ideal venue in which to study information literacy in the workplace, since it is an accessible population of students who are involved in full-time, professional work. Students in the co-op program are in the unique position of having the opportunity to explore the work world mid-way through their studies, assess their skills in the workplace setting, then return to school, possibility altering their course selection based on areas they wish to develop further. As such, the students and employers involved in the Arts Co-op program provide an appropriate population in which to explore which information literacy skills are most important in the workplace and if the skills of students in this area are meeting employers’ expectations. The following introductory chapter explains the problem statement at the core of this research study, the key research questions the study aims to answer, the overall significance of the study, and its potential limitations.

**Problem Statement**

This study will investigate the importance of information literacy skills in the workplace of UBC Arts Co-op students and employers. Using a descriptive survey method, the research project will examine a range of workplace environments, the degree to which employers value information literacy skills in the students they hire, and whether a student’s experience on the job
develops awareness of the importance of these skills as well as of areas they need to further
develop.

Determining the significance of these skills in the workplace will inform not only Arts Co-op students, employers, and the Arts Co-op program itself, but also provide a valuable contribution to the formative body of research that connects information literacy skills to the workplace environment.

**Research Questions**

By surveying Arts Co-op employers and students, the project aims to answer the following research questions:

- What level of importance do Arts Co-op employers place on specific information literacy skills?
- How do Arts Co-op students perceive the importance of information literacy skills in relation to their Co-op work placement position?
- Do perceptions of the importance of information literacy skills change for Arts Co-op students with experience on the job?
- Do perceptions of the importance of information literacy skills in the workplace differ between Arts Co-op employers and students?

**Significance of Study**

This research project will provide insight to students and staff in the Arts Co-op program regarding the information literacy skills that employers seek in the students they hire. The benefits of uncovering this information are multifold:
a. The research provides Arts Co-op Program personnel with the opportunity to collect feedback from students and employers in a formal manner, and accordingly, enables them to learn how they may better prepare students for Co-op positions.

b. Bringing information literacy skills to the attention of employers may encourage them to consider the relevance of these essential but often overlooked skills in their workplace environment. Awareness of these skills may help in future hiring decisions as well as assist in the development of employee training programs.

c. For students, the information will be useful for gaining awareness of the types of information literacy skills that employers are looking for and accordingly help them with future job placements.

d. Research into the perception of the importance of information literacy skills in the workplace may be beneficial for assessing student investment in information literacy programs offered at UBC. Similarly, learning the value that information literacy skills have in the workplace may encourage students to take advantage of the various UBC library workshops and programs designed to develop these skills.

e. Many questions exist among members of the academic community as to whether the information literacy competencies that students are gaining in their educational experiences are meeting the needs of the workplace. The research can help to answer these questions with regard to the population of Arts Co-op students surveyed, as well as explore how the Arts Co-op program itself is helping to nurture and develop information literacy skills.
Overall, the project aims to deliver information to benefit students, staff, and employers of the Arts Co-op program as well as contribute to the research in the area of information literacy in the workplace.

**Limitations of Study**

Since the focus of the study is a specific population of Arts Co-op students and employers, the greatest limitation of the study will be the generalisability of the results. Students in the Arts Co-op program, for example, must go through an interview process and are selected to participate in the program based on strong written communication skills; professionalism, maturity, enthusiasm, and career motivation; willingness to apply to a broad range of positions, regardless of location or wage; and an overall minimum grade point average of 72%. Accordingly, the types of students in the Arts Co-op program are not an accurate representation of students in the Faculty of Arts as a whole. While it is hoped that results may help to inform library initiatives in information literacy in terms of where librarians/faculty may want to focus training for students, the results cannot be generalized beyond the study population.

The second major limitation of the study is that it asks students and employers to rate the importance of a set of skills that are meant to define and operationalize information literacy, when in fact much academic debate still exists around the competencies involved with the concept. While questions for the study are based on solid and widely accepted academic research, information literacy is an imprecise and evolving concept that cannot be readily measured. Nevertheless, the study provides insight into specific skills sets that are relevant in the workplace environment and helps to inform future initiatives that examine information literacy in the workplace environment.
Conclusion

With the information explosion in the 21st century, the ability to locate, evaluate and use information effectively is an increasingly important skill set. This study aims to provide a valuable contribution to the formative body of research that connects information literacy skills to the workplace environment, taking the concept beyond the classroom walls and exploring how these skills apply in the workplace context. It aims to examine, with a sample population of students and employers in the UBC Arts Co-op Program, perceptions around the importance of information literacy skills in the workplace. The significance of information literacy skills in today’s knowledge based economy cannot be underestimated. For many university students, however, it is not until entry into the workplace that this is fully realized.

The following chapter will review the literature on information literacy, with particular emphasis on studies that connect these skills to the workplace. Chapter three will outline the methodological approach to the study, chapter four will analyze the research outcomes, and chapter five will discuss the conclusions and interpretations that may be reached from the research.
CHAPTER 2: 
LITERATURE REVIEW

Over the last three decades, there has been tremendous growth in the literature on information literacy, much of it relating to the development and application of these skills in the academic environment. In fact, sixty percent of the literature on information literacy pertains to academic libraries while another twenty percent focuses on school libraries (Rader 2002, 242). The area where the research is lacking, however, is in how these skills transfer beyond the classroom into the workplace. As mentioned earlier, while information literacy skills are acknowledged as essential for success in today's workplace (Goad 2002, 1), studies in the area are still relatively rare (Bruce 2000, 212). The focus for employers and managers has been primarily on the need for computer and information technology skills while the discussion of information literacy remains confined to the academic community (Bruce 1999, 33-34).

The purpose of this review is to investigate material on information literacy skills with particular emphasis on the relevance of these skills in the workplace. Information sources were identified by consulting numerous indexes and databases across the fields of library and information science, social science, education, and business as well as by searching Dissertation Abstracts, a variety of library catalogues, and the Internet. Given the vast amount of literature on information literacy, this review will highlight the material that can apply to or specifically discusses the workplace environment. The review will identify the key studies that have helped shape and clarify the concept; evaluate the research that has identified tools for assessing information literacy skills; and examine the key articles that have dealt specifically with the concept of information literacy in the workplace. Controversies in the literature are discussed and areas that require further investigation are identified.
Defining Information Literacy

The introduction of the term *information literacy* in the mid-1970s was followed by nearly two decades of debate and discussion over the definition of the concept. From the mid-1990s onwards, numerous review articles attempted to synthesize the literature in the area and come to some consensus on the meaning of information literacy and the skills involved with the concept. Behrens (1994), Snavely and Cooper (1997), Bruce (2000), and Rader (2002) provide comprehensive overviews of the development of information literacy, point out the disagreement among scholars, and seek to clarify the term through an analysis of the research. A common theme identified in the literature in all of these reviews is the need to move beyond the debates over definition and terminology and to concentrate efforts toward initiating and maintaining effective information literacy programs. Rather than duplicate the work already accomplished by such articles, this section of the review will examine the evolution of the concept of information literacy with a particular emphasis on the relevance of the literature to the workplace environment.

Defining Connections to the Workplace

Zurkowski is credited as being the first to use the concept of information literacy in a proposal he submitted to the National Commission on Libraries and Information Science (NCLIS) in 1974. Notably, his original application of the term was in reference to the workplace environment:

People trained in the application of information resources to their work can be called information literates. They have learned techniques and skills for utilizing the wide range of information tools as well as primary sources in molding information-solutions to their problems (Zurkowski 1974, 6).
Prompted by the proliferation of information in society that he observed, Zurkowski identified the need for better organization and use of information in the workplace environment. His definition suggests that using information requires unique skills and techniques that can be applied across a variety of work situations to solve problems.

From Zurkowski's simple description, the concept of information literacy developed and expanded, culminating in 1989 with the American Library Association's now widely accepted definition:

To be information literate an individual must recognize when information is needed and have the ability to locate, evaluate and use effectively the information needed. . . Ultimately, information literate people are those who have learned how to learn. They know how to learn because they know how information 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 always find the information needed for any task or decision at hand (American Library Association Presidential Committee on Information Literacy).

Notably, the report also contains a detailed section on the importance of information literacy skills in the business environment. It reviews several scenarios where either an employee's lack of information literacy skills is costly to a business or where the application of these skills in the business environment saves the company millions of dollars. Not only do these scenarios emphasize the importance of information literacy skills in business, they also provide practical examples that help to define these skills in relation to the workplace environment.

In a similar effort to define information literacy in the business sector, corporate information professional Oman addresses the divide between the different vocabularies used by the education and corporate settings in her article "Information Literacy in the Workplace" (2001). She asserts that "success in selling the information literacy concept within a corporate environment is the branding" (33). She explains that similar concepts such as information
power, information competency, information proficiency, and knowledge management are currently used in the corporate environment and that promoting information literacy requires consideration of how best to position the concept within the workplace. Speaking the company language with concepts like “knows how to find internal and external information effectively” will be clearer than “demonstrates information literacy” (40). Oman emphasizes that success in applying information literacy in the workplace is defining the term in ways that will resonate with management and staff.

The concept of information literacy continues to evolve, and both the ALA report and Oman’s article demonstrate a growing recognition of the importance of defining the term in relation to the workplace environment. Having reviewed how information literacy is defined, it is important to consider the controversies that exist around the concept.

Key Controversies

As Oman explains in her article, there are other terms that tend to be used interchangeably with information literacy, such as information power or information competency. While such synonyms demonstrate the recognition of the concept in the corporate sector, a criticism of academic libraries is the adoption of information literacy as simply an updated term for library skills, bibliographic instruction, or library orientation. In an article expressing his concerns with the term information literacy, McCrank explains that at times the phrase is used to repackage older terms such as library skills and bibliographic instruction while at other times it acts as an umbrella term encompassing a host of skills so comprehensive that it is difficult to reduce to practical goals and objectives (1992, 486). Although written twelve years ago, McCrank’s viewpoint is particularly valid when considering the movement of the term beyond the academic
realm. Even within the academic community, confusion over the term continues today. In order for the concept to be successfully applied in the workplace environment, researchers and professionals need to be aware of the ambiguity that exists around the term and how it can be resolved.

The common themes in the literature that challenge the term “information literacy” include the vagueness of the phrase, the misuse of the term, and the potential misinterpretation of the term “literacy.” For example, in his article “Information Literacy: Some Misgivings,” Foster expressed his objections to the term, pointing out that the phrase is value-laden and that lack of the related skills condescendingly implies the state of information illiteracy. Indeed, information literacy expert Breivik notes that “most people today are information illiterates, and this is having a significantly negative impact on business and society in general” (1992, 6). While Breivik’s point is important in emphasizing the need for information literacy skills in business, the quote also demonstrates Foster’s point regarding the negative connotations of the term. Such considerations are particularly relevant when considering the application of the term to the workplace environment by identifying potential misinterpretations.

Noting the ongoing and unproductive deliberations in the literature over the concept of information literacy, Owusu-Ansah attempts to resolve the definitional debate with his article “Information Literacy and the Academic Library: A Critical Look at the Concept and the Controversies Surrounding It” (2003). Owusu-Ansah demonstrates that there are more similarities than differences in the efforts to define information literacy and that the apparent ‘definitional conundrum’ is subverting the efforts of academic librarians to develop and maintain effective information literacy programs (220). While disagreements in the literature are sure to continue, Owusu-Ansah emphasizes the need to shift beyond the exploration of definitions
towards designing innovative solutions. Notably, a similar argument comes from Oman in the business sector, as she explains that "[i]n a corporate environment, it's best to quickly get past 'theorizing' and start talking about demonstrated value" (2001, 40).

Components of Information Literacy

As noted by Behrens (1994) in her historical overview of information literacy, many of the earlier definitions focused on the requirements of information literacy, but did not attempt to identify the precise skills and knowledge involved with the concept (311). The Association of College and Research Libraries (ACRL)'s *Information Literacy Competency Standards for Higher Education* sets out to accomplish this task. In this report, an information literate person is described as someone who is able to:

- Determine the extent of information needed
- Access the needed information effectively and efficiently
- Evaluate information and its sources critically
- Incorporate selected information into one's knowledge base
- Use information effectively to accomplish a specific purpose
- Understand the economic, legal, and social issues surrounding the use of information, and access and use information ethically and legally

(2000, 2)

Complementing the definition proposed by the American Library Association, the ACRL report clearly delineates the competencies associated with the concept of information literacy. The report also provides clarification on the difference between information literacy and information technology or computer skills: "Information literacy, while showing significant overlap with information technology skills, is a distinct and broader area of competence... information technology skills are interwoven with, and support, information literacy" (2000, 3).

A recent contribution in the effort to define the skills of information literacy specifically in the workplace environment comes from Goad in his book *Information Literacy and Workplace*
Performance (2002). Goad offers a sixteen-step model that provides a template for executing the information literacy process. His model attempts to illustrate the complexity of information literacy in the workplace and present the detailed steps involved in the process. His model includes steps such as establishing a need, selecting a strategy, authenticating information, selecting an information context, and evaluating the action taken (27). Goad frames information literacy as a system of interdependent skills that must be mastered for success in the future workplace.

Notably, scholars such as Kuhlthau (1993) and Bruce (1997) conclude that information literacy is not a discrete set of skills, but rather a way of learning, thinking, and reasoning. Similarly, in an examination of information literacy experiences of auditors and engineers, Cheuk (1998) notes that many dimensions of information literacy are closely tied to context. She notes, for example, that information seeking is not always necessary and that the process is not always linear. In contrast to Goad’s sixteen-step model, Cheuk emphasizes the unpredictable and highly individualistic nature of information seeking and asserts that such linear models cannot be applied across all workplace situations.

Limitations of Current Definitions

The greatest limitation to the current definitions with regard to application in the workplace environment is the fact that most of the research stems from academia. While the concept of information literacy originated in relation to the workplace, the definition has expanded and developed since that time and become closely tied to the academic realm. Noting this insufficiency, the literature points to a need to move beyond the confines of the academic library and take action in promoting the importance of these skills in society. While the
competencies involved in information literacy seem transferable across a variety of contexts, Cheuk's study points out the need to investigate further the applicability of these standards in non-academic workplace environments. The challenge for future research will be to conduct further testing of information literacy standards in the workplace to explore the relevancy and applicability of the standards detached from the academic sector.

Assessing Information Literacy

Since the publication of the ACRL’s Information Literacy Competency Standards for Higher Education in 2000, a number of college and university libraries have launched studies to measure the information literacy skills of their student populations against the five standards and twenty-two performance indicators outlined in the document. The standards provide a detailed framework for assessing an individual's information literacy skills. By clearly defining recommended competencies, they also provide an impetus for planning, implementing, and evaluating teaching programs. The impact of these standards on current research initiatives has been so significant that, for the purposes of this literature review, the focus will be on assessment studies produced after the ACRL publication.

While the literature does not indicate that the ACRL assessment standards have been applied in the workplace, an examination of assessment techniques can provide a framework for developing a measurement tool applicable to the business environment. This section will examine the challenges in assessing information literacy skills, review the current assessment tools that exist, and address the limitations of these tools with regards to assessment in the workplace environment.
Challenge with Assessing Information Literacy

As the ACRL standards have now been widely adopted within the academic library community, the key challenge for current researchers lies in developing effective tools for evaluating students' skills and learning progress. In most cases, this process is difficult and labour-intensive. Dunn notes in “Assessing Information Literacy Skills in the California State University: A Progress Report,” that many standards and competencies are expressed in vague language, making it difficult to translate the concepts into precise measures to assess competence (2002, 34). In recent years, a number of academic libraries have experimented with small-scale assessment projects; however, the need for larger-scale, systematic studies is widely acknowledged (Maughan 2001, 84; Meulemans 2002, 67; Rockman 2002).

Current Assessment Tools

The ACRL standards carefully distinguish between the “lower order” and “higher order” thinking skills that should be considered in any information literacy assessment project (2000, 6). Lower order skills include, for example, the abilities to formulate a keyword search and differentiate between primary and secondary sources (Maughan 2001, 73). In her article, “Assessing Information Literacy Among Undergraduates: A Discussion of the Literature and the University of California-Berkeley Assessment Experience,” Maughan describes the efforts of the university’s teaching library to evaluate the lower order skills of graduating seniors in several academic departments. Detailed questionnaires were mailed to students to gather information about their self-assessed and demonstrated competencies. Many of these thirty-six multiple-choice questions, however, were highly source-specific; history seniors, for example, were asked to identify particular resources such as America: History and Life, Current Contents, and the Readers’ Guide to Periodical Literature (Maughan 2001, 79). Overall, this questionnaire was
developed with reference to the library collection at hand. As a result, the assessment tools employed by this library would not translate easily to a different research context. This study concluded that students generally tend to overestimate their lower order information literacy skills (Maughan 2001, 83). This finding could be particularly relevant for employers if incoming graduates tend to report a higher level of competence than they are actually able to demonstrate on the job.

Higher order skills, in comparison, include the abilities to critically evaluate information sources and synthesize information (Maughan 2001, 73). Several recent projects aim to assess skills on both levels. In an article on the Project for the Standardized Assessment of Information Literacy Skills (SAILS), O'Connor, Radcliff, and Gedeon document efforts to design an "instrument for programmatic-level assessment of information literacy skills" (2002, 528). This project, sponsored by Kent State University and the Association of Research Libraries, draws on systems design and item response theory to develop an assessment tool based on the "model learning outcomes written and adopted by ACRL" (O'Connor et al 2002, 332). Ultimately, the project seeks to measure students' information literacy skills through a series of pre- and post-tests. During the three year research and development phase, over 80 academic institutions and 42,000 students participated in project SAILS, and the latest version of the multiple-choice test will be launched Fall 2006 (Kent State University, 2006). The instrument is intended to be applicable to any institution or library context, can be administered online, and measures information literacy skills at the cohort level by skill set, majors, and class standings.

In a similar study, the California State University's Information Competence Assessment Project seeks to develop standardized, longitudinal tools for skills assessment. According to Dunn, this comprehensive project is a "multi-method, multi-year approach using qualitative and
quantitative strategies” (2002, 27). Assessment tools developed in the first phase of this project included a lengthy questionnaire that presented students with a number of “real life” information scenarios. The goal of this process was to assess if students could develop connections between “theoretical knowledge learned in school and everyday life/workplace tasks” (2002, 29). A Research Process Skills Scale and a Library Problems Scale were also employed to analyze students’ perceptions of their own information literacy competencies. In the second phase of this project, students were invited to participate in a full day of intensive assessment activities. Their information-seeking strategies were carefully tracked via screen captures, video and audio recordings, and in-person interviews.

The Information Competence Assessment is a work in progress. Overall, however, this project’s emphasis on assessing the transferability of academic skills to “real life” contexts is noteworthy. Considering that support for information literacy education has emerged from a range of external stakeholders, including the business community (Rockman 2002), this emphasis may represent a new direction for assessment goals and strategies.

Limitations of Assessment Techniques

In recent years, information literacy has been widely recognized as a critically important learning outcome for college and university students in all disciplines. These skills have now been formally defined and delineated by the ACRL report (2000). As Meulemans suggests in “Assessment City: The Past, Present, and Future State of Information Literacy Assessment,” however, the “great detail of ACRL’s information literacy standards belie the need for in-depth, comprehensive assessment of student learning and teaching. The formalization of information
literacy is an imperative to assess it" (2002, 67). Current assessment studies seek to develop tools to measure the extent to which students comply with these standards.

According to the ACRL, "information literacy competency extends learning beyond formal classroom settings and provides practice with self-directed investigations as individuals move into internships, first professional positions, and increasing responsibilities in all areas of life" (2000, 4). To date, however, most studies have focussed on evaluating these competencies as they contribute to student learning and success in academic contexts. Existing surveys, questionnaires, screen captures, and other research methods are largely designed to measure college or university library research skills. Very few tools have been developed to evaluate these competencies in “real life” contexts. Accordingly, the limitations of current assessment techniques present a challenge to researchers seeking to assess these competencies in the workplace or other non-academic environments.

Information Literacy and the Workplace

As previously noted, the majority of research and scholarship on information literacy has originated from the academic environment. In general, most of the research conducted in the business sector has been focused on new technologies and, in some cases, the concept of computer literacy (Bruce 1999, 33). It is certainly agreed that employees need to be “technology literate” to survive in today’s workforce; however, the union of academic standards of information literacy with the expectations of the workplace is just beginning to occur.

This section of the review will look at recent studies that have been conducted both within the discipline of library and information science, and beyond. It will examine the present gap between the academic and business communities in their understanding of information
literacy, its importance, and its application to the workplace. What emerges from the research of both the academic and corporate worlds is a clear indication that information literacy is a growing force in today’s society.

Recent Studies

One of the most important studies to look at information literacy in the workplace, and one that is frequently cited in the academic literature, is the SCANS report published in the early 1990’s by the Secretary’s Commission on Achieving Necessary Skills (a unit within the US Department of Labor). This report examined the specific skills required by individuals on entry into the workforce and, through an analysis of the direction in which the corporate world was moving, researchers were able to draft a core set of required skills. The report seeks to identify the skills necessary for the workforce, propose a new “language” in which to speak of these skills, and use these findings to improve the American educational system. Notably, this study does not specifically employ the term “information literacy;” however, it is evident that many of the required skills fall under its definition (Spitzer, Eisenberg, and Lowe 1998, 90).

The study itself takes a variety of approaches to gathering research material. Experts in various fields related to workplace skills were consulted, corporations and their employees were interviewed, and contemporary research was reviewed. The study is valuable for its evaluation of the direction in which the workforce was headed. Notably, the specific skills recommended as required in the future are among the skills now considered as central to information literacy today.

The SCANS report is an example of a specific report that was produced to look at the workplace as a whole. Since its publication, many more specific studies have been conducted within various disciplines that examine the skills necessary to succeed in the workplace. For
example, "Information Technology Skills Recommended for Business Students by Fortune 500 Executives" (Zhao and Alexander 2002), looks at the skills needed for business students for entry into the workforce. The study used a questionnaire to survey members of the business community regarding the skills they viewed as essential in new employees. The research was conducted to develop a methodology for consistent evaluation of the changing needs of the workplace and to help students recognize the skills that the workforce demands.

Since the study’s focus was on technology skills, the results indicate the necessity of many specific computer skills and knowledge of specific software programs. Coupled with these results, however, a recurring theme within the research findings was the importance of self-learners. Among the survey comments, one made most frequently was the desire that “upon graduation, students should also have life-long learning skills and be able to teach themselves new skills and knowledge under the pressure of time” (186). Although not specifically referring to the term information literacy, such survey comments echo part of the ALA’s definition of information literacy that “information literate people are those who have learned how to learn” (1989). Further research in this area could be conducted with a focus on students’ ability to adapt to the constantly changing workforce and its technological developments, as opposed to the focus on evaluating the shifting needs of the workplace. A limitation to note regarding these findings, however, is the 12% response rate of the survey (51 usable responses of 434 questionnaires sent) (181), bringing into question the reliability of the results.

A similar study was conducted in the nursing discipline (McCannon and O’Neal 2003). This study, too, focused on the specific computer skills needed by students for employment in their field. Again, the method chosen was the distribution of a questionnaire. In this case, however, the number of respondents was much higher (752 respondents from the 2000
questionnaires sent), resulting in a 38% response rate (339). Many specific skills were recommended by the study; however, as with Zhao and Alexander's study, the focus did not specifically extend to information literacy. Despite this, its relevance to information literacy may be inferred by the conclusions of the authors. The study indicates that it is necessary to move beyond the boundaries of single disciplines in order to address the demands of the contemporary workplace. This conclusion is notable since it appears that library and information science literature was not consulted in the process of this study and researchers might have found relevant information pertaining to their study by doing so. The application of the concept of information literacy to such specific fields needs further study. Notably, studies with a similar focus on technology skills and computer literacy have been conducted in other disciplines, including Communications (Lowrey and Becker 2001) and Information Technology (Abell 2000).

Currently, the majority of studies on information literacy and the workplace are specific to one discipline and conducted in isolation from other fields. In some cases, the term “information literacy” is discussed, but most often the focus is on the technology skills required by the workplace. The interdisciplinary nature of information literacy has yet to be fully recognized. Recent literature that elaborates on the concept of the changing workplace, however, provides support for the view that information literacy is an essential, marketable asset in today’s economy.

Academic versus Workplace Environments

With the majority of literature on information literacy emerging from the academic community, much of it is focused on curriculum development and the implementation of
programs to foster the necessary skills in students. As the importance of information literacy is promoted, the academic community has taken up the challenge voiced by Owusu-Ansah:

The need is for academic librarians to come to some consensus on the desired structure of a program that is comprehensive enough to assure the information literacy training of every college and university student, and to convince the entire college/university community of the viability and effectiveness of that program (2003, 227).

Such a program is beginning to take shape in many universities and colleges throughout the United States and Canada. Information literacy standards and learning outcomes are being drafted and adapted to suit individual communities of learners (Spitzer, Eisenberg, and Lowe 1998; Rockman 2002; Lemke 2003; Miles and Wilson 2004). While progress takes place in the academic environment, however, “little has been written about information literacy in the corporate environment” (Oman 2001, 33).

In Oman’s article “Information Literacy in the Workplace” (2001), she notes that there is growing recognition among management of the importance of employing staff who know how to deal with information. Oman identifies the gap between the educational and business sectors of information literacy research. While stressing the importance of information literacy, she explains that the skills taught in the academic environment are not (and may never be) sufficient for the workplace. Oman states: “the skill sets taught in today’s classroom have not necessarily made the transition to the corporate setting” (35). She asserts that society and individuals cannot rely solely on academia to teach students the skills they need to know in the workplace and businesses need to take the initiative in fostering these skills in their employees.

Bruce (1999) takes a different approach to information literacy in the corporate world in her article “Workplace Experiences of Information Literacy.” Rather than looking at the need for information literacy in the workplace or the skills that define it, Bruce investigates the ways in which people experience information literacy. The result is her proposal of the “seven faces
of information literacy.” Through her research concerning the different ways people deal with information, Bruce offers suggestions to both managers and educators for supporting information-based processes. The article is useful not only for its unique approach to information literacy, but also for learning about the methodology used to gain results. Bruce takes a qualitative approach to her research, rather than a quantitative survey. While her qualitative approach produces results that are difficult to interpret, her research method delves deeply into the psychological experience of information and learning. Although the application of “the seven faces of information literacy” is not immediately apparent, it is interesting to note that her conclusions are similar to those of other research. The abilities to think critically, adapt to new situations, and organize and evaluate information are all critical skills of the information literate person. A more general conclusion that can be drawn from her research is that people experience information in different ways and that there is more than one definition of an information literate person.

More recently, Goad’s book *Information Literacy and Workplace Performance* (2002) attempts to address the lack of connection between the academic and business perspectives of information literacy. This comprehensive work delves into the application of the concept to the workplace. Goad asserts that, while formerly an academic matter, the critical array of skills concerned with information literacy are now important for anyone working in a knowledge-based environment. Goad’s findings echo many of the conclusions drawn by Oman and Bruce, and his book further demonstrates the growing recognition among scholars of the importance of examining information literacy skills in the workplace environment.
Limitations of Current Studies and Research

Although information professionals agree that information literacy is crucial to student success in the workplace, there appears to be little current evidence to support this claim. Many information literacy studies are over a decade old (such as the SCANS report), and the few workplace related studies that have been conducted (i.e. Zhao and Alexander 2002; McCannon and O’Neal 2003) focus only on one or two aspects of information literacy. In recent years, numerous information literacy standards have been drafted and programs have been developed. If information professionals are to be justified in their advocacy of information literacy, however, research must stay current and relevant to today’s marketplace.

One particular challenge facing the adoption of information literacy in the workplace is the insular nature of academic disciplines. Many recent studies, as previously discussed, have been conducted within specific fields that relate to information literacy. Yet, each discipline has its own language with which to speak of curriculum requirements and workforce skills. This results in research limited to the computer and technology skills that are unique to each discipline. What is absent is a discussion of skill sets and abilities to serve a person across a range of disciplines and development of the concept of an information literate person as a lifelong learner who can adapt to changing work environments.

Conclusion

This review has examined the relevance of information literacy in connection to the workplace environment. A significant amount of literature exists on the concept of information literacy and numerous studies have developed tools to assess information literacy skills. For the purposes of this review, information literacy has often been framed within the context of the
workplace; however, specific research on its usefulness to the corporate world is still emerging. For example, in searching for material for this review, an examination of *Dissertation Abstracts* yielded some results relating to information literacy, but no doctoral or masters theses could be located that focused directly on the relevance of information literacy skills in the non-academic workplace. Currently, there is little connection between the academic and corporate applications of information literacy.

Many questions still remain as to whether the information literacy competencies that students are gaining in their educational experiences are meeting the needs of the workplace. The lack of evaluative tools for assessing information literacy beyond the academic context currently contributes to the difficulties facing researchers in this area. Effective evaluation tools need to be developed and research needs to take place to assess how the information literacy skills gained in higher education can transfer to the workplace environment. Furthermore, research into the perception of the importance of information literacy skills in the workplace would be beneficial for assessing student and employer investment in such initiatives.

Research into the application of information literacy in the workplace is still in its infancy. Accordingly, there is much opportunity for researchers, both within and beyond the library profession, to explore this connection. This review of the literature provides a guide for research in this area by providing a sense of how the concept applies to the workplace, an overview of information literacy assessment techniques that can be tailored for the workplace, and a sense of the work that has already been initiated in the area. As emphasized in the literature, it is time to focus efforts away from describing the concept of information literacy and to start taking action.
CHAPTER 3

METHODOLOGY

As identified in the review of the literature, a lack of evaluative tools for assessing information literacy beyond the academic context has contributed to the difficulty for researchers examining this complex skill set in the workplace environment. Because of this, development of an effective evaluative tool was a focal point of this research project. After considering other research options, such as focus groups or interviews, it was decided that a questionnaire was the most appropriate method for collecting information for this study since it presents the most efficient and cost-effective way to reach the target population.

The following chapter outlines the methodology employed for this study, including a discussion of the format of the questionnaire; a description of how each question was researched and developed; specifics on the target population surveyed; details on how the survey was delivered to participants; and an explanation of how the survey data were analyzed.

Questionnaire Design

Insights from a review of the literature on information literacy and from an examination of Arts Co-op job descriptions formed the basis of all three questionnaires developed for this study. The three questionnaires developed for the descriptive survey are:

1. An online questionnaire for Arts Co-op students delivered at the beginning of their work terms. (see Appendix A)

2. An online questionnaire for the same Arts Co-op students delivered when exiting their work terms (see Appendix B).
3. A questionnaire for employers currently employing an Arts Co-op student (or students) (see Appendix C).

Each questionnaire consisted of a combination of Likert scale and short answer questions.

To formulate the “duties” categories for the first question in each questionnaire (i.e. “Which of the following duties applied to the co-op position?”), an analysis of thirty Arts Co-op job descriptions was conducted. The thirteen categories listed in question one encompass the range of duties encountered across the various job descriptions. This question was included to provide a richer context for analyzing the responses in question four, since it is hypothesized that the duties involved with a position will impact the specific information literacy skills that are deemed important.

Question two on each of the questionnaires (i.e. “Overall, do you feel that the ability to locate, evaluate, and use information is important . . .”) was included to give participants an opportunity to assess whether the concept of information literacy as a whole was important in the workplace environment. Participants were also asked to specify and give examples for their responses to this “yes/no” question. The open-ended element of this question provides the opportunity for participants to explain their response, and in cases when participants indicate “yes,” it allowed them to provide examples specific to their workplace.

As the core question to this study, question three required significant research. In formulating this question, it was particularly challenging to include all of the relevant skills that define information literacy without making the question so long that participants would lose interest. For example, the information literacy skills listed in the Association of College and Research Libraries’ (ARCL) report “Information Literacy Competency Standards for Higher Education” total eight printed pages and are highly academic in focus. The skills outlined by
Dunn in her report on assessing information literacy skills at California State University (2002) served as a useful balance to the catalogue of skills delineated by the ACRL report. Dunn defined information literacy through seven core competencies and these served as useful guidelines for formulating the skills listed in question three. Ultimately, formulating these eight skills was an iterative process that involved weaving specifics and details from the ACRL standards into Dunn’s succinct core competencies to achieve a comprehensive list of skills that are relevant to the workplace environment.

The final two questions on each questionnaire were open-ended questions that allowed participants to provide qualitative information related to the skills they rated in question three. The employer questionnaire asked if there were any particular skills listed in question three in which Arts Co-op students possess particular strength and, similarly, where they could use improvement. Part one of the student questionnaire asked the same question in regard to the skills of the student him/herself. These questions were aimed at gaining insight into areas where students need to develop their skills and providing points of comparison between the perceptions of employers and students regarding information literacy competencies. The open-ended questions in part two of the student questionnaire provided an opportunity for students to reflect on the information literacy skills they may have gained during the work term and areas where they discovered they needed improvement. Responses to this question will be particularly informative for the Arts Co-op administration and could provide focus for future workplace skills training sessions.

Each questionnaire was piloted with ten participants. The researcher recruited classmates, co-workers, and former supervisors to fill out and provide feedback on the questionnaire. This pilot of the questionnaire provided validation for the overall design of the questionnaire and
revisions were made based on participant feedback. Notably, several people who participated in the pilot survey indicated that the language used in question three was much too technical (library jargon) and difficult to understand for those not familiar with the concept of information literacy. The language was changed accordingly and re-piloted on these users to insure the changes corrected the initial difficulty they identified.

After submitting details of the study to the UBC Behavioural Research Ethics Board, including a copy of each of the three questionnaires, approval to conduct the study was received in February 2005 (see Appendix D).

**Target Population**

The target population for the study was all UBC Arts Co-op students and employers who met the following criteria:

- **Students**: All Arts Co-op Students hired for a work placement for the Summer 2005 semester (May to August).
- **Employers**: All employers who hired an Arts Co-op student for the Summer 2005 (May to August) semester and who had employed at least one Arts Coop student in the past in the same position. Arts Co-op employers who had not previously hired a student in the same position were excluded since these employers would not have the necessary level of familiarity with the position to make knowledgeable comments about the duties and skills involved. The contact name of the direct supervisor of each co-op student was provided by Arts Co-op administration.

A total of ninety-nine students were hired for co-op work placements for Summer 2005. The total number of employers who hired a co-op student(s) for the same period and met the above
criteria was forty-five. Based on data provided by the Arts Co-op program, forty-one students were working in public organizations (i.e. government agencies, universities, museums, school boards); thirty students were working in private organizations (i.e. publishers, consultants, law firms, hotel chains, car rental agencies); and twenty-eight students were working at not-for-profit organizations (i.e. youth services, mental health foundations, social services).

**Delivery of Questionnaire**

Arts Co-op employers were given a cover letter and questionnaire during a routine site visit from Arts Co-op administrators. Arts Co-op staff were provided with a script (Appendix E) to briefly explain the purpose of the questionnaire and the importance of employer participation in the survey.

Upon accepting their co-op positions, UBC Arts Co-op students were sent a link to the online questionnaire from the Arts Co-op office. After completing their work term, those students who submitted the first questionnaire were emailed a link to the second student survey to complete. For both student surveys, reminder emails were sent out two weeks after a student was sent the original invitation to complete the survey if they had not yet responded.

**Collection and Analysis of Results**

Survey results were collected online and by fax. Faxed copies of the questionnaire were sent to the Arts Co-op office and online surveys were sent directly to the researcher’s email address. Upon receiving the completed questionnaires, the researcher compiled and analyzed the data to identify the specific skills that were viewed as important by students and employers and extract relevant findings revealed in the data. Written responses were examined and coded into
specific categories to reveal patterns in the data as well as analyzed for their qualitative aspects. T-tests were conducted on the data from question three in order to assess if there were any statistically significant differences in responses between Student Survey 1 and Student Survey 2; Student Survey 1 and the Employer Survey; and Student Survey 2 and the Employer survey. T-test analysis was selected because it is an appropriate statistical test for comparing the means of two groups. T-test scores were then compared against an alpha level of 0.05, which means there is a 95% confidence level that results with a t-score of less than this assigned alpha level are statistically significant and not due to chance.

Conclusion

Thorough research was conducted in order to develop an appropriate questionnaire for this study. Through analysis of Arts Co-op job postings, ACRL guidelines for information literacy, and Dunn’s report on assessing information literary skills at California State University, a solid questionnaire was developed and adapted for the three survey situations: Student Survey 1, Student Survey 2, and the Employer Survey. The online method of survey delivery served as an effective method for reaching participants and also facilitated greater ease in analysis of results (as they were already in digital format). Data from each survey were carefully analyzed to reveal patterns and draw conclusions from the responses. As will be evident in the Results chapter to follow, the methodological approach employed for this study allowed for the collection of a rich data set for analysis and provided an effective method for exploring the concept of information literacy in the workplace.
CHAPTER 4

RESULTS

The first survey in this study, Student Survey 1, was launched in April 2005. A total of 99 questionnaires were sent out and 64 students responded. The second student survey was launched in late August 2005 and sent only to those students who responded to the first survey; a total of 53 students submitted their feedback in this second phase. The employer survey took place over June and July 2005. Since many employers hired multiple students, there were a total of 45 employers who received a survey, 37 of whom responded. The corresponding response rates are illustrated in Table 1 below.

Table 1. Response rates

<table>
<thead>
<tr>
<th></th>
<th>Student Survey 1</th>
<th>Student Survey 2</th>
<th>Employer Survey</th>
</tr>
</thead>
<tbody>
<tr>
<td>Questionnaires Sent</td>
<td>99</td>
<td>64</td>
<td>45</td>
</tr>
<tr>
<td>Responses</td>
<td>64%</td>
<td>53%</td>
<td>37%</td>
</tr>
<tr>
<td>Response Rate</td>
<td>65%</td>
<td>83%</td>
<td>82%</td>
</tr>
</tbody>
</table>

Notably, although the response rate on Student Survey 2 was 83%, a total of 54% of the original respondents completed the second survey (53 of the initial 99). Regarding the Employer Survey, there was initially a very low response rate on the hard copy of the questionnaire (seven responses). Accordingly, an email reminder was sent out to employers with a link to an online version of the survey that resulted in 30 additional responses.

Following is a summary of responses across the three surveys conducted for this study. Since questions on each of the surveys vary only slightly but aim to collect similar information from respondents, results across each survey are compared and contrasted question by question, enriching the analysis and providing an overview of the study’s results.
Question One Responses

The first question on each survey asked participants to indicate which duties applied to their co-op position. The percentage of respondents who marked each duty as applying to their co-op position is presented in table 2 below:

Table 2. Respondents indicating each duty applied to the co-op position, by percentage

<table>
<thead>
<tr>
<th>Duty</th>
<th>Student Survey 1</th>
<th>Student Survey 2</th>
<th>Employer Survey</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research &amp; Analysis</td>
<td>52%</td>
<td>60%</td>
<td>73%</td>
</tr>
<tr>
<td>Customer Service</td>
<td>66%</td>
<td>57%</td>
<td>65%</td>
</tr>
<tr>
<td>Public Relations</td>
<td>56%</td>
<td>55%</td>
<td>62%</td>
</tr>
<tr>
<td>Filing, organizing, and/or compiling data</td>
<td>66%</td>
<td>74%</td>
<td>81%</td>
</tr>
<tr>
<td>Event planning/Coordination</td>
<td>44%</td>
<td>40%</td>
<td>59%</td>
</tr>
<tr>
<td>Program Design/implementation</td>
<td>20%</td>
<td>32%</td>
<td>32%</td>
</tr>
<tr>
<td>Software development/testing</td>
<td>3%</td>
<td>0%</td>
<td>3%</td>
</tr>
<tr>
<td>Writing/composition</td>
<td>55%</td>
<td>66%</td>
<td>76%</td>
</tr>
<tr>
<td>Proofreading/editing</td>
<td>38%</td>
<td>59%</td>
<td>65%</td>
</tr>
<tr>
<td>Teaching/presenting to groups</td>
<td>31%</td>
<td>38%</td>
<td>54%</td>
</tr>
<tr>
<td>Managing/supervising staff</td>
<td>14%</td>
<td>21%</td>
<td>11%</td>
</tr>
<tr>
<td>Website maintenance/development</td>
<td>13%</td>
<td>11%</td>
<td>11%</td>
</tr>
<tr>
<td>Graphic Design</td>
<td>5%</td>
<td>11%</td>
<td>22%</td>
</tr>
</tbody>
</table>

The top five duties students indicated would apply to their co-op position on Student Survey 1 were:

1. Filing, organizing, and/or compiling data (66%)
2. Customer Service (66%)
3. Public Relations (56%)
4. Writing/composition (55%)
5. Research and analysis (52%)
Notably, when students initially completed the questionnaire they had not yet started the job, whereas when they submitted the second questionnaire, they were near completion of the four-month work term. Accordingly, by Student Survey 2, the top five duties that students reported as relevant to their co-op position had shifted to the following:

1. Filing, organizing, and/or compiling data (74%)
2. Writing/composition (66%)
3. Research and analysis (60%)
4. Proofreading/editing (59%)
5. Customer service (57%)

From the first student survey to the second, the duties of writing/composition and research shifted to a position of greater relevance, whereas customer service moved down in percentage, and public relations did not make the second list of top five duties. On both surveys, filing, organizing, and/or compiling data was a duty that applied to the majority of co-op positions.

The top five duties that employers indicated as applying to the co-op position with their company were as follows:

1. Filing, organizing, and/or compiling data (81%)
2. Writing/composition (76%)
3. Research and analysis (73%)
4. Proofreading/editing (65%)
5. Customer service (65%)

Notably, the top five skills indicated by employers as applying to the position with their company was identical to those indicated by students in the second survey. The skills that were
least relevant to the co-op positions for both students and employers were software
development/testing, graphic design, website maintenance/development, and
managing/supervising staff.

**Question Two Responses**

Question two on each questionnaire asked participants to indicate whether the ability to
locate, evaluate, and use information was important to their co-op position. Ninety-four percent
of students on both surveys and 100% of employers answered “yes” to this question. On the first
student survey, of the 42 students who elaborated on their responses, 23 indicated that
information literacy skills were important to their position because of the heavy research and
data analysis components involved in their work. The four students who reported that these skills
were not important indicated that customer service and public relations duties were most
important to their position and commented that their jobs did not require research skills or the
need to find information. On the second student survey, student responses focussed on the need
in their co-op position to locate specific information quickly and efficiently for their employers.
Those employers who elaborated on their response to question two emphasized the importance
of solid research skills in many co-op positions as well as the ability to communicate information
effectively to clients and other co-workers both in verbal and written formats. Another theme
that emerged from employer comments was the need for students to be strong critical thinkers
and work well independently to research, problem solve, and/or meet clients’/customers’ needs
and requests.
Question Three Responses

Question three of each survey asked participants to rate the importance of eight key abilities that define information literacy as a whole. Results from question three are illustrated in table 3, below:

Table 3: Respondents rating importance of each information literacy related skill, by percentage

<table>
<thead>
<tr>
<th>Ability to . . .</th>
<th>Survey</th>
<th>Perceived Importance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Not at all Important</td>
</tr>
<tr>
<td>a. Clearly formulate and articulate a problem, issue, or research question.</td>
<td>Student 1</td>
<td>3%</td>
</tr>
<tr>
<td></td>
<td>Student 2</td>
<td>6%</td>
</tr>
<tr>
<td></td>
<td>Employer</td>
<td>---</td>
</tr>
<tr>
<td>b. Determine the information required to solve a problem, issue, or research question.</td>
<td>Student 1</td>
<td>2%</td>
</tr>
<tr>
<td></td>
<td>Student 2</td>
<td>4%</td>
</tr>
<tr>
<td></td>
<td>Employer</td>
<td>---</td>
</tr>
<tr>
<td>c. Select the most appropriate source for accessing the required information and formulate an effective search strategy for locating it.</td>
<td>Student 1</td>
<td>3%</td>
</tr>
<tr>
<td></td>
<td>Student 2</td>
<td>4%</td>
</tr>
<tr>
<td></td>
<td>Employer</td>
<td>---</td>
</tr>
<tr>
<td>d. Use the variety of information resources available (i.e. print, electronic, human) to answer or solve a problem, issue, research question.</td>
<td>Student 1</td>
<td>5%</td>
</tr>
<tr>
<td></td>
<td>Student 2</td>
<td>2%</td>
</tr>
<tr>
<td></td>
<td>Employer</td>
<td>---</td>
</tr>
<tr>
<td>e. Apply information in the planning, creation, and revision of a particular product or performance.</td>
<td>Student 1</td>
<td>5%</td>
</tr>
<tr>
<td></td>
<td>Student 2</td>
<td>11%</td>
</tr>
<tr>
<td></td>
<td>Employer</td>
<td>---</td>
</tr>
<tr>
<td>f. Create and communicate information effectively to others using various media.</td>
<td>Student 1</td>
<td>5%</td>
</tr>
<tr>
<td></td>
<td>Student 2</td>
<td>4%</td>
</tr>
<tr>
<td></td>
<td>Employer</td>
<td>---</td>
</tr>
<tr>
<td>g. Understand the ethical, legal, and sociopolitical issues surrounding the use of information (i.e. privacy and security, copyright, intellectual property).</td>
<td>Student 1</td>
<td>3%</td>
</tr>
<tr>
<td></td>
<td>Student 2</td>
<td>4%</td>
</tr>
<tr>
<td></td>
<td>Employer</td>
<td>---</td>
</tr>
<tr>
<td>h. Accurately and appropriately acknowledge the use of information sources (i.e. through references, citations, written or verbal acknowledgement) in communicating a product or performance.</td>
<td>Student 1</td>
<td>12%</td>
</tr>
<tr>
<td></td>
<td>Student 2</td>
<td>17%</td>
</tr>
<tr>
<td></td>
<td>Employer</td>
<td>---</td>
</tr>
</tbody>
</table>
Based on the summary in table 3, the majority of students and employers rated all skills as either important or very important to their co-op positions. Overall, however, employers rated the skills more highly than students, with not one skill rated as “not at all important” and few rated as “of little importance.” Student ratings, by comparison, are more distributed across the scale of perceived importance.

In order to better compare student and employer ratings of importance across each survey and allow for analysis of statistical significance across groups, the mean ratings of each skill on the five-point scale (from “not at all important” to “very important”) were compared between Student Survey 1 and Student Survey 2; Student Survey 1 and the Employer Survey; and Student Survey 2 and the Employer Survey. Figure 1 below shows the mean ratings across the two student surveys:

![Figure 1. Mean ratings, Student Survey 1 and Student Survey 2](image-url)
Analyzing these results further, a list comparing mean ratings of each skill in ranked order shows a shift in ratings of importance from the first student survey to the second (see table 4, below):

Table 4. Ranked ratings for Student Survey 1 and 2, by mean

<table>
<thead>
<tr>
<th>Rank</th>
<th>Student Survey 1</th>
<th>Student Survey 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Skill</td>
<td>Mean</td>
</tr>
<tr>
<td>1</td>
<td>b</td>
<td>4.20</td>
</tr>
<tr>
<td>2</td>
<td>d</td>
<td>4.14</td>
</tr>
<tr>
<td>3</td>
<td>f</td>
<td>4.13</td>
</tr>
<tr>
<td>4</td>
<td>c</td>
<td>3.98</td>
</tr>
<tr>
<td>5</td>
<td>a</td>
<td>3.89</td>
</tr>
<tr>
<td>6</td>
<td>e</td>
<td>3.78</td>
</tr>
<tr>
<td>7</td>
<td>g</td>
<td>3.63</td>
</tr>
<tr>
<td>8</td>
<td>h</td>
<td>3.06</td>
</tr>
</tbody>
</table>

In Student Survey 1, the skill rated as most important was 3b (the ability to determine the information required to solve a problem, issue, or research question). On Student Survey 2, this skill shifted down in importance to be replaced by 3d (the ability to use the variety of information resources available to answer or solve a problem, issue, research question). Interestingly, skill 3f (the ability to create and communicate information effectively to others using various media), shifted up in rank from the first student survey to the second; however, the mean rating shifted down from 4.13 on the first student survey to 4.11 on the second student survey. Skill 3c (the ability to select the most appropriate source for accessing the required information and formulate an effective search strategy for locating it) remained in the same position, although the mean rating decreased from 3.98 on the first survey to 3.89 on the second.

The skills rated as least important on Student Survey 1 were skill 3g (the ability to understand the ethical, legal, and socio-political issues surrounding the use of information) and skill 3h (the ability to accurately and appropriately acknowledge the use of information sources...
in communicating a product or performance). The skills rated as least important on Student Survey 2 were skill 3e (the ability to apply information in the planning, creation, and revision of a particular product or performance) and skill 3h. The mean for skill 3h, which was rated as least important on both student surveys, shifted from 3.06 on the first student survey to 2.87 on the second.

To analyze and interpret these results, t-tests were conducted to determine the probability that the difference between the means on each skill were causal or by chance. Despite the shifting ratings of importance, however, t-test results compared against an alpha level of 0.05 showed no statistically significant differences between Student Survey 1 and 2. Detailed t-test results are included in Appendix F.

While there was no statistically significant difference between means to report on the two student surveys, differences emerge when comparing Student Survey 1 with the Employer Survey. Figure 2 (page 42) compares mean ratings of each skill for these two surveys. Analyzing these results further, a list comparing mean ratings of each skill in ranked order shows the key differences between student ratings on the first survey and employer ratings (see table 5):

<table>
<thead>
<tr>
<th>Rank</th>
<th>Student Survey 1</th>
<th></th>
<th>Employer Survey</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Skill</td>
<td>Mean</td>
<td>Skill</td>
<td>Mean</td>
</tr>
<tr>
<td>1</td>
<td>b</td>
<td>4.20</td>
<td>d</td>
<td>4.73</td>
</tr>
<tr>
<td>2</td>
<td>d</td>
<td>4.14</td>
<td>f</td>
<td>4.59</td>
</tr>
<tr>
<td>3</td>
<td>f</td>
<td>4.13</td>
<td>b</td>
<td>4.51</td>
</tr>
<tr>
<td>4</td>
<td>c</td>
<td>3.98</td>
<td>e</td>
<td>4.46</td>
</tr>
<tr>
<td>5</td>
<td>a</td>
<td>3.89</td>
<td>c</td>
<td>4.41</td>
</tr>
<tr>
<td>6</td>
<td>e</td>
<td>3.78</td>
<td>a</td>
<td>4.27</td>
</tr>
<tr>
<td>7</td>
<td>g</td>
<td>3.63</td>
<td>g</td>
<td>4.11</td>
</tr>
<tr>
<td>8</td>
<td>h</td>
<td>3.06</td>
<td>h</td>
<td>4.00</td>
</tr>
</tbody>
</table>
Compared with Student Survey 1, which rated skill 3b as most important (determine the information required to solve a problem, issue, or research question), employers rated skill 3d as most important (use the variety of information resources available to answer or solve a problem, issue, research question). Employers rated skill 3f (create and communicate information effectively to others using various media) of greater importance than did students, as indicated both by rank and by mean. The skills rated least important by both students and employers were skill 3g (understand the ethical, legal, and socio-political issues surrounding the use of information), and skill 3h (the ability to accurately and appropriately acknowledge the use of information sources in communicating a product or performance).
T-test analysis of the student and employer means showed several statistically significant differences between the ratings for each skill. The greatest difference between means for employers and students on survey 1 were on skills 3d (use the variety of information resources available to answer or solve a problem, issue, research question), 3e (apply information in the planning, creation, and revision of a particular product or performance), and 3h (accurately and appropriately acknowledge the use of information sources in communicating a product or performance), all with t-values of zero. The next greatest difference was on skill 3c (select the most appropriate source for accessing the required information and formulate an effective search strategy for locating it), with a t-value of 0.02. Accordingly, at an alpha level of 0.05 (see page 33 for an explanation of alpha level) it can be concluded that the difference between employer and student ratings of skills 3c, 3d, 3e, and 3h are statistically significant and not caused by chance. Detailed t-tests results are included in Appendix G.

The mean ratings across Student Survey 2 and the Employer Survey showed a similar difference in ratings (figure 3, page 44). Analyzing these results further, a list comparing mean ratings of each skill in ranked order shows the key differences between student ratings on the second survey and employer ratings (see table 6, page 44).
Figure 3. Mean ratings, Student Survey 2 and Employer Survey

Table 6. Ranked ratings for Student Survey 2 and Employer Survey, by mean

<table>
<thead>
<tr>
<th>Rank</th>
<th>Student Survey 2</th>
<th>Employer Survey</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Skill</td>
<td>Mean</td>
</tr>
<tr>
<td>1</td>
<td>d</td>
<td>4.21</td>
</tr>
<tr>
<td>2</td>
<td>f</td>
<td>4.11</td>
</tr>
<tr>
<td>3</td>
<td>b</td>
<td>4.08</td>
</tr>
<tr>
<td>4</td>
<td>c</td>
<td>3.89</td>
</tr>
<tr>
<td>5</td>
<td>g</td>
<td>3.81</td>
</tr>
<tr>
<td>6</td>
<td>a</td>
<td>3.64</td>
</tr>
<tr>
<td>7</td>
<td>e</td>
<td>3.57</td>
</tr>
<tr>
<td>8</td>
<td>h</td>
<td>2.87</td>
</tr>
</tbody>
</table>
Rankings from Student Survey 2 and the Employer Survey are identical for the first three skills, with 3d (use the variety of information resources available to answer or solve a problem, issue, research question), 3f (create and communicate information effectively to others using various media), and 3b (determine the information required to solve a problem, issue, or research question) being the top three skills. Employers rated skill 3c (select the most appropriate source for accessing the required information and formulate an effective search strategy for locating it) and 3g (understand the ethical, legal, and socio-political issues surrounding the use of information) as less important than students, while they rated skill 3e (apply information in the planning, creation, and revision of a particular product or performance) as much more important than students. Skill 3h (accurately and appropriately acknowledge the use of information sources in communicating a product or performance) was rated as least important by students and employers, although there was a large difference between average ratings with 2.87 as the mean for students and 4.00 as the mean for employers.

With the exception of skill 3g, t-test analysis of the student and employer means showed statistically significant differences between these two groups on all skills. The greatest differences were on skills 3e and 3h, both with t-values of zero. Skill 3d showed a t-value of 0.003, skill 3f a t-value of 0.010, skill 3c a t-value of 0.013, and skill 3b a t-value of 0.019. Detailed t-tests results for Student Survey 2 and the Employer Survey are included in Appendix H.

As a final point of analysis/summary, the top five skills for each survey were compiled in three separate tables in order to get a sense of how each group rated these skills. On the first student survey, the top five abilities rated as most important by students as determined by mean ratings were (see table 7, page 46):
Table 7. Top five abilities, Student Survey 1

<table>
<thead>
<tr>
<th>Ability to...</th>
<th>Mean rating across five point scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. (3b) Determine the information required to solve a problem, issue, or research question.</td>
<td>4.20</td>
</tr>
<tr>
<td>2. (3d) Use the variety of information resources available (i.e. print, electronic, human) to answer or solve a problem, issue, research question.</td>
<td>4.14</td>
</tr>
<tr>
<td>3. (3f) Create and communicate information effectively to others using various media.</td>
<td>4.13</td>
</tr>
<tr>
<td>4. (3c) Select the most appropriate source for accessing the required information and formulate an effective search strategy for locating it.</td>
<td>3.98</td>
</tr>
<tr>
<td>5. (3a) Clearly formulate and articulate a problem, issue, or research question.</td>
<td>3.89</td>
</tr>
</tbody>
</table>

In contrast to the top five skills in Student Survey 1, the top five abilities rated as most important on Student Survey 2, as determined by mean ratings, were (see table 8):

Table 8. Top five abilities, Student Survey 2

<table>
<thead>
<tr>
<th>Ability to...</th>
<th>Mean rating across five point scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. (3d) Use the variety of information resources available (i.e. print, electronic, human) to answer or solve a problem, issue, research question.</td>
<td>4.21</td>
</tr>
<tr>
<td>2. (3f) Create and communicate information effectively to others using various media.</td>
<td>4.11</td>
</tr>
<tr>
<td>3. (3b) Determine the information required to solve a problem, issue, or research question.</td>
<td>4.08</td>
</tr>
<tr>
<td>4. (3c) Select the most appropriate source for accessing the required information and formulate an effective search strategy for locating it.</td>
<td>3.89</td>
</tr>
<tr>
<td>5. (3g) Understand the ethical, legal, and socio-political issues surrounding the use of information (i.e. privacy and security, copyright, intellectual property).</td>
<td>3.81</td>
</tr>
</tbody>
</table>
Finally, the top five skills rated as most important on the Employer Survey were (see table 9, below):

Table 9. Top five abilities, Employer Survey

<table>
<thead>
<tr>
<th>Ability to..</th>
<th>Mean rating across five point scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. (3d) Use the variety of information resources available (i.e. print, electronic, human) to answer or solve a problem, issue, research question.</td>
<td>4.73</td>
</tr>
<tr>
<td>2. (3f) Create and communicate information effectively to others using various media.</td>
<td>4.59</td>
</tr>
<tr>
<td>3. (3b) Determine the information required to solve a problem, issue, or research question</td>
<td>4.51</td>
</tr>
<tr>
<td>4. (3e) Apply information in the planning, creation, and revision of a particular product or performance.</td>
<td>4.46</td>
</tr>
<tr>
<td>5. (3c) Select the most appropriate source for accessing the required information and formulate an effective search strategy for locating it.</td>
<td>4.41</td>
</tr>
</tbody>
</table>

In summary, while a number of skills shifted in importance from Student Survey 1 to Student Survey 2, as shown in tables 8 and 9, t-tests did not reveal any statistically significant difference between the two sets of responses. By contrast, the top skills indicated on Student Survey 1 and the Employer Survey differed in rankings of importance and also showed several statistically significant differences. Finally, while the top five list for Student Survey 2 and the Employer Survey are nearly identical, these two groups showed the most statistically significant differences between the means, with employers rating all skills higher in importance than students.

**Question Four Responses**

Question four first asked participants to review the abilities listed in question three and for Student Survey 1, indicate the skills in which they felt they possessed a particular strength; for the Employer Survey, indicate which of these skills employers found to be a strength of co-
op students; and for Student Survey 2, indicate the skills they felt were developed during their work term. The written responses from question four were analyzed and grouped according to the categories from question three in which they fit. The results from question four were as follows (see table 10):

**Table 10. Respondents rating skills as personal strength/area improved during work term/student strength, by percentage**

<table>
<thead>
<tr>
<th>Ability to</th>
<th>Student Survey 1 specifically in which you feel you possess a particular strength</th>
<th>Student Survey 2 you developed or improved during your work term</th>
<th>Employer Survey in particular you have found to be a strength of Arts Co-op students in general?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Of the skills listed in question 3 above, are there skills where...</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Clearly formulate and articulate a problem, issue, or research question.</td>
<td>18%</td>
<td>12%</td>
<td>32%</td>
</tr>
<tr>
<td>b. Determine the information required to solve a problem, issue, or research question.</td>
<td>20%</td>
<td>24%</td>
<td>36%</td>
</tr>
<tr>
<td>c. Select the most appropriate source for accessing the required information and formulate an effective search strategy for locating it.</td>
<td>6%</td>
<td>12%</td>
<td>43%</td>
</tr>
<tr>
<td>d. Use the variety of information resources available (i.e. print, electronic, human) to answer or solve a problem, issue, research question.</td>
<td>33%</td>
<td>31%</td>
<td>50%</td>
</tr>
<tr>
<td>e. Apply information in the planning, creation, and revision of a particular product or performance.</td>
<td>6%</td>
<td>7%</td>
<td>14%</td>
</tr>
<tr>
<td>f. Create and communicate information effectively to others using various media.</td>
<td>35%</td>
<td>52%</td>
<td>71%</td>
</tr>
<tr>
<td>g. Understand the ethical, legal, and socio-political issues surrounding the use of information (i.e. privacy and security, copyright, intellectual property).</td>
<td>2%</td>
<td>21%</td>
<td>4%</td>
</tr>
<tr>
<td>h. Accurately and appropriately acknowledge the use of information sources (i.e. through references, citations, written or verbal acknowledgement) in communicating a product or performance.</td>
<td>10%</td>
<td>10%</td>
<td>7%</td>
</tr>
</tbody>
</table>
The skills from question three that students on the first survey rated most consistently as a strength were skills 3d (use the variety of information resources available to answer or solve a problem, issue, research question) and 3f (create and communicate information effectively to others using various media). Students noted that problem solving, communication and research skills were well developed from their academic work and thus they considered such skills to be a strength they brought with them into their co-op work placements. For example, regarding skill 3d, one student noted that “I do that all the time with research papers and my current job so I feel quite comfortable finding extra resources to help answer questions.” Referring to his/her strength with skills 3d and 3f, another student remarked: “I'm very good with people generally, and communication is one of my strengths, but I'm also good at being creative in my response to difficulty.”

Employers also rated these skills as a strength of co-op students, with 50% of employers rating skill 3d and 71% rating skill 3f as a strength in the students they hired. In relation to skill 3f, several employers noted that Arts Co-op students demonstrated excellent research and writing abilities. For example, one employer commended the skills of Co-op students saying:

We have found our Arts Co-op students to be very good researchers, skilled at discovering areas of interesting research and developing well referenced reports. We choose them for their ability to communicate effectively with the public and provide various media (pictures, props, handouts) which they are encouraged to use.

Another employer noted that students “tend to be quite resourceful in digging up information and [are] good written communicators.” Employers also valued students for the fresh and unique perspectives they brought to the workplace, enabling them to effectively find information and solve difficult problems.
From Student Survey 2, 52% of students noted that during the course of their work term they developed skill 3f, in particular, public speaking skills and the ability to communicate effectively to clients and/or co-workers. For example, one student commented: “I learned to word emails and correspondence letters in a more professional tone and manner.” Another student remarked:

The ability to articulate and communicate problems and information was an area that I improved during my work term. I was required to explain... Foundation Policies on corporate sponsorship to event organizers in the community. I found that with practice I was better able to explain and defend both the policies and the reasons they were adopted.

Another finding to note is the difference in ratings from Student Survey 1 to Student Survey 2 on skill 3g. On the first survey, only 2% of students indicated that the abilities represented in 3g were a strength, whereas 21% on survey 2 indicated it was an area they had developed during their work term. Interestingly, however, this was the skill in question three that employers and students consistently reported as least important to the workplace. Another difference was the ratings of skill 3c (select the most appropriate source for accessing the required information and formulate an effective search strategy for locating it) on Student Survey 1 and the Employer Survey. Only 6% of students rated 3c as a strength, whereas 43% of employers felt it was a strength of co-op students.

**Question Five Responses**

Similar to question four, question five varied slightly across the three surveys. Student Survey 1 asked students to review the skills listed in question three and indicate the skills in which they could use improvement. Likewise, the Employer Survey asked participants which of the skills in question three were areas that students could use improvement. Student Survey 2
asked participants to indicate the skills in question three where they thought could use further development and how they planned to develop these skills. Written responses from question five were analyzed and grouped according to the categories from question three. The results of question five are included in table 11:

Table 11. Percentage of respondents rating skills as personal area for improvement/area for student improvement

<table>
<thead>
<tr>
<th>Ability to...</th>
<th>Student Survey 1</th>
<th>Student Survey 2</th>
<th>Employer Survey</th>
</tr>
</thead>
<tbody>
<tr>
<td>Of the skills listed in question 3...</td>
<td>are there any in particular in which you feel you could use improvement?</td>
<td>are there any that you think could use further development? If so, how do you plan to develop these skills?</td>
<td>in particular where you have found that Arts Co-op students could use improvement?</td>
</tr>
<tr>
<td>a. Clearly formulate and articulate a problem, issue, or research question.</td>
<td>12%</td>
<td>20%</td>
<td>20%</td>
</tr>
<tr>
<td>b. Determine the information required to solve a problem, issue, or research question.</td>
<td>7%</td>
<td>10%</td>
<td>13%</td>
</tr>
<tr>
<td>c. Select the most appropriate source for accessing the required information and formulate an effective search strategy for locating it.</td>
<td>14%</td>
<td>20%</td>
<td>13%</td>
</tr>
<tr>
<td>d. Use the variety of information resources available (i.e. print, electronic, human) to answer or solve a problem, issue, research question.</td>
<td>10%</td>
<td>27%</td>
<td>13%</td>
</tr>
<tr>
<td>e. Apply information in the planning, creation, and revision of a particular product or performance.</td>
<td>5%</td>
<td>3%</td>
<td>0%</td>
</tr>
<tr>
<td>f. Create and communicate information effectively to others using various media.</td>
<td>24%</td>
<td>37%</td>
<td>33%</td>
</tr>
<tr>
<td>g. Understand the ethical, legal, and socio-political issues surrounding the use of information (i.e. privacy and security, copyright, intellectual property).</td>
<td>12%</td>
<td>30%</td>
<td>13%</td>
</tr>
<tr>
<td>h. Accurately and appropriately acknowledge the use of information sources (i.e. through references, citations, written or verbal acknowledgement) in communicating a product or performance.</td>
<td>14%</td>
<td>7%</td>
<td>13%</td>
</tr>
</tbody>
</table>
Due to the diversity of responses to question five, a strong pattern did not emerge; nevertheless, skill 3f (create and communicate information effectively to others using various media) was rated most highly across all three surveys. On Student Survey 1, many students noted the need to improve their ability to communicate as well as to improve their public speaking/presentation skills. For example, one student noted: “I need to improve my ability to communicate and clearly articulate what I am trying to convey. Sometimes I can be shy and come off as blunt or abrasive simply because I need to work on my social finesse.” Another student on Survey 1 commented: “It takes me a while to efficiently and concisely translate my thoughts into words. I always know what I want to say but seldom know the best way to say it. For example, when writing essays, it often takes me many many revisions to produce the final result.”

Employers also noted the need for students to further develop communication and public speaking skills; however, as one respondent noted, the need to improve these skills “...is not at all limited to Arts Co-op students.” One employer explained that students need to “...become more proficient at presenting information to varied audiences (technical and non-technical).” Another noted that he/she found BCIT students to be stronger in communication and presentation skills because they “… have a mandatory communication/presentation type course as part of their program.” Strong presentation and communication skills came through as highly important to employers.

Respondents from Student Survey 2, remarking on how they planned to further develop the skills they felt could use improvement, noted that they planned to do so through schoolwork, volunteer opportunities, and future co-op work placements. One student commenting on her wish to improve her skills in 3f noted: “I would like to use other forms of communication perhaps

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² British Columbia Institute of Technology
power point. If I had the chance to take a class to learn I would.” Regarding the same skill set, another student remarked: “I could develop these skills by getting more hands-on experience doing so in as many diverse situations as possible through volunteer work, etc.”

A positive finding from the employer responses was their overall satisfaction with co-op students. Several employers noted that co-op students met all of their expectations. One employer commented: “To date we have found that Arts Co-op students exceed what is required of them.” In response to the question of whether there were specific skill areas where they felt co-op students could use improvement, an employer responded “No—we don't expect them to know everything before they get here, we can teach what is important to our organization.” Overall, while employers recognized that there is always room for improvement, the majority seemed satisfied with the skills that students were bringing to the workplace.

Conclusion

The three surveys delivered a rich data set from which to explore information literacy in the workplace. The response rate of 65% on Student Survey 1, 85% on Student Survey 2, and 82% on the Employer survey provides an adequate pool of results from which to draw conclusions on the research population. Across all co-op positions examined, the top five duties were filing, organizing and/or compiling data; writing/composition; research & analysis; proofreading; and customer service. Ninety-four percent of students and 100% of employers indicated that the ability to find, locate, and evaluate information was useful to the co-op position in question. Of the range of abilities included in question three, students and employers both indicated that the ability to use the variety of information resources available (i.e. print, electronic, human); create and communicate information effectively to others using various
media; determine the information required to solve a problem, issue or research question; select
the most appropriate source for accessing the required information and formulate an effective
search strategy; and apply information in the planning, creating, and revision of a particular
product or performance were important for workplace success. Notably, student ratings of the
importance of these skills were more varied than those of employers.

The ability that employers found to be a strength in co-op students was the ability to create
and communicate information effectively to others using various media, and while student
ratings were more dispersed across the categories, students also rated this both as a strength and
as an area that had most improved over the course of their work term. Interestingly, when asked
to indicate an area where students could most use improvement, the strongest trend in the results
from employers was in the very same skill they indicated was a strength—the ability to create
and communicate information effectively to others using various media. It was also the ability in
which students felt they could use the most improvement, and one that they hoped to develop
further in the future.

Overall, the results from the survey provide a rich data set from which to draw
conclusions. Questions one through three, which were in the yes/no answer or Likert scale
format, provided the strongest data set, whereas the results from questions four and five were
much more varied, and a strong pattern did not emerge from these results. In the next chapter,
the results will be explored and discussed, and the future implications of these results will be
considered.
CHAPTER 5

CONCLUSION AND RECOMMENDATIONS FOR FURTHER RESEARCH

In an article entitled 21st Century Learning and Information Literacy, Breivik notes that "[n]owhere is the need for information literacy skills greater than in today's work environment, where efforts to 'manage' knowledge are increasingly necessary to keep a strategic advantage within a global market" (2005, 23). This study was designed to investigate whether within the context of the Arts Co-op Program, information literacy skills are highly valued by employers across a range of workplace environments and if a student's experience on the job develops awareness regarding the importance of these skills and areas they need to further develop. Specific issues under investigation were the level of importance that Arts Co-op employers and students placed on particular information literacy skills; if the perceptions of the importance of information literacy skills changed for Arts Co-op students with experience on the job; and if the perceptions of the importance of information literacy skills in the workplace differed between Arts Co-op employers and students. The following chapter will interpret the results from the study, relating the findings to the original problem statement and to the literature in the field. Implications of the research will be discussed with respect to undergraduate students, university staff, the Arts Co-op program, and future researchers investigating information literacy skills in the workplace.

Discussion

The review of the literature emphasized that although information professionals agree that information literacy is crucial to student success in the workplace, there is little evidence to support this claim. While specific to the Arts Co-op population surveyed, this study provides
data to support the belief that information literacy skills are important across diverse workplace environments. All employers who responded to the survey indicated that the ability to locate, evaluate and use information was important to the Co-op position with their company. Analysis of mean ratings of importance across the eight abilities listed on the questionnaire as well as comments in short answer responses indicate that employers across a variety of fields viewed these skills as critical for workplace success. These findings provide support that information literacy skills are highly valued by employers. In addition, the findings from question one, which had respondents indicate the key duties involved with each co-op position, provide useful information to students on the types of duties they are expected to perform in Arts Co-op jobs, and indeed, in similar positions when they graduate.

One rather surprising finding was that the results did not indicate that a student’s experience on the job increases awareness of the importance of these skills and areas they need to develop further. Ninety-four percent of students before their work terms and 94% afterwards indicated that they felt these skills were important—showing no change from the first survey to the second. Furthermore, results from question three showed no statistically significant difference in the ratings of importance of these skills from the beginning of the work term to the end. It could be concluded that students found these skills to be important prior to beginning the work term, explaining why there was not a large difference in ratings from Student Survey 1 to Student Survey 2. Overall, however, the students’ mean ratings of importance for the abilities listed in question three were considerably lower than those of employers. In fact, student ratings on both surveys, but particularly those on the second student survey, showed a significant difference compared with employers in the level of importance students assigned to each skill. Students’ views of these skills not only changed very little over the course of their work terms,
but based on the mean ratings of the skills, it would also appear that they are not in concordance with employers on the significance of these skills in the workplace.

While the mean ratings tell one story, comparison of the ranked lists (pages 46-47) provides an alternate interpretation. Comparing Student Survey 1 and the Employer Survey, mean ratings showed some significant differences, as did the ranked lists. Therefore, rankings of importance and levels of importance differed between students on the first survey and employers. Mean ratings on Student Survey 2 and the Employer Survey seem to tell a similar story; however, the ranked lists do not. While there were statistically significant differences in the mean ratings of all but one skill when Student Survey 2 and the Employer Survey were compared, the top five skills listed by these two groups are nearly identical. Based on this, it could be concluded that over the course of the work term, students’ views become more in line with employers’, although they do not necessarily meet in terms of the level of importance assigned to each skill.

Another finding illustrating the divergent views of students and employers came from short answer question number four. Only six percent of students on the first survey indicated that they felt that skill 3c (select the most appropriate source for accessing the required information and formulate an effective search strategy for locating it) was a strength, whereas forty-three percent of employers indicated it was a strength they felt co-op students brought to the workplace. In this case, it seems that students underestimated their skills in this area. Notably, this data contradicts Maughan’s research findings that students tend to overestimate their information literacy skills (2001, 83). Of course, another interpretation of these results is that employers, who may not have well developed information literacy skills themselves, may be overestimating students’ abilities.
Also based on the short answer responses, skill 3f (create and communicate information effectively to others using various media) emerged as particularly important in the workplace environment. Employers indicated that it was both a strength of co-op students and an area to improve. Fifty-two percent of students indicated that this was a skill they developed over the course of their work term. Notably, skill 3f was also highly rated both in terms of mean and rank on question three for all surveys. While skill 3f stood out as both a strength of Co-op students and a skill where some students could use improvement, no other consistent pattern emerged from employer responses in terms of skills areas that students needed to develop. As one employer noted, “I see the areas listed in question 3 as skills that most students would/should be looking to improve through this experience.” Indeed, as reported in the results section, employers’ responses seem to indicate that they were satisfied with the skills that Co-op students brought to the workplace. A limitation to note with this finding, however, is that since these employers are hiring students and not graduates for these positions, they are likely to place less stringent expectations on these short-term employees. Rodrigues notes that corporations expect their new hires to “hit the ground running” (2001, 181) and emphasizes that the time to develop information literacy skills is not when entering the corporate world, but during an undergraduate program where library staff are available for support.

A final point of analysis relates to the responses for question five on Student Survey 2, which asked students to indicate if there were skills where they realized they could use improvement, and if so, how they planned to develop these skills. Students responded that they planned to develop their information literacy skills through schoolwork, volunteer opportunities, and future co-op work placements. It is notable that although the development of this skill set in students is a key focus for academic librarians and there are numerous programs offered at UBC
Library specifically for this purpose, not one student mentioned the library as a resource for improving their abilities. This may point to a lack of student awareness about the services that the library offers in developing these skills. Related to this finding, Haycock (1999) notes that

Students...do not use instructional programs that are offered on a voluntary basis and removed from classroom instruction; they are too busy and do not see any immediate need. If we are serious about implementing information literacy programs we need to start with the construction of assignments and the instruction provided for their effective completion. That means that we start with faculty colleagues. (n.p.)

In support of this, Brievik also notes that “...the single most effective way to increase library use is for faculty to create assignments that require thoughtful use of library resources and services” (2001, 24-25). Construction of assignments by faculty to emphasize the importance of developing these skills is critical—not only for the student’s benefit in the academic environment, but for developing the lifelong learning skills that are essential for success in the workplace.

Overall, the views expressed by both the students and employers who participated in this study provide evidence to support the importance of information literacy skills in the workplace. Findings also point to a difference in views, however, between students and employers in terms of the specific value of these skills in the workplace context. Furthermore, although their views did move more in line with those of employers by the end of the work term, student views showed little change over the course of their work term with respect to ratings of importance of these skills.

Implications and Further Research

Unlike other literacy research conducted in the business sector that has focused on new technologies, such as the concept of computer literacy (Bruce 1999, 33), this study was able to
examine how the many skills that comprise information literacy come into play in the workplace environment and determine which skills in particular are deemed most important by students and employers. With respect to research around these skills in the workplace context, the literature also points to a lack of evaluative tools for assessing information literacy competencies beyond the academic environment. The questionnaire used for this study could be easily adapted and replicated on other, more diverse, student populations—for example, Commerce, Engineering, Forestry, or Science Co-op programs at the University of British Columbia, across the province of British Columbia, or even across Canada. It could also be adapted for a study looking at the experiences of recent graduates in the workplace. Further research could better define the diverse set of skills and abilities that would serve an individual across a range of disciplines in the management of information.

Where the study could be expanded and improved upon is in the development of an assessment tool to measure the information literacy competencies of employees in the workplace. The questionnaire developed for this study drew from the core competencies, such as the ACRL guidelines on information literacy (2000), that define information literacy in the academic environment to create a way to measure how these skills transferred to the workplace environment. Taking this further, however, there would be significant weight in research findings that were able to measure the information literacy competencies of recent graduates in the workplace. With the Fall 2006 release date for the SAILS project’s latest version of their multiple-choice test designed to assess information literacy skills in students, the development of such a tool for the workplace may not be far off (Kent State University, 2006).

While the concept of information literacy originated in relation to the workplace, the definition has evolved since that time and become closely tied to the academic realm. There is a
need, however, to move beyond the confines of the academic library and take action in promoting the importance of these skills in society. This study is a step toward emphasizing the importance of the skills in the workplace and the need for students to develop these skills during their undergraduate programs. If, as Haycock (1999) notes, students are not taking advantage of voluntary information literacy programs, the knowledge that these skills are highly sought after by employers will certainly add incentive for students to take advantage of these programs while they are available. It is a matter not only of fuelling student incentive with an emphasis of the importance of these skills in the workplace, but also of effective collaboration between librarians and faculty to integrate information literacy programs more fully into undergraduate curricula.

As Breivik notes “[e]ducation has always had the responsibility to help students acquire research skills, a responsibility that grew both harder and more urgent even prior to the widespread use of computers, with the information explosion” (2005, 22). Accomplishing this task, however, is a complex process, and as Dorner, Taylor and Hodson-Carton point out: “[c]omprehensively incorporating information literacy instruction into college and university courses takes a commitment on the part of library professionals, the teaching faculty, and the university administration (2001, 132). The more research that can be conducted to support the value of information literacy skills to the workplace success of graduates, the easier it will be to convince faculty and administration to invest time and resources to integrate such programs into the curriculum.

A final point of discussion is the implications of this research to the Arts Co-op program. It was a positive finding that, overall, employers are satisfied with the information literacy skills Arts Co-op students are bringing to the workplace. Of concern were the results that indicated the students and employers are not in agreement on the significance of these skills in the workplace
environment. All students entering the Arts Co-op program go through pre-employment training. In light of the research findings, useful additions to this training program may be 1) a review of the key information literacy skills these employers are looking for and 2) a training session with a librarian on the variety of research tools available and on how library staff may assist students with information related concerns they may encounter on their work terms (i.e. by providing information on citing resource, intellectual property, finding government statistics, writing business documents/reports, etc.). Such training would serve to educate students on the importance of information literacy skills in the workplace and the support available to them to develop these skills. Notably, in order to plan and deliver such training, a partnership between the library and Arts Co-op program needs to be initiated and developed.

Conclusion

In a society drowning in information, a student who learns to navigate the waters gains a competitive advantage. A solid foundation of information literacy skills provides a framework of abilities that transfer across a diverse range of workplace environments, not only opening up employment options, but also adding to an individual’s marketability to employers. A central part of problem solving in the workplace is identifying and gathering appropriate information in a timely manner. The time to develop these skills is not in the corporate world under the scrutiny of employers, but in the supportive university environment where librarians and faculty are prepared to help students develop their skills. Whether a student is in the Faculty of Arts, Commerce, Engineering, Forestry, or Science, development of solid information literacy skills during an undergraduate program will support future success and facilitate lifelong learning.
REFERENCES


Jacobson, Trudi E. and Beth L. Mark. 2000. Separating wheat from chaff: Helping first year students become more information savvy. *Journal of General Education* 49, no. 4: 256-278


Wathen, C. Nadine and Burkell, Jacquelyn. 2002. Believe it or not: Factors influencing
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Zhao, Jensen J. and Melody W. Alexander. 2002. Information technology skills
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44, no. 3 (Fall): 175-189.

APPENDIX A:

Student Questionnaire 1
1. Which of the following duties apply to the co-op position in which you are/will be working? (Please check all duties relevant to the position).

- Research and analysis
- Customer service
- Public relations
- Filing, organizing, and/or compiling data
- Event planning/coordination
- Program design/implementation
- Software development/testing
- Writing/composition
- Proofreading/editing
- Teaching/presenting to groups
- Managing/supervising staff
- Website maintenance/development
- Graphic design
- Other (please specify)

2. Overall, do you feel that the ability to locate, evaluate and use information is/will be important to your co-op position?

- Yes
- No

Please comment or give examples:

3. In relation to the co-op position in which you are/will be working, how would you rate the importance of the following abilities?

<table>
<thead>
<tr>
<th>Ability to...</th>
<th>Perceived Importance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Not at all Important</td>
</tr>
<tr>
<td>a. Clearly formulate and articulate a problem, issue, or research question.</td>
<td>1</td>
</tr>
<tr>
<td>b. Determine the information required to solve a problem, issue, or research question.</td>
<td>1</td>
</tr>
<tr>
<td>c. Select the most appropriate source for accessing the required information and formulate an effective search strategy for locating it.</td>
<td>1</td>
</tr>
<tr>
<td>d. Use the variety of information resources available (i.e. print, electronic, human) to answer or solve a problem, issue, research question.</td>
<td>1</td>
</tr>
<tr>
<td>Ability to...</td>
<td>Perceived Importance</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>----------------------</td>
</tr>
<tr>
<td></td>
<td>Not at all Important</td>
</tr>
<tr>
<td>e. Apply information in the planning, creation, and revision of a particular product or performance.</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>f. Create and communicate information effectively to others using various media.</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>g. Understand the ethical, legal, and socio-political issues surrounding the use of information (i.e. privacy and security, copyright, intellectual property).</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>h. Accurately and appropriately acknowledge the use of information sources (i.e. through references, citations, written or verbal acknowledgement) in communicating a product or performance.</td>
<td>1 2 3 4 5</td>
</tr>
</tbody>
</table>

4. Of the skills listed in question 3, are there any specifically in which you feel you possess a particular strength? Please explain.

5. Of the skills listed in question 3, are there any in particular in which you feel you could use improvement? Please explain.

Thank you for taking the time to complete this questionnaire!
APPENDIX B:

Student Questionnaire 2
### Information Literacy in the Workplace: Student Questionnaire 2

1. Which of the following duties applied to your co-op position? (Please check all duties relevant to the position).

- [ ] Research and analysis
- [ ] Customer service
- [ ] Public relations
- [ ] Filing, organizing, and/or compiling data
- [ ] Event planning/coordination
- [ ] Program design/implementation
- [ ] Software development/testing
- [ ] Writing/composition
- [ ] Proofreading/editing
- [ ] Teaching/presenting to groups
- [ ] Managing/supervising staff
- [ ] Website maintenance/development
- [ ] Graphic design
- [ ] Other (please specify)

2. Overall, did you feel that the ability to locate, evaluate and use information was important to your co-op position?

- [ ] Yes
- [ ] No

Please give examples:

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

3. In relation to the co-op position in which you have worked, how would you rate the importance of the following abilities?

<table>
<thead>
<tr>
<th>Ability to...</th>
<th>Perceived Importance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Not at all Important</td>
</tr>
<tr>
<td>a. Clearly formulate and articulate a problem, issue, or research question.</td>
<td>1</td>
</tr>
<tr>
<td>b. Determine the information required to solve a problem, issue, or research question.</td>
<td>1</td>
</tr>
<tr>
<td>c. Select the most appropriate source for accessing the required information and formulate an effective search strategy for locating it.</td>
<td>1</td>
</tr>
<tr>
<td><strong>Ability to . . .</strong></td>
<td><strong>Perceived Importance</strong></td>
</tr>
<tr>
<td>---------------------</td>
<td>--------------------------</td>
</tr>
<tr>
<td></td>
<td>Not at all Important</td>
</tr>
<tr>
<td>d. Use the variety of information resources available (i.e. print, electronic, human) to answer or solve a problem, issue, research question.</td>
<td>1</td>
</tr>
<tr>
<td>e. Apply information in the planning, creation, and revision of a particular product or performance.</td>
<td>1</td>
</tr>
<tr>
<td>f. Create and communicate information effectively to others using various media.</td>
<td>1</td>
</tr>
<tr>
<td>g. Understand the ethical, legal, and socio-political issues surrounding the use of information (i.e. privacy and security, copyright, intellectual property).</td>
<td>1</td>
</tr>
<tr>
<td>h. Accurately and appropriately acknowledge the use of information sources (i.e. through references, citations, written or verbal acknowledgement) in communicating a product or performance.</td>
<td>1</td>
</tr>
</tbody>
</table>

4. Of the skills listed in question 3, are there any that you feel you developed or improved during your work term? Please explain.

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

5. Of the skills listed in question 3, are there any that you feel you could use further improvement? If so, how do you plan to further develop these skills?

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

Thank you for taking the time to complete this questionnaire!
APPENDIX C:

Employer Questionnaire
Information Literacy in the Workplace: Employer Questionnaire

1. Which of the following duties apply to the co-op position in your company? (Please check all duties relevant to the position).

- Research and analysis
- Customer service
- Public relations
- Filing, organizing, and/or compiling data
- Event planning/coordination
- Program design/implementation
- Software development/testing
- Writing/composition
- Proofreading/editing
- Teaching/presenting to groups
- Managing/supervising staff
- Website maintenance/development
- Graphic design
- Other (please specify)

2. Overall, do you feel that the ability to locate, evaluate, and use information is important to the co-op position in your company?

- Yes
- No

Please comment or give examples:

3. In relation to the co-op position with your company, how would you rate the importance of the following abilities in a co-op student?

<table>
<thead>
<tr>
<th>Ability to . . .</th>
<th>Perceived Importance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Not at all Important</td>
</tr>
<tr>
<td>a. Clearly formulate and articulate a problem, issue, or research question.</td>
<td>1</td>
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<tr>
<td>b. Determine the information required to solve a problem, issue, or research question.</td>
<td>1</td>
</tr>
<tr>
<td>c. Select the most appropriate source for accessing the required information and formulate an effective search strategy for locating it.</td>
<td>1</td>
</tr>
<tr>
<td>d. Use the variety of information resources available (i.e. print, electronic, human) to answer or solve a problem, issue, research question.</td>
<td>1</td>
</tr>
<tr>
<td>Ability to . . .</td>
<td>Perceived Importance</td>
</tr>
<tr>
<td>-----------------</td>
<td>----------------------</td>
</tr>
<tr>
<td></td>
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</tr>
<tr>
<td>e. Apply information in the planning, creation, and revision of a particular product or performance.</td>
<td>1</td>
</tr>
<tr>
<td>f. Create and communicate information effectively to others using various media.</td>
<td>1</td>
</tr>
<tr>
<td>g. Understand the ethical, legal, and socio-political issues surrounding the use of information (i.e. privacy and security, copyright, intellectual property).</td>
<td>1</td>
</tr>
<tr>
<td>h. Accurately and appropriately acknowledge the use of information sources (i.e. through references, citations, written or verbal acknowledgement) in communicating a product or performance.</td>
<td>1</td>
</tr>
</tbody>
</table>

4. Of the skills listed in question 3, are there any in particular that you feel are a strength with Arts Co-op students in general? Please explain.

5. Of the skills listed in question 3, are there any in particular where you feel that Arts Co-op students could use improvement? Please explain.

Thank you for taking the time to complete this questionnaire!
APPENDIX D:

Certificate of Approval, UBC Ethics Review Board
APPENDIX E:

Script for UBC Arts Co-op Staff
Script for Arts Co-op Staff for Information Literacy Survey

One of our former Arts Co-op students, Julie Mitchell, is conducting thesis research for her Masters of Library and Information Studies on Information Literacy skills in the workplace. She is conducting a survey to assess Arts Co-op student and employer perceptions about the importance of these skills with respect to their work placements.

We would like to encourage you to take 10 minutes to complete this questionnaire and fax your responses into the Arts Co-op program. Further details around the study and the importance of your participation are included in the attached cover letter.
APPENDIX F:

T-Test Results, Student Survey 1 and Student Survey 2
| @3a 3a | Equal variances assumed | 6.166 | .014 | 1.165 | 115 | .246 | .249 | .214 | -.174 | .673 |
| Equal variances not assumed | 1.143 | 100.194 | .256 | .249 | .218 | -.183 | .681 |
| @3b 3b | Equal variances assumed | 1.092 | .298 | .730 | 115 | .467 | .128 | .175 | -.219 | .474 |
| Equal variances not assumed | .714 | 98.550 | .477 | .128 | .179 | -.227 | .482 |
| @3c 3c | Equal variances assumed | 2.376 | .126 | .483 | 115 | .630 | .098 | .202 | -.303 | .498 |
| Equal variances not assumed | .476 | 103.731 | .635 | .098 | .205 | -.309 | .504 |
| @3d 3d | Equal variances assumed | .814 | .369 | -338 | 115 | .736 | -.067 | .198 | -.459 | .325 |
| Equal variances not assumed | -.336 | 108.368 | .737 | -.067 | .199 | -.461 | .327 |
| @3e 3e | Equal variances assumed | .392 | .533 | .948 | 115 | .345 | .215 | .227 | -.235 | .665 |
| Equal variances not assumed | .940 | 106.964 | .349 | .215 | .229 | -.239 | .669 |
| @3f 3f | Equal variances assumed | .001 | .970 | .056 | 115 | .955 | .012 | .209 | -.403 | .427 |
| Equal variances not assumed | .056 | 111.431 | .955 | .012 | .209 | -.403 | .426 |
| @3g 3g | Equal variances assumed | 1.291 | .258 | -.864 | 115 | .389 | -.186 | .216 | -.614 | .241 |
| Equal variances not assumed | -.855 | 105.972 | .394 | -.186 | .218 | -.618 | .246 |
| @3h 3h | Equal variances assumed | 1.666 | .199 | .950 | 115 | .344 | .195 | .205 | -.211 | .600 |
| Equal variances not assumed | .944 | 107.753 | .347 | .195 | .206 | -.214 | .603 |
APPENDIX G:

T-Test Results, Student Survey 1 and Employer Survey
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<th>t-test for Equality of Means</th>
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<tr>
<td>@3a</td>
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<tr>
<td>@3a</td>
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<tr>
<td>@3b</td>
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APPENDIX H:

T-Test Results, Student Survey 2 and Employer Survey
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</tr>
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<td></td>
<td>Equal variances not assumed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>@3c 3c</td>
<td>Equal variances assumed</td>
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<td>.038</td>
</tr>
<tr>
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<td>Equal variances not assumed</td>
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<td></td>
</tr>
<tr>
<td>@3d 3d</td>
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<td>.000</td>
</tr>
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<td></td>
<td>Equal variances not assumed</td>
<td></td>
<td></td>
</tr>
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<td>.000</td>
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<td>Equal variances not assumed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>@3f 3f</td>
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<td>8.143</td>
<td>.005</td>
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