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Understanding the Paradigm Shift: A Descriptive Case Study of the Impact of Changes in Information Literacy Instruction Methods on Librarians, Faculty, and Students at a Private, Comprehensive Institution

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UNDERSTANDING THE PARADIGM SHIFT:

A DESCRIPTIVE CASE STUDY OF THE IMPACT OF CHANGES IN INFORMATION LITERACY INSTRUCTION METHODS ON LIBRARIANS, FACULTY, AND STUDENTS AT A PRIVATE, COMPREHENSIVE INSTITUTION

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Title: Understanding the Paradigm Shift: A Descriptive Case Study of the Impact of Changes in Information Literacy Instruction Methods on Librarians, Faculty, and Students at a Private, Comprehensive Institution

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The purpose of this descriptive case study was to understand the impact on librarians, faculty, and students of changes in information literacy instructional methodologies that were piloted as an innovation within a particular institutional setting.

The following questions were considered. In what ways and to what extent has a more holistic approach to teaching information literacy been assimilated by faculty and librarians? In what ways and to what extent have faculty attitudes toward teaching information literacy skills been affected by the introduction of these holistic instructional approaches? In what ways and to what extent have librarian relationships with faculty changed as a result of these holistic approaches to teaching information literacy? In what ways and to what extent are student learning outcomes affected by the introduction of a more holistic approach to teaching information literacy?

Focus group interviews were conducted with librarians and faculty participants of the holistic instructional model to determine the extent to which assimilation had occurred, and to explore changes in faculty attitudes toward teaching information literacy and in faculty relationships with librarians. The focus group questions were based upon the *Stages of Concern (SoC) Questionnaire* (Hall & Hord, 2001). To understand the impact of the instructional model upon student learning outcomes, paired samples *t* tests and analyses of variance were conducted on information literacy knowledge pretest and posttest scores reported during the time that the holistic model was introduced.

The findings of this study indicated that assimilation of the holistic model of information literacy instruction at the study site was affected by factors such as scope of responsibility for instruction, degree of support, and impact of the rate of change on work load. Faculty attitudes toward teaching information literacy components as part of their own courses changed in a positive way, mainly because the model provided them opportunities for development and support. Librarian and faculty relationships improved as a result of the collaborative teaching models employed as components of holistic information literacy instruction. Finally, student learning outcomes were affected positively by an approach to teaching information literacy that includes first-year as well as upper-level instruction.

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First do what is necessary; then do what is possible, and very soon you will be doing the impossible – St. Francis of Assisi. The words of this 13th century saint are no less true today than they were nearly 800 years ago when he offered them to his followers, who wondered how they could possibly carry on the work he had begun. This is also good advice for writing a dissertation. The very thought of such an undertaking is overwhelming; but if the work is done word by word, page by page, chapter by chapter, very soon one has accomplished what seemed to be impossible.

Of course, nothing of this magnitude is accomplished without the support of family, friends, and colleagues. First and foremost, I extend my deepest gratitude to my husband Robert, whose unwavering support, encouragement, and love made the work possible. I also thank my parents, children, grandchildren, and all my family and friends for their understanding and patience. A special thank you is extended to my advisor, Dr. Wenfan Yan, for his encouragement, advice, and assistance throughout this process—and to my committee members, Dr. Cathy Kaufman and Dr. Robert Millward, for their contributions to this dissertation.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

Figure Page

CHAPTER ONE: THE PROBLEM

Background of the Problem

Why is it important to teach and assess information literacy in higher education? Information is a powerful commodity in our twenty-first century society. Who owns it? Who should have access to it? What is plagiarism? What are the boundaries of privacy in information, and how do we respect them? Information literacy attempts to respond to these ethical questions, and in so doing, provides citizens with opportunities for advancing the ideals and aims of a democratic society. Seen in this light, information literacy is an essential part of a free and humane society (Shaprio & Hughes, 1996). Clearly, the teaching of information literacy competencies is an important objective for institutions of higher education, whose missions have long supported the democratic ideal of forming young men and women into productive, informed life-long learners who are capable of making intelligent and ethical decisions that advance the common good. It follows that competency in information literacy has come to be regarded in recent years within the higher education community as a mission-critical outcome for academic libraries (Simmons, 1994). Moreover, successful information literacy programs are seen as indicators of quality by regional accreditation agencies, which view information literacy as an essential learning outcome for students preparing to enter twenty-first century society (Middle States Commission on Higher Education, 2002; Simmons, 1994).

Recent changes in professional and accreditation standards have influenced consideration of information literacy competency development and assessment by institutions of higher education. As early as 1997, the Association of College and Research Libraries (ACRL) developed a set of *Guidelines for Instruction Programs in Academic Libraries* (ACRL, 1997). At about the same time, the outcomes assessment movement in higher education prompted academic librarians to consider how the

teaching of information literacy concepts was being evaluated (Pausch & Popp, 1997). The assessment movement also prompted the ACRL to appoint a Task Force on Academic Library Outcomes Assessment, which subsequently issued a *Report* (1998) that stimulated major revisions in the *Standards for College Libraries* (ACRL, 2000). In January 2000, the *Information Literacy Competency Standards for Higher Education* (ACRL, 2000) was adopted. The new *Standards* generated several companion documents, including *Objectives for Information Literacy Instruction: A Model Statement for Academic Librarians* (ACRL, 2001) and *Best Practices and Assessment of Information Literacy Programs* (National Information Literacy Institute, 2002), which view information literacy as a lifelong learning skill.

The focus on assessment also prompted regional higher education accreditation commissions to revise their standards to reflect a greater emphasis on outcomes assessment, distance education, and information literacy framed within an atmosphere of collaboration, innovation, and experimentation in teaching and learning (Gratch-Lindauer, 1996, 2002; Simmons, 1994). Accreditation processes are designed to function as quality assurance mechanisms that will produce institutional improvement; through them society assures its citizens that the goods and services provided meet standards of quality and are delivered with integrity (Dalrymple, 2001). As the needs and standards of society change, so do those of accreditation agencies. Where standards once focused on inputs and outputs, (amount of money spent, number of books in the library, etc.) they now focus on outcomes. The essential question now becomes: what impact do programs or curricula or educational environments have on the student? How has he or she been changed by his or her experience at your institution? And how do we assess this? (Iannuzi, 2002)

Which leadership approaches will be most helpful in shaping institutional response to the teaching and assessment of information literacy competencies? If

teaching information literacy competency is viewed from the standpoint that “it takes a university” to accomplish this task, then strong, collaborative leadership is essential for success. If we want our information literacy instruction programs to have a lasting impact on the lives of students, and if we want students to become truly engaged in learning the processes of research, then we must find meaningful contexts within which to structure instruction. We must make distinct efforts to find out where students’ interests lie, so that we may design instruction methodologies that are valued and appreciated—and which make a lasting impact on students’ lives (Ward, 2001). We must also find appropriate ways to assess these methodologies.

Generally, we find that college and university students are interested in doing well in what they refer to as their “real” (major/subject/discipline) classes. Library instruction classes, whether credit- or non-credit-bearing, are generally not considered “real” classes—unless they are able to connect in some way with the perceived “real” classes. In order for this to be accomplished effectively and meaningfully, library and teaching faculty must intentionally create a learning environment within which teaching responsibilities are distinct but mutually supportive of the same goal: educating students (Bruce, 1997; Escobar, Kanzler, Porter, & Smith, 2002; Owusu-Ansah, 2004).

Statement of the Problem

Chapter Two will show that while previous studies highlight the importance of information literacy instruction and assessment, many also conclude that the majority of information literacy programs, whether formal or informal, have experienced only lukewarm success in terms of positively impacting student learning outcomes. These findings (Hartman, 2001; Holman, 2000; Maughan, 2001; Seamans, 2001) could be due to attitudinal barriers and students’ overconfident self-perceptions of their own information literacy skills. Or they could, as suggested by Bruce (1997), be due to an

outmoded (or perhaps ineffective) behavioral/skill approach to information literacy education in which the various elements are isolated exercises targeted toward solving decontextualized problems at particular times.

Bruce suggests that a more effective approach to teaching information literacy may be through the adoption of a holistic, or relational model of instruction, which may include linked courses, course embedded instruction, "just-in-time" instruction, web-based resources, and librarian-faculty collaboration, not just in the first year, but in all four years of undergraduate education, as seen in Figure 1.

Teaching and Assessing Information Literacy Competencies in Higher Education: A Comparison of Traditional and Holistic Models			
Traditional (Behavioral/Skill) Instruction and Assessment Paradigm		Holistic (Relational/Conceptual) Instruction and Assessment Paradigm	
Instruction Methods	Assessment Methods	Instruction Methods	Assessment Methods
Reference Interview (Individual instruction)	None or individual survey	Reference Interview (Individual instruction)	Individual, "on-the-spot" survey
Bibliographic Instruction (Groups)	None or group survey	Freshman-level credit course in basic research linked with content course	Pre/post competency test, class assignments, online worksheets
Library Orientation	None or general survey	"Just-in-time" workshops on specific applications	Workshop evaluations
Informal course-like instruction (1 or more sessions in library)	Un-graded tests	Online tutorials, pathfinders, FAQs	Online surveys
Formal Courses (Semester-long, credit courses, content isolated from other course work)	Pre/post tests, content-specific worksheets, class assignments	Upper-level, course-embedded IL elements in major or interdisciplinary courses	Course-embedded elements evaluated as part of overall course grade; competency retest in 3rd or 4th year

Figure 1. Traditional and holistic models of teaching information literacy.

Moreover, while it is clear that the development of information literacy competencies is viewed as an essential component of scholarly research, it is not always clear how these competencies are learned. At a typical college or university,

librarians have been primarily responsible for teaching information literacy, previously known as *bibliographic instruction*, *library information*, or *library orientation*. These informal education programs were developed in response to students' information needs (Kirk, 2001). However, a broader, more holistic view of information literacy as a "new liberal art that extends from knowing how to use computers and access information to critical reflection on the nature of information itself ... as essential to the mental framework of the educated information-age citizen" (Shapiro & Hughes, 1996, p. 3) has expanded this responsibility beyond the library and into the classroom and has prompted the recent changes in accreditation and program standards, which call for shared responsibility between librarians and teaching faculty for their implementation (Middle States, 2002).

For many institutions of higher education, such a notion amounts to a paradigm shift since responsibility for teaching information literacy competencies has traditionally been viewed as the purview of librarians. As institutions begin to assimilate this paradigm shift, the impact of the resulting changes on student learning outcomes and on the roles of faculty and librarians within and outside the classroom must be more clearly understood if collaborative information literacy initiatives are to succeed.

Purpose of the Study

The purpose of this descriptive case study was to understand the impact on librarians, faculty, and students of changes in information literacy instruction methodologies that were piloted as an innovation within a particular institutional setting. While the majority of studies of information literacy instruction have employed quantitative methods such as competency testing and surveys, or qualitative methods such as focus groups, interviews, and open-ended survey questions to obtain and analyze data, the focus of these studies has primarily been in the following areas:

(a) policy or program development; (b) student or faculty understanding of information literacy as a concept; (c) skill development and retention (perceived and actual); (d) assessment of information literacy instruction (acquired knowledge and/or student self-perception of ability); (e) impact of technology on pedagogy; and, (f) conceptual models (constructivist vs. behaviorist approach). Additionally, although numerous studies have attempted to assess the impact of technology on teaching, learning and information-seeking behaviors of faculty, librarians and students, there are currently few studies that have sought to understand the impact of information literacy instruction on these behaviors, especially those that are distributed across the undergraduate curriculum. The intention of this study was to fill this "gap" to some degree.

Theoretical Framework

Research in the area of organizational change within higher education provided the theoretical framework for this study. While a review of the literature indicates that a variety of theoretical models have been proposed for understanding the dynamics of change within institutions of higher education, one model stood out, in particular, as most appropriately aligned with the purpose and goals of this study.

When higher education administrators think of change, they generally think in terms of institutionalization, or diffusion, a process in which others are influenced to adopt a particular concept, program or structure (ASHE-ERIC, 2001). Diffusion models tend to focus on individuals rather than whole organizations, and are characterized by several phases: *awareness*, *interest*, *evaluation*, *trial*, and *adoption* (Rogers, 1995). The *Concerns-Based Adoption Model (CBAM)*, an example of a diffusion model, is a conceptual framework that describes, explains, and predicts probable behaviors as individuals experience a change process (Hord, Rutherford, Huling-Austin, & Hall, 1987); thus, it is an appropriate model for the study of change in higher education settings.

Concerns-Based Adoption Model and Stages of Concern

For any new initiative to be successful, change must occur within an organization. Generally, change involves learning. Individuals who experience change must be supported through the various learning stages in order to fully assimilate the new initiative (Loucks-Horsley, 1996). The *Concerns-Based Adoption Model (CBAM)* was developed after several years of studying ways in which schools might initiate change processes leading to improvement, and is based upon six assumptions about change (Hord, Rutherford, Huling-Austin, & Hall, 1987), given in Figure 2.

1. Change is a process, not an event.
2. Change is accomplished by individuals.
3. Change is a highly personal experience.
4. Change involves developmental growth.
5. Change is best understood in operational terms.
6. The focus of facilitation should be on individuals, innovations, and the context.

Figure 2. Assumptions about change.

The *CBAM* identifies seven stages of concern, as seen in Figure 3.

Stage of Concern	Expression of Concern
6. Refocusing	I have some ideas about something that would work even better.
5. Collaboration	How can I relate what I am doing to what others are doing?
4. Consequence	How is my use affecting learners? How can I refine it to have more impact?
3. Management	I seem to be spending all my time getting materials ready.
2. Personal	How will using it affect me?
1. Informational	I would like to know more about it.
0. Awareness	I am not concerned about it.

Figure 3. The *Concerns-Based Adoption Model's* seven stages of concern.

These stages hold major implications for the professional development of educators. As individuals consider and experience change, they naturally become curious and begin to ask questions that evolve as the innovation becomes assimilated. The type of question being asked reveals the developmental stage that an individual is experiencing at any given time (Loucks-Horsley, 1996).

Understanding the nature of the concerns of educators as they experience the implementation of change or an innovation can provide valuable insight for institutional leaders and can provide guidance for actions that might be taken to facilitate the change process. Concerns of individuals as they experience change do not exist in a vacuum; rather, they are outcomes of their feelings about the innovation, their perceptions of their ability to use it, the number of other changes that will occur as a result, the setting in which change occurs, and the type of assistance and support that they receive while implementing the change (Hord et. al., 1987).

There are several methods that may be employed to assess concerns. One method is by directly interviewing a participant in face-to-face conversation. A second method involves asking open-ended questions within a group setting. A third method is to administer the *Stages of Concern Questionnaire (SoCQ)* (Hall, George, & Rutherford, 1979), most often used with larger groups when formal research or program evaluation is being conducted. In this case study, the second methodology described above was employed. Focus group questions based upon the *SoCQ* were used to determine the level of assimilation of an innovation, i.e., a holistic information literacy instruction model, among librarians and faculty who teach information literacy courses or course components at the institution which serves as the site for the study.

Research Questions

This study considered the following specific questions:

1. In what ways and to what extent has a more holistic approach to teaching information literacy been assimilated by faculty and librarians?
2. In what ways and to what extent have faculty attitudes toward teaching information literacy skills been affected by the introduction of these holistic instructional approaches?
3. In what ways and to what extent have librarian relationships with faculty changed as a result of these holistic approaches to teaching information literacy?
4. In what ways and to what extent are student learning outcomes affected by the introduction of a more holistic approach to teaching information literacy?

Definition of Terms

For the purposes of this study, the definitions of the following terms are provided:

1. *Information literacy* is defined as "a set of abilities requiring individuals to recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information" (ACRL, 2000, p.2).

2. A person who is *information literate* is "able to: 1) determine the extent of information needed, 2) access the needed information effectively and efficiently, 3) evaluate information and its sources critically, 4) incorporate selected information into one's knowledge base, 5) use information effectively to accomplish a specific purpose, and 6) understand the economic, legal, and social issues surrounding the use of information, and access and use information ethically and legally" (ACRL, 2000, p. 3).

3. The term *information literacy across-the-curriculum* refers to the notion that information literacy is central to the curriculum, regardless of major area of study, and is

viewed as a core competency. Basic information literacy skills are developed, and then later expanded into areas such as history, literature, mathematics, social studies, government, physics, and biology. The assumption is that once students have acquired basic information literacy skills, they can move those skills into the discipline areas (adapted from Bruce & Davidson, 1996).

4. *Effectiveness of information literacy instruction* is defined as measurable, statistically significant progress toward the achievement of the six information literacy competencies described in item 2, above. Successful information literacy instruction, as measured by cognitive variables in pretests and posttests, appears to relate primarily to opportunities for reinforcement of learning objectives, either by providing detailed and aesthetically appealing documentation to support learning, or through assignments requiring the application of concepts learned (Boon & Julien, 2003).

Study Site

The institution of higher education that served as the site for this descriptive case was Saint Francis University, a small, Catholic co-educational comprehensive institution sponsored by the Franciscans of the Third Order Regular and located in west central Pennsylvania. The University's early recognition of the importance of research and computer application competency development in general education led to the institution of a one-credit *skills workshop* in 1992 which eventually evolved over the years into the current *information literacy* course (*CORE 101*), a general education core requirement taught by librarians. The holistic information literacy instruction model piloted at the study site builds upon these basic competencies by emphasizing course-embedded forms of information literacy instruction at the upper-class levels. At the time that this study was conducted, the holistic model was in its third year of implementation. A more detailed description of the study site and the model appears in Chapter Three.

Study Design

This descriptive case study employed both qualitative and quantitative methods of data collection and analysis, including focus groups, interviews, and analysis of existing student learning outcome data. The impact upon faculty and librarians of changes in information literacy instructional approaches was explored through the use of focus groups and interviews. In order to assess the impact of these changes upon students, learning outcomes were evaluated through analysis of existing pretest and posttest scores. These methodologies are described in greater detail in Chapter Three.

Limitations and Delimitations

Because the researcher chose to employ a case study approach, a potential limitation of this study is that it may not be possible to generalize the findings across a larger population. However, because the purpose of the study was to understand the impact of a particular innovation adopted by a particular institution, the case study method of inquiry is appropriate, and the findings may be informative for those wishing to employ similar teaching strategies at other institutions, or to strengthen curricular coherence between disciplinary courses and information literacy instruction, or even to better understand the nature of the educational change process.

Importance of the Study

The design and methodologies employed in this study are of significance to the study site in that they serve as a model for assessing the effectiveness of a new instructional approach that seeks to extend a general education core competency across undergraduate curricula. In addition, the study will also be well-regarded by the academic library community, given that its findings are pertinent to the recent changes in professional and accreditation standards that emphasize information literacy skill

development and assessment within institutions of higher education. Finally, the findings and conclusions of this study contribute to a growing body of research in the areas of information literacy instruction, student learning outcomes assessment, and innovation assimilation.

CHAPTER TWO: REVIEW OF LITERATURE

Introduction

This study is informed by the literature of two disciplines: information literacy instruction and change theory. This chapter begins with a discussion of studies that have been conducted in the area of information literacy instruction. The second part of this chapter provides a discussion of change theory with a particular focus on pertinent studies employing the *Concerns-Based Adoption Model* (Hord, Rutherford, Huling-Austin, & Hall, 1987) as a research methodology. Although these methodologies have been widely used in educational research, these studies were selected purposefully for inclusion within this review of the literature because their particular focus on the integration of information literacy or technology as an innovation establishes the conceptual framework for the proposed study. The chapter ends with a summary and rationale for the focus of the current study.

The Literature of Information Literacy Instruction

What do we know about the effectiveness of information literacy instruction programs, and how do we assess them? Even before the adoption of the new ACRL *Standards* in 2000, researchers had been studying various methods of information literacy instruction and their effectiveness. The “information explosion” and the proliferation of information resources brought about within the past decade or so by the invention of the personal computer and its companion “information superhighway,” the Internet, have revolutionized business, education, and society to the extent that finding the information one needs to conduct one’s personal affairs is critical to success (Shapiro & Hughes, 1996).

Libraries, which had long been in the business of providing instruction in how to use their collections and locate information, were foremost in recognizing the complexity of this new environment. Academic libraries have historically provided services such as *bibliographic instruction, reference*, and *research guides* or *pathfinders*, and in some cases, have taught formal credit-bearing or non-credit courses in basic research methods. More recently, these activities have fallen under the umbrella of *information literacy instruction*, where pedagogies continue to range from the formal full-semester credit courses to the informal introductory sessions of an hour or longer, printed and online research guides, reference interview, etc. The methods employed to assess these efforts have also been quite varied (Owusu-Ansah, 2004).

Previous studies of information literacy and information literacy instruction have employed both qualitative and quantitative methods of investigation. The focus of the majority of these studies has been primarily in the following areas: (a) policy or program development; (b) student or faculty understanding of information literacy as a concept; (c) skill development and retention (perceived and actual); (d) assessment of information literacy instruction (acquired knowledge and/or student self-perception of ability); (e) impact of technology on pedagogy; and, (f) conceptual models (constructivist vs. behaviorist approach). These six areas provide a means of organizing the segment of the review of literature that follows.

Policy and Program Development

Many of the early studies in information literacy focused on the development of outcome measures, models of information literacy instruction, or specific course and program development. The purpose of Doyle's (1992, 1993) grounded theory study was to seek agreement among a group of experts in developing a national policy statement on the acquisition of information literacy skills, and to refine the definition of information

literacy. The research population consisted of 125 experts in the field of information literacy, composed of members of the National Forum on Information Literacy and other experts who were nominated by the Forum members. The research design employs the Delphi technique, drawing on a broad base of people knowledgeable about the issue being studied. This Delphi consisted of three rounds. In Round 1, participants were given the opportunity to react to an existing definition of information literacy, to list attributes of one who is information literate, and to state why information literacy is a critical issue nationally. After the responses to Round 1 were received, they were categorized, and the most common themes that emerged were included in Round 2. The objective for this round was to develop outcome measures for assessing information literacy, so participants were encouraged to brainstorm on this question. Round 3 was composed of 124 Likert-rated items, which were analyzed with a statistical computer package. The study resulted in the development of a comprehensive definition of information literacy and a set of information literacy outcome measures.

In the area of program development, Brock (1993) used a 15-member panel of school library media specialists to develop an "information intermediary process model" which includes planned instructional activities as well as unplanned individual assistance. Similarly, Schultz (1995) used survey research to solicit input from a panel of information literacy experts to develop a three-credit, semester-length, individualized information literacy course for community college students, and Brown (1996) utilized a problem-solving process to develop an entire program of information literacy instruction, including competencies, assessment tools, strategic and faculty development plans, and implementation timeline for the undergraduate school at Philadelphia College of Bible.

Finally, the findings of a focus group study with health sciences students enrolled in graduate-level research classes at a small private comprehensive university (Serotkin, Fitzgerald, & Balough, 2005) whose primary intent was to inform collection development

decision-making also provided valuable insights for information literacy program development. In this study, the participants were introduced to a set of electronic journals without print counterparts via an instruction session provided by a librarian within an upper-level research course. After at least one semester, students were asked about their usage of the journals. While students appreciated the availability of the new journals, they found that they did not use them as much as they did other electronic and print resources. This was primarily due to the fact that access to this set of journals was restricted to the study participants, which meant that they could not be searched from the university library's database webpage, but only through a WebCT™ course link. Because of this restriction, the participants forgot that the journals were available. However, the participants said they appreciated the librarian instruction session and wished that they could have yearly updates or advanced instruction so that their knowledge of the library's resources in their discipline could remain current, suggesting a need for upper-level information literacy instruction.

Understanding Information Literacy as a Concept

The purpose of Valentine's study (1993) was to gain an understanding of undergraduate students' attitudes toward and skills in conducting library research. The research population consisted of sixteen undergraduate students who were also library assistants. The research design was qualitative, employing the use of focus groups (two groups of six students each) and individual interviews (four students). The conclusions of this study were that: (a) students tended to use the easiest, least painful, "quick and dirty" way to complete a research project, employing none of the organized strategies that librarians teach in bibliographic instruction sessions; (b) students generally began their research with "easy" or familiar sources, seemingly unaware of alternative and better ways of searching; (c) the students' lack of familiarity with the library and its

resources posed a significant obstacle to their research efforts; (d) students seemed reluctant to ask instructors and librarians for help, but when they did ask, the upper division students more often turned to their instructors, while the lower-division students more frequently consulted librarians; and, (e) consulting a librarian for help seemed to be "the last resort" for many students, equating such an action with personal failure.

Morrison's exploratory study (1997) examined the undergraduate perspective on the role of the library in developing information literacy skills. The research questions were: (a) what does information literacy mean, (b) is a certain level of information literacy skills something that you should get in the course of an undergraduate degree, and (c) what is the role of the library in developing information literacy? The research population consisted of six undergraduate students and the husband of one of the students, who regularly assisted with her library research. The research design employed the use of focus groups for exploring student perceptions about information literacy. Data were gathered by audiotape during the one and one-half hour focus group session. Participants were asked to discuss each of the skills for approximately ten minutes, then to rank each individually, in writing, in terms of difficulty. Next, students briefly discussed the usefulness of information literacy and whether students should attain a particular level of competence as undergraduates. Finally, the role of the library in developing these skills was discussed. The students who participated in this study agreed that locating information, evaluating information, and effectively using information are, in fact, components of information literacy; however, they generally disagreed with the idea that recognizing a need for information could be a true skill. The participants' frequent references to attitudinal and emotional factors with regard to recognizing a need for information supports the contention that such recognition may produce anxiety, so that it may not be seen so much as a skill as an ability to deal with the emotional aspect and proceed to the next stage. The researcher concludes that this perception should be

studied in more depth, that students believe that the library plays an important role in helping them develop information literacy skills, and that the students' lack of confidence in their ability to evaluate information indicates a need for further instruction in the form of upper-level seminars. These conclusions support the notion that information literacy instruction should be extended across undergraduate curricula.

Hartmann (2001) studied the perceptions of first year undergraduate students toward the importance of information literacy at the University of Ballarat, Australia, where the University Library has developed and piloted a number of information literacy programs, one of which has been the Information Skills Program, a program that is offered for but not required of first-year students. The course was designed to introduce students to the variety of resources available to them at the University library and to familiarize them with search strategies. The need for research into student perceptions about their information needs was demonstrated by the fact that only about 25% of first year students typically enrolled in the class, indicating apparent disconnects between librarians' and students' perceptions about the importance of and/or need for this class. Quantitative analysis of student attendance rates suggested a need for qualitative research, so focus groups were conducted with first and third-year students. Analysis of the focus group discussions indicated that students feel the library should assist them in developing the skills they need to access and use information appropriately. However, responsibility for acquiring these skills was aligned more closely with instructor expectations and less with student initiative. Students also confirmed that their own and librarian expectations about information literacy skill transference from secondary to higher education settings are shortsighted and overconfident. A conclusion that may be drawn from this study is that information literacy is best taught in a contextual manner, connected to or embedded within interdisciplinary or major courses.

Finally, a study conducted by Kuh and Gonyea (2003) examined the nature and value of undergraduate students' experiences with the academic library, as reported in the College Student Experiences Questionnaire. Responses from over 300,000 students between 1984 and 2002 were analyzed. The research questions were: (a) has student use of library resources changed over time, (b) is frequent use of the library associated with greater gains in information literacy, and (c) how does student use of library resources affect their engagement with effective educational practices? The results of the study indicated that student use of the library has changed over time, in that fewer students use the library as a place to study, but more students ask librarians for help, and more of them are using indexes and databases to find information. A second finding indicated that library experiences do not seem to directly contribute to gains in information literacy, nor do they contribute to what students gain overall from college experiences or to student satisfaction. However, library experiences were strongly correlated with educationally purposeful activities such as working with faculty members on research, discussing papers with faculty members, and working harder to meet faculty members' expectations. An important finding was that students who perceive that their campuses emphasize the importance of information literacy as an educational concept gained more in this area than did others, suggesting that if institutions wish to graduate information literate students they should require activities that provide students with opportunities to practice information literacy and to demonstrate their competence in evaluating the quality of the information that they choose.

Despite information literacy's significant presence in discussions in academic libraries and academe, librarians continue to debate the definition of the concept. Owusu-Ansah (2003) observes that although the American Library Association provided the defining characteristics of an information literate individual as early as 1989 with the

expectation that the aggregate of those characteristics would determine the essence of the concept, the thoroughness of the standards drafters may have compromised the practical viability of their work. The controversies and uncertainties that continue to surround the concept of information literacy suggest a deep professional dilemma that concise definitions and elaborate standards have not resolved. However, despite these controversies, there apparently exists a sufficient enough understanding of what constitutes information literacy, such that the concept continues to be widely discussed in higher education and accreditation bodies require it, pointing to its importance as an educational concept (Owusu-Ansah, 2003).

Skill Development and Retention

As early as 1982, Hardesty, Lovrich, and Mannon reported the results of a study of long-term retention of library-use skills. This study was a follow-up to an earlier study conducted by the same authors, which measured short-term gains of students exposed to library instruction programs in their freshman year. The research questions included: (a) what are the lasting effects of library-use instruction, (b) can we associate higher levels of individual skills in library use with higher degrees of exposure to library-use instruction, and (c) are factors other than library-use instruction better predictors of the acquisition of library-use skills? The research population consisted of three groups: Group 1 comprised 91 seniors graduating in 1977; Group 2 comprised 312 seniors in the 1980 graduating class, and Group 3 consisted of a panel of 82 students selected from among Group 2. The research design employed both quantitative and qualitative methodologies. Data gathering and analysis strategies included comparisons of pretest and posttest scores over a three-year period, the use of control and experimental groups, aggregate and individual comparison, and multiple regression analysis. Although qualitative research methods reportedly had also been employed in this study,

they were not described. The study found that long-term changes in library-use skills are highly associated with two measures of exposure to library-use instruction: freshman-level instruction and upper-division course-embedded instruction. The authors believe that these findings indicate that neither intellectual capacity nor academic diligence can produce a degree of library-use skill that can rival the amount of skill acquisition that is gained from library-use instruction.

McKinzie's (1997) research with adult learners supports the contention that context is a major factor in information literacy instruction. The purpose of her study was to understand the impact of the informational context of a school or organization on the development of information literacy skills, where informational context is defined as the composition of people, the information with which the people interact, and the technology that delivers the information. Her findings indicate that there are several factors within the informational context that should be considered when designing information literacy instruction programs. These factors include: (a) the nature of the informational context; (b) the needs of the people within the context; (c) the continual redefinition of the context by the people, information, and technology within it; and, (d) identified structures within the informational context that may support or inhibit information literacy skill development.

Maughan (2001) reports the results of a five-year study conducted at the University of California-Berkeley in which undergraduates responded to a questionnaire consisting of 36 multiple-choice questions. The first three questions obtained affective (perceptual) information, while the remaining questions were designed to test mastery of basic library research skills and the respondents' knowledge about the UC-Berkeley library system. The questionnaire was pretested using selected undergraduate groups. The final survey was administered to differing populations (graduating seniors in selected disciplines) in 1994, 1995 and 1999, with varying return rates. The findings of

this study are interesting: while 46% to 77% of the respondents consistently self-rated their library knowledge and skills as “excellent” or “pretty good,” between 36% and 81% actually received poor or failing scores on the questions designed to measure their skill level. The fundamental conclusion drawn from this study is that students think they know more about library research and accessing information than they actually do.

Another study by Seamans (2001) reinforces the phenomenon that students often perceive their information literacy competencies to be stronger than they actually are. In this study, freshman students at Virginia Polytechnic Institute and State University were surveyed by email and in face-to-face interviews about their information use. Survey questions were based on the *Information Literacy Competency Standards for Higher Education* (2000). Analysis of the responses confirmed that students demonstrated a lack of understanding about what they know about information and how they use it. Maughan’s and Seamans’ findings provide insight into attitudinal barriers that may affect student interest and engagement in traditional (isolated) information literacy instruction, again reinforcing the need for a more holistic approach.

Assessment of Information Literacy Instruction

The majority of studies of information literacy focus on assessment of information literacy instruction, employing both quantitative and qualitative methods. Nero (1999) tested over 500 senior education majors at selected Pennsylvania State System of Higher Education institutions on their knowledge of basic information literacy concepts (how to locate, evaluate, and use information), traditional library resources, and information technologies that are typically found in academic and school libraries. Participants were also asked to identify the aspects of their educational experience that contributed most to their information literacy abilities. Those identified included: personal initiative, class-related assignments, specific instruction, library use,

technology, and human interaction. The analysis of test results indicated that most senior education majors were deficient in their knowledge of digital information technologies and just slightly more knowledgeable regarding traditional library resources. These findings are not surprising if one considers that the educational experiences that the participants said contributed to their information literacy abilities seem not to be connected within a coherent program of instruction.

The results of a study conducted by Wertzberger (1999) that compared group and individual library skill instruction to determine which method was more effective were presented as a poster session for the ACRL 9th National Conference. The project goal was to analyze and compare the effectiveness of group library instruction and individual library instruction. The research design included a survey instrument administered before and after students received instruction (pretest/posttest), containing both affective questions and cognitive questions. The survey was distributed to all students receiving individual and/or group instruction over a two-month period. Once again, this instruction was not connected to the curriculum in any way. Of the 472 students who received group instruction, 328 returned both pretest and posttest, a 70 percent response rate. Of the 184 students who received individual instruction, only 77 returned both tests for a 42 percent response. The limitations of the study included disparity between sample sizes and a small sample size for the individual-instruction group; moreover, stratification by gender, class level, etc., was not possible, and response rate influenced the sample size for individual-instruction students as fewer of these participants returned both tests. Analysis of the data indicated: (a) the instrument used was better suited to a larger test group than a smaller one; (b) both modes of library instruction generally improve knowledge about the library as well as attitudes about the library and research; (c) students who were individually instructed were more confident about the library and their ability to use it; (d) students who were individually instructed began with more knowledge

about and a more positive attitude toward the library than their group-instructed counterparts; and, (e) a quantitative assessment of individual instruction sessions may not have been the best approach. Wertzberger's study concluded that a single instrument should not be used to measure both individual and group instruction modes of library skill instruction and that future studies should include both knowledge and affective measures since students' attitudes about the library are as important as their ability to use it effectively. A disappointing aspect of this study was that regardless of the method of library instruction employed, posttest scores (*M*= 62, 61) showed little improvement from the pretest scores (*M*= 57, 59), attributable perhaps to the short period of time between administration of the pre/post tests, or to the brevity of the instruction itself, or to the lack of its integration with the curriculum. In any case, these findings appear to reinforce the notion that effective information literacy instruction needs to be formalized, coherent, and connected to the curriculum, a strategy which was proposed at Nanyang Technological University (Singapore), after qualitative research revealed that students' skills in information literacy were weak (Hepworth, 1999).

Holman (2000) reports the results of a study that examined the efficacy of computer-assisted instruction in the form of an online tutorial compared to that of the more traditional classroom approach to bibliographic instruction. First-year undergraduate students at the University of North Carolina in Chapel Hill enrolled in English composition and rhetoric classes served as the subjects for this study. A total of 125 students participated in the study; 27 completed the tutorial, 56 received in-class instruction, and 42 were in the control group. All participants completed pretests and posttests to determine the gains experienced through instruction. The results indicated that although students preferred the pace of the tutorial over that of classroom instruction, there was no statistically significant difference in students' perception of the effectiveness of the two methods or the clarity of their presentation. In terms of

performance, while both groups of students improved their scores significantly between pretest and posttest, neither group scored particularly well on the posttest; in fact, a majority of the students would have failed if it had been a graded exercise.

Carter (2002) studied the efficacy of library instruction programs at The Citadel Library. The research population consisted of three cohorts: psychology students, first-year students, and students enrolled in history courses. The research design included quantitative and qualitative measures, consisting of pretests, posttests, and focus groups. The researcher's conclusions were that the library learned from the focus groups that sophomore and junior level students were in need of research instruction sessions and that real assessment takes time, planning, and a great deal of effort.

Dunn (2002) describes a multi-year and multi-phase plan developed by the California State University to assess information literacy skills in undergraduates. Information literacy competencies were defined and tested by various methodologies, including quantitative, qualitative, and longitudinal studies, entrance/exit assessments, and faculty surveys. Analysis of the data provided some insights into the information-seeking behavior of undergraduate students. Not surprisingly, one of the findings of this study indicates that while students generally begin their research process at the computer, their search strategies are largely inefficient, suggesting a need for information literacy instruction.

A study of first-year students enrolled in a fundamentals of technology management course at Deakin University School of Engineering and Technology in Geelong, Australia was conducted by Palmer and Tucker (2004), where elements of information literacy were incorporated into classroom instruction as a means of developing information literacy and of facilitating the transition of students into university-level study. Course goals included: (a) exposing and orienting students to the university library, its services, and facilities; (b) providing students with practice and rationale for

citing information sources; (c) providing general information literacy training; (d) providing easy access to information sources and practice and training in discipline-specific databases; and, (e) encouraging students to use information resources habitually and systematically. At the beginning of the course, students completed an online self-guided interactive-tutorial tour of the library and an assignment. Online resources introduced in the tutorial tour were available throughout the duration of the course. Afterwards, students completed an evaluation of the tour combined with an information literacy knowledge pretest in one survey. Next, students were given an information literacy session that focused on information resources in engineering and technology taught by the school's liaison librarian and a second assignment. Students were then asked to complete an evaluation of the instruction session combined with an information literacy knowledge posttest in a second survey. Of 134 enrolled students, 66 returned both the pretest and posttest for a response rate of 49.3 percent. Analysis of the data indicated that students positively valued the self-guided tour and the information literacy session. However, comparison of pretest and posttest information literacy knowledge scores indicated no significant differences in students' abilities to correctly identify common types of references; e.g., book, chapter in a book, journal article, and internet page, indicating that additional instruction was needed. These findings provide impetus for the improvement of information literacy instruction programs and underscore the need to develop pedagogies that are related to core requirements.

Impact of Technology on Pedagogy

In order to understand the impact of information technology on the research activity of university professors at King's College (London), Barry (1995) conducted a grounded theory investigation of the effects of technological changes in accessing information on its management and communication. This study's research population

consisted of sixteen university professors at different stages in their careers from two different disciplines (theoretical physics and education). The research design was a qualitative study using ethnographic methods based in grounded theory. Data gathering strategies included formal and informal observation and conversation, as well as semi-structured interviews. The findings of this study included: (a) prior to implementation of IT, the subjects relied on informal methods of information access and communication, which tended to satisfy their information requirements; (b) after the advent of IT, there was no consistent pattern of adoption of any particular methodologies among these subjects; (c) most of the subjects could be characterized as novice, rather than expert users, tending not to have expected to go through a learning process but to have been able to use the IT immediately; (d) the subjects expected to be able to use the IT without help and support, so did not make time for learning or to attend workshops or training sessions; (e) overall perceptions of the IT were incomplete; (f) the subjects' motivation to use the IT was linked to their perceptions of its usefulness; (g) finding time to learn to use the tools was a key issue for these subjects; and, (h) there appeared to be a complex relationship among perception, motivation and learning, with motivation being the overall causal factor leading to learning and affecting perception. These findings imply that faculty, perhaps more than students, experience a "learning curve" with respect to understanding and making effective use of newer technologies to access and obtain information resources, suggesting a need to develop information literacy instruction programs for faculty.

McDowell's study (2002) explored the impact of electronic information resources on teaching and learning from the perspectives and practices of university lecturers. The theoretical foundation for this interpretive study was phenomenographic research, in which the researcher attempts to identify all of the different ways in which a particular phenomenon is experienced, rather than to determine the relative frequency of particular

views. The research questions focused on how the subjects perceived and used information resources in teaching their classes. A purposive sample of twelve lecturers representing a range of disciplines from three universities comprised the research population for this study. Data were gathered through in-depth interviews, which were conducted in an open, conversational style that encouraged the participants to talk about their teaching and role of electronic information resources. The data were analyzed by reviewing the interviews so as to understand the perspectives of each individual in a holistic way; then the focus shifted to the differences between perspectives in order to identify a variety of pertinent features and issues. The findings of the study identified three functional categories of electronic information use: (a) using the electronic academic library as equivalent to the traditional university library; (b) bringing the world into the classroom, including resources such as government, legal and historical documents, media materials, official statistics, public opinion data and the like; and, (c) venturing into the large body of unregulated electronic information resources on the World Wide Web. However, while the lecturers acknowledged the importance of information literacy instruction for students, they were reluctant to take ownership of this concept but preferred to rely on librarians to help students to develop these skills. Again, a conclusion of this study was that information literacy instruction should be made available to faculty as well as to students.

Nichols, Shaffer, and Shockey (2003) developed an online format for delivering basic information literacy instruction for the purpose of allowing librarians to focus on more specialized instruction in introductory major courses and upper-division capstones as well as to make this instruction more widely available to students to fulfill a new general education requirement at State University of New York (SUNY) at Oswego. In order to test the efficacy of the new format, the authors conducted a study to determine whether student learning would be comparable using the online tutorial versus more

traditional pedagogies. Six sections of an English Composition course taught by three instructors provided the researchers with 64 subjects who completed the entire research methodology. Subjects were given an information literacy knowledge pretest just prior to the instructional session. Forty students received the online tutorial and had no in-class contact with a librarian, while the 24 students who received in-class instruction from a librarian were not exposed to the online tutorial. Both groups of students were given one week to complete their information literacy assignment. The posttest was administered in the following week. The average improvement of the online group was 3.75 points and the in-class group was 5.83 points; additionally, *t* test comparisons indicated a significant positive mean difference of 4.53 ($t = 2.679$; $p = .009$), indicating that students learned from both methodologies. Students' attitudes toward the two methodologies were also measured. Here, the mean difference between scores was 2.08 ($t = .593$; $p = .278$) which is not statistically significant, indicating that students are at least as satisfied with the online tutorial as they are with in-class instruction. Finally, observations of behaviors and comments made by students using the tutorial indicated that neither mode of instruction fits all learning styles, that students were more interested in active participation than in reading text or hearing detailed lectures, and that the timing of library instruction is important.

In the face of increasing technological sophistication, why does it seem that neither faculty nor students appear to use these technological advances to their advantage when seeking information? Warnken (2004) observes that technology's impact on libraries and library instruction has changed in focus, from *bibliographic instruction*, which dealt with more traditional library resources, to *information literacy*, a more inclusive concept that integrates digital technologies that have increased the amount of information that is available. At the same time, new accreditation standards in higher education are requiring evidence of instruction in information management and

technological literacy, along with increased emphasis in general education programs on integrated learning and learner-centered education. All of these changes have impacted the role of the university library and librarians. However, electronic enhancements that make the research process more efficient also tend to create confusion because students do not understand the research process as well as they understand the electronic tools: “It is especially critical that students understand how to do research and be self-reliant in the electronic information environment at a time when it is no longer necessary to consult with a librarian and not even necessary to come into a library” (p.153). As a result, information literacy requirements are appearing increasingly in higher education and librarians have been drawn into the curriculum process in ways that have created new opportunities for innovation and collaboration. Warnken concludes that the entire academic institution is responsible for graduating students who are both technology and information literate. In order for this to occur, academic program requirements must include courses that expose students to information and technology literacy as integral components, and successful partnerships must be formed between teaching faculty, librarians, technologists, and administrators.

Similarly, Jensen (2004) believes that most college faculty are aware of the problems that students encounter in conducting research when they use the Internet, but not as many understand why students are not successful when they use electronic indexes and databases provided by the institution’s library. College faculty and administrators have long accepted that students must graduate from our institutions having attained an acceptable level of information literacy in order to be successful in life. Why then do students have so much trouble locating appropriate information sources? Because most of the research that students conduct at the college level is done online, Jensen believes that the context for research has been lost. The library as a physical entity and all of the materials that can be found within can be easily bypassed

if not completely eliminated from the students' perspective. Today's students have extensive experience in using computers but they have not worked with the hard copies of the information items that they would find in an actual library, nor have they spent much time in one. Thus it is difficult for students to recognize the differences between scholarly journals and popular magazines or articles and abstracts (Jensen 2004).

Conceptual Models of Information Literacy Instruction

In recent years there has been a shift in focus from "teaching" to "learning" in higher education. This parallels the shift from *bibliographic instruction* to *information literacy* (Lupton, 2002; Warnken, 2004) in libraries. Luption (2002) believes that this shift in viewpoint has precipitated a change in the role of librarians as service providers to that of educators. In order to facilitate students' abilities to gain knowledge, librarians should see themselves as teachers rather than trainers. Asserting that much of what is currently presented as *information literacy* is actually *library skills*, *user education* or *bibliographic instruction*, she regards these as forms of training and not true education:

> In contrast, information literacy is a holistic educational outcome, involves all information formats, includes evaluation, analysis, and synthesis, is learner centered and involves the learner in all aspects of their lives … We are deluding ourselves if we believe that we are "embedding" information literacy into the curriculum by delivering the standard 50-minute bibliographic instruction session, even if it is within the context of the subject. We are also misrepresenting information literacy (p. 78).

If information literacy is viewed as "training," then it is unlikely that it will be perceived as a wider educational concept which should be embedded in the curriculum. One way to facilitate information literacy as a wider educational concept is to embed it in the curricula of individual disciplines or entire programs of study. This can be accomplished

in several ways, including: (a) the explicit inclusion of information literacy learning goals within subject and course learning outcomes; (b) the inclusion of information literacy learning outcomes within assessment criteria; (c) developmental sequences of learning throughout programs of study; and, (d) librarian-faculty collaborations in reviewing and grading student work (Lupton, 2002). Thus, we see the emergence of a variety of conceptual models of information literacy instruction, many involving collaboration.

Lashbrook (1986) reported the results of a study whose purpose was to "see" library media skills instruction as the participants see it, by attempting to get "inside the skin" of teachers, the library media specialist, and students. The primary research question in this grounded theory study was, "How does the instruction of the classroom teacher interact with that of the library media specialist as they instruct fifth graders in the media skill of retrieving stored information?" (p. 205). The research population consisted of three fifth-grade classrooms in a single elementary school located in a rural community in the mid-western United States. Data gathering strategies included participant observation, the collection of life stories from key informants, and structured interviews. The findings of this study included: (a) interaction between the classroom teacher and the library media specialist proved to be insignificant in affecting the students' ability to learn to retrieve information; (b) the instructional strategy used by the classroom teacher was most responsible for student success in retrieving information; (c) the ability of the student to use the materials that were organized in the library media center was related to success in answering questions that were raised in the classroom through curricular experiences; and, (d) the linking of classroom experiences with those in the library media center occurred through the translation of "classroom language" into "library media center language." The researcher concluded that further investigation is needed into the connections between and the use of these languages, or dialects relevant to information retrieval, which were not always similar. A second conclusion

was that there is also a need for teacher education programs which emphasize the development of team-building skills for teachers and library media specialists.

Fitzgibbons (1990) studied the relationship between adult students' self-directed learner capacity and their levels of library literacy, defined as attitudes and knowledge affecting library use. Other factors were also examined, including age, gender, academic major, earned academic credits, grade point average, type of library instruction received, frequency of library assignments, and number of hours spent using libraries. Adult learners enrolled in baccalaureate degree continuing education programs at a leading public university were surveyed, using Oddi's Continuing Learning Inventory (OCLI) and the Library Literacy Assessment Test (LLAT), which was developed for the study. Both affective (attitudinal) and cognitive (knowledge) domains were studied. This study found no statistical significance between any of the factors studied and library literacy, with the exception of self-directedness.

Strege (1996) employed a qualitative approach to assess information literacy instruction, participating in a study skills class at a community college for one quarter. She first observed students to discover their interests and abilities, then designed and implemented a curriculum based upon her observations, and finally evaluated its effectiveness. Her findings indicated that students were largely uninterested in library research, even when they participated in selecting research topics that interested them personally. This finding is significant in that the conceptual model employed – connecting students to the instruction through individual contact and personalized topics – actually failed, reinforcing the concept that information literacy cannot be taught in isolation, but in order to be meaningful must be connected to a "real" research need such as linking information literacy assignments with research assignments in a disciplinary course.

Bruce (1997) analyzed various conceptual models of information literacy in higher education. She developed the metaphor of an *information literacy wheel* (in which descriptions of information literacy, information literacy education, and research comprise the three spokes of the wheel) to examine problems associated with the then-dominant behavioral model and to propose a new relational approach to information literacy instruction as an alternative. Bruce's study analyzed data obtained from instructors, librarians, counselors, and staff developers to construct a detailed picture of the different ways in which information literacy is experienced. The resulting seven conceptions (information technology, information sources, information process, information control, knowledge construction, knowledge extension, and wisdom) provide a composite picture of what information literacy means to people, and forms the center or hub of the relational information literacy wheel. These outcomes provide a new way of thinking about information literacy education and open the door to further research.

Sheehy (2001) conducted a study whose purpose was to establish and assess a professional development model for affecting change in the way teachers implement information technology in the classroom, a change based on a paradigm shift from a behaviorist skills and drills methodology to a constructivist resource-based learning methodology. The study was part of a small liberal arts college's ongoing efforts to incorporate information technology into its teacher education program and provide professional development opportunities for area educators. A cohort of pre-service teachers (K–12) was trained in information technology skills including software management, online information retrieval, Internet searching, word processing, spreadsheets, databases, document imaging, and desktop publishing. These skills were used to integrate information literacy activities into their student teaching. By critiquing these lessons the cooperating teacher partners were encouraged to incorporate these methods into their own teaching. The goal of the project was twofold: to aid pre-service

teachers in building competence and confidence in teaching information literacy and to encourage in-service teachers to integrate these skills into the curricula. Data to measure the effectiveness of the model were collected from focus group discussions, pre- and post-questionnaires, evaluation surveys, and personal interviews that examined the change, over time, of the way in which the participants viewed their use of computers for personal, professional, and instructional purposes. Analysis of these data indicated that the new program was a positive experience overall for both groups.

The findings of a study conducted by Brown and Krumholz (2002) in which an information literacy component was incorporated into a senior-level geo-microbiology course at the University of Oklahoma support the holistic conceptual model of information literacy instruction as expressed by Bruce (1997) and Lupton (2002). In this study, students were asked to complete a questionnaire at the beginning of the semester that assessed their self-reported information literacy levels. They were then exposed to two detailed instruction sessions on finding information to support their class assignments given by librarians. One of the assignments required them to select and critique an article from a peer-reviewed journal. In addition to the written critique, each student gave an oral presentation in class, after which others in the class were given the opportunity to ask questions. The written critiques, oral presentations, and classroom participation were rated against the ACRL's *Information Literacy Competency Standards for Higher Education* (2000), and the self-reported surveys were re-administered. Overall, the level of improvement on the survey questions was eleven percent although these findings were not correlated to students' scores on the *Standards* checklist. It was hypothesized at the outset of this study that students' grades on the literacy event as assessed by their instructor would correspond to their scores on the *Standards* checklist and the self-reported surveys, but this was not the case. We might thus conclude that course-embedded information literacy instruction fares no better than traditional modes;

however, it must be noted that there is no evidence that the instruction offered was connected to a more comprehensive program in this instance.

A study conducted by Ivey (2003) investigated the working partnerships of librarians and faculty in their efforts to develop information literacy in students at the University of Waikato, Hamilton, New Zealand. The study focused on important aspects of collaborative teaching partnerships, including how these partnerships can be fostered and sustained; additionally, the roles of the faculty-librarian partners in planning, teaching and evaluating learning and the challenges related to these processes were explored. Seven liaison librarians and seven faculty members who had worked in teaching partnerships were interviewed by the researcher and asked to identify the three most important behaviors they found to be essential for successful collaborative partnerships from a list developed as a result of a study of successful collaborations conducted by Schrage (1990). Four behaviors were identified as essential for developing collaborative partnerships: (a) a shared, understood goal; (b) mutual respect, tolerance, and trust; (c) competence for the task in both partners; and, (d) continual and ongoing communication. Other important elements were identified as commitment, enthusiasm, like-mindedness, and innovation. Moreover, librarians and faculty agreed that good working relationships must be established prior to the development of collaborative teaching partnerships. An additional finding indicated that the development and the sustainability of collaborative partnerships were enhanced where librarians supported the research interests of their faculty partners. While these partnerships were initiated by the faculty partner, further analysis of the interview data revealed that the role of librarians was perceived as one of development and support. Finally, most of the faculty and a few of the librarian participants in this study believed that information literacy should be connected to discipline-specific learning, and that teaching information literacy is a responsibility that should be shared between faculty and librarians. These

beliefs support a holistic or process-based view. However, most of the librarians and a few of the faculty members in this study saw information literacy as a discipline of its own, and felt that teaching the elements of information literacy is primarily a librarian or faculty responsibility, which is a more fragmented approach. These findings may be attributable to differences in understanding of information literacy or the differing perceptions of librarians and faculty about their teaching responsibilities. However, they highlight the importance of a shared understanding of the concept of information literacy and its associated teaching responsibilities in successful collaborative partnerships. An overriding concern that was identified in this study by both the faculty and librarian participants was the problem of insufficient resources, particularly with regard to the workloads of the librarians. As the role of librarians changes to include teaching groups or entire classes of students, issues of goal-setting, support, and professional development become important aspects of collaborative teaching efforts. In her conclusions, Ivey suggests that an understanding of the development of information literacy and the associated teaching responsibilities by university and library administrators is needed in order to ensure that these programs are adequately supported.

Does context-based library instruction result in improvement in team-based research and writing? In order to answer this question, Roldan and Yuhfen (2004) conducted a study with management information systems students enrolled in six sections of a capstone MIS Strategy class. The course required students to work in teams of three to conduct research and write a term paper. Students in the course were given an introductory session in MIS research taught by a reference librarian who specializes in this subject. The session included a Web-based tour of library services and resources. Pretest and posttest surveys were administered to all students just prior to and following the introductory session. The surveys contained two sections: a

knowledge assessment and a self-efficacy assessment. Complete data sets were obtained from 135 respondents. Paired samples *t* tests were conducted to determine the differences between pretest and posttest mean scores. Statistically significant differences were found for one item: hours spent on research for term papers (*Mdiff* = 5.78, $p < .01$). Additionally, there was a 13% decrease in the number of students who reported satisfaction with the results of their research efforts, suggesting that as students gained greater knowledge of research processes and resources, they also developed higher standards. For all items, students reported greater confidence with activities involved in strategic analysis post-instruction, including their ability to assess the quality of materials needed and their ability to structure and organize the information that they collected in their research. The study's findings indicate that intensive interweaving of course content and library instruction is an effective method of improving students' information literacy, supporting the efficacy of a holistic model of instruction.

Owusu-Ansah (2004) observes that a comprehensive approach to information literacy instruction is clearly needed in higher education, given its greater prominence and importance to accreditation. He recommends a collaborative approach that involves faculty and librarian partnerships and a course-integrated instruction program, ensuring that every undergraduate receives information literacy instruction prior to graduation. The components of such an approach would include an independent credit course in information literacy that offers in-depth engagement with issues inherent in and skills attendant to information literacy as part of the general education curriculum, mandatory segments of information literacy taught by librarians within basic courses required of all undergraduates, and an elective credit course that provides more elaborate and complete training in information literacy (Owusu-Ansah, 2004).

The Literature of Change Theory

Change is a recurring theme in a variety of literatures, including business, healthcare, social sciences, and education. Theoretical models have represented change as a biological process (Sheehy, 1995; Wheatley, 1994; Zohar, 1997), a personal journey (Bridge, 1980; Hall & Hord, 1987, 2001), an organizational imperative (Fullan, 2001; Kanter, 2001), a prescriptive process (Kotter, 1996; Senge et al., 1999), or a combination of these themes (Schein, 1999). However, the theoretical models of change that are most pertinent to this study are those of change in higher education.

Change in Higher Education

Various theoretical models have been proposed for understanding the dynamics of change within institutions of higher education. For example, Gumport and Snydman (2002) suggest that one line of thinking about change in academic institutions involves competing organizational theories of inertia and adaptation. Theories that emphasize organizational inertia are characterized by a tendency to resist fundamental change (Hannan & Freeman, 1989) and an inclination to retain their founding organizational arrangements (Stinchcombe, 1965). There are extensive examples in higher education to support these theories as academic organizations have often been criticized for ineffective management, bloated bureaucracy, and professional stagnation (Bergmann, 1991; Gumport & Pusser, 1995; Pew, 1990). However, not all examples of inflexibility in academic structures are perceived as negative as many of the most enduring organizational features of academia, including faculty tenure, classical curricula, tradition, ritual, and symbols are viewed as embodiments of academic ideals and mission (Gumport & Snydman, 2002). On the other hand, adaptation theorists present a view of organizational change in which strategic changes are made in processes and structures in response to imperatives driven by changing environmental conditions, such

as shifts in the availability of key resources (Miles & Cameron, 1982; Pfeffer & Salancik, 1978). Some examples of adaptive responses to environmental demands might include structural changes such as networking, reengineering, or outsourcing (Gumport & Pusser, 1997).

Kezar and Eckel (2002) describe six categories of change theories found within a multidisciplinary literature, including biological, teleological, political, life cycle, social cognitive, and cultural. While biological (unplanned change) and teleological (planned change) models have the longest histories in higher education and have received the most attention, they have also tended to produce generalized change strategies that have been perceived as problematic (Burns, 1996; Collins, 1998). Political models, also historically significant in higher education, have been critiqued for their inability to provide organizational participants with solutions for facilitating or reacting to change (Burns, 1996; Collins, 1998; Van de Ven & Poole, 1996). Life cycle, cultural, and social cognitive theories have been recently lauded among researchers for their ability to illustrate complexity and to demonstrate the context-based nature, ambiguity, and human aspects of the change process (Collins, 1998).

In examining the effects of institutional culture on change, Kezar and Eckel (2002) found that several assumptions from cultural theory are supported, including the significance of culturally appropriate strategies, the importance of examining multiple layers of culture (enterprises, institutions, and groups), and the possibility of predicting which strategies are more important. Their findings challenge a conventional assumption about change processes: that general principles or approaches can be followed without awareness of the impact of distinct organizational cultures upon the process. More importantly, the findings of their study suggest the need for practitioners to become “cultural outsiders” (Kezar & Eckel, 2002, p. 2) in order to observe their own institutional patterns.

Lueddeke (1999) proposed an *adaptive-generative development (A-GDM)* model of change that integrates cultural, social-cognitive, and evolutionary-teleological change models with constructivism, which involves the continuous construction of meaning, and whose outcomes depend to some extent upon the prior knowledge and interests of the learner (Olssen, 1996). The *A-GDM* change model, whose central assumption is that change results from the shared construction of meaning facilitated by an interactive and inclusive team, comprises six interrelated elements: needs analysis, research and development, strategy formation and development, resource support, implementation and dissemination, and evaluation.

According to a 2001 ASHE-ERIC *Higher Education Report* titled "Understanding and Facilitating Organizational Change in the 21st Century: Recent Research and Conceptualizations," when higher education administrators think of change, they generally think in terms of institutionalization, or diffusion. In other words, they wonder how they can influence others to adopt a particular concept, program, or structure. This type of change is characterized by three phases: *mobilization*, *implementation*, and *institutionalization*. Remarkably similar is Kurt Lewin's basic model of change, which involves "unfreezing, changing, and refreezing" (Schein, 1999, p.1). Lewin named the initial stage in his change theory *unfreezing*. In this stage, members of an organization are influenced to begin to think differently by the introduction of information that demonstrates discrepancies between current behaviors, structures, or methods and those that are desired. The second stage, *changing*, or *moving*, involves the intervention of new behaviors, values, and attitudes. This is accomplished through a shift, or move, to a different level of behavior from that previously experienced. In the third and final stage, *refreezing*, the organization becomes stabilized as it reaches a new equilibrium (Cummings & Worley, 2001).

Diffusion models of change tend to focus on individuals rather than whole organizations and are characterized by several phases: *awareness*, *interest*, *evaluation*, *trial*, and *adoption* (Rogers, 1995). The *Concerns-Based Adoption Model (CBAM)*, described more fully in Chapter One, is an example of a diffusion model. The *CBAM* is a conceptual framework that describes, explains, and predicts probable behaviors as individuals experience a change process (Hord, Rutherford, Huling-Austin, & Hall, 1987) and is based upon the premise that individuals who experience change must be supported through seven *Stages of Concern (SoC)* in order to fully assimilate the new initiative (Loucks-Horsley, 1996).

The Concerns-Based Adoption Model and Change

In a recent case study conducted at a private university, Costantino (2003) sought to determine the extent to which undergraduate students, faculty, and administrators perceive information literacy competencies to be of importance and whether these skills are being taught and learned. This study employed the *SoC* to understand the level of assimilation of the concept of information literacy instruction and to initiate a change, rather than to assess progress in a change process. The study's methodology involved the use of a self-designed questionnaire and interviews. Selected performance indicators and outcomes from Standard Two of the *Information Literacy Competency Standards for Higher Education* (ACRL, 2000) formed the basis of the questionnaire and open-ended interview questions. In order to assure content validity, eight information literacy experts were involved in designing the instruments. Questionnaire comments and interview responses were coded into categories and compared with the *Stages of Concern (SoC)* in order to apply the results practically. Responses were obtained from 141 of 428 undergraduate students and 24 of 71 faculty and administrators (response rates = 33% and 34% respectively). The participants

overwhelmingly agreed that teaching and learning information literacy skills are important; however, there was disagreement about how these skills are learned or taught. Whereas the majority of faculty and administrators believed that students learned these skills from librarians or faculty, many students responded that they had not learned these skills, nor were they self-taught. The findings that emerged from this study, including that the stakeholders' levels of concern about information literacy competencies varied, and that no formal plan for teaching these competencies existed at the institutional setting, led to the development of an action plan to: 1) develop a formal information literacy action plan; 2) promote an understanding of the differences between computer literacy and information literacy; 3) decrease the use of the Internet/WWW and increase the use of research databases; and 4) mandate faculty/librarian collaboration in the pursuit of these objectives.

Additional studies have employed the *CBAM* and *SoC* to understand the integration of technology or other types of changes into a course, program, curriculum, or educational environment. For example, Downie (2003) determined the effectiveness of a balanced literacy approach to reading instruction in the primary grades of a central western Pennsylvania school district by evaluating the impact of change upon teachers' professional growth and students' academic progress. The program's effectiveness was assessed through the *SoC*, teacher interviews, and student reading scores. The study determined that all teachers had moved forward in the implementation of the reading program though at different paces. Sufficient professional development was provided, but the timetable for program implementation was too aggressive. The findings also revealed that the administratively driven program design may have caused a delay in the acceptance of the program by a portion of the faculty. This study concluded that professional development must be tailored to teachers' needs to sustain growth and that it takes time and effort to learn and apply new teaching strategies.

Wells (2000) employed the *Stages of Concern Questionnaire (SoCQ)* to measure changes in graduate students' concerns toward the use of Internet applications in course delivery and/or integration into course assignments. The purpose of this case study was to assess student attitudes toward using the Internet to deliver a computer-mediated communication course requiring the integration of Internet applications into the instructional design. The researcher sought to understand the relationship between students' Internet concerns and the following factors: on-line delivery of the course, prior computer experience, prior Internet knowledge, and students' learning styles. A single group of thirteen graduate students enrolled in a particular course during one semester at a public university comprised the participants for the study. The findings indicated that computer-mediated delivery was effective in teaching skills and methods of integration, that prior computer experience was not an issue for the graduate students taking the on-line course, and that course requirements—not the method of delivery—were the cause of increases in students' internal and external concerns. A general conclusion drawn from these findings was that basic computer-mediated communication skills alone are not enough for full content integration to occur; it seems that additional courses at an advanced level are required to enable students to develop complex integration skills.

Another technology-innovation assimilation study employing the *SoCQ* was conducted by Scott (1998). The purpose of this case study was to determine differences between experimental and control groups' *Stages of Concern* with technology use in the classroom. Surveys were given to 150 education students at a selected southern university; 88 of 106 useable responses were randomly selected for data analysis. The results indicated no significant relationship between the groups and scores on the *SoCQ*, nor was there a significant relationship between group and planned use of technology by teachers or students. Similarly, a study conducted by Bissette (1998)

also explored technology integration in a rural school district using the *SoCQ*. This study surveyed 21 graduate education students participating in a four-semester technology education program. Pretest and posttest instruments were used to assess the impact of the program on participants. A pre-survey of computer knowledge and educational technology designed by the researcher was used to establish a baseline of technology use in the classroom prior to application of a technology integration program. At the conclusion of the third semester of the program, technology profiles and computer logs were used to assess changes in the use of educational technology by the participants, while the *SoCQ* was used to assess the participants' level of concern about these changes. The results of the study indicate positive changes in participant use of and attitude toward technology in the classroom.

In a slightly different venue, Alfieri (1998) used the *SoCQ* to identify the *Stages of Concern* of faculty at Defense Systems Management College toward the use of technology-based education and training and to identify appropriate interventions to facilitate the change process. In this case, the SoCQ was administered to 135 teaching faculty. Of the 126 responses returned, the majority (64%) reported no experience with technology-based courses. Strong personal concerns and negative attitudes were expressed in responses to the *SoCQ* regarding the impact the innovation would have on faculty, who seemed unconvinced that technology integration was an optimal solution.

Germann's and Sasse's 1997 study monitored changes in concerns and beliefs of elementary and secondary teachers who were involved in a two-year program designed to integrate the use of computers and science teaching. The *SoCQ* was used to measure self-concerns, management concerns, and impact concerns for two groups of teachers participating in the program. Concern profiles for "group 1" teachers showed decreases in self-concerns and management concerns and increases in impact concerns in the first year, but instead of moving toward adoption stages in the second

year, they reverted to high self-concerns and lower impact concerns. However, concern profiles of “group 2” teachers in year two were similar to those of “group 1” teachers in year one. A major barrier to adoption cited was the perception that learning to use computers in science teaching was not a single innovation but several innovations disguised as one. A resulting outcome of this study was the development of remedial training programs and support systems that were designed to counteract these barriers.

A 1996 case study conducted by Wesley and Franks sought to improve understanding of processes related to teachers’ adoption of networked *computer-assisted instruction (CAI)* and desktop computer multimedia resources at a selected magnet elementary school. The *SoCQ* was used to gather quantitative data while interviews with four selected teachers supplied qualitative data. The research focused on understanding the role of teachers’ self-initiated or voluntary individual or collegial adoption-related activities in promoting progression for the innovations. Data analysis indicates that increasing collegial interaction among adopting teachers over time is related to personal, management, information, collaboration, and consequence concerns. The findings of this study also indicated that the evolution of teachers’ concerns and their voluntary adoption activities are interrelated with their advances in experience with the technology innovations.

The purpose of a similar study conducted by Hope (1995) was to assess the initiation and implementation of microcomputer technology (teacher workstations) within the educational environment of an elementary school in Florida, and to understand its impact upon teachers. The *CBAM* served as one of three elements of a conceptual framework that was developed to promote the technology and to monitor and interpret its progress. The results of this study indicated that teachers experienced task and self-concerns near the beginning of the study, but as their involvement with the technology increased, their concerns changed to those of impact, consequences, and refocusing.

Finally, Todd (1993) reported the results of a technology-integration study using the *SoCQ* with 26 members of education department faculty at a university in the northwestern United States to assess concerns related to teacher competency with computer technologies. The data indicated that this faculty expressed the most intense and frequent concerns within the categories of awareness, information, and personal self-concern. Interestingly, this study found that the more experienced instructional users had more intense concerns at the impact stages than the inexperienced users, with experience in incorporating computing assignments in courses being the most important factor influencing the stage of concern.

Summary

Part one of this review of the literature indicates that the topic of information literacy instruction has been studied from a variety of aspects, including: policy or program development (Brock,1993; Brown, 1996; Doyle,1992 & 1993; Schultz, 1995; Serotkin, Fitzgerald & Balough, 2005); information literacy as a concept (Hartmann, 2001; Kuh & Gonyea, 2003; Morrison, 1997; Owusu-Ansah, 2003; Valentine, 1993); skill development and retention (Hardesty, Lovrich & Mannon, 1982; Maughan, 2001; McKinzie, 1997; Seamans, 2001); assessment of programs (Carter, 2002; Dunn, 2002; Hepworth, 1999; Holman, 2000; Palmer & Tucker, 2004; Nero,1999; Wertzberger, 1999); impact of technology on pedagogy (Barry,1995; Jensen, 2004; McDowell, 2002; Nichols & Shockey, 2003; Warnken, 2004); and, conceptual models (Brown & Krumholz, 2002; Bruce, 1997; Fitzgibbons, 1990; Ivey, 2003; Lashbrook, 1986; Lupton, 2002; Owusu-Ansah, 2004; Roldan & Yuhfen, 2004; Sheehy, 2001; Strege, 1996). Regardless of the methodology employed, focus, or subjects investigated, the literature of information literacy instruction reveals that older, more traditional models based on behaviorist concepts are not producing acceptable or lasting results (i.e., skill retention

over a period of time). However, newer, relational/conceptual, or holistic models of information literacy instruction employing constructionist concepts have seen greater success. The holistic model of instruction is the one employed at the institution that served as the setting for this current case study.

The review of the literature of change demonstrates that a variety of studies of educational change have effectively employed the *Concerns-Based Adoption Model* and *Stages of Concern* to assess the degree to which an innovation has been assimilated within a particular environment, program, or course (Alfieri, 1998; Bissette, 1998; Costantino, 2003; Downie, 2003; Germann & Sasse, 1997; Hope, 1995; Scott, 1998; Todd, 1993; Wells, 2000; Wesley & Franks, 1996). The methodologies, findings, and conclusions of these studies are particularly relevant to those of the current study.

Focus of the Current Study and the "Gap" in the Literature

The current study employs the *Concerns-Based Adoption Model (CBAM)* and *Stages of Concern (SoC)* as a conceptual framework to investigate and understand the impact of introducing a more holistic approach to teaching information literacy across-the-curriculum as an innovation at a particular institutional setting with regard to the *personal, management*, and *impact* concerns of the participants. As has been previously mentioned, although numerous studies have attempted to assess the impact of technology on teaching, learning and information-seeking behaviors of faculty, librarians, and students, there are currently few studies that have sought to understand the impact of information literacy instruction methods on these behaviors, especially those that are distributed across the undergraduate curriculum. The current study's findings and conclusions regarding the impact of this program on librarians, faculty, and students will serve to fill this gap in the literature to some degree.

CHAPTER THREE: RESEARCH DESIGN AND METHODOLOGY

Case Study Approach

The case study approach to this research design was chosen for its ability to portray the multi-dimensional complexities of a phenomenon within a unique setting. In this case study, the researcher sought to understand and depict the impact upon the study population of changes in information literacy instruction methodologies introduced as an innovation within a particular institutional setting. According to Stake (1995):

> We study a case when it itself is of very special interest. We look for the detail of interaction with its contexts. Case study is the study of the particularity and complexity of a single case, coming to understand its activity within important circumstances (p. xi).

This case is of "very special interest" to the researcher not only because it is the institutional employment setting of the researcher, but also because it is one of only a few settings known to the researcher where a multi-disciplinary, multi-year approach to teaching information literacy skills has been attempted.

Moreover, although this study combines both quantitative and qualitative research methods, a qualitative approach is appropriate because the researcher wishes not only to measure the success of the new instructional methodologies in terms of student learning outcomes, but also to obtain an in-depth understanding of "how" and "why" these methodologies may or may not be successful, as well as the extent to which they have been generally assimilated or adopted within the institutional setting. Frick (1990) explored the question of whether qualitative evaluation of library user education programs is appropriate. He concluded that while both quantitative and qualitative evaluation methods may be pertinent to user education programs, the methods and data of qualitative evaluation may be of particular value to the designers and administrators of such programs.

Merriam (2002) suggests that before one undertakes a study of a particular phenomenon or problem, one must make a case for its importance. How useful will the findings be to others? Who will benefit from them? As previously stated, this study holds some significance for the institution that serves as the setting, or, "case," in that it may be viewed as a model for assessing the effectiveness of a portion of the institution's general education program, and its findings and conclusions will help to guide future information literacy program development. Additionally, the findings and conclusions of this study contribute to a growing body of research in the areas of information literacy instruction, student learning outcomes assessment, and innovation assimilation.

Role of the Researcher

The role of the researcher in case studies has been described by Stake (1995) as teacher, as advocate, as evaluator, as biographer, and as interpreter. In his view, the researcher may play one or more of these roles throughout the duration of the study, continuously deciding how much to emphasize each role and when to play it. As librarian, instructor, and administrator at the study site for over twenty years, the researcher has already served in several of these roles with respect to fostering the development of the innovation that is the subject of this study. While the researcher admits to personal and professional reasons for conducting this investigation, the researcher has also maintained rigorous standards throughout the course of this study in order to avoid any real or perceived conflict of interest. That being said, in qualitative research it is nearly impossible to separate the researcher from that which is being researched (Merriam, 2002; Stake, 1995; Yin, 2003). The researcher must recognize that she or he will have some impact upon the data being collected, simply by virtue of interaction with the subjects. Yin (2003) describes several attributes or skills that are desirable for good case study investigators. These include:

- Asking good questions and interpreting the responses
- Being a good listener, not limited by personal preconceptions or ideologies
- Being adaptive and flexible, seeing new situations as opportunities and not threats
- Having a firm grasp of the issues being studied, whether the investigation has a theoretical or policy orientation, even if in an exploratory mode; this allows the researcher to reduce relevant events and information to manageable proportions
- Being sensitive and responsive to contradictory evidence, unbiased by preconceived or theoretical notions.

This researcher began this study with no preconceived notions concerning its outcomes, wishing only to conduct an honest assessment of the findings.

Institutional Setting for the Case Study

Saint Francis University is a small, Catholic, comprehensive institution sponsored by the Franciscans of the Third Order Regular and located in the Allegheny Mountains of west central Pennsylvania in the community of Loretto. Founded in 1847, the institution is the oldest Franciscan and twelfth oldest Catholic university in the nation. At the time that this study was conducted, the University enrolled a total of 2,102 students, including 1,371 undergraduates, 153 continuing education students, and 578 graduate students, where 80% of undergraduate students and 92% of continuing education/graduate students are Pennsylvania residents.

Early recognition of the importance of research and computer application skills development in undergraduates by general education program revisionists at Saint Francis University led in 1992 to the institution of a one-credit *skills workshop* for first-year students (*Report from the General Education Task Force*, 1993, p. 9) which eventually evolved over ten years into the University's *information literacy* course (*CORE 101*), a general education core requirement taught by librarians. Within a few months of

the Association of College & Research Libraries' adoption of the *Information Literacy Competency Standards* (ACRL, 2000), the University library used the new standards to conduct an analysis of *CORE 101*, reference desk services, and upper-level bibliographic instruction. The ensuing report indicated that the library's performance in these three areas demonstrated a high level of compliance with the standards. However, one notable weakness was the lack of any formal program of information literacy instruction beyond the freshman year.

In order to give adequate consideration to the broader implications of a more comprehensive information literacy instruction program, the report recommended that an information literacy committee be appointed under the auspices of the University's General Education Committee and charged with developing such a program. Recognizing that the challenge of developing the information literacy skills of all Saint Francis students was one that could not be met by the librarians alone but must be shared with faculty, the General Education Committee appointed the University's first Information Literacy Committee (ILC) in 2001. Composed of librarians, faculty, an instructional technologist and a student, the ILC was charged to direct the future development of information literacy instruction in conjunction with the University's ongoing assessment and improvement of the General Education Program.

At an orientation meeting in November 2001, several information items were shared and discussed with the ILC, including: the ACRL's *Information Literacy Competency Standards* (2000) and *Best Practices* (2002), the academic programs section of the Middle States Commission on Higher Education's latest revision of *Characteristics of Excellence* (2002), and several background articles about information literacy (Kirk, 2001; Shapiro & Hughes, 1996; Ward, 2001). Two members of the ILC attended a workshop in New York City in December 2001, which focused on information literacy and outcomes assessment. The ILC's review of the professional standards and

background information, along with supplemental information obtained from the workshop, enabled the ILC to complete three of its objectives: to review the ACRL and Middle States standards regarding information literacy, to examine best practices and assessment methods used at other institutions, and to identify a consultant to conduct a formal review of the University's information literacy program in Fall 2002.

Early on, the ILC identified several challenges to its expansion of the information literacy instruction program. One such challenge was the misconception that *information literacy* is synonymous with *computer literacy*. Another was the perception that one semester of information literacy instruction was sufficient. The challenge of convincing various constituents that there were credible reasons for modifying the existing information literacy course and for instituting formal instruction beyond the first year was considerable. Finally, the ILC recognized that it must be made clear to faculty that librarians were willing to seek partnership with them in these efforts and to share the workload that such an enterprise would require.

Most of these challenges had been overcome to some extent, as the University moved to implement the ILC's recommendations for expanding information literacy instruction across the curriculum. While formal information literacy instruction at Saint Francis remained focused on the first-year student, a poll conducted by the ILC with faculty in fall 2002 indicated that information literacy skill development was, in fact, informally occurring within upper-level disciplinary instruction. Subsequently, several strategies were implemented to encourage collaborative relationships between faculty and librarians that would help to transform these informal instances into formalized units that were meaningful because they were integrated into subject content.

For example, class schedule alignments provided opportunities for strengthening the connections between first-year class sections of *CORE 101* (*Information Literacy*—a one-credit course) and *CORE 102* (*Colloquium*—a two-credit, interdisciplinary, topical

course). Librarians teaching the information literacy sections were thus able to partner with faculty teaching the corresponding sections of the colloquia (content varies for each) so as to make logical connections that produce complementary assignments in both classes. Moreover, the General Education Task Force on Writing-Across-the Curriculum recommended changes in the timing and structure of required writing courses that opened the door to the possibility of introducing course-embedded information literacy components through writing courses taken in the freshman and sophomore years. Additionally, a librarian liaison program was initiated in fall 2003, in which instruction librarians were assigned to academic departments to work with individual faculty members in developing course-embedded information literacy components in upper-level courses. In 2005-2006 a *faculty teaching information literacy pilot program* was initiated, in which faculty participated in summer training sessions with librarians and an instructional technologist to develop information literacy components that were intentionally incorporated into their upper-level content courses. Finally, the ILC's recommendation that the University begin to re-assess information literacy skills in the junior or senior year was implemented in spring 2006 in order to measure progress in information literacy competencies.

Participants and Method of Subject Selection

The subject population consisted of two groups. Group One was comprised of faculty and librarians, approximately 35 – 65 years of age; undergraduate students approximately 18 – 22 years of age comprised Group Two. Both of the subject populations included male and female participants. For inclusion in Group One, participants must have been faculty members or librarians who had taught one or more information literacy courses or had included one or more information literacy components within upper-level courses. Faculty and librarians who had not taught

information literacy components or courses were excluded from the study because their classroom experiences would not have been relevant to this study. For inclusion in Group Two, subjects must have been full-time undergraduate students who were currently enrolled or previously enrolled for a period of at least two years prior to the time that the study was conducted. Part-time, continuing education and graduate students were excluded from this study because their experiences of information literacy instruction would have differed significantly from those of the target population. No subjects classified as vulnerable (children, pregnant women, fetuses, prisoners, mentally disabled persons) were included within the subject population.

Purposive sampling was used to select participants for Group One; faculty members and librarians who were experienced instructors of information literacy courses or who had formally incorporated information literacy components within courses were invited to participate. Convenience sampling was used to select subjects for Group Two; all available information literacy pretest and posttest scores from three groups of undergraduate students were selected for analysis.

Research Questions

This study considered the following four questions:

1. In what ways and to what extent has a more holistic approach to teaching information literacy been assimilated by faculty and librarians?
2. In what ways and to what extent have faculty attitudes toward teaching information literacy skills been affected by the introduction of these holistic instructional approaches?
3. In what ways and to what extent have librarian relationships with faculty changed as a result of these holistic approaches to teaching information literacy?

4. In what ways and to what extent are student learning outcomes affected by the introduction of a more holistic approach to teaching information literacy?

Procedures

A non-experimental approach was taken in this case study. Focus groups were conducted with participants in Group One in order to explore issues regarding changes in student learning outcomes and attitudes toward information literacy instruction, relationships, and instructional approaches, and to assess the degree to which the new instructional methodologies have been assimilated. No direct research methods were applied to subjects in Group Two. Student learning outcomes were evaluated via analysis of existing data obtained from information literacy pretest and posttest score comparisons. These procedures are described in greater detail in the following sections.

Focus Groups

Although focus group research has been used in previous studies of information literacy instruction effectiveness (e.g., Carter, 2002; Morrison, 1997; Valentine, 1993), these have primarily been conducted with undergraduate students. In this study, focus group research was conducted with faculty and librarian participants within Group One in order to explore salient issues regarding changes in attitude, relationships, and instructional approaches, as well as to evaluate the degree to which the new information literacy instructional methodologies have been assimilated by the participants.

Focus groups are basically group interviews, and as such, are a form of qualitative research. However, the researcher's technique is different from that used in a more traditional interview setting. Instead of alternating between the interviewer's questions and a participant's responses, in a focus group the interaction within the group is the primary dynamic. The researcher's role is more one of a facilitator who supplies

open-ended questions that are designed to elicit data and insights that are less accessible without the type of interaction that is found within a group (Morgan, 1997).

Focus groups are used in three basic ways in current social science research. In studies in which focus groups serve as the principal source of data, they are used as a *self-contained* method. Focus groups may also be used as *supplementary* sources of data in studies in which some other method (such as a survey) is primarily used. Finally, they can be used in *multi-method* studies where several methods of collecting data are used in which no one method is primary. Focus groups can serve as the basis for a complete study or as part of a triangulation technique in which data are compared to validate conclusions (Morgan, 1997).

The size of the group, the setting, and the recording methods are considerations that are crucial to the success of focus group research. The complexity of the topics and the depth to which they will be explored should determine the size of the focus group although it is generally recommended that the number of participants should range from 5 to15. The focus group should be conducted in a setting that provides privacy and comfort. Focus groups are generally audio-taped although other methods may be used. Whatever the method chosen, it should be unobtrusive, so as not to interfere with the group's interaction. The questions posed to the group are also of utmost importance: they must be designed so as to be open-ended enough to draw out the subjects' responses while at the same time focused closely on the topic of study (Morgan, 1997).

The researcher had used focus groups on numerous occasions to collect data for various initiatives and so was quite familiar and comfortable with this research methodology. In this study, focus groups were used as the primary method of collecting data from participants in Group One, as described in greater detail in Chapter Four.

Analysis of Existing Data

The primary method of research conducted with subjects comprising Group Two was analysis of existing data. At the time that this study was conducted, the holistic information literacy model had been implemented at the study site for a period of three years. Three first-year cohorts of information literacy pretest and posttest scores were analyzed for statistical significance using paired-samples *t* tests and tests of analysis of variance. In addition, a sampling of students from the original 2003-2004 cohort were retested in the spring semester of their third year (2006); these retest scores were compared with their first-year posttest scores to determine improvement in information literacy skill development beyond the first year. Additional data were obtained from pretests and posttests administered to students within classes of faculty who participated in the *faculty teaching information literacy program*, which is described in Chapter Five.

Instrumentation

Focus Group Questions

Focus group interviews were conducted in this study in order to address faculty and librarian concerns with regard to assimilation of the holistic information literacy instruction model. As discussed earlier in Chapter One, there are several methods that may be employed to assess concerns. One method is by directly interviewing a participant in face-to-face conversation. A second method involves asking open-ended questions within a group setting. A third method is to administer the *Stages of Concern Questionnaire (SoCQ)* (Hall, George, and Rutherford, 1979), most often used with larger groups when formal research or program evaluation is being conducted. The *SoCQ*, developed through extensive research that assures its reliability and validity, is a 35-item paper-and-pencil instrument that employs a 0 to 7 Likert response range and that can be scored by hand or by computer (Hord et al, 1987). As seen in Chapter Two, these

methodologies have been successfully employed to assess the degree to which innovations have been assimilated within educational institutions, particularly with regard to technology or information literacy integration. In this case study, the second methodology described above was employed. The questions developed for use in the faculty and librarian focus groups were based upon the *Stages of Concern Questionnaire (SoCQ)* and can be found in Appendix A and Appendix B, respectively.

Information Literacy Assessment Measures

As described earlier, this study employed no direct instrumentation to measure information literacy learning outcomes. However, data obtained from several existing information literacy assessment measures were analyzed for statistical significance. These measures include: (a) *CORE 101* information literacy pretest and posttest, (b) upper level instruction assessments, and (c) information literacy junior retest.

Information literacy pretest and posttest. The information literacy pretest and posttest, given in Appendix C and Appendix D, were developed by the Saint Francis University library in response to recommendations made by an Information Literacy Committee (described in more detail in Chapter Three) regarding a closer alignment of *CORE 101: Information Literacy* course material and assessments with the *Information Literacy Competency Standards for Higher Education* (ACRL, 2000). An inventory of forty multiple-choice items, eight per each of the five standards was developed by librarians and sent to a panel of six recognized information literacy experts for review, and was revised to incorporate recommended suggestions and changes. After adding several demographic questions, the instrument was pilot-tested with a small group of upper-class students who had previously taken the *CORE 101: Information Literacy* course in their first year. After the students had completed the test, a focus group session was held in order to collect their reactions and suggestions. Some minor

revisions were made based on student feedback, and the instrument was launched in fall 2003. The information literacy pretest is administered via a WebCT™ course link within the first week of *CORE 101* either as an in-class or out-of-class assignment. The information literacy posttest is generally administered as an in-class assignment in the last week of the semester, again via WebCT™ course link. At the time that this study was conducted, pretest and posttest scores were available for analysis from three first-year student cohorts (2003-2006).

Upper level instruction assessments. Information literacy pretest and posttest scores were also available for this study from five upper-level classes taught by university faculty members who had agreed to participate in a *faculty teaching information literacy training program* in fall 2005, in which they worked with librarians and a technology specialist to develop course-embedded information literacy components. Each of the participating faculty members chose ten items from the forty-item *CORE 101* information literacy pretest or posttest (described above) and adapted the questions specifically for their courses. The resulting quizzes were used as pretests at the beginning of the semester or prior to receiving the embedded information literacy instruction components. Equivalent forms of the quizzes were used as posttests following the instruction components or at the end of the course. These assessments generally were administered in-class as pencil-and-paper assignments. Examples of upper-level instruction course outcomes and the corresponding assessments (pre- or post-instruction quizzes) are given in Appendix E.

Information literacy junior retest. In spring 2006, the Saint Francis University general education administration and librarians developed a ten-item subset of the forty-item information literacy posttest (described above) in order to determine whether students' information literacy competency had improved, worsened, or remained at the same level subsequent to the completion of their *CORE 101* course as first-year

students. The resulting information literacy junior retest, given in Appendix F, was administered via a SurveyMonkey™ web-based survey link sent to them by email.

Participant Benefits and Compensation

Benefits to Group One include the potential professional developmental benefits derived from participation in the instruction program and the study. As expected, the issues discussed within the focus group phase of the research proved to be particularly beneficial to participants as they shared experiences and acquired knowledge. Benefits to Group Two include the potential educational benefits derived from analysis of the impact upon student learning outcomes of changes in information literacy instruction methodologies. These benefits would feasibly extend beyond the subject population into the general student population, who would be recipients of future benefits to be gained from continued application and refinement of these instructional methods. Group One participants were provided with refreshments during the focus group discussion. Because of the indirect nature of inquiry applied to Group Two subjects, no compensation was provided.

Safeguards and Confidentiality of Data

Participation in the focus group phase of the study was voluntary. All Group One participants received, read, and signed consent forms prior to their participation. Focus group summaries are available to Group One participants should they desire to see them. No debriefing procedures were planned for Group Two subjects. However, the data analysis, findings, and conclusions of the study were made available to the university library and to the general education assessment specialist at the study site.

Confidentiality of data was maintained by disassociating participants' identifying information from all data collected. As seen in Chapter Four, where direct quotes are

incorporated into findings, numeric identifiers were used (e.g., Faculty Participant 1, Librarian Participant 2, etc.) All data and consent forms are in a locked file cabinet in the primary investigator's office at 301E Scotus Hall, Saint Francis University, where they will be kept for a period of no less than three years as required by law.

CHAPTER FOUR: DATA ANALYSIS AND FINDINGS

Introduction

Change, as Fullan (2001) so aptly states, is a double-edged sword. There are both positive and negative aspects to change. Change is generally a messy process; those who lead change hope that something better will emerge from the chaos. They must also be aware that they are leading those who are responsible for implementing the change down a path that they sometimes do not want to go. Moreover, the effects of change are not always clear at first, nor are they clearly measurable. Even after one suspects that the change has been more or less completely assimilated, surprises may occur. Researchers who study change within organizations must have no preconceived notions about what their data will reveal. They must be open to new discoveries.

The purpose of this descriptive case study was to understand the impact upon faculty, librarians, and students of changes in information literacy instruction methodologies that have been piloted as an innovation within a particular institutional setting. This study considered the following specific questions:

1. In what ways and to what extent has a more holistic approach to teaching information literacy been assimilated by faculty and librarians?
2. In what ways and to what extent have faculty attitudes toward teaching information literacy skills been affected by the introduction of these holistic instructional approaches?
3. In what ways and to what extent have librarian relationships with faculty changed as a result of these holistic approaches to teaching information literacy?
4. In what ways and to what extent are student learning outcomes affected by the introduction of a more holistic approach to teaching information literacy?

Analysis of Focus Group Data

The impact of changes in information literacy instructional methodologies upon faculty and librarians were explored through the use of focus groups and interviews. The researcher facilitated two focus group sessions and conducted one interview. The focus group and interview questions were based upon the *Stages of Concern Questionnaire (SoCQ)* (Hall, George, and Rutherford, 1979) as described in Chapter Three. Two focus groups were conducted; one with faculty (Focus Group One) and one with librarians (Focus Group Two). One faculty member who could not attend the focus group was interviewed separately. In order to protect confidentiality, the interview responses were aggregated with those from the faculty focus group.

The duration of the sessions varied from one hour (interview) to one and three-quarters hours (focus groups) in length. The same set of twenty-three questions was posed to all participants, with one modification: faculty participants were questioned about their relationships with librarians, while librarian participants were questioned about their relationships with faculty. All three sessions were recorded by audiotape. The audiotape transcriptions were compared with the researcher's notes and then revised. The final transcripts comprised sixty-two pages of data.

Demographic Characteristics of Participants

Focus Group One (FG1) was comprised of five participants. At the time that the study was conducted, two participants held the rank of associate professor; two were assistant professors; one was an instructor. Two participants were tenured; three were tenure-track but not tenured. Three participants had been teaching at the study site between six and ten years. Two had five years or less of teaching experience at the study site. Four participants had taught at other institutions of higher education for periods of between four and seven years. One had no prior teaching experience.

Three of the FG1 participants had incorporated information literacy components into their courses for a period of between six and ten years; two had done so for five years or less. Most of the participants had not incorporated information literacy components prior to teaching at the study site, but two participants had done so. One participant had no prior experience in teaching information literacy components before participating in the university's *faculty teaching information literacy training program*. At the time that this study was conducted, one of the FG1 participants was between 30 and 35 years of age; two were between 36 and 40; one was between 46 and 50; and one participant was between 51 and 55 years of age.

Focus Group Two (FG2) was comprised of four participants. At the time that the study was conducted, two participants held the rank of associate librarian and one held the rank of assistant librarian. One librarian group participant was not eligible for faculty rank; this participant held the position of instructional technology specialist. Although not technically a librarian, the instructional technology specialist was included within the librarian participant group because this participant was a member of the library staff and had been intimately involved in the creation and application of many aspects of the holistic information literacy model. None of FG2 participants were tenured; these participants are not classified as tenure-track. All four of the FG2 participants had taught at other institutions of higher education or in primary/secondary education for periods of between eleven and fifteen years.

Two FG2 participants had been teaching information literacy at the study site between eleven and fifteen years. One had between six and ten years of experience, and one had less than one year of information literacy teaching experience at the study site. All but one of the participants had taught information literacy courses or had incorporated information literacy components into their courses at the study site for a period of between five and ten years. At the time that this study was conducted, one of

the FG2 participants was between 30 and 35 years of age; two were between 46 and 50; and one participant was between 56 and 60 years of age. The demographics of the focus group participants are summarized in Table 1.

Table 1

Focus Group Participant Characteristics

Group	Rank	Tenure	Teaching Experience	IL Teaching Experience	Age
Faculty					
	Instructor (1)	T (2)	0 -5 (1)	0-5 (2)	30-35 (1)
	Asst Prof (2)	N-T (3)	6-10 (0)	6-10 (3)	36-40 (2)
	Assoc Prof (2)		11-15 (4)	11-15 (0)	46-50 (1)
					51-55 (1)
Librarians					
	No rank (1)	T (0)	0-5 (0)	0-5 (1)	30-35 (1)
	Asst Libn (1)	N-T (4)	6-10 (0)	6-10 (2)	46-50 (2)
	Assoc Libn (2)		11-15 (4)	11-15 (1)	56-60 (1)

Data Analysis Procedures for Focus Group Data

In order to begin analysis of the focus group transcripts, the researcher first created a database that could be sorted by category of question, question number, key words in each question, stage of concern, type of concern, category of response, actual comment or response, page number, participant code (to protect confidentiality), and type of focus group (faculty or librarian). The next step was to compare each question and response to the *Stages of Concern Questionnaire (SoCQ)* (Hord et al., 1987) in order to assign a score to each response. The individual scores were then totaled for each response. A detailed summary of the transcript analysis is given in Figure 4.

Question	Type or Stage of Concern	Focus Group 1 (*N* = 5) Faculty Responses	FG1 Score	Focus Group 2 (*N* = 4) Librarian Responses	FG2 Score
1.0 General Concerns					
1.1 Not enough time	3 Management	VT = 2 x 7 = 14 NT = 3 x 1 = 3	17	VT = 2 x 7 = 14 NT = 2 x 1 = 2	16
1.2 Conflict between interests/responsibilities	3 Management	VT = 3 x 7 = 21 NT = 2 x 1 = 2	23	ST = 4 x 4 = 16	16
1.3 Inability to manage everything	3 Management	ST = 3 x 4 = 12 NT = 2 x 1 = 2	14	VT = 4 x 7 = 16	28
1.4 Revising my methodologies	6 Refocusing	ST = 1 x 4 = 4 NT = 4 x 1 = 4	8	VT = 4 x 7 = 28	28
1.5 How my teaching has changed or will change	2 Personal	NT = 5 x 1 = 5	5	NT = 4 x 1 = 4	4
1.6 Non-academic problems	3 Management	ST = 4 x 4 = 16 LT = 1 x 2 = 2	18	ST = 4 x 4 = 16	16
2.0 Comfort Level					
2.1 Would like to familiarize others	5 Collaboration	VT = 5 x 7 = 35	35	ST = 2 x 4 = 8 IR = 2 x 0 = 0	8
2.2 Would like to revise instructional approaches	6 Refocusing	VT = 1 x 7 = 7 ST = 4 x 4 = 16	23	VT = 4 x 7 = 28	28
2.3 Like to know what others are doing in this area	5 Collaboration	VT = 3 x 7 = 21 IR = 2 x 0 = 0	21	VT = 3 x 7 = 21 IR = 1 x 0 = 0	21
2.4 Would like to know of other approaches	6 Refocusing	VT = 2 x 7 = 14 NT = 3 x 1 = 3	17	VT = 4 x 7 = 28	28
2.5 Like to supplement or enhance/replace method	6 Refocusing	VT = 5 x 7 = 35	35	VT = 4 x 7 = 28	28
3.0 Impact on Students					
3.1 Students' attitudes toward your role	4 Consequence	NT = 5 x 1 = 5	5	VT = 3 x 7 = 21 ST = 1 x 4 = 4	25
3.2 Affect of program on students	4 Consequence	NT = 5 x 1 = 5	5	VT = 4 x 7 = 28	28
3.3 My impact on students	4 Consequence	VT = 5 x 7 = 35	35	VT = 3 x 7 = 21 ST = 1 x 4 = 4	25
3.4 Excite students	4 Consequence	VT = 5 x 7 = 35	35	VT= 4 x 7 = 28	28
3.5 Modify teaching based on student experience	6 Refocusing	VT = 4 x 7 = 28 IR = 1 x 0 = 0	28	VT = 2 x 7 = 14 ST = 2 x 4 = 8	22
3.6 Use feedback from students to change	4 Consequence	MT = 5 x 6 = 30	30	MT = 4 x 6 = 24	24
4.0 Working Relationships					
4.1 Want to help or helped other faculty	5 Collaboration	VT = 3 x 7 = 21 ST = 1 x 4 = 4 NT = 1 x 1 = 1	26	VT = 4 x 7 = 28	28
4.2 Develop relationships with other faculty	5 Collaboration	VT= 5 x 7 = 35	35	VT = 4 x 7 = 28	28
4.3 Change in status or relationships with others	2 Personal	VT = 3 x 7 = 21 NT = 2 x 1 = 2	23	VT = 4 x 7 = 28	28
4.4 Coordinated efforts with others	5 Collaboration	VT = 4 x 7 = 28 ST = 1 x 4 = 4	32	VT = 4 x 7 = 28	28
4.5 Coordination taking too much time	3 Management	NT = 5 x 1 = 5	5	VT = 2 x 7 = 14 ST = 1 x 4 = 4	18
4.6 How my role has changed or will change	2 Personal	VT = 3 x 7 = 21 ST = 1 x 4 = 4 NT = 1 x 1 = 1	26	VT = 4 x 7 = 28	28
Key: VT = very true (score 7) MT = mostly true (score 6) ST = somewhat true (score 4) LT = little true (score 2) NT = not true (score 1) IR = irrelevant (score 0)					

Figure 4. Summary of focus group transcript analysis.

Next, the individual score totals for each response were mapped to the corresponding stage of concern and aggregated, so as to provide a raw score for each stage of concern. The means of the raw scores were used to assign an intensity percentile for each stage, using the *SoCQ Quick Scoring Device* given on pages 50 and 51 of Hord et al. (1987). Next, the intensity percentiles for each group were charted in order to develop a *SoCQ Profile* for each group.

It must be noted here that while the actual *SoCQ* contains thirty-five items (five items corresponding to each of seven stages of concern) the focus group questions used in this study corresponded to only twenty-three of the *SoCQ* items, divided into four categories: *general concerns*, *comfort level, impact on students*, and *working relationships*. The focus group questions were mapped to the following *SoC* stages: *2 personal, 3 management, 4 consequence, 5 collaboration,* and *6 refocusing*. Five questions corresponded to each stage, with the exception of *2 personal*, for which only three items were included. Questions corresponding to the *SoC* stages of *0 awareness* and *1 informational* were not included in this study, as all of the participants were expected to have progressed beyond the first two stages of concern at the time that the study was conducted. However, in order to properly apply the *SoCQ Quick Scoring Device* (Hord, et al., 1987) and to develop an accurate *SoCQ Profile*, a weighting factor was assigned to the raw scores for *stage 2 personal* concerns in order to compensate for the two *SoCQ* questions that were not used.

Summary of the Transcript Analysis

A summary of the transcript analysis after application of the *SoC Quick Scoring Device* is given in Table 2, which demonstrates the raw scores, mean scores, and intensity percentile corresponding to the *Stages of Concern* for each focus group.

Table 2

Summary of Focus Group Transcript Analysis

Focus Group	Stage of Concern	Raw Scores	Mean Scores	Percentiles
Faculty				
	2 Personal	90	18	67
	3 Management	77	15	56
	4 Consequence	110	22	38
	5 Collaboration	149	30	88
	6 Refocusing	111	22	73
Librarians				
	2 Personal	100	25	85
	3 Management	94	24	88
	4 Consequence	130	33	90
	5 Collaboration	113	28	80
	6 Refocusing	134	34	99

The raw scores for each stage of concern were derived by totaling scores ranging from 0 (*irrelevant)* to 7 (*very true*) for each individual response to the questions corresponding to the stages. The mean scores were derived by dividing the raw score totals by the number of participants in each group; for FG1, $n = 5$, while in FG2, $n = 4$. This was done in order to calculate group scores for each stage of concern. The mean or group scores were then compared with the *SoC Quick Scoring Device* percentile chart, in order to determine the intensity percentile associated with each stage. The resulting percentiles were then charted in order to represent a *SoC Profile* for each group. The profiles for the faculty and librarian participants are given in Figure 5.

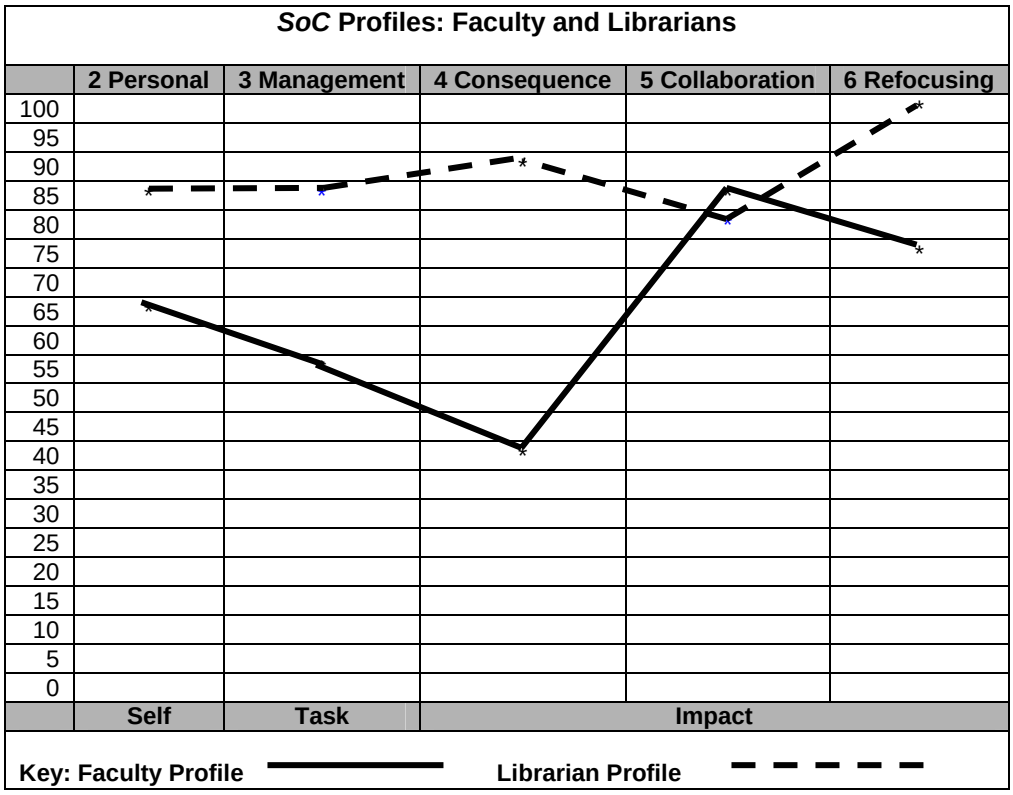

Figure 5. Faculty and librarian *SoC* profiles.

Interpretation of Faculty Profile

It is clear from the analysis of data that the faculty *SoC* profile indicates moderate *stage 2 personal* (self) and *stage 3 management* (task) concerns, low *stage 4 consequence* (impact) concerns, and high *stage 5 collaboration* (impact) and *stage 6 refocusing* (impact) concerns, with the highest peak at *collaboration*.

The finding that the faculty participants have moderate *stage 2 personal* concerns is supported by responses to questions about how their teaching has changed, such as:

> "I actually did have an information literacy component in my course, but I don't think I knew it. I think that what we did this summer helped me to better identify the goals and more specific information, getting a little bit more structure." (FP1)
>
> "I had a similar assignment last year, but the quality of my assignment improved this year, even though the students last year were more academically gifted." (FP5)

> "I like having this in the upper level; I think that if we had more of it throughout [the curriculum] I think people would be more vigilant and more aware, meaning students would be more vigilant and more aware about what they are doing." (FP3)
>
> "I think my standards have changed now that I know what we have access to here really. My standards have gone way up; in terms of plagiarism that is going to be my big info lit piece I am going to use every single semester without fail. But I think we need more reinforcement throughout, not just freshman year." (FP2)
>
> "Absolutely; I told my students don't even think about it. I think the more of these classes we do, the more professors we have incorporating standards, we will shift the culture and the vocabulary and the way students are talking about things." (FP4)

When asked about how their relationships with the librarian liaisons had changed, also a *stage 2 personal* concern, they responded:

> "I do not think it has changed because I have always been so involved with the library. I have a good working relationship with all the librarians that I know, and even the ones that I do not know. I am tired of people bashing the library. I do not get it; how can you bash the library when there is a ton of stuff there, more than you will ever be able to use. I do not understand." (FP1)
>
> "Mine have always been very good; they [librarians] are incredibly helpful. Anytime you ask for ask for anything, they get it for you. It has been a good experience for me. My only critique is that I don't feel they had enough time because they were stretched. If feedback from this project can help to hire another librarian, so be it. They are so valuable." (FP4)
>
> "I think one of the things I was most impressed with was when we were working on the objectives and the syllabus and [the librarian] said to me, 'Sounds like an interesting class. Can I come to your class?'" (FP3)
>
> "It has been great to work with them. I wish we had more time with them." (FP2)
>
> "My relationships with the librarians have not changed much; they have always been good. But I have been thinking that maybe I did not use my librarian liaison to help me with the class as much as I could have. So I will think about that next time." (FP5)

The finding that the faculty participants appear to be moderately confident about their abilities to use the new methodologies, a *stage 3 management* concern, is supported by comments such as:

> "I think I can manage it pretty well; I think I have a good understanding of what needs to be done." (FP1)
>
> "The session that we went to this summer was helpful. It was very helpful and I would go to another session if there was another one that would be kind of a little brush-up session, I would do that again. I could manage better." (FP4)
>
> "I was on my own pretty much, but I thought the time management would have been better if I would have had them [librarians] come into my class, maybe one session." (FP5)
>
> "I just cannot stress enough about having a strong support person in a librarian because I know how to do the research but the librarians do the electronic part so much better than I can or want to do." (FP3)

The faculty participants' lowest concerns were in the *stage 4 consequence* (impact) area. When the participants were asked if they were concerned about students' attitudes toward their role, they indicated:

> "No, I think they understand that I really want them to learn, and I think I get more innovative when they don't understand." (FP1)
>
> "I am not really concerned. I think that it probably might be wise to survey the students the next time I teach this course. Maybe next semester I will incorporate a little mini-survey or if the library wants to generate a general survey that you want to implement in all courses, maybe we can do that." (FP4)
>
> "No, I don't think so; I think I have demonstrated to them enough that I know how information literacy works. I think that perhaps they are a little skeptical of my information finding ability, so I would be a little concerned about that." (FP5)
>
> "No; I think in my discipline that by the time I get them as seniors, they are just looking at me as if to say, 'What am I going to have to do?' and whatever I give them, they know they will use when they go on to graduate school." (FP3)

> "At first I was a little concerned because of their attitude that they already knew it all. But then after they took the pretest, they discovered how much they didn't know that I do know. So, no, I was really not concerned because their attitude improved." (FP2)

Their responses were similar when asked whether they were concerned about the effect of the program on student learning outcomes. However, when asked whether they were concerned about evaluating their own impact on the students, the responses were somewhat different:

> "I am sure I am concerned about how I impact them, because I want to impact them in a positive manner, and I happen to teach a subject they have very little knowledge about coming into it. Right now I have students that are struggling, and that bothers me." (FP1)
> "I am concerned. I mean, I put all this time into it and I really want to know if it is going to have some fruition. I am hoping very strongly that this has done something really positive." (FP5)
> "We have some of the most sophisticated databases, so I am more concerned because I want them to know how to access and use the resources that we have. I want them to think a little more about differences between popular and scholarly works." (FP4)
> "I agree; I want them to be more educated about what resources to use and how to use them, and I want to be well-versed in explaining it to them." (FP3)
> "Yes, you are right. I brought in examples of my own articles, and tried to explain the hard work and all of the ways that I had to pull the resources together. They were not impressed, though." (FP2)

The faculty participants' highest level of concern appeared in *stage 5 collaboration*. However, the participants' responses to the questions indicated very positive attitudes about collaboration. When asked if they would like to familiarize others with this approach, they all responded positively, as they did when asked if they would like to know what others are doing in this area. When asked if they would like to help or have helped other faculty, they responded:

"I would say that the way that I do that is to help people find primary sources on specific topics. Anyone who is looking for evidence to support some of the things they teach often comes to me. I am also the 'WebCT™ guru' in the department, so most people come to me for that as well." (FP1)

"I guess I haven't thought of myself as a resource, but I suppose I could be one." (FP4)

"I am just talking informally with other faculty in my department who are not doing these kinds of components in their classes. I think at our next meeting I will bring it up specifically because it is a weakness of our students, I think." (FP5)

"It would be nice to establish ourselves as resources to other faculty. I feel that as teachers on this campus we don't have any resources, no place to go." (FP2)

"I have other people come to me because I teach research writing, and they have questions such as 'How do I cite this,' or, 'Is this correct,' or, 'Is this plagiarism?'" (FP3)

When asked about the relationships they had developed with other faculty who were teaching information literacy, they responded:

"I did not know that the others here [in the group] were in the program, but now that I do I will definitely collaborate more." (FP2)

"I look at this a bit differently in that I have been doing some of these things with other faculty even before this program. Because I do a good bit of research in my courses with my students, I almost back-fit a lot of things that I already do in my course." (FP3)

"I know now which others are participating and would like to collaborate. This discussion, for example, is beneficial." (FP5)

"It would be nice to get together during faculty development week and share what we do with others." (FP4)

"I think that one of the neat things about this summer was that I got to sit and listen to someone from another discipline. And that was kind of neat, but it was interesting to work on the assignments we prepared for our classes together because our disciplines were so different. But it all worked out in the end." (FP1)

Finally, the faculty participants' high level of concern in *stage 6 refocusing* is supported by their positive responses to questions about revising their instructional approaches; supplementing, enhancing, or replacing these approaches; and gaining knowledge of other approaches. When asked if they would like to modify their teaching based on student experience, they responded:

> "I think I am going to start challenging them earlier in the semester. I think I am going to start next year with reviewing the articles. Maybe the first two times I will do it and give examples of what to look for and how to discuss and dissect them, but I think I will start earlier so that even working in groups they can present two articles instead of one." (FP1)
>
> "In *CORE 101* the students are doing more research now rather than learning application software. And that would have been the shift I would have suggested. Making it content-driven results in a better learning experience." (FP2)
>
> "One of the problems I ran into was with the timing of course content. So, I've already modified the teaching schedule based on course needs." (FP3)
>
> "Yes, having more flexibility is really more helpful. And I am going to exploit that the next time I teach this course." (FP4)

When the faculty participants were asked if they thought they could easily revise their methodologies, another *stage 6 refocusing* concern, they responded:

> "I would say yes, because I often times may have a plan of my syllabus and depending on the group that I am teaching and how they are responding to the material, I sometimes need to make changes rather spontaneously." (FP1)
>
> "I had done this previously, and it was kind of all hodge-podge thrown together; and now I have it a little more systematic with some specific outcomes. Now it would be really easy to revise, and I would maybe change one or two things but keep the majority of it." (FP5)
>
> "I agree with that." (FP3)
>
> "We are better able to see the gaps now once we have tried it." (FP2)
>
> "Easily revise? I'm not sure I understand. Of course I can revise." (FP4)

Interpretation of Librarian Profile

The librarian *SoC* profile is almost a mirror image of the faculty profile. The librarian profile indicates high *stage 2 personal* (self), *stage 3 management* (task), *stage 4 consequence* (impact), *stage 5 collaboration* (impact), and *stage 6 refocusing* (impact) concerns, with the lowest peak at *stage 5 collaboration* and the highest peaks at *stage 4 consequence* and *stage 6 refocusing*.

The librarian participants demonstrated a high level of *stage 2 personal* concerns, but these appeared to be positive rather than negative. When asked how their relationships with the faculty who are teaching information literacy had changed, they responded:

> "This project almost legitimized it; it made it real. I think they have an increased understanding of what we are trying to accomplish, and that it is not different from what they are trying to accomplish. It was a real good cooperative." (LP3)
>
> "I think that they could see that there are librarians here that they can come and work with on any given thing that is even remotely related to helping their students. One of them said to me that she wished that her students could see how we are all working together; see the cooperation between people with very different viewpoints and strengths in areas of knowledge." (LP4)
>
> "I think that they saw that, 'Oh, you have a brain and you are contributing, you are thinking on the same wavelength.' That happened this summer; it does not happen as much, and the learning community is supposed to foster that and it does not." (LP2)
>
> "I thought a lot of the success was due to the design of the workshop. It allowed enough time for them to develop their own ideas, it gave a little bit of structure, and they could focus on things they needed to address, so they worked well." (LP1)

When asked how their role has changed or will change as a result of teaching information literacy, also a *stage 2 personal* concern, they responded:

"I think in previous years, the librarian was the come-to person. You came to the library and you said 'I need this' and you expected them to have the knowledge or resources and you expected them to take you to the book on the shelf. I think the laptop initiative and WebCT™ resources online have enabled the user; consequently the role of the librarian has shifted. You have to train the user to be the trainer, to be the knowledge person themselves." (LP1)

"I left the classroom because I thought the best teaching took place one on one at the reference desk, so I think it is the height of irony that I am now teaching more classes. Forgive me, but I like the idea of supplying information to the person who needs it." (LP2)

"I don't have much to add to that as I don't have a lot of experience teaching at this level, but I would say more variety, be-bopping all over campus, which I am fine with." (LP4)

"I think that this gave me an opportunity to show people that I do know what I am talking about with regard to concept mapping, and mapping your objectives, and assessment techniques. So I think that it gave me an opportunity to display that I have some curriculum design background." (LP3)

But, when asked about how their teaching has changed, they seemed less concerned:

"I think the content is an important part for me. A couple of years ago there were a lot more skill steps involved. You did not have time to talk about search strategies. You did not have a philosophical or theoretical underpinning of what they are really after, so I think we have more time now because the interfaces are better." (LP1)

"I would say that I just came from class where I put together three various applications and formerly I might have spent a whole class on each, but when I went into class my feeling was that they have all done this in high school. I don't need to spend so much time on them especially since the tutorials are online and I can reference them." (LP2)

"We had hoped that would happen. We designed the tutorials so that students could do self-help and so that faculty could teach some of these concepts on their own." (LP3)

"When I first started here, I guess I thought because they were in college, they would be taking it [instruction] a little more seriously, and they did not. They really do rely on Google™ and I think they were allowed to do that in high school. They therefore want one-stop shopping and it's hard to get them to use a database because I require use of it

on an assignment. There is a product that lets you put all your databases together into one search called Federated Searches™ and I think that product will greatly change my job, giving us even more time for teaching content." (LP4)

Stage 3 management concerns were also high in the librarian group. When asked if they had enough time to do everything that teaching information literacy requires, two said they did, while two said they did not. When asked if they were concerned about their inability to manage everything that teaching information literacy requires, they responded:

"I think this initiative to bring IL into the upper class content is significant because that is the avenue we will have to reinforce *CORE 101*. It seems as though we spend a lot of time and effort with *CORE 101* and that if the ball drops right after that students do not have any type of continuity of the instruction. So I think it has to be an ongoing effort, especially the summer workshops." (LP1)

"The summer workshops do seem very important to make the teachers think differently about research, both of themselves and their students. They need to be reminded gently that their students are using certain tools and perhaps they might like to see those tools move ahead with their students." (LP2)

"Things change very quickly and they don't know how to access [resources] after a certain time period even if they have been through a training period. Keeping up with the changes and passing them on to students and faculty is a real challenge." (LP4)

"Every year it changes faster than the year before; by the time they get to their upper class levels, students feel like they need to be reacquainted with everything." (LP3)

When asked about whether they had spent much time working with nonacademic problems, also a *stage 3 management* concern, they responded:

"What I do, I will work with students who miss the class, so yes, I have a feeling that some of them were physically present and mentally off and I can't quite judge whether they are not quite capable or what. I think that if they are going to be able to learn and it is going to

stick, it is going to come from one of us at the reference desk. That is where I feel more confident. If I have a good day at the reference desk, it makes up for the people that are sleeping in class." (LP2)

"There are technical issues, too, of course, such as databases going down, the power being out, and room temperature being so hot that people fall asleep. We have talked about environmental concerns in those classrooms a lot." (LP3)

"I had one of those today; a student came up and said she couldn't hear. She was sitting in the back row next to the blower." (LP1)

"I have a lot of student-athletes who are out. Some of them give me their schedule and some of them do not. Some will ask right before or after class what they have missed. So I think I spend a lot of time on attendance." (LP4)

The librarian group also demonstrated very high *stage 4 consequence* concerns, in the 90th percentile of intensity. When asked if they were concerned about students' attitudes toward their role as well as their own impact on students, they responded with comments such as:

"I think I am concerned. I don't know if I have any answers as to how effectively to address it. And you hear conflicting stories about students who come back as sophomores and they say, 'You know, you went over that last year and I really appreciate that,' but you also see other students who were in your class, and they come to the reference desk and ask the same question that you know you covered in class." (LP1)

"It is the people who snarl and say, 'I have had this from the time I was in seventh grade,' and you bite your tongue because you want to say, 'And you have not learned it yet.' There is a lot of resentment because they cannot make the connection." (LP2)

"This semester particularly I was asked by other faculty to come into their classes to teach a particular skill. Those students have an appreciation because they see the immediate application of what you are telling them." (LP3)

"I would say their attitude in the class is poor because they are required to be there to learn what we are teaching. But when they come up to the desk and ask for help, I think they see it differently. I think that if they had a test they could take and they did not pass

it, they might say, 'Maybe I don't know this,' and it would change their attitude in the class, because if they did not pass the test, then obviously they need the instruction." (LP4)

They were also very concerned about the effect of the program on student learning outcomes, another *stage 4 consequence* concern:

"The information literacy philosophy is that the student is able to actually become an independent learner, and they are empowered to understand what to do with this information and how to go about it and be effective. So you have got to have that understanding before you can approach any topic and analyze the problem and arrive at a solution." (LP1)

"I agree one hundred percent. However, I am wondering if by giving them more than they can take at a time they don't want it, are we setting up a backlash against us? They may be thinking, 'I don't want to be an independent learner.' So the course may work against our cause." (LP2)

"Going back to a modular way of thinking, instead of a course, you could offer a series of workshops and shift the number that they would take each year." (LP1)

"I like the idea of a required workshop for each semester. I like that very much." (LP4)

"I wonder if there is not some correlation between the fact that students come to the library for *CORE 101* and their willingness to come to the library at all. So I think we have to carefully look at any change in the program because it is important whether or not they would choose to come to the library to study because they are familiar with the front door and they know where the tables are and they know faces. It is important to get them to come in the door." (LP3)

The librarian participants' lowest concerns, although still high (80th percentile) were in *stage 5 collaboration*. When asked what they were doing or would be willing to do to help other faculty who are teaching information literacy, they responded positively:

"I have helped them develop a more complete list of resources for projects. I have shown them databases; I have drawn their attention to the format that would be appropriate given the resources; I have shown them how to cite the resources they have found. I have gone

into their classrooms, sent them information through email, and I have gone to their offices to show them how to access online journals." (LP4)

"Through the workshops last summer we pretty much taught them how to go from objectives to activities to assessments and to tie that together so we developed assessments with them. We found resources they could use that directly matched the goals that they had. We pointed them to activities for their students to do. And we have added content for WebCT™ so that they could tie their information literacy resources into the WebCT™ sites." (LP3)

"I don't think I've done anything much different; however, I do usually attempt to read the text [used by other faculty] and be aware of the work the teacher is using so that I can go into their class and say, 'You are doing this author, you might want to look here.'" (LP2)

Similarly, questions about wanting to know what others are doing in this area, familiarizing others with the program, and coordinating efforts with others all met with very positive responses. When asked if they had developed new relationships with faculty as a result of the new methodologies, some responded:

"I had worked with various faculty members before we held the workshops. But the workshop experience was more collaborative. They were excited about the content, we developed their tools together, and we worked together with the students in the class. So it was like we established some roots that had not been there previously." (LP1)

"I think there were some very good things that came out of it [the workshop]. I think in some cases they have this dawning awareness that, 'I am in a position where I can make this real for these students.' They left with things of value, things that they could not have developed on their own that were going to lead to better lessons, to better student work, and things they were going to use in other courses in some cases." (LP3)

The highest level of concern expressed by the librarian group appeared in *stage 6 refocusing*, in the 99th percentile of intensity. Some negative concerns were expressed when the participants were asked if they found it easy to revise their methodologies:

> "For my part, no. I find that I am a little rigid in the way I teach. It just seems that I have tried different strategies to get a little more student involvement, to keep them more engaged. I mean, you want it to be entertaining, you want it to be fun, but sometimes it cannot always be fun. Sometimes they have to sit down and learn something. I think you have to be very conscious about developing materials and trying strategies." (LP1)
>
> "I am constantly changing, tweaking. It is something I have to do. If I am not satisfied, I have to keep on trying, so if I can say I don't like the results this time, I am going to try something else next time, whether it is easy or not." (LP2)
>
> "Even adapting a quiz is a challenge. We came up with a ten question quiz in the summer workshops, and half of it was on primary and secondary sources and the other half was on popular vs. scholarly sources. We originally developed it for one discipline and adapted it for two others. It took a couple of hours to do each time." (LP3)
>
> "I would say that it takes time to adapt the IL content to accommodate different colloquia, because you are looking at it from a different perspective each time and a different discipline each time. On top of that, the resources themselves are constantly changing. It takes more time to figure out what has changed so that it is adapted correctly." (LP4)

However, many of the librarian group's *stage 6 refocusing* concerns were expressed through a shared desire to improve and modify the program. For example, when asked if they would like to know what others are doing in this area, they all said, "Yes, definitely." When asked if they would like to revise their instructional approaches, they responded:

> "It seems like one of the avenues we might take with the upper level workshops might be to curtail the resources in the class. For example, if they are planning on having a research paper and they want the students to use a particular style because that is the one approved in their discipline, we could target those resources and provide an online link." (LP1)
>
> "I think that if students have chosen a major, they should be introduced to the resources that they should be using in that discipline in an introductory course, maybe a team-taught unit in that class. We could also allow testing out of *CORE 101*." (LP4)

"And then we would like to see anyone offering a GenEd course, particularly in the first two years, to be strongly encouraged at the beginning of any project to request librarian time, so that particular teacher is on the right page. The timing is important." (LP2)

"So much of it depends on where the students are coming from. You are right. I think that the partnership between the teacher of the class and the librarian is extremely important for many reasons, about the least of which is the modeling of extended intelligence, if you will. If you don't have the knowledge to do *this* and you know someone who does, then you pair up with them. Together you can present something very strong and worthwhile for the students." (LP3)

When asked if they knew of other approaches that might work better, a flood of new ideas poured forth:

"I think service on demand at the reference desk. There you are with the resources. There they are with a problem. That is when teaching takes place." (LP2)

"I think that part of the problem is that we are struggling with this societal change where the kids stay up all night and that is when they do their work. Time management is a huge problem. Students are so busy and so many things taking their attention; they work on a priority basis. So I think that it is time to consider modularizing and developing tutorials that can be done independently." (LP3)

"I try to be proactive with the design of our program in that we are trying to link *CORE 101* and 102 but I don't know if that is the best linkage to information literacy instruction because the 102 content changes so much from term to term and instructor to instructor. I think maybe we could try offering a series of workshops throughout the term, maybe borrowing from the Community Enrichment Series model where the students are required to attend six sessions each semester; that might work." (LP1)

"That moves you away from the point of need. If they are just taking workshops they may have nothing to do with what they need." (LP4)

"I wonder if we shouldn't be looking at a test, like a CLEP. There are information literacy knowledge tests out there." (LP3)

"If they fail the CLEP, we could do the instruction one on one." (LP2)

"We could tie the workshops into the upper class courses of the faculty. Let them identify

what type of instruction is needed for the class they are teaching. Frequency of the workshops would be determined by the demand of the faculty." (LP1)

"So what do you do with students who are not students yet? As someone said to me, they do not know how to go out and seek what they need or even bother to ask someone they might know." (LP4)

"Would you still have a required course for those who don't exempt it? It would certainly reduce the number of sections that you would need. It would also free up the librarians to work with faculty on their course needs, and to work with students on a one-to-one or workshop basis. It is a more distributed model." (LP3)

Finally, when the librarian participants were asked if they would like to modify their teaching of information literacy based on student experiences, they responded:

"I think information literacy is certainly a movement or whatever you want to call it, but the tenets of information literacy as we understand them are a fundamental part of the college experience and it needs to be expanded at the awareness level. But I would not mind experimenting with the exact approach we are using." (LP1)

"I wonder if it would be more effective to actually have a class where they do research and there is a paper required and it is the same instructors teaching it all the time, rather than the rotating instructors. Students could pick their own topics. Then information literacy could be paired with this type of class that has a determined content." (LP3)

"If it were paired with an English writing course, they do have an argumentative research essay, and that would certainly take care of certain components of information literacy. But I would like to underscore the fact that we do more than teach them how to do research and how to document a paper. We show them how they can get ready for a simulation and for discussion, how they can add to their body of information as an informed human being, not just to spit out ten pages with fifteen references. People think, 'research paper, that's all that it encompasses,' and I hope we do more than that." (LP2)

"I like the idea of continuing the partnership with the two instructors my classes are linked with now so that if those colloquia are going to be offered again I am matched with them because I already have that base and it is going to grow. One concern I would have if we change to a different model would be in not getting to know the students." (LP4)

Comparison of Faculty and Librarian Profiles

According to Hall and Hord (2001) the faculty profile indicates that these participants are fairly comfortable and confident in their ability to use the new teaching methodologies. Their moderate personal and task concerns indicate acceptance of and comfort with the methodologies. Their lower consequence concerns indicate a fair degree of confidence in the efficacy of the methodologies. Finally, the faculty participants' high collaboration and refocusing concerns indicate a willingness to work with other faculty and librarians to further implement and improve the program. Overall, these findings indicate a positive response to the new teaching methodologies and a moderate degree of assimilation among the faculty participants.

In contrast, the librarian profile indicates that these participants are extremely concerned with all aspects of the teaching methodologies and that their concerns are largely unresolved. The high personal and management peaks indicate concerns about how their relationships with others or their roles have changed and whether they can manage all that is expected of them. High consequence and refocusing peaks indicate concerns about the impact of these methodologies on students, but also concerns about what could be done to make it a better experience for them. A lower, although still high, concern about collaboration indicates a greater level of comfort with that aspect of the methodology. According to Hall and Hord (2001) the librarian profile is typical of teachers who have not assimilated an innovation or are not favorably disposed toward the innovation and wish to change it.

The researcher's expectation was that the librarian participants would have shown a higher level of assimilation with teaching information literacy than would have the faculty participants. In fact, the findings were quite the opposite. What factors could possibly account for this surprising development? For example, could demographic differences play a role in influencing the concern level of these participants?

Demographic differences between the two groups might offer some explanation. However, a close reading of the data given in Table 1 indicates very few demographic differences between the two groups. In terms of rank, the participants in both groups are distributed fairly evenly. In terms of tenure, about half of the faculty participants were tenured, whereas the librarian participants are non-tenure-track employees. Was tenure an issue for the librarian group? Their responses to questions such as "concerns about your change in status or relationship" would not seem to support this difference, as there was no mention of appointment status, rank, or tenure.

Age might also be a factor influencing concern levels. The overall age range for both groups was thirty to sixty, a difference of thirty years. However, the distribution of ages across this range for both groups is comparable, although it can be noted that the librarian group did not have any participants in the 36-40 range; whereas the faculty group had two participants in this range; and, the librarian group had one participant over 56, while the faculty group had none in this range. However, the differences in the distribution appear to be minimal, and thus not necessarily related to the differences in concern or assimilation level.

Teaching experience is a factor that might influence concern about teaching a new methodology, but the number of years of teaching experience reported by the participants in both groups is comparable. Information literacy teaching experience might certainly be a factor influencing the concern level of someone expected to teach it. The faculty participants reported less experience teaching information literacy than the librarian group, yet their assimilation level appears to be higher than that of the librarian group. An interesting idea that emerges from this finding is that perhaps there is an inverse relationship between information literacy teaching experience and level of concern. This idea will be explored further in Chapter Five.

Analysis of Student Learning Outcomes

In order to assess the impact of changes in information literacy instructional approaches upon students, learning outcomes were evaluated through analysis of existing data, specifically information literacy pretest and posttest scores.

Using the Statistical Package for the Social Sciences (SPSS)™ paired-samples *t* tests and analyses of variance (ANOVA) were conducted for three groups of pretest and posttest scores: (a) *CORE 101* first-year cohorts from 2003 to 2006, (b) students in upper-level classes taught by faculty who had intentionally incorporated information literacy components into their courses in fall 2005, and (c) a junior re-test of information literacy knowledge from spring 2006.

Pretest and Posttest Score Comparisons: CORE 101

As previously discussed in Chapters One and Three, all first-year students at the study site are required to take a one-credit course in information literacy (*CORE 101*). Student learning outcomes are evaluated by graded assignments, quizzes, and a final examination. Additionally, at the beginning of the semester the information literacy knowledge pretest is administered; an equivalent version of the knowledge test is administered at the end of the semester. The pretest and posttest scores are then compared to measure progress in information literacy skill competency.

At the time that this study was conducted, information literacy pretest and posttest scores were available for three first-year student cohorts. Only subjects who had taken both the pretest and posttest were included in this study. For the 2003-2004 cohort $N = 247$, for the 2004-2005 cohort $N = 208$, and for the 2005-2006 cohort $N = 223$. The total number of subjects comprising all three cohorts for which pretest and posttest scores were available was 678. The same 40-item pretest and posttest (two separate tests) were administered to each cohort via the WebCT™ quiz function.

Paired samples *t* tests were conducted for individual cohort scores as well as for the entire sample. For the 2003-2004 cohort, the pretest mean was 21.42 out of 40 items, indicating a pass rate of 56%, while the posttest mean score was 27.02, indicating a pass rate of 68%. The 2004-2005 cohort pretest mean was 22.84, a pass rate of 57%, and the posttest mean was 27.77, a pass rate of 69%. Finally, the 2005-2006 cohort pretest mean was 22.05, indicating a pass rate of 55%, while the posttest mean was 29.10, a pass rate of 73%. Of the three cohorts, the 2005-2006 group showed the most improvement between pretest and posttest.

For the overall results (2003-2006), the pretest mean was 21.42 out of 40 items, for a pass rate of 55%. Overall posttest means improved significantly to 27.94 items correct, for a pass rate of 70%. Table 3 indicates that the statistical differences between pretest and posttest scores for the first-year student cohorts are highly significant.

Table 3

CORE 101 Pretest and Posttest Score Comparisons by Cohort

Cohort	*N*	*M(1)*	*SD*	*M(2)*	*SD*	*M(diff)*	*SD*	*df*	*t*	*p*
2003-2004	247	21.42	4.63	27.02	5.80	5.60	5.06	246	17.39***	.000
2004-2005	208	22.84	4.13	27.77	5.89	4.93	5.49	207	12.95***	.000
2005-2006	223	22.05	5.00	29.10	5.26	7.05	5.15	222	20.51***	.000
2003-2006	678	21.42	4.64	27.94	5.71	5.87	5.29	677	28.94***	.000

Note. *M(1)* = pretest mean; *M(2)* = posttest mean; *M(diff)*= Mean difference between pretest and posttest. *$p < .05$. **$p < .01$. ***$p < .001$.

Paired-samples *t* tests were also conducted for the entire sample by semester, gender and instructor. Table 4 summarizes the comparisons by semester. Students taking *CORE 101* in the fall semester of all three years (2003, 2004, and 2005) showed pretest means of 22.17, a pass rate of 55%, and posttest means of 28.81, or a pass rate of 72%. Students who took *CORE 101* in the spring semesters (2004, 2005, and 2006) had pretest means of 22.02, a pass rate of 55%, and posttest means of 27.05, for a pass rate of 68%. These results indicate that students generally improve more in the fall semester as opposed to spring, but that improvement in both semesters is statistically significant.

Table 4

CORE 101 Pretest and Posttest Score Comparisons by Semester

Semester	*N*	*M(1)*	*SD*	*M(2)*	*SD*	*M(diff)*	*SD*	*df*	*t*	*p*
Fall	343	22.17	4.55	28.81	5.02	6.65	4.71	342	26.17***	.000
Spring	335	22.02	4.59	27.05	6.24	5.03	5.64	334	16.32***	.000

Note. *M(1)* = pretest mean; *M(2)* = posttest mean; *M(diff)*= Mean difference between pretest and posttest. *$p < .05$. **$p < .01$. ***$p < .001$.

Table 5 summarizes the comparisons by gender. For male students the pretest mean was 20.79, a pass rate of 52%, and the posttest mean was 26.06, for a pass rate of 65%. For female students, the pretest mean was 22.82 for a pass rate of 57%, and the posttest mean was 28.98, a pass rate of 73%. These results indicate that female students generally score higher than males on both the pretest and posttest, but that the differences between pretest and posttest scores were highly significant for both male and female students.

Table 5

CORE 101 Pretest and Posttest Score Comparisons by Gender

Gender	*N*	*M(1)*	*SD*	*M(2)*	*SD*	*M(diff)*	*SD*	*df*	*t*	*p*
Male	241	20.79	5.04	26.06	6.65	5.27	6.03	240	13.59***	.000
Female	437	22.82	4.11	28.98	4.83	6.16	4.74	436	27.18***	.000

Note. *M(1)* = pretest mean; *M(2)* = posttest mean; *M(diff)*= Mean difference between pretest and posttest. *$p < .05$. **$p < .01$. ***$p < .001$.

Table 6 indicates statistically significant improvement regardless of instructor. For instructor 1, the pretest mean was 21.82 (pass rate 55%) and the posttest mean was 27.84 (pass rate 70%). Instructor 2 had a pretest mean of 22.79 (pass rate 57%) and a posttest mean of 28.46 (pass rate 71%). Instructor 3 had a pretest mean of 21.71 (pass rate 54%) and posttest mean of 28.80 (pass rate 72%). The instructor 4 group had a pretest mean of 21.44 (pass rate 54%) and a posttest mean of 25.55 (pass rate 63%).

Table 6

CORE 101 Pretest and Posttest Score Comparisons by Instructor

Instructor	*N*	*M(1)*	*SD*	*M(2)*	*SD*	*M(diff)*	*SD*	*df*	*t*	*p*
1	238	21.82	4.38	27.84	6.18	6.02	5.05	237	18.38***	.000
2	237	22.79	4.39	28.46	5.01	5.67	4.93	236	17.69***	.000
3	119	21.71	4.39	28.80	4.57	7.08	4.01	118	19.23***	.000
4	84	21.44	5.57	25.55	6.97	4.11	7.35	83	5.12***	.000

Note. *M(1)* = pretest mean; *M(2)* = posttest mean; *M(diff)*= Mean difference between pretest and posttest. *$p < .05$. **$p < .01$. ***$p < .001$.

In order to better identify the factors that might affect student performance, a four-way analysis of variance (ANOVA) was run on the mean difference between pretest-posttest scores. The four factors considered were: semester (fall vs. spring), gender (male vs. female), year (2003-2006), and major (8 groups). These factors were analyzed to determine, for example, whether taking *CORE 101* in the fall versus spring semester has an effect on improvement, or whether males or female students tend to improve more, or whether students' choice of major is related to their performance. The overall results were significant, F (90,586) = 1.78, p = .000. The results, summarized in Table 7, revealed three significant main effects, one near-significant main effect, and four significant two-way interactions.

Table 7

Main Effects of Factors on CORE 101 Pretest-Posttest Difference Scores

Source	*SS*	*df*	*MS*	*F*	*p*
Overall	3985.75	90	44.28	1.78***	.000
Semester	7995.02	1	443.22	17.78***	.000
Gender	207.28	1	207.28	8.32***	.000
Major	355.39	7	50.77	2.04*	.049
Year	179.06	3	59.69	2.39	.067
Semester x Gender	166.57	1	166.57	6.68**	.010
Semester x Major	403.23	7	57.60	2.31*	.025
Semester x Year	206.24	1	206.24	8.27*	.004
Gender x Major	648.84	7	92.69	3.72***	.001
Within Groups	14608.06	586	24.93		
Total	18593.81	676			

Note. *p < .050. **p < .010. ***p < .001.

One significant main effect was for semester, F (1,586) = 17.78, p < .000. Overall, students enrolled in *CORE 101* during the fall semester (M = 6.78, SD = .41) showed more improvement throughout the course than those enrolled during the spring (M = 4.45, SD = .39). The second significant main effect was for gender, F (1,586) = 8.32, p = .004. Overall, females (M = 6.45, SD = .37) showed more improvement throughout *CORE 101* than males (M = 4.87, SD = .43). The third significant main effect was for major, F (7,586) = 2.04, p = .049. Overall, education majors (*Mdiff* = 3.93, SE = .84) showed significantly less improvement throughout *CORE 101* than health science majors (*Mdiff* = 6.79, SE = .42, p = .002), and social science majors (*Mdiff* = 6.70, SE = .84, p = .020). Also, education majors showed near-significant trends of less improvement than business majors (*Mdiff* = 5.73, SE = .58, p = .077), natural science majors (*Mdiff* = 5.91, SE = .91, p = .109), and other miscellaneous majors (*Mdiff* = 5.72, p = .083). A near-significant main effect for academic year, F (3,586) = 2.39, p = .067 showed that students in *CORE 101* during 2005 (M = 6.35, SE = .53) improved more throughout the course than students during 2004 (M = 4.77, SE = .49, p = .028).

A semester x gender interaction, F (1, 586) = 6.68, p = .010, showed that males are at a greater disadvantage than females if they are enrolled during the spring semester rather than the fall, though both genders show less improvement in the spring. A semester x major interaction, F (7, 586) = 2.31, p = .025, showed that only health science and natural science majors show no spring semester disadvantage in amount of improvement from beginning to end of *CORE 101*. All other majors show less improvement in the spring semester than in the fall. A semester x year interaction, F (1,586) = 8.27, p = .004 suggests that although more improvement is shown in fall semester across all years, the gap between fall 2005 and spring 2006 was much greater than those that occurred in the two prior years. Table 8 summarizes these results.

Table 8

Mean Differences between CORE 101 Pretest-Posttest Scores for Gender, Major, and Year by Semester

Demographic Factor		Fall *M(diff)*	*SE*	Spring *M(diff)*	*SE*
Gender					
	Male	6.40	0.60	3.21	0.62
	Female	7.19	0.57	5.69	0.48
Major					
	Health Science	6.75	0.53	6.83	0.65
	Natural Science	5.77	1.28	6.06	1.29
	Business	6.61	0.90	4.85	0.72
	Education	5.53	1.13	1.99	1.25
	Social Sciences	9.32	1.32	1.99	1.25
	Humanities	6.65	1.46	3.79	1.24
	Math/CPSC/Engr.	6.68	0.88	4.50	0.83
	Other/Msc.	6.94	0.88	4.50	0.83
Year					
	2003-2004	6.02	0.67	4.25	0.66
	2004-2005	5.33	0.73	3.62	0.73
	2005-2006	8.91	0.75	6.65	0.62

Note. M(diff) = Mean difference between pretest and posttest.

Finally, a gender x major interaction, F (7,586) = 3.72, p = .001, summarized in Table 9, suggests that for health science and natural science majors, males show greater improvement in information literacy skills, for other/miscellaneous majors there is no gender difference, and for all remaining majors, females improve more than males.

Table 9

Mean Differences between CORE 101 Pretest-Posttest Scores for Major by Gender

Demographic Factor	Male *M(diff)*	*SE*	Female *M(diff)*	*SE*
Major				
Health Science	7.60	0.75	5.98	0.37
Natural Science	6.47	1.41	5.36	1.15
Other/Msc.	5.75	0.87	5.70	0.84
Business	4.84	0.72	6.62	0.90
Education	0.17	1.63	7.06	0.73
Social Sciences	4.59	1.09	8.81	1.27
Humanities	4.98	0.95	6.17	2.25
Math/CPSC/Engr.	3.60	2.12	5.81	1.23

Note. M(diff) = Mean difference between pretest and posttest.

The results of the *CORE 101* pretest-posttest score analyses can be summarized as follows: (a) the statistical differences between pretest and posttest scores for the first-year student cohorts are highly significant; (b) students generally improve more in the fall semester as opposed to spring, but improvement in both semesters is statistically significant; (c) female students generally score higher than males on both the pretest and posttest, but the differences between pretest and posttest scores are highly significant for both male and female students; (d) the degree of improvement is statistically significant, regardless of instructor; and, (e) other demographic factors such as semester, year, and major may have some effect on student performance but that students improve their scores significantly regardless of these factors. These findings lead to the general conclusion that *CORE 101* improves information literacy skills in first-year students.

Pretest and Posttest Score Comparisons: Upper-Level Instruction

Information literacy pretest and posttest score comparisons were also analyzed for upper-level classes (third- and fourth-year students) taught by five university faculty members who participated in a *faculty information literacy training program* in fall 2005, in which they worked with librarians and a technology specialist to develop course-embedded information literacy components. As described more fully in Chapter Three, the participating faculty members chose ten items from the forty-item *CORE 101* (first-year) information literacy pretest or posttest and adapted the questions specifically for their courses. The resulting information literacy "quizzes" were used as pretests prior to the information literacy instruction components of the courses. A variation of the same ten questions was used as a posttest at the end of the course or following the information literacy instruction unit.

Because no two instructors used the same set of ten questions, direct comparisons could be conducted only within each of the five courses; however, the combined scores were used to determine general trends. As demographic data for this group were very limited and since the sample size was small (N = 93), it was not possible to conduct extensive analyses, as was done with the *CORE 101* data.

Paired samples t tests were used to determine whether differences between pretest and posttest scores were statistically significant for each course. Table 10 depicts these comparisons. Statistically significant differences between pretest and posttest scores were found in courses 1, 3, and 4, as well as for all courses combined. Students in course 1 showed the greatest improvement, with a pretest mean of 5.88 and posttest mean of 9.00. For course 2, the pretest mean was 7.88 and the posttest mean was 8.86. In course 3, scores actually worsened between pretest and posttest, with a pretest mean of 9.33, and a posttest mean of 7.50. The course 4 pretest mean was 8.35 and the posttest mean was 9.27. The pretest mean for course 5 was 8.1 and the

posttest mean was 8.9. Overall, the mean pretest score for all upper-class sections was 8.11 and the mean posttest score was 9.02. These results indicate that student information literacy knowledge increased significantly as a result of embedding information literacy components into upper-level courses.

Table 10

Upper Level Pretest and Posttest Score Comparisons by Course and Instructor

Course	*N*	*M(1)*	*SD*	*M(2)*	*SD*	*M(diff)*	*SD*	*df*	*t*	*p*
1	8	5.88	1.36	9.00	1.20	3.12	1.25	7	7.09***	.000
2	7	7.88	1.95	8.86	1.07	1.00	1.29	6	2.05	.086
3	6	9.33	0.52	7.50	1.05	-1.83	0.75	5	-5.97**	.002
4	52	8.35	1.22	9.27	0.95	0.92	1.48	51	4.50***	.000
5	20	8.10	1.59	8.90	0.91	0.80	1.77	19	2.03	.057
Total	93	8.11	1.52	9.02	1.05	0.91	1.74	92	5.06***	.000

Note. *M(1)* = pretest mean; *M(2)* = posttest mean; *M(diff)*= Mean difference between pretest and posttest. *$p < .05$. **$p < .01$. ***$p < .001$.

In order to determine gender differences within the upper-level group, additional analyses were conducted. Paired samples *t* tests indicated statistically significant differences between pretest-posttest scores for both male and female upper-class students. The male pretest mean was 8.19 and the posttest mean was 9.08, while the female pretest mean was 8.05 and the posttest mean was 8.98. Although the female students improved their test scores more significantly than did the males (*Mdiff* = 0.93 and 0.89 respectively), the results, summarized in Table 11, also indicate that males scored higher on both tests.

Table 11

Upper Level Pretest and Posttest Score Comparisons by Gender

Gender	*N*	*M(1)*	*SD*	*M(2)*	*SD*	*M(diff)*	*SD*	*df*	*t*	*p*
Male	36	8.19	1.51	9.08	1.18	0.89	1.95	35	2.73**	.010
Female	57	8.05	1.54	8.98	0.97	0.93	1.61	56	4.35***	.000

Note. *M(1)* = pretest mean; *M(2)* = posttest mean; *M(diff)*= Mean difference between pretest and posttest. *$p < .05$. **$p < .01$. ***$p < .001$.

A two-way ANOVA run to determine the effect of instructor and gender on pretest-posttest difference scores was significant, F (8,84) = 5.93, p = .000, with a main effect for instructor, F (1,84) = 9.06, p = .000. There was no significant effect for gender and no interaction between gender and instructor, confirming the *t* test results. Table 12 summarizes the results of the ANOVA.

Table 12

Main Effects of Factors on Upper Level Pretest-Posttest Difference Scores

Source	*SS*	*df*	*MS*	*F*	*p*
Overall	100.82	8	12.60	5.93***	.000
Instructor	77.05	4	19.26	9.06***	.000
Gender	0.19	1	0.19	0.09	.767
Instructor x Gender	13.81	3	4.60	2.17	.098
Within Groups	178.49	84	2.13		
Total	279.31	92			

Note. *$p < .05$. **$p < .01$. ***$p < .001$.

The results of the upper-level course embedded instruction analyses are summarized as follows: (a) upper-level information literacy instruction appears to significantly improve students' information literacy skills; and (b) the observed disadvantage of male first-year students (see *CORE 101* analysis) disappears by the junior year, as males performed better than females on both the pretest and posttest in this sample, although the female students improved their scores more than the males.

Pretest and Posttest Score Comparisons: Junior Retest

In spring 2006, librarians and the general education administration at the study site institution decided to retest students in their junior year who had taken *CORE 101* as first-year students in 2003-2004 in order to determine the degree to which information literacy skills were retained after taking *CORE 101*, and the degree to which these skills may have been reinforced by subsequent courses or from general experiences.

In the original administration of the information literacy knowledge test, a total of 247 students from the 2003-2004 cohort completed a 40-item pretest and posttest. Both tests were administered using the quiz tool in WebCT™; some course sections administered both tests during class time while other sections allowed out-of-class completion. Eighty-two of the original 247 students in this cohort (33%) as juniors two years later competed a ten-item subset version of the original forty-item information literacy test by responding to a SurveyMonkey™ web-based survey link sent to them by email. Because the students were asked to complete the survey voluntarily, the ten-item subset was designed to reduce the amount of participation time from forty to ten minutes in order to encourage a better response rate. In order to compare all three time periods of testing, scores for only the ten items common to all three testing periods were compared in this analysis.

Overall results of paired-samples *t* tests conducted for pretest-posttest and posttest-retest indicated statistically significant improvement between first and second and second and third testing periods. For this group, the mean pretest score was 5.66 (pass rate 57%) and their posttest mean was 6.72 (pass rate 67%) as first-year students, but by the time they became juniors their mean retest score was 7.39 (pass rate 74%). Table 13 summarizes these results.

Table 13

Comparison of First Year Pretest-Posttest and Junior Retest Results

Test Time	*N*	*M(1)*	*SD*	*M(2)*	*SD*	*M(diff)*	*SD*	*df*	*t*	*p*
Pre-Post	82	5.66	1.46	6.72	1.92	1.06	1.89	81	5.07***	.000
Post-Retest	82	6.72	1.92	7.39	1.41	0.67	2.17	81	2.80**	.006

Note. *M(1)* = pretest mean; *M(2)* = posttest mean; *M(diff)*= Mean difference between pretest and posttest. *$p < .05$. **$p < .01$. ***$p < .001$.

Additional *t* tests were conducted using the same pairs of scores (pretest-posttest and posttest-retest) to determine whether gender or taking *CORE 101* originally in the first or second semester might be a predictor of improvement in later years. Male students in this group had a pretest mean of 5.31 (53% correct), a posttest mean of 6.10 (61% correct), and a retest mean of 7.24 (72% correct), showing a trend toward significant improvement between pretest-posttest ($p = .058$) and a significant improvement between posttest-retest ($p = .030$). Female students had a pretest mean of 5.85 (59% correct), a posttest mean of 7.06 (71% correct), and a retest mean of 7.47 (75% correct), showing a significant improvement between pretest-posttest ($p = .000$) and no significant improvement between posttest-retest ($p = .102$). Students who took

CORE 101 in the fall semester of their first year had a pretest mean of 5.83 (58% correct), a posttest mean of 6.97 (70% correct), and a retest mean of 7.53 (75% correct), showing a significant improvement between pretest-posttest (p = .000) and no significant improvement between posttest-retest (p = .122). Students who took *CORE 101* in the spring semester of their first year had a pretest mean of 5.52 (55% correct), a posttest mean of 6.52 (65% correct), and a retest mean of 7.28 (73% correct), showing highly significant improvement between pretest-posttest (p = .001) and a moderately significant improvement between posttest-retest (p = .026). Table 14 summarizes these results.

Table 14

Comparison of First Year Pretest-Posttest and Junior Retest Results by Gender and Semester

Factor	Test	*N*	*M(1)*	*SD*	*M(2)*	*SD*	*M(diff)*	*SD*	*df*	*t*	*p*
Males											
	Pr-Po	29	5.31	1.20	6.10	2.19	0.79	1.89	28	1.98	.058
	Po-Re	29	6.10	2.19	7.24	1.41	0.67	1.14	28	2.29*	.030
Females											
	Pr-Po	53	5.85	1.56	7.06	1.68	1.21	1.73	52	5.06***	.000
	Po-Re	53	7.06	1.68	7.47	1.42	0.42	1.81	52	1.67	.102
Fall											
	Pr-Po	36	5.83	1.63	6.97	1.87	1.14	1.78	35	3.85***	.000
	Po-Re	36	6.97	1.87	7.53	1.52	0.56	2.10	35	1.59	.122
Spring											
	Pr-Po	46	5.52	1.31	6.52	1.95	1.00	2.00	45	3.39***	.001
	Po-Re	46	6.52	1.95	7.28	1.33	0.76	2.24	45	2.30*	.026

Note. *M(1)* = pretest mean; *M(2)* = posttest mean; *M(diff)*= Mean difference between pretest and posttest. *p < .05. **p < .01. ***p < .001.

A three-way ANOVA run on the mean differences between pretest-posttest, F (22,59) = .63, p = .883 and posttest-retest, F (22,59) = .79, p = .720 for the factors major, semester, and gender was insignificant with no interaction effects. The results, summarized in Table 15 indicate that none of these factors affected improvement.

Table 15

Main Effects of Selected Factors on Pretest-Posttest and Posttest-Retest Difference Scores

Source	*SS*	*df*	*MS*	*F*	*p*
Overall					
Pretest-Posttest	55.45	22	2.52	0.63	.883
Posttest-Retest	87.26	22	3.97	0.79	.720
Major					
Pretest-Posttest	21.44	7	3.06	0.77	.616
Posttest-Retest	24.38	7	3.48	0.70	.674
Semester					
Pretest-Posttest	6.56	1	6.56	1.64	.205
Posttest-Retest	8.56	1	8.56	1.71	.196
Gender					
Pretest-Posttest	0.62	1	0.62	0.16	.694
Posttest-Retest	0.21	1	0.21	0.04	.837
Major x Semester					
Pretest-Posttest	24.45	6	4.07	1.02	.420
Posttest-Retest	20.11	6	3.35	0.67	.674
Semester x Gender					
Pretest-Posttest	3.74	1	3.74	0.94	.337
Posttest-Retest	0.27	1	0.27	0.05	.817
Within Groups					
Pretest-Posttest	235.25	59	3.99		
Posttest-Retest	294.85	59	5.00		
Total					
Pretest-Posttest	290.70	81			
Posttest-Retest	382.11	81			

Note. $*p < .05$. $**p < .01$. $***p < .001$.

The results of the junior retest analyses are summarized as follows: (a) no improvement to moderate improvement in information literacy skill level was observed in students who have not been exposed to information literacy instruction between the end of their first year and the end of their third year in college, and, (b) factors such as gender, semester of instruction, and major, which in previous measures appeared to influence degree of improvement had no effect in this model.

Summary

The impact of changes in information literacy instruction at a particular educational institution on faculty and librarians were explored through the use of focus groups and interviews, while the impact of such changes upon students was investigated via analysis of pretest-posttest score data. The findings of these investigations may be summarized as follows: (a) faculty response to the new teaching methodologies was positive and indicated a moderate level of assimilation; (b) librarian response was negative and indicated a low level of assimilation; (c) student learning generally improved as a result of having experienced the new methodologies. These findings will be discussed in greater detail in Chapter Five.

CHAPTER FIVE: DISCUSSION, CONCLUSIONS, AND RECOMMENDATIONS

Review

The purpose of this study was to understand the impact upon faculty, librarians, and students of the changes that have occurred in information literacy instruction within a particular institutional setting. At Saint Francis University, a small, Catholic, comprehensive institution, information literacy has been taught by librarians as a one-credit course required as part of the general education curriculum since 1993. In that time, the course evolved from a simple library and computer skills workshop to a full-fledged course in information literacy whose content is aligned with information literacy standards developed by the Association of College and Research Libraries (ACRL, 2000), which have been adopted by higher education regional accreditation agencies.

Within the last several years, Saint Francis University has revised the information literacy course to better meet students' research needs and to accommodate the increasing levels of technological expertise seen in first-year students. In its most recent revision, the course is almost entirely focused on conducting research, with specific computer applications taught on an as-needed basis or through on-line tutorial components. In addition, the University has sought to expand information literacy instruction beyond the first year and across the curriculum in the form of upper-level course components taught by faculty.

In order to achieve this goal, the Saint Francis University library instituted a *librarian-faculty liaison program* in 2003 in which librarians were assigned to academic departments to work with faculty on ways to embed information literacy components into courses and to assess these components. Additionally, the library sponsored an innovative *faculty teaching information literacy pilot program* for the first time in 2005, in which faculty agreed to participate in a summer workshop where they developed information literacy components for their 300- or 400-level courses. As part of the pilot

program, participating faculty members agreed to teach their revised courses for at least one semester, to conduct information literacy knowledge pretests and posttests as part of their course assessments, and to permit the University library to conduct other assessments as deemed necessary. Throughout the pilot program, librarian support was provided as requested by the faculty member.

In this study, the following specific questions were considered:

1. In what ways and to what extent has a more holistic approach to teaching information literacy been assimilated by faculty and librarians?
2. In what ways and to what extent have faculty attitudes toward teaching information literacy skills been affected by the introduction of these holistic instructional approaches?
3. In what ways and to what extent have librarian relationships with faculty changed as a result of these holistic approaches to teaching information literacy?
4. In what ways and to what extent are student learning outcomes affected by the introduction of a more holistic approach to teaching information literacy?

In order to answer questions 1, 2, and 3, the researcher conducted focus group interviews with librarians and faculty who had participated in the holistic model of instruction introduced as an innovation at the study site in 2003. The focus group questions were derived from those contained in the *Stages of Concern (SoC) Questionnaire* (Hall & Hord, 2001), an instrument used to measure the degree to which individuals have assimilated an innovation. In order to answer question 4, the researcher conducted a statistical analysis of information literacy knowledge pretest and posttest scores reported for the years 2003-2006, during the time that the holistic model was introduced.

Discussion and Conclusions

Assimilation of Holistic Approaches by Faculty and Librarians

In what ways and to what extent has a holistic approach to teaching information literacy been assimilated by faculty and librarians at the study site? As reported in Chapter Four, the researcher's expectation was that the librarian participants would have shown a higher level of assimilation in teaching information literacy than the faculty participants would have, given their long history with the program. In fact, the findings were quite the opposite.

According to Hall and Hord (2001) the faculty *SoC* profile (range: 40th to 85th percentile) indicates that the faculty participants are comfortable with the teaching methodologies and fairly confident in their ability to teach information literacy in their classes. They appear also to be willing to work with other faculty and librarians to further implement and improve the program. Overall, the faculty who participated in the study experienced a positive response to the pilot program and a demonstrated a moderate degree of assimilation. In contrast, the librarian *SoC* profile (range: 80th to 100th percentile) indicates that the librarian participants are extremely concerned with all aspects of the program and that their concerns about teaching information literacy are largely unresolved. As per Hall and Hord (2001) the librarian profile is typical of teachers who have not assimilated an innovation or are not favorably disposed toward the innovation and wish to change it.

What factors could possibly account for this surprising development? As described in more detail in Chapter Four, demographic differences between the participants in this study might certainly influence the findings. However, an analysis of factors such as age, teaching experience, tenure, and rank indicated few differences between the two groups. One demographic factor that might influence the concern level of someone expected to teach information literacy is the amount of information literacy

teaching experience that one has acquired. In this study, the faculty participants reported less experience teaching information literacy than the librarian group, yet their assimilation level appears to be higher than that of the librarian group. Is it possible that there is an inverse relationship between information literacy teaching experience and level of concern?

Hall and Hord (2001) believe that comfort level with an innovation increases as the concern level decreases. Familiarity, or experience with the implementation of an innovation should increase one's comfort level, not decrease it. It is not logical that more experience with something should increase one's level of concern about it unless there are other factors to be considered. This belief is supported by the findings of numerous studies in which the *SoC* was used to measure assimilation of an innovation (e.g., Alfieri, 1998; Bissette, 1998; Downie, 2003; Hope, 1995; Scott, 1998; Wells, 2000).

In this study, the researcher assumed that the participants would respond to the focus group questions about their experience with one aspect of teaching information literacy: the pilot study. The faculty participants did just that. However, it became very clear to the researcher that the librarian participants took a much broader view of their experiences of teaching information literacy when responding to the questions. Their responses reflected their entire experience of teaching information literacy, focusing particularly on the required one-credit course.

As a result, the two groups held very different views with regard to their concerns about information literacy instruction in terms of the *scope of responsibility* for such instruction. The faculty participants defined "information literacy instruction" as *one component* of a course that they normally teach in their discipline. However, the librarian participants defined "information literacy instruction" as the *totality* of their teaching experience. This is a very large difference that the researcher believes may partially explain the unexpected findings with regard to assimilation level.

It is easy to understand why the librarian participants' *self concern* level would be higher than that of the faculty participants (by 18 percentiles) if one considers that teaching information literacy is perceived by the librarians as a primary responsibility, paramount to their institutional identity and existence. Moreover, the faculty also perceive teaching information literacy as primarily a librarian responsibility. While they are willing to adopt some responsibility for teaching information literacy and are comfortable doing so, many faculty view teaching information literacy as peripheral to teaching their discipline, which remains their primary responsibility (Lupton, 2002).

There are other differences between the faculty and librarian experiences of teaching information literacy that can be explored as well. One such difference is in the *degree of support* experienced by the two groups. As previously discussed in Chapter One, we have seen that individuals who experience change must be supported through various learning stages in order to fully assimilate a new initiative (Hall & Hord, 2001; Loucks-Horsley, 1996). The faculty who participated in the pilot study knew that the librarian-liaisons were available to support them throughout their experience. The librarians helped them to design their assignments and quizzes, adapted the information literacy knowledge test for their course topics, and were available for consultation at all times. Additionally, faculty participants could request a librarian to come into their classes to teach a particular concept. At least three of the five faculty participants availed themselves of this option. In contrast, the librarians have had very limited options for teaching support. Three librarians are responsible for teaching the one-credit course to over three hundred first-year students, as well as providing reference-desk and consultation services as needed. The librarians' only teaching supports have come from one another, with some assistance from the instructional technology specialist. These large differences in degree of support may explain why the librarians' *task concerns* were higher by 32 percentiles than those of the faculty.

Finally, a third difference between the librarians' and faculty participants' experiences of teaching information literacy may be related to the *rate of change* in terms of the amount of course revision that is required and its impact on librarian workload. While the faculty participants reported in the focus groups that once through the pilot program they would most likely make small changes to their course materials and that it would be "easy to revise," the librarians reported the need for constant revision, due in part to the rapidly changing nature of the course material and in part to the way in which the one-credit course is linked to a subject course that changes from semester to semester, forcing the librarians to revise their course assignments to complement assignments in the linked courses each semester. As the subject courses are rarely repeated, the librarians are faced with constant, major revisions to their course materials.

The differences between the faculty participants' and the librarian participants' experience of the rate of change and its resulting impact on work load may explain why the librarians' *impact concerns* were so much higher than those of the faculty participants (consequence = 52 percentiles; refocusing = 26 percentiles). The faculty participants' concern level was slightly higher than that of the librarians in only one *impact concern* area (collaboration = 8). Otherwise, the librarians' *impact concerns* were nearly off the chart. According to Hall and Hord (2001) high stage 4 consequence and stage 5 collaboration concerns "represent the ideal goal of a concerns-based implementation effort," (p. 71) as it is desirable for teachers to be concerned about the effect, or impact of an innovation in their teaching. This is why the faculty profile can be interpreted to indicate that they have assimilated the innovation. However, when *self* and *task concerns* are also high, as in the librarian profile, they generally indicate non-acceptance and dissatisfaction, as has been seen in other studies (Germann & Sasse, 1997; Todd, 1993; Wells, 2000).

In summary, the findings of this study with regard to innovation assimilation point to the conclusion that factors such as scope of responsibility for instruction, degree of support, and impact of the rate of change on work load can have an effect on the degree to which an innovation is assimilated by the participants. Nevertheless, it was clear to the researcher that despite their unresolved concerns, the librarians were very much interested in finding ways to improve teaching information literacy, to the extent that they were willing to entertain structural revisions and even alternatives to the current one-credit first-year course, as highlighted in this excerpt from the focus group transcript:

> "I think it is interesting that this institution that has been teaching the [information literacy] course, something librarians at other institutions would kill for, to have a credit-bearing information literacy course, is thinking about going backwards. Maybe not backwards but onwards, evolving into a different form. What do you think about that?" (Facilitator)
> "I think it is a credit to [the librarians] in thinking, 'What is going to be best for the students in the long run. Is my availability more important than me standing in front of a room full of students who don't want to hear what I have to say?'" (Participant)

Attitudinal Changes Toward Teaching Information Literacy

In what ways and to what extent have faculty attitudes toward teaching information literacy skills been affected by the introduction of holistic instructional approaches? The findings of this study indicate that faculty attitudes have changed in a positive way with regard to teaching information literacy components as part of their own courses. Most of the participants admitted to having taught these concepts in the past, but not in such an intentional way as they did during the pilot program. They were pleased with the results, and were excited about the possibility of integrating the same or other types of information literacy components into courses other than the one or ones they had chosen for the pilot. As mentioned in Chapter Four, the faculty participants' lower *task*, and *impact* (stage 4 consequence) concerns indicate confidence in the

efficacy of teaching information literacy and in their ability to integrate the concepts into their courses. Their higher *self* concerns may reflect some hesitance toward their role in teaching information literacy, but several of the faculty participants commented that they learned a great deal from their experience and would be more confident in teaching the components in future courses. All were willing to assist other faculty in integrating these concepts into their courses, as indicated by the higher stage 5 collaboration and stage 6 refocusing *impact concerns* that appear in the faculty profile. Taken together, these findings lead to the conclusion that faculty attitudes generally will change in a positive way with regard to teaching information literacy components as part of their own courses if they are provided with opportunities for development and support through a holistic model of teaching information literacy.

Changes in Librarian-Faculty Relationships

In what ways and to what extent have librarian relationships with faculty changed as a result of these holistic approaches to teaching information literacy? Both librarians and faculty in this study said that their relationships with each other, while previously good, had improved as a result of the information literacy pilot program. The workshop experiences especially were cited by both librarians and faculty as being opportunities to show each other that they were more than the one-dimensional caricatures defined by their institutional roles. Several of the faculty participants said that they wished that their students could have observed the workshops and learned from the ways in which they demonstrated collaboration and teamwork. Librarian and faculty participants said that they enjoyed learning from each other and that their in-class experiences in the instances in which they team-taught certain concepts could serve as models of collaboration. In fact, several of the faculty participants said that their relationship with their librarian liaison was especially enhanced when the librarian took a special interest

in their course topic and asked to be more involved in the class. These comments are substantiated by the much smaller difference (8 percentiles) between librarian and faculty stage 5 collaboration *impact concerns*, which while still high at 80 and 88, respectively, indicate that while both groups of participants have concerns about collaboration, there is also strong interest in collaborating (Hall and Hord, 2001). Therefore, the findings of this study with regard to librarian and faculty relationships lead to the conclusion that these relationships generally improve as a result of collaborative teaching models that are components of holistic information literacy instruction.

Student Learning Outcomes

In what ways and to what extent are student learning outcomes affected by the introduction of a holistic approach to teaching information literacy? The results of statistical analyses conducted for three separate groups of student information literacy pretest and posttest scores indicated that in general, student learning improved as a result of a holistic approach to teaching information literacy.

The first group of pretest-posttest scores was obtained from three first-year student cohorts who took a one-credit information literacy course (*CORE 101*) in either the fall or spring semester between fall 2003 and spring 2006. The results of the *CORE 101* pretest-posttest score analyses indicated that students significantly improved their scores from tests taken at the beginning of the semester to those taken at the end across all three cohorts and for the entire sample (N = 678), regardless of the semester or year in which the course was taken, or which instructor taught the course. This finding is significant in that it indicates a consistent instructional experience across all sections of the course and across time. Three significant trends were also noted: first, students generally improve more in the fall semester as opposed to spring; second, female students generally score higher than males on both the pretest and posttest; and

third, students' choice of major may be related to degree of improvement, as it was demonstrated that students enrolled in some major areas of study improved more than others. However, regardless of the influence of these demographic factors, the differences between pretest-posttest scores were highly significant in all cases.

These findings point to the general conclusion that *CORE 101* improves information literacy skills in first-year students. One reason for caution when interpreting these findings is that there is no group of first-year students who did not take *CORE 101*; thus, there is no control group. *CORE 101* is a first-year student requirement, and the vast majority of students complete it by the end of their first year. The absence of a control group makes it difficult to rule out the possibility that the improvement noted between pretest-posttest was due simply to having completed one or two semesters of college as opposed to *CORE 101* instruction. However, despite the lack of a control group, it is possible to infer to some degree the extent to which the information literacy improvements are due to *CORE 101* versus general college educational experiences. As shown in Table 4, the pretest means for both fall and spring semesters are essentially identical, which suggests that the additional semester of college education that spring semester first-year students bring with them when entering their *CORE 101* course does not result in any noticeably improved entry level information literacy skills. For this reason, combined with the fact that in both semesters there was significant improvement between pretest and posttest scores, the improvement is more likely due to *CORE 101* instruction than to general first-year college experiences.

The second group of pretest-posttest scores analyzed was obtained from students enrolled in courses (N = 93) taught by the five faculty members who participated in the fall 2005 *faculty teaching information literacy pilot program*, in which faculty agreed to work with librarians and an instructional technologist to design and

incorporate information literacy components into upper-level courses in their disciplines. The results of these analyses revealed that upper-level information literacy instruction appears to significantly improve students' information literacy skills. Additionally, a significant trend was noted in that the tendency of male first-year students to show less improvement between pretest and posttest (as indicated in the *CORE 101* analyses) disappears by the junior year. Male students in the upper-level instruction group performed better than females on both the pretest and the posttest in this sample, although the female students improved their scores to a greater degree than the males.

Although these findings are encouraging, they appear to be mixed and it may not be possible to generalize them due to several factors. One factor was small sample size; another was that the pretests and posttests administered to this sample differed. Although these assessments were based on the original 40-item *CORE 101* pretest or posttest, each faculty member selected ten items and adapted them to the specific topic covered in his or her course. Therefore, direct comparisons are not actually possible for the entire sample. The best interpretation of these findings may lie in considering the results for each class independently. For example, the researcher noted that pretest means for four of the five classes tested were very high. Moreover, differences between pretest and posttest means were significant in only three of the five classes. In one of the classes a significant *negative* difference was found, indicating that student performance on the pretest was actually better than that on the posttest (see Table 10). The high pretest means and small gains that appear to be fairly consistent in this group may indicate that students at the upper levels gain as much information literacy skill on their own as they do from taking classes, or they may indicate that the versions of the information literacy knowledge test used in these classes were not challenging enough. Finally, the absence of a control group again makes it difficult to attribute the improvement in information literacy skill directly to this form of instruction.

The third group of pretest-posttest scores was obtained as a result of retesting students in the spring semester of their junior year who had taken *CORE 101* as first-year students in 2003-2004 (*N* = 82). The retest was conducted in order to determine the degree to which students retained information literacy skills from taking *CORE 101*, and the degree to which these skills may have been reinforced by subsequent courses or from general experiences. The results of these analyses indicated that the degree of improvement in information literacy skills in third-year students who have not been exposed to additional information literacy instruction after their first year is not significant. Significantly, factors such as gender, semester of instruction, and major, which appeared to influence improvement in the *CORE 101* and upper-level group, did not appear to have any effect on degree of improvement for this group. The findings of this component of this study are important because they suggest that students do not acquire information literacy skills on their own or from other courses, but that subsequent course work may help them to retain or reinforce these skills.

Throughout this discussion the absence of a control group was cited as a factor in determining the attribution of improvement in information literacy skill directly to CORE101 or to upper-level instruction. However, despite the fact that the junior retest occurred in spring 2006 and the upper-class testing occurred in fall 2005, it is possible to view the junior retest group as a control group for the upper-class instruction group, as the retest group did not have the benefit of additional information literacy instruction after their first year, whereas the upper-class group was exposed to such instruction. That being said, it should be noted that methodological differences in test administration may have contributed to differences between the upper-class and retest group findings. Whereas the *CORE 101* pretests and posttests were administered with a high degree of consistency with regard to content, format, and timing, there was no such consistency apparent within the other two groups. Each of the five upper-level classes used a

different pretest and posttest, and most were administered as an in-class paper and pencil exercise. In contrast, while the junior retest group was exposed to one version of the test, the questions were different from the versions of the test used by the upper-class faculty, the test was administered via email link to a web-based survey, and the respondents were voluntary participants. Because of these methodological differences, the findings from the upper-level instruction group and the junior retest group cannot be directly compared and it may not be possible to generalize them. Nevertheless, the findings of these upper-level components of the study, along with those of the *CORE 101* analysis point to the conclusion that student learning is affected positively by a holistic approach to teaching information literacy that includes both first-year and upper-level instruction components.

To summarize the above discussion, four major conclusions emerge from this study. They are:

1) Innovation assimilation, in this case a holistic model of information literacy instruction, is affected by factors such as scope of responsibility for instruction, degree of support, and the impact of the rate of change on work load.
2) Faculty attitudes toward teaching information literacy components as part of their own courses will generally change in a positive way when opportunities for development and support are provided.
3) Librarian and faculty relationships generally will improve as a result of collaborative teaching models that are a component of holistic information literacy instruction.
4) Student learning is affected positively by a holistic approach to teaching information literacy that includes both first-year and upper-level instruction.

Practical Implications and Contributions to Research

The findings and conclusions of this study may be best viewed in terms of their practical implications for the study site and in terms of their contributions to a growing body of research in information literacy and change assimilation.

Practical Implications for the Study Site

The first major conclusion that innovation assimilation is affected by factors such as scope of responsibility for instruction, degree of support, and the impact of the rate of change on work load holds practical implications for the study site in terms of course restructuring within the general education curriculum. This comes at an opportune time for Saint Francis University, as a new set of fourteen general education objectives and associated learning outcomes have recently been approved by the faculty and administration. Curricular changes are currently being contemplated and discussed with regard to aligning course requirements with the new objectives and outcomes.

The findings of this study will help to inform these curricular discussions. Clearly, the librarians' experiences with the current model used for first-year information literacy instruction should be considered. The librarians themselves indicated that they were open to change and suggested several alternative models, including: creating a permanent link for *CORE 101* with an English literature or other general education first-year required course in order to reduce the need for continual revision of course materials; integrating *CORE 101* with *CORE 102* and creating a first-year seminar that would include a significant information literacy component; and replacing *CORE 101* with a series of online tutorials supported by a set of required workshops, with different topics being covered each semester.

Throughout these discussions, however, one common denominator emerged. Despite their overall concerns about the current structure, the librarian participants

agreed that some form of information literacy instruction that is more substantial than library orientation was both necessary and important for students to succeed academically. The faculty participants were equally supportive of this view, indicating that they relied upon the "solid base" that first-year information literacy instruction gives students for conducting more advanced research. These views are supported by the finding that student learning improves as a result of teaching information literacy in the first year and in upper-level courses.

In terms of the practical implications of this study's findings and conclusions with regard to information literacy innovation assimilation at Saint Francis University, it is clear that regardless of the model of teaching information literacy that is eventually chosen, librarians who are expected to teach information literacy must be given a greater degree of support and resources than that which is currently provided. Additionally, some means of reducing the nature and frequency of the type of course revision currently experienced by librarians must be afforded. Finally, the university would do well to consider implementing a shared model of responsibility for teaching information literacy.

The second major conclusion of this study that faculty attitudes toward teaching information literacy components as part of their own courses will generally change in a positive way when opportunities for development and support are provided holds practical implications for the development of information literacy instruction across the curriculum. The positive attitudes of the faculty participants toward integrating information literacy concepts into their courses and their willingness to assist other faculty in doing so are indications of a growing awareness of the importance of information literacy and its role in the curriculum. This is good news for Saint Francis University, as "effectively conduct research/information literacy" has been defined as one of fourteen revised general education outcomes adopted in 2004. Even so, it would

appear that the university has some distance to travel with regard to fully integrating this outcome across the curriculum as several recent assessments conducted at the university indicate mixed perceptions about information literacy on the part of both faculty and students.

In a report on faculty and student perceived importance of general education objectives, “conduct research” or “information literacy” were mentioned as learning outcomes in only 35% of course syllabi, 11% of all Community Enrichment Series objectives, and 28% of senior capstones. The objective was mentioned in 50% of Colloquium course descriptions, but this was most likely due to the fact that colloquia are currently linked with information literacy sections (Moist, 2006). In the same report, students ranked information literacy fourth in a list of six items in response to the question, “What bothers you most about GenEd?” When the faculty importance rankings were compared with those of students, information literacy was ranked seventh of fourteen by faculty and ninth of fourteen by students (Moist, 2006). However, in a report of National Study of Student Engagement (NSSE) scores over time (2001, 2003, and 2005) correlated with general education objectives, first-year students consistently ranked their experiences with information literacy education at Saint Francis University higher than the benchmark schools while seniors ranked their experiences at about the same level as the benchmark schools (Moist, 2006).

Clearly, student and faculty perceptions of the importance of information literacy must be raised if the university wishes to successfully implement this general education objective. In this regard, a recommendation that emerges from the findings of this study might be to increase university and general education program support for the library’s *faculty teaching information literacy program*, given the positive response of faculty to the pilot program and the noted improvement in faculty attitude toward teaching information literacy components in their own courses as a result.

The third major conclusion of this study that librarian and faculty relationships improve as a result of collaborative teaching models that are a component of holistic information literacy instruction will also help to shape and inform decisions regarding the teaching models used for information literacy instruction at Saint Francis University. The findings of this study indicate that faculty-librarian partnerships are effective means of teaching information literacy, particularly with regard to teaching information literacy as components of upper-level courses, and they support the formation of such partnerships as an effective means of implementing information literacy across the curriculum as a general education objective. As such, it is recommended that consideration be given to developing models of information literacy instruction which incorporate faculty-librarian partnerships as the institution moves to develop curricular revisions that accommodate the 2004 general education objectives.

The fourth major conclusion that emerged from this study was that student learning is affected positively by a holistic approach to teaching information literacy which includes both first-year and upper-level instruction components. This conclusion and the findings that support it are significant for the study site in that they establish the effectiveness of *CORE 101* as a means of teaching information literacy to first-year students for the first time in the history of the general education program at Saint Francis University. While previous assessments of *CORE 101* had been conducted for many years by the general education program, these were primarily subjective measures of students' perceptions about the course, which were mostly negative, as seen in the study of student and faculty perception of the importance of general education objectives referenced earlier. Moreover, none of these previous assessments measured student learning. The findings of this study demonstrate that students do benefit from information literacy instruction as evidenced by improved performance on posttests when compared with pretest performance. They also suggest that embedding

information literacy components into upper-level content courses is an effective means of reintroducing or reinforcing information literacy skills in third- or fourth-year students.

However, despite the fact that posttest score improvement in the *CORE 101* cohorts across all years and all factors was statistically significant, the overall mean scores were low for both pretest and posttest, with a pretest mean score equivalent to a failing grade of "F," and the posttest mean score equivalent to a passing grade of "C." A low score on the pretest is expected; however, a passing score higher than a "C" would be more desirable on the posttest, when one considers that the average final grade earned in *CORE 101* across all sections from fall 2003 to spring 2006 was a "B-." These findings are not particularly encouraging, but they are consistent with those of similar studies (Brown & Kruhmholz, 2002; Jenson, 2004; Maughan, 2001; Seaman, 2001; Holman, 2000). One possible explanation for the low pretest and posttest mean scores, as in the studies cited above, may be that while the pretest and posttest are course requirements, neither is graded. Policy regarding course credit for participating in both tests is not consistent across instructors, which begs the question regarding students' incentive to perform to the best of their ability, especially on the posttest. On a practical level, another recommendation that emerges from this study would be that the *CORE 101* instructors and the general education administration resolve the pretest-posttest incentive problem in an appropriate way.

Additionally, the absence of a control group, differences in teaching and testing in upper-level courses, and the methodological problems with junior retesting noted earlier in this discussion also have practical implications for improvement in these areas if the university wishes to continue these programs and to assess them in a more rigorous way. Therefore, another recommendation that emerges from this study would be to introduce a greater degree of consistency with regard to teaching and assessment practices in both first-year and upper-level information literacy programs, so that it is

possible to conduct a longitudinal study that demonstrates the outcomes of these programs over time. Finally, as one of the findings of the *CORE 101* analysis indicated that students in some major programs of study may be disadvantaged by waiting until their second semester to take their information literacy course, the university may wish to consider targeting these groups for early (first-semester) instruction so as to improve the probability of academic success for these students.

In general, the conclusions of this study hold positive implications for Saint Francis University, the study site, in that they demonstrate the effectiveness of a new instructional approach that seeks to extend a general education core competency across undergraduate curricula. In so doing they make significant contributions to the university's growing assessment movement, especially given the recent changes in professional and accreditation standards that emphasize information literacy skill development and assessment within institutions of higher education. They also contribute to the development of a comprehensive assessment plan for the institution.

Contributions to Research

The findings and major conclusions of this study contribute positively to a growing body of research in the areas of information literacy instruction and innovation assimilation. The conclusion that innovation assimilation is affected by factors such as scope of responsibility for instruction, degree of support, and the impact of the rate of change on work load supports those of several other studies (Costantino, 2003; Germann & Sasse, 1997; Todd, 1993; Wells, 2000) where various mitigating factors were found to impede innovation assimilation. Moreover, the question of "who is responsible" for teaching information literacy has become an important issue as colleges and universities have begun to include information literacy as part of their general education curricula and to experiment with librarian-faculty teaching models (Ivey, 2003;

Jenson, 2004; Kuh & Gonyea, 2003; Lupton, 2002; Owusu-Ansah, 2004; Palmer & Tucker, 2004; Roldan & Yuhfen, 2004: Warnken, 2004; Zabel, 2004). While these questions have yet to be resolved, the conclusions of this study will help to inform the discussion.

A second major conclusion that the attitudes of faculty changed in a positive way with regard to teaching information literacy components as part of their own courses supports the conclusions of similar studies (Ivey, 2003; Jensen, 2004; Kuh & Gonyea, 2003; Lupton, 2002; Rolday & Yuhfen, 2004) where faculty attitudes were shown to have positively changed as a result of information literacy teaching partnerships.

The third major conclusion that librarians and faculty relationships improve as a result of collaborative teaching models that are a component of holistic information literacy instruction is consistent with those of other studies of effective collaborative partnerships between faculty and librarians (Ivey, 2003; Sheehy, 2001). This conclusion is particularly relevant to Ivey's finding that the development and sustainability of collaborative partnerships was enhanced where librarians supported the research interests of their faculty partners. Moreover, Hall and Hord (2001) believe that faculty collegiality is a desired outcome of innovation, citing the research of Little and McLaughlin (1993) on teacher collegiality that confirms the importance of the collaboration dynamic as having a positive impact on teachers and their students.

Finally, the fourth major conclusion that student learning is affected positively by a holistic approach to teaching information literacy that includes both first-year and upper-level instruction components supports those of similar studies in which information literacy instruction was found to improve student learning outcomes (Brown & Kruhmholz, 2002; Hardesty, Holman, 2000; Jenson, 2004; Lovrich & Mannon, 1982; Maughan, 2001; Roldan & Yuhfen, 2004; Seaman, 2001). The finding that students do not apparently acquire information literacy skills on their own or from other courses, but

that subsequent course work may help them to retain or reinforce these skills is particularly relevant to the 1982 study by Hardesty, Lovrich and Mannon of long-term retention of information literacy skills, which showed that skill retention was associated with two factors: first-year instruction and upper-level course-embedded instruction.

Recommendations and Suggestions for Further Study

The purpose of this study was to understand the impact upon faculty, librarians, and students of the changes that have occurred in information literacy instruction within a particular institutional setting. The findings and conclusions of this study demonstrate that a holistic model of teaching information literacy impacts faculty and students in a positive manner. However, the experiences of librarian participants were found to be not as positive as those of students or faculty. Although some factors were identified in this study that might explain these findings, additional research in this area would provide a more solid basis for these conclusions.

From the researcher's perspective, a primary limitation of this study was inherent in one segment of the study design: the inability to directly manipulate student data so as to exploit its full potential. As the researcher was limited to the study of existing data samples, it was difficult, if not impossible to manipulate the data in ways that might have been more productive. For example, inconsistencies that were found in the ways that individual test question scores (not overall scores) were recorded made it impossible to perform an item-by item comparison that would have determined which information literacy standards were being learned and which were not. If the inconsistencies in the data can be resolved, a more detailed analysis will be extremely valuable for institutional assessment purposes at the study site.

Finally, at the outset of this study, the researcher admitted that a potential limitation of the study might be that it may not be possible to generalize the findings

across a larger population because a case study approach was chosen. As few similar instructional models existed at other institutions, the case study model seemed appropriate at the time that the study was undertaken. Because the purpose of this study was to understand the impact of a particular innovation adopted by a particular institution, the findings and conclusions are particularly relevant to the study site; however, it is clear that they are consistent with and support those of numerous previous studies. Nonetheless, as additional collaborative models of instruction have since emerged at other institutions, additional research in this area is also needed.

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APPENDICES

APPENDIX A

FOCUS GROUP QUESTIONS (FACULTY)

APPENDIX A: FOCUS GROUP QUESTIONS (FACULTY)

Focus Group Questions (Faculty)

Introductory Comments: Please respond to the questions in terms of your present concerns, or how you feel about your involvement with the *Faculty Teaching Information Literacy Initiative.* We do not hold to any one definition of this innovation, so please think of it in terms of your own perception of what it involves. Please remember to respond to the interviewer in terms of your present concerns about your own involvement with the *Faculty Teaching Information Literacy Initiative.*

Category 1: General Concerns

1) Thinking about your involvement with teaching information literacy, do you feel that you have enough time to organize yourself each day?

2) Throughout your participation in this initiative, have you experienced any conflict between your interests and your responsibilities? If you have experienced conflict, how has it affected you?

3) How well are you able to manage everything that teaching information literacy requires?

4) Do you find that you are able to easily revise your implementation of teaching information literacy?

5) Tell me about how your teaching has changed, and how you might expect it to further change, as a result of teaching information literacy.

6) In teaching information literacy, have you spent any time spent working with nonacademic problems? How has working with these problems affected you?

Category 2: Comfort Level

1) Would you like to familiarize other departments or persons with teaching information literacy?

2) Would you like to revise instructional approaches to teaching information literacy?

3) Would like to know what other schools or faculty are doing in this area?

4) Do you now know of some other approaches that might work better?

5) Would you like to supplement, enhance, or replace this method of teaching information literacy?

Focus Group Questions (Faculty)

Category 3: Impact on Students and Student Learning

1) Are you concerned about students' attitudes toward your role in teaching information literacy?

2) Are you concerned about how teaching information literacy affects student learning outcomes?

3) Are you concerned about evaluating your own impact on students?

4) Would you like to excite your students about their part in this approach?

5) Would you like to modify teaching information literacy based on the experiences of our students?

6) Would you like to use feedback from students to change teaching information literacy?

Category 4: Working Relationships

1) In what ways have you helped other faculty who are teaching information literacy?

2) What relationships have you developed with other faculty who are teaching information literacy?

3) In what ways have your relationships with the librarian liaisons changed?

4) In what ways have you coordinated your efforts with others to maximize effects?

5) Do you find that coordination of tasks and people is taking too much of your time?

6) How do you think that your role has changed as a result of teaching information literacy?

APPENDIX B

FOCUS GROUP QUESTIONS (LIBRARIANS)

APPENDIX B: FOCUS GROUP QUESTIONS (LIBRARIANS)

Focus Group Questions (Librarians)

Introductory Comments: Please respond to the questions in terms of your present concerns, or how you feel about your involvement with the *Faculty Teaching Information Literacy Initiative.* We do not hold to any one definition of this innovation, so please think of it in terms of your own perception of what it involves. Please remember to respond to the interviewer in terms of your present concerns about your own involvement with the *Faculty Teaching Information Literacy Initiative.*

Category 1: General Concerns

1) Thinking about your involvement with teaching information literacy, do you feel that you have enough time to organize yourself each day?

2) Throughout your participation in this initiative, have you experienced any conflict between your interests and your responsibilities? If you have experienced conflict, how has it affected you?

3) How well are you able to manage everything that teaching information literacy requires?

4) Do you find that you are able to easily revise your implementation of teaching information literacy?

5) Tell me about how your teaching has changed, and how you might expect it to further change, as a result of teaching information literacy.

6) In teaching information literacy, have you spent any time spent working with nonacademic problems? How has working with these problems affected you?

Category 2: Comfort Level

1) Would you like to familiarize other departments or persons with teaching information literacy?

2) Would you like to revise instructional approaches to teaching information literacy?

3) Would like to know what other schools or faculty are doing in this area?

4) Do you now know of some other approaches that might work better?

5) Would you like to supplement, enhance, or replace this method of teaching information literacy?

APPENDIX B: FOCUS GROUP QUESTIONS (LIBRARIANS)

Focus Group Questions (Librarians)

Category 3: Impact on Students and Student Learning

1) Are you concerned about students' attitudes toward your role in teaching information literacy?

2) Are you concerned about how teaching information literacy affects student learning outcomes?

3) Are you concerned about evaluating your own impact on students?

4) Would you like to excite your students about their part in this approach?

5) Would you like to modify teaching information literacy based on the experiences of our students?

6) Would you like to use feedback from students to change teaching information literacy?

Category 4: Working Relationships

1) In what ways have you helped other faculty who are teaching information literacy?

2) What relationships have you developed with other faculty who are teaching information literacy?

3) In what ways have your relationships with the faculty who are teaching information literacy changed?

4) In what ways have you coordinated your efforts with others to maximize effects?

5) Do you find that coordination of tasks and people is taking too much of your time?

6) How do you think that your role has changed as a result of teaching information literacy?

APPENDIX C

INFORMATION LITERACY KNOWLEDGE PRETEST

APPENDIX C: INFORMATION LITERACY KNOWLEDGE PRETEST

Information Literacy Pre-Test Questions

Name: _____

Gender: **Male / Female**
Race: **Afro-American, Asian, Caucasian, Hispanic, Native-American, Other.**

What is your major area of study? **[CHOOSE FROM LIST]**

Have you had Information Literacy instruction prior to this course? **Yes No**

Please indicate your status: **Freshman Sophomore Junior Senior**
Transfer Continuing Education

How do you rate your ability in using the following software applications? **(1 = low, 5 = high)**

Microsoft Word 1 2 3 4 5

Microsoft Excel 1 2 3 4 5

Microsoft PowerPoint 1 2 3 4 5

Microsoft FrontPage 1 2 3 4 5

What is your "comfort level" when beginning an academic research assignment?
(1 = low, lost, uncomfortable 5 = high, confident) 1 2 3 4 5

INSTRUCTIONS: This assessment is designed to track the development of your information literacy skills. Our hope is that by your senior year you will be able to answer all of these questions with little effort. The goal is to measure progress toward these competencies according to standards developed by the Association of College & Research Libraries. Please select one answer to each of the following questions. All information requested is intended for the purpose of statistical analysis only, and will be handled in a confidential manner.

1) When performing research, one important part of forming a search strategy is to:
   a) Locate books using the library's online catalog.
   b) Search an index to popular magazines.
   c) Analyze a topic to identify alternative keywords/concepts.
   d) Check the Internet for background information on your topic.

2) Which of the following is a characteristic of a scholarly journal?
   a) The presence of glossy photos and advertisement.
   b) Articles are written by people from a variety of fields.
   c) Footnotes and bibliographies are regularly used to cite sources.
   d) Topics covered are not confined to one major field of study.

3) Which of the following is NOT a secondary source?
   a) A literary text such as The Catcher in the Rye by J. D. Salinger.
   b) Books about The Catcher in the Rye.
   c) Journal articles written by J. D. Salinger about The Catcher in the Rye.
   d) Dissertations about The Catcher in the Rye.

4) Your assignment is to "describe the effects of the thinning ozone layer on the environment." Which of the following keyword examples may yield the best results in a database search?

a) Ozone not pollution
b) Environment* and ozone layer and effect*
c) effects or environment*
d) Ozone and layer

5) Your assignment is to "describe the effects of the thinning ozone layer on the environment." Which of the following sources would be most helpful in finding the main concepts relevant to this statement?

a) Dictionary
b) Directory
c) Map
d) Periodical

6) Read the following opening paragraphs from the essay entitled: *Biodiversity: The Key to Saving Life on Earth* by Donella H. Meadows. Choose the sentence that represents the essay's thesis statement.

The ozone hole and the greenhouse effect have entered our public vocabulary, but we have no catchy label for the third great environmental problem of the late 20th century. It's even more diffuse than depletion of the ozone layer or global warming, harder to grasp and summarize. The experts call it "the loss of biodiversity." Biodiversity, obviously, has something to do with pandas, tigers, and tropical forests. Preserving biodiversity is a much bigger job than protecting rain forests of charismatic megafauna. It's the job of protecting all life—microscopic creepy-crawlies as well as elephants and condors—and all life's habitats – tundra, prairie, and swamp as well as forests.

a) The experts call it "the loss of biodiversity."
b) The ozone hole and the greenhouse effect have entered our public vocabulary, but we have no catchy label for the third great environmental problem of the late 20th century.
c) Biodiversity obviously has something to do with pandas, tigers, and tropical forests.
d) Preserving biodiversity is a much bigger job than protecting rain forests or charismatic megafauna.

7) Which of the following is a correct example of truncation?

a) puppies not (kittens)
b) *kitt and dogs
c) dog (or) cat
d) cat* and kitten*

8) The topic you selected for your research paper is "diet and health," and you decide to utilize a periodical database to locate related articles. To achieve the best results from the database, you try using "diet and health" as your keywords. Unfortunately, you discover that this search yields far too many articles than you can sensibly use. Which of the following suggestions would be your next best course of action for achieving a more manageable list of articles?

a) Choose keywords that are more specific to your topic.
b) Use the same keywords "diet and health" and perform a search on the Internet.
c) Perform a search using "food and well-being" as keywords.
d) Use "diet" or "health" as separate keywords and perform a search for each.

9) Steinbeck, John. "How, under the most adverse circumstances, love came to Big Joe Portagee." Tortilla Flat. New York: Viking Press, 1962. 104-109. The above reference is a bibliographic citation for a:

a) journal article
b) personal interview
c) World Wide Web site
d) book chapter

10) Your instructor asks your class to select a controversial issue of your own choosing and construct a five-page paper supporting one side of the argument. After some initial preparation, you decide that the inclusion of some notable statistics would be beneficial to your case. Which of the following would be the best approach for including the statistical information in your paper?

a) Consult a knowledgeable instructor, a manual, or draw on your own prior experience in order to incorporate your statistics into your paper using a computer-based visual aid, such as a table or pie-chart.
b) Make a general reference to the overall statistics in your paper without explaining their meaning, since numbers speak for themselves.
c) Ignore statistics that contradict your main arguments.
d) Simply list the statistics in an appropriate area within the context of your paper.

11) Patterson, Berniece. "Creating Artistic Math Concepts on the Computer." *Arts & Activities*. May 2000: 19, 49. The above reference is a bibliographic citation for a:

a) Book
b) Subject encyclopedia
c) Magazine article
d) World Wide Web site

12) Which of the following examples demonstrates the correct use of quotation marks using the MLA style?

a) Was it Somerset Maugham who said, "Love – the dirty trick nature played on us to achieve the continuation of the species"? (64)
b) In the Connecticut Sunday Herald on February 19, 1967, Harry Neigher was quoted as saying, "A Westporter confided at Asti's: 'I just bought my wife a dinner set for her birthday – 32 teeth'."
c) In Pudd'nhead Wilson's Calendar, a famous work by Mark Twain, he wrote, "Why is it that we rejoice at a birth and grieve at a funeral? It is because we are not the person involved."
d) Robert Maynard Hutchins once remarked, "The college graduate is presented with a sheepskin to cover his intellectual nakedness (18)".

13) Which of the following is the most important criterion that you should use to evaluate information found on a web site?

a) File size
b) Authority
c) Location
d) Bandwidth

14) Your class assignment is to prepare a PowerPoint presentation that you will have to display to your classmates. There are a few general but important guidelines that you should consider when using PowerPoint. Choose the one answer that would *not* contribute to the effectiveness of your presentation.

a) Avoid lengthy or wordy sentences.
b) Use as many visual and auditory aids as possible to keep your audience interested.
c) Make sure that the contrast between the colors of the text and background is pleasing to the eye, and that the text is easy to read.
d) Text should usually be displayed in outline form.

15) If you are writing a paper on animal rights, and you use information from a website produced by the People for the Ethical Treatment of Animals (PETA), which of the following website evaluation criterion should you consider as most important?

a) location
b) bias
c) currency
d) related links

16) Your assignment requires that you present a formal speech to your peers, which is designed to influence their views on a particular issue. Which of the following choices would *not* be an effective course of action when giving your presentation?

a) Take as much time as you need in order to fully explain and present your argument.
b) Wear clothing that gives a favorable first impression and is appropriate for the intended audience.
c) Refrain from reading your speech in written form; use note cards.
d) Practice your speech beforehand using good vocabulary and proper diction.

17) Read the following original book passage from *Slavery* written by David Turley: "Although there is some debate on the subject, differences of colour or race seem to have mattered relatively little to the ancient Greeks, but 'otherness' in terms of ethnicity and language counted for a great deal." Now, choose one of the following choices as an acceptable example of paraphrasing according to the MLA style, which does *not* constitute plagiarism:

a) In ancient Greece, slavery was generally based on the differences between people in terms of background and language.
b) "Otherness" in terms of ethnicity and language counted for a great deal to the ancient Greeks.
c) In ancient Greece, differences between people in terms of background and language mattered quite a bit (Turley 28).
d) Differences of color seem to have mattered little to the Greeks, but ethnicity and language meant a great deal.

18) You discover information on the World Wide Web that you would like to incorporate into your research paper. You know the adverse consequences of plagiarism, so you know you need to properly cite the information that you plan to use. Unfortunately, you are unsure of the proper format. Choose the best course of action below to solve your problem.

a) Copy most of the text from the information you found into your paper and don't worry about citing its source.
b) Consult the "Citing Sources" section of the Saint Francis Library Web Pages or refer to a book /library study guide that explains proper documentation techniques for research papers.
c) Type in the sentences that you wish to use and simply enclose them in quotes.
d) Copy the citation format used in any popular book you find in the library.

19) When a writer does not give proper acknowledgement to another person's work, thoughts, or arguments, it is known as:

a) originalism
b) poetic license
c) referencing
d) plagiarism

20) If you collect images from the World Wide Web and compile them into a web site, paper, or display for a class project, then use a collective title that names you as the author, you have:

a) plagiarized
b) destroyed its intellectual content
c) infringed on the copyright law
d) improved the scholarly content

21) As required by your professor, you have obtained two books, two magazine articles, and one newspaper item as sources for your research paper. The next appropriate course of action would be:

a) Briefly scan the materials and immediately begin work on your research paper.
b) Prepare your paper utilizing only one or two of your sources.
c) Quickly scan your sources, disregard the ones you feel do not provide enough information, but still name them in your bibliography.
d) Carefully read through your sources and determine whether or not they satisfy your information needs, or if a revision of your search strategy is required.

22) Full-text articles on your particular research topic can be located and emailed to you using FRANCIS, the Saint Francis University Library's Online Catalog. Which two databases within FRANCIS should be consulted initially, to accomplish this research activity?

a) Netlibrary and FirstSearch
b) Proquest and WilsonSelectPlus
c) Google and MDConsult
d) FirstSearch and ArticleFirst

23) You are required to locate peer-reviewed articles on a topic that was assigned to you in class. Where would you find this information?

a) popular magazines
b) compendiums
c) journals
d) newspapers

24) You are investigating public health concerns and the long term effect of dioxin, a cancer causing agent, on the environment. Which of the following sources would present an overview of various sides of the issue?

a) FirstSearch – AGRICOLA database
b) FirstSearch – WilsonSelect Plus
c) Hoover's Online
d) CQ Researcher
e) I'm not sure which source is appropriate.

25) You are concerned with the controversy between the logging industry and forest preservation in the western United States. Where might you turn to get some accurate background information and an authoritative analysis of the current situation?

a) Your uncle Jerry lives in California. This is a good time to call him and discuss his views on the subject.
b) Visit the Weyerhaeuser Company's website on the Internet. (Weyerhaeuser is a very large lumber and wood products company located in the United States).
c) Find newspaper articles concerning "forest fires" using the ProQuest database.
d) Visit the CQ Researcher database and locate an issue devoted entirely to your topic.
e) I have no idea where to begin.

26) Dr. Neeley asks you to read an article entitled, "Experiences of the Occult in an Undergraduate Library." which he has placed on reserve in the library. After reading it, you describe its content in a short written paper he has assigned. What is your next step?

a) Even though you paraphrase the content you must cite the original work in your paper.
b) Because the paper is short, there is no need to cite the original source.
c) Check the ProQuest database for full-text availability of this particular article. You can then copy and paste this without having to cite it.
d) If you don't plan to publish, you won't need to cite the article, especially if you re-phrase it in your own words.

27) After completing a search of the FRANCIS online catalog and finding no books on your research topic, what can you do?

a) You understand that WorldCat is an online database of books and decide to search there.
b) Wait until semester break and investigate at your home public library.
c) Visit Penn State campus library with one of your friends.
d) Use Proquest database for full-text journal articles and forget using any more books.

28) You need to compare unemployment rates on a local, state, and national level as part of your research paper. Using the U.S. Department of Labor website, you were able to locate the necessary information. Which of the following would be the best method of representing the data in your work?

a) Place the unemployment figures directly into the text of your research paper.
b) Mention the trends in the unemployment rates, but state in your paper that the exact figures can be viewed at the U.S. Department of Labor website.
c) Create and insert a new table into your research paper that contains only the necessary unemployment rates but also acknowledges the origin of the information.
d) Copy all three tables directly from the website into the text of your research paper while giving proper credit to the U.S. Department of Labor.

29) You've been asked by Dr. Woznak to locate criticism of a play by Tennessee Williams. What would you do next?

a) Use a keyword search in FRANCIS and look up the term "Tennessee Williams."
b) Select the Literature Resource Center database from the choices available in FRANCIS.
c) Obtain this item from the reserve collection located at the library's circulation desk.
d) Employ Metacrawler to conduct a literature search on the World Wide Web.

30) In what way does a "metasearch engine" such as Metacrawler.com differ from a search engine such as Google?

a) Metacrawler maintains its own unique database of websites, where Google does not.
b) Metacrawler processes several simultaneous searches using a variety of search engines, then "weeds-out" the results.
c) Metacrawler is only available through FRANCIS.
d) Metacrawler requires a much larger operating system than Google.
e) I am not familiar with meta-search engines such as "Metacrawler."

31) I'm unfamiliar with "Buddhist religious practice in Tibet," a research topic assigned by my religious studies instructor. Which of the following search strategies would be useful for me?

a) Search "Buddhist" as a keyword in FRANCIS.
b) Consult the topic index contained in the Encyclopedia of Religion available in the reference area.
c) Check the Proquest database for full-text articles on "Buddhism" and "Tibet".
d) Use EZBorrow to obtain books on this topic from another academic library in Pennsylvania.
e) All of the strategies listed above may be used.

32) Which of the following software applications would be appropriate for my presentation on "Life-cycle of the Butterfly (Lepidoptera papilionidea)"?

a) Excel
b) Word
c) PowerPoint
d) FrontPage
e) none of the above

33) I'm interested in knowing whether the Saint Francis University Library subscribes to the periodical "American Journal of Occupational Therapy" (AJOT). What should I do?

a) Enter the name of the journal in Journal Finder to determine its location and format.
b) Ask the librarian at the reference desk.
c) Check the shelf holdings on the second floor of the library.
d) Complete an interlibrary loan request for the article you need.
e) I'm not sure what to do.

34) Which of the following resources could quickly help your roommate who confides: "I don't really understand all the controversy over plagiarism… I never really intend to plagiarize, but how can I be sure that I haven't?"

a) Locate "plagiarism" in Webster's dictionary.
b) Search "plagiarism" in Proquest.
c) Search "plagiarism" using Google.
d) Review all the online library resources on "plagiarism" via FRANCIS.

35) Of the following FirstSearch databases, the one containing journal articles available in full-text is:

a) Worldcat
b) Essay and General Literature Index
c) WilsonSelect Plus
d) Dissertation Abs
e) I am not familiar with any of these databases.

36) You need to locate a book review of the student summer reading selection *Nickel and Dimed* by Barbara Ehrenreich. An appropriate source to locate a review would be:

a) New York Times Index
b) Book Review Digest
c) Book Review Index
d) Proquest
e) All of the above.

37) You would like to present data collected from a series of lab experiments to your chemistry class. What strategy would be most effective?

a) Write-up your conclusions in a Word document and hand them in to your instructor.
b) Develop an internet webpage using Frontpage. Plot data using Excel and present it to your class within a Powerpoint presentation.
c) Present information to class orally, since visuals are too distracting.
d) I haven't worked with any of these applications enough to complete an assignment using them.

38) You visit the computer lab and discover someone has left a computer station without logging-out. You should:

a) Go to Start and Login as a new user.
b) Use the back button of their browser to see what Internet sites they've visited.
c) Sit down and work on your own assignment, being sure to save it to disk.
d) Send them an email message if it is open.

39) Why should I consider conference proceedings a useful aid to my senior research project dealing with hippotherapy?

a) Conference proceedings often present recent findings which can be valuable to research in a particular discipline.
b) Conference proceedings are only useful if you can obtain them from other schools; but unfortunately we can't.
c) Conference proceedings generally discuss information already researched in books, and so, are of little value.
d) I have never had to use conference proceedings for research.

40) You saved an image from a website you've visited and because it's related to your research topic, you decide to paste it into a class PowerPoint presentation you are preparing. What is your next step?

a) You need to request permission of the website owner to post the image.
b) You need to cite the original source of the image.
c) Since the image was obtained for free on the internet, there is no need to cite it; you only need to cite purchased items.
d) You need to complete both steps a) and b) above.
e) A determination cannot be made based solely on the information provided in this question.

APPENDIX D

INFORMATION LITERACY KNOWLEDGE POSTTEST

APPENDIX D: INFORMATION LITERACY KNOWLEDGE POSTTEST

Information Literacy Post-Test Questions

Name: _____

Gender: **Male / Female**
Race: **Afro-American, Asian, Caucasian, Hispanic, Native-American, Other.**

What is your major area of study? **[CHOOSE FROM LIST]**

Have you had Information Literacy instruction prior to this course? **Yes No**

Please indicate your status: **Freshman Sophomore Junior Senior**
Transfer Continuing Education

How do you rate your ability in using the following software applications? **(1 = low, 5 = high)**

Microsoft Word 1 2 3 4 5

Microsoft Excel 1 2 3 4 5

Microsoft PowerPoint 1 2 3 4 5

Microsoft FrontPage 1 2 3 4 5

What is your "comfort level" when beginning an academic research assignment?
(1 = low, lost, uncomfortable 5 = high, confident) 1 2 3 4 5

INSTRUCTIONS: This assessment is designed to track the development of your information literacy skills. Our hope is that by your senior year you will be able to answer all of these questions with little effort. The goal is to measure progress toward these competencies according to standards developed by the Association of College & Research Libraries. Please select one answer to each of the following questions. All information requested is intended for the purpose of statistical analysis only, and will be handled in a confidential manner.

1) A critical step in the research process is:

a) Consulting a full-text database.
b) Identifying alternative keywords related to your research topic.
c) Using the library's online catalog.
d) Starting your topic investigation using an Internet browser.

2) A scholarly journal is characterized by which of the following?

a) Colorful advertisements.
b) Presence of an abstract summarizing the article content.
c) Articles written by staff writers on a variety of subjects.
d) Limited use of graphs and chart data.

3) Which of the following items is considered a "primary source"?

a) A book such as the novel On The Road written by Jack Kerouac.
b) Books about the novel On The Road.
c) Journal articles written by Jack Kerouac concerning his novels.
d) A student dissertation on the works of Kerouac.

4) Your assignment is to "describe the effect of solar flares on the earth's atmosphere." Which of the following keyword examples would yield the best results in a database search?

a) solar and flar* and earth
b) sunspots and atmosphere
c) effects or atmosphere
d) solar and flares

5) Your assignment is to determine the proximity of two metropolitan airports to one another. Which of the following sources would be most helpful in determining this type of information?

a) directory
b) dictionary
c) atlas
d) periodical

6) Read the following paragraphs from the article titled *The Quake Makers* by Nicola Jones. Choose the answer that best represents this essay's thesis.

Earthquakes usually happen deep underground, where giant pieces of the Earth's rigid shell, called tectonic plates, rub against each other. Some plates slide past each other gently, but others get stuck, and the forces pressing on the plates build up. Eventually, those locked plates slip and shift in a sudden jolt of movement, sending out vibrations, or seismic waves, that cause the earth to shake. No one can yet predict exactly when and where earthquakes will happen or how big they'll be, despite decades of research. "More and more experts agree that prediction is impossible," said Valerio De Rubeis, a seismologist at the National Institute of Geophysics in Rome. That's why he's trying to figure out a way to prevent them instead by creating miniquakes.

a) Predicting earthquakes is impossible, but creating miniquakes may actually prevent future earthquakes from occuring.
b) Predicting earthquakes is a job for scientists, not for the rest of us, says De Rubeis.
c) No one can yet predict exactly when and where earthquakes will happen.
d) "An ounce of prevention is worth a pound of cure."

7) *Truncation* is a term used to describe special characters employed during a search which can accommodate language variations such as singular and plural forms of a word. Which of the following represent a search which correctly uses truncation?

a) puppy (or) cat
b) kitten and cats
c) puppies not kittens
d) cat* or kitten*

8) The topic you selected for your research paper is "organic food and nutrition". A database search using these keywords yields too many results. Which of the following answers would be your best strategy to identify a shorter list of useful articles?

a) Perform a search using "food and well-being" as keywords.
b) Choose keywords that are more specific to you topic.
c) Use the same keywords, but perform the search on the Internet.
d) Use "organic" and "food" as separate keywords and perform a search for each.

9) Stein, Edward. <u>Guilt; Theory and Therapy</u>. Philadelphia: Westminster Press, 1968. The citation listed above is appropriate for which of the following sources?

a) journal article
b) World Wide Web site
c) Book
d) personal interview

10) You are asked to write a position paper on a controversial issue. Which of the following approaches will allow you to best incorporate statistics which support your opinion on the topic?

a) Make only indirect references to statistics, since numbers speak for themselves.
b) Provide visual representations, such as pie-charts to represent complex data sets.
c) Ignore contradictory statistical evidence.
d) Show all statistics in various appendices located at the end of your paper.

11) Gopnik, Blake. *"Cultural Fabric; There's Nothing Patchwork About [These] Quilts…"* Washington, D.C.: Washington Post, Feb 19, 2003. p. C.01. The citation above is appropriate for a:

a) book
b) encyclopedia
c) newspaper article
d) World-Wide-Web site

12) Which of the following examples demonstrate correct punctuation using MLA style?

a) Hostetler says that Amish society is "defined by religion" (76).
b) Hostetler says that, Amish society is "defined by religion" (76).
c) Hostetler says that "Amish society is defined by religion."
d) Hostetler says that Amish society is "defined by religion." (76)

13) Of the following criteria, which is the most important in evaluating website content?

a) Browser configuration
b) authority of author
c) bandwidth
d) file size

14) You are asked to create a PowerPoint presentation for your class. Which of the following choices would *NOT* contribute to the quality of your presentation?

a) Brief, but well-organized sentence structure.
b) Extensive audio and visual animations intended to attract interest.
c) Good contrast between text and background color choices.
d) Print copies of handouts which will be available for students.

15) You are writing a research paper on the hazards of smoking and visit the website of the tobacco producer Phillip Morris. Which of the following criterion should you consider as most important?

a) location
b) bias
c) currency
d) related links

16) You are asked to present a persuasive speech to your classmates. Which of the following choices would *not* help your intention to change their views on your topic?

a) Spend a fair amount of time reviewing the history of your topic so that students will understand the issue.
b) Give a favorable first-impression by wearing clothing which is appropriate and in good taste.
c) Read your speech entirely from cards prepared beforehand.
d) Use good vocabulary and proper diction.

17) Read the following original book passage from *Bluebeard* written by Kurt Vonnegut:

"So—of all the people who know about my locked potato barn, the one who finds the mystery most intolerable is surely Circe Berman. She is after me all the time to tell her where the six keys are, and I tell her again that they are buried in a golden casket at the foot of Mount Ararat."

Now choose an appropriate example of paraphrasing the original content from the following choices:

a) Circe Berman is intrigued because the potato barn remains locked. When she asks, she is told that the keys to unlock it are buried in a foreign land (Vonnegut 51).
b) Circe Berman is intrigued because the potato barn remains locked. When she asks, she is told that the keys to unlock it are buried in a foreign land.
c) Circe Berman is after me all the time to tell her where the six keys are, and I tell her again that they are buried in a golden casket at the foot of Mount Ararat.
d) "six keys…are buried in a golden casket."

18) You are not sure of the correct format to use when citing a resource found on the World Wide Web in your research paper. Which of the following choices is your best course of action?

a) Copy the information into your paper without providing a citation to the original source, since it is not necessary to cite webpage content.
b) Refer to various style guides within "The Brief Handbook" text used in *Core 101* (which is also available at the library circulation desk) in order to cite the original source properly.
c) Simply enclose the borrowed text in quotation marks, thereby eliminating the need to cite the source.
d) Include a copyright symbol © in your text to clearly identify the borrowed material.

19) A writer who knowingly or unknowingly uses someone else's original idea without giving credit to the original author, is guilty of :

a) ambient prejudition
b) plagiarism
c) precognition
d) poetic license

20) If you collect images from the World Wide Web and compile them into a web site of your own which names you as the author, you have:

a) plagiarized
b) destroyed the intellectual content
c) preserved the intellectual content
d) infringed on the copyright law.

21) As required by your professor, you have obtained two books and three magazine articles as sources for your research paper. The appropriate next course of action would be to:

a) Briefly scan the materials and immediately begin writing your research paper.
b) Prepare your paper using only one or two of the sources.
c) Scan all your sources, disregarding the ones you feel do not provide enough information, while still naming them in your bibliography.
d) Carefully read through your sources and determine whether or not they satisfy your information needs, or if a revision of your search strategy is required.

22) Which two databases within FRANCIS should be consulted initially, to locate full-text articles on your research topic?

a) EZ Borrow and FirstSearch
b) Proquest and WilsonSelectPlus
c) Google and MDConsult
d) FirstSearch and Books in Print

23) You are required to locate peer-reviewed articles on a topic that was assigned to you in class. Where would you find this information?

a) popular magazines
b) encyclopedias
c) journals
d) newspapers

24) You are investigating the stockpiling of nuclear waste and its effect on man and the environment. Which of the following sources would present an overview of various sides of the issue?

a) FirstSearch – AGRICOLA database
b) FirstSearch – WilsonSelect Plus
c) Hoover's Online
d) CQ Researcher
e) I'm not sure which source is correct.

25) You are concerned with the controversy between a highway construction contractor and a wetlands preservation group in the eastern United States. Where might you turn, to get some accurate explanatory information on the current situation?

a) Your uncle Jerry lives in Maryland. This is a good time to call him and discuss his views on the subject.
b) Don your waders and visit the wetlands yourself.
c) Locate a newspaper article concerning "wetlands controversy" using the ProQuest database.
d) Visit the CQ Researcher database and locate an issue devoted entirely to the preservation of wetlands.
e) I have no idea where to begin.

26) Dr. Neeley asks you to read an article entitled, "Experiences of the Occult," which he has placed on reserve in the library. After reading it, you describe its content in a short written paper he has assigned. What is your obligation as you write the paper?

a) Even though you paraphrase the content you *must* cite the original work in your paper.
b) Because the paper is short, there is no need to cite the original source.
c) Check the ProQuest database for full-text availability of this particular article. You can then copy and paste it without having to cite the article.
d) If you don't plan to publish, you won't need to cite the article, especially if you re-phrase it in your own words.

27) After completing a search of the local FRANCIS online catalog and finding no books on your research topic, what can you do?

a) You understand that Worldcat is another large online database of books and decide to search there.
b) Wait until semester break and investigate at your home public library.
c) Visit Penn State campus library with one of your friends.
d) Use Proquest database for full-text journal articles and forget using any more books.

28) You need to compare unemployment rates on the local, state, and national level as part of your research. Using the U.S. Department of Labor website, you were able to locate the necessary information. What method will work best to present the information?

a) Place the unemployment figures directly into the text of your research paper.
b) Mention the trends in the unemployment rates, but state in your paper that the exact figures can be viewed at the U.S. Department of Labor website.
c) Create and insert a new table into your research paper that contains only the necessary unemployment rates but also acknowledges the origin of the information.
d) Copy all three tables directly from the website while noting that this is a class assignment.

29) You've been asked by Dr. Zhang to locate a criticism of one of Shakespeare's plays. What do you do next?

a) Use a keyword search in FRANCIS and look up the keywords "Plays-Criticism."
b) Consult the Shakespearian Criticism Series located via FRANCIS.
c) Obtain this item from the reserve collection located at the library's circulation desk.
d) Employ the Metacrawler search engine to conduct a literature search of the World Wide Web.

30) In what way does a "metasearch engine" differ from a search engine such as Google?

a) A meta-search engine maintains its own unique database of websites, where Google does not.
b) A meta-search engine processes several simultaneous searches using a variety of search engines, then eliminates duplicate hits.
c) Google can locate multimedia files where a metasearch engine cannot.
d) Metacrawler requires a much larger operating system than Google.
e) I am not familiar with this type of search engine.

31) I'm unfamiliar with "Traditional Church Celebrations in Mexico", a research topic assigned by my Spanish instructor. What search strategy should I employ?

a) Search "Mexico" as a keyword in FRANCIS.
b) Consult the topic index contained in the Encyclopedia of Religion available in the reference area.
c) Check the Proquest database for available full-text articles on "Church" and "Celebrations".
d) Use EZBorrow to obtain books on this topic from another academic library in Pennsylvania.
e) All of the above strategies may be used successfully.

32) Which one of the following software applications would be most appropriate for my presentation on "Battlefields of the Civil War"?

a) Excel
b) Word
c) PowerPoint
d) FrontPage
e) None of the above.

33) I'm interested in knowing whether the Saint Francis University Library subscribes to the periodical, "Pennsylvania Game News." What should I do?

a) Enter the name of the journal in Journal Finder to determine its location and format.
b) Ask your professor to change your topic.
c) Check the shelf on the second floor of the library to determine the holdings.
d) Complete an interlibrary loan request for the article you need.
e) I don't have a strategy developed yet. Right now, I'm not sure what to do.

34) Which of the following sources would be the most helpful in explaining a research concern such as "plagiarism"?

a) Look up a definition of "plagiarism" using Webster's dictionary.
b) Search the term "plagiarism" in Proquest.
c) Search the word "plagiarism" using Google.
d) Review the FRANCIS subject guide on "plagiarism."

35) Which of the following FirstSearch databases contains journal articles available in full-text?

a) Worldcat
b) Essay and General Literature Index
c) WilsonSelect Plus
d) Dissertation Abs
e) I am not familiar with any of these databases.

36) You need to locate a book review of the book *The Alchemist* by Paulo Coelho. The appropriate source to locate a review would be:

a) America History & Life database
b) Book Review Digest
c) Wall Street Journal newspaper
d) Chemical Abstracts
e) Use EZ Borrow to obtain a copy of the book itself.

37) You plan to present data collected from a series of lab experiments to your chemistry class. Which of the following strategies will be the most effective?

a) Write-up your conclusions in a Word document and hand them in to your instructor.
b) Develop an internet webpage using FrontPage.
c) Plot data using Excel and present it to your class within a PowerPoint presentation.
d) Present information to class orally, since visuals are just too distracting.
e) I haven't worked with any of these applications long enough to complete an assignment using them.

38) You visit the computer lab and discover someone has left their computer station without logging-out. You should:

a) Inquire if they've left the area and are not returning. If so, then log yourself in as a "new user".
b) Use the back button of their browser to see what Internet sites they've visited.
c) Sit down and work on your own assignment, being sure to save it to a floppy disk.
d) Continue working with their application as if you were there all along.

39) Why should I consider EZ Borrow a useful aid to my senior research project dealing with hippotherapy?

a) Using EZ Borrow, you can often locate additional research materials which can target very specific topics in a particular discipline.
b) EZ Borrow is only useful if you can travel to other schools in the area, but unfortunately I can't.
c) EZ Borrow generally finds information already available in our book collection.
d) I have never heard of EZ Borrow, nor have I used it.

40) You saved an image from a website you've visited because it's related to your research topic and now you've decided to paste it into a class PowerPoint presentation you are preparing. What is your next step?

a) You need to request permission of the website owner to include the image.
b) You need to cite the original source of the image.
c) Since the image was obtained for free on the internet, there is no need to cite it; you only need to cite purchased items.
d) You need to cite the original source and follow-up by requesting the permission of the website owner whenever possible.
e) A determination cannot be made based solely on the information provided in this question.

APPENDIX E

UPPER LEVEL INSTRUCTION SAMPLES

APPENDIX E: UPPER LEVEL INSTRUCTION SAMPLES

Ecological Information Literacy Components
Biology 203 – Ecology
Fall 2005

I. Outcome: Students will understand the difference between primary and secondary literature in ecology, and between scholarly and non-scholarly sources of ecological information.

Assignment/Activity:

a) Through WebCT, provide students with one ecological source that is non-scholarly and secondary, and with one source that is scholarly and primary (both on a similar topic), and have them read over both. Students will write down ten observations on similarities/differences between the two sources.
b) In class, students and instructor will discuss these differences.
c) For homework, students will view module on WebCT that discusses primary vs. secondary and scholarly vs. non-scholarly sources in ecology.
d) For homework, students will take a ten point quiz on WebCT to demonstrate that they understand these concepts.

Assessment: Participation in discussion and completion of quiz.

II. Outcome: Students will know where and how to access ecological literature through the Saint Francis University Library.

Assignment/Activity:

a) Demonstration/Discussion of library resources in class
b) Students will use Francis to locate five ecological research papers from five different journals on a given topic and discuss in class.

Assessment: Completion of assignment and participation in discussion.

III. Outcome: Students will understand how an ecological research paper (primary literature, peer-reviewed) is structured, and learn to evaluate an ecological research paper.

Assignment/Activity:

a) Provide students with an ecological research paper. In class, review/discuss how a research paper is structured (its format), who the intended audience is, and who typically authors ecological research papers. Discuss strategies for successfully comprehending ecological research papers.
b) Students will read the journal article and turn in a written evaluation. Instructions for the assignment will be provided on WebCT.
c) Students and instructor will discuss the assignment in class.

Assessment: Participation in discussion and written evaluation score (using a rubric).

APPENDIX E: UPPER LEVEL INSTRUCTION SAMPLES

Ecological Information Literacy Components
Biology 203 – Ecology
Fall 2005

IV. Outcome: Students will understand the importance of basic ecological research in solving current environmental problems by completing a PowerPoint presentation on the topic of biodiversity. Students will use their previously-learned ecological information literacy skills to complete the assignment successfully.

Assignment/Activity:

a) Students will select a topic related to biodiversity loss (focus on a particular region or a particular organism).
b) Students will develop a ten-minute class presentation that
    1. explains an environmental problem related to biodiversity
    2. explains how ecological research is being used to investigate the problem (the student will select one research paper related to the topic and integrate it into the presentation)

Assessment: A rubric will be used to evaluate the presentation—criteria include delivery, content, and appearance.

APPENDIX E: UPPER LEVEL INSTRUCTION SAMPLES

Ecological Information Literacy Quiz
Biology 203 – Ecology

1. The main distinction between primary and secondary sources is:
   a. primary sources are printed accounts of an event while secondary sources are verbal accounts of an event.
   b. primary sources contain accurate information while secondary sources do not.
   c. primary sources provide unedited words, images, or objects by persons directly involved in an event while secondary sources offer an analysis or restatement of an event.
   d. primary sources cannot be found in electronic form while secondary sources can.

2. Which of the following is not a primary source?
   a. A student's diary of his field biology trip to the Galapagos Islands
   b. A student's laboratory notes for ecology class
   c. Charles Darwin's account of his expedition to the Galapagos Islands in the book *On the Origin of Species*
   d. An encyclopedia article on the Galapagos Islands

3. Of the following, select the list which contains ONLY primary sources:
   a. newspaper article about butterfly migration, journal article reporting research about butterfly migration, interview with the entomologist doing research on butterfly migration
   b. picture of a butterfly, a preserved specimen of a butterfly, an article in Audubon Magazine about a butterfly
   c. your ecology textbook by Molles, your ecology professor, the Internet
   d. journal article reporting research on food preferences of butterflies, an expert who conducts research on the food preferences of butterflies, a preserved slide of the mouthparts of a butterfly

4. You are researching nutrient cycling in salt marshes. You have found an audio interview with the Director of the EPA on the *Living on Earth* online radio program in which he discusses measures that are being taken to preserve salt marshes. Is this interview a primary or secondary source? Why?
   a. Yes; the interview is a primary source because the head of the EPA is an expert on nutrient cycling in salt marshes.
   b. Yes, because interviews are eye witness accounts and therefore primary sources.
   c. No, because even though the director of the EPA is an expert on nutrient cycling in salt marshes, your topic is not on preservation of salt marshes.
   d. No, because the interview is online.

APPENDIX E: UPPER LEVEL INSTRUCTION SAMPLES

Ecological Information Literacy Quiz
Biology 203 – Ecology

5. Which of the following is most likely to be a primary source?
   a. Molles Jr., Manuel C. (2005). *Ecology Concepts and Applications.* New York: McGraw Hill.
   b. Adams, P.A. and J.F. Heath. 2005. Temperature regulation in the sphinx moth. *Celerio lineate. Nature* 201:20-22.
   c. Smith, John. (2005, June 8). Why new hunting restrictions are bad for the environment. *Mainline Newspaper*, pp. B1.
   d. Sander, Wesley. (2004, September/October). Jumping Frogs: Hopping Into Oblivion? *E: the Environmental Magazine* 15 (5), 11-12.

6. Which of the following is a characteristic of scholarly journals?
   a. They report on current events.
   b. Issues are usually published weekly.
   c. Articles include bibliographies or references.
   d. The intended audience is the general public.

7. In a scholarly journal, article illustrations
   a. are not included.
   b. include statistics, graphs, and photos to support the text.
   c. are linked to advertising.
   d. always include a photograph of the author(s).

8. You are reading an article in the journal *Ecology* on competition between songbirds. Of the following choices, the most likely author is:
   a. a staff writer for *National Geographic.*
   b. an amateur birdwatcher who takes pictures of songbirds.
   c. a university professor conducting research on songbirds.
   d. a reporter for *The Environmental News Network* website.

9. Which of the following would be considered a scholarly resource?
   a. Molles Jr., Manuel C. (2005). *Ecology Concepts and Applications.* New York: McGraw Hill.
   b. Burgett, S. (News reporter). (2005, April 25). *Wind energy and the local environment* [Television broadcast]. Johnstown: National Broadcasting Corporation.
   c. Smith, John. (2005, June 8). Why new hunting restrictions are bad for the environment. *Mainline Newspaper*, pp. B1.
   d. Sander, Wesley. (2004, September/October). Jumping Frogs: Hopping Into Oblivion? *E: the Environmental Magazine* 15 (5), 11-12.

10. In which of the following ecological resources would you most likely find an evidence-based research article?
   a. *The Journal of Animal Ecology*
   b. *Newsweek*
   c. *National Geographic*
   d. *Audubon* Magazine

APPENDIX E: UPPER LEVEL INSTRUCTION SAMPLES

Information Literacy Outcomes for Physical Therapy Research
Fall 2005

1. Describe and demonstrate comprehension regarding the development of research questions and how research questions are ultimately published in professional journals.
2. Discuss the difference between refereed and non-refereed journals and the possible implications for the reader/consumer.
3. Identify, discuss, apply, and demonstrate understanding of the contents of the various elements of a research article.
4. Use electronic databases to conduct a focused literature search.
5. Demonstrate the ability to access information and/or literature relevant to the field of physical therapy using a variety of sources including, but not limited to, the following: library, Internet, professional meetings, interviews, and databases.

Information Literacy Quiz for Physical Therapy Research
Primary vs. Secondary and Scholarly vs. Popular Resources

1. The main distinction between primary and secondary sources is

a. primary sources are printed accounts of an event while secondary sources are verbal accounts of an event.
b. primary sources contain accurate information while secondary sources do not.
c. primary sources provide unedited words, images, or objects by persons directly involved in an event while secondary sources offer an analysis or restatement of an event.
d. primary sources cannot be found in electronic form while secondary sources can.

2. Which of the following is NOT a primary source?

a. A student's journal of his clinical education experience in a holistic physical therapy practice
b. A student's laboratory notes for his health care systems class
c. EW Kellogg III's recounting of his personal dream healing experience in his article entitled *A Personal Experience in Lucid Dream Healing*
d. An encyclopedia article on New Age physical therapy practices

3. Of the following, select the list which contains ONLY primary sources:

a. newspaper article about plant therapy, journal article reporting research about plant therapy, an interview with the horticulturalist doing research on plant therapy
b. a picture of a patient's room containing many plants, a collection of plants, the American Floral Endowment's summary of the research article entitled *Does being around plants reduce people's perceptions of physical discomfort?*
c. your physical therapy textbook by Rothstein, your physical therapy professor, the Internet
d. a journal article reporting research on plants and physical discomfort, an expert who conducts research on plants and their effects on patients, a patient's personal account of pain reduction attributed to bringing plants into a clinical facility

4. You are conducting research on physical therapy management of chronic pelvic pain. You have found an audio interview with Susan Parker, PT on OBGYN.net's *Chronic Pelvic Pain Audio and Video Library* in which she discusses interventions she has successfully used with her patients who experienced chronic pelvic pain. Is this interview a primary or secondary source? Why?

a. The interview is a primary source because Ms. Parker actually treated patients using the techniques being studied.
b. The interview is a secondary source because Ms. Parker isn't the one who experienced the chronic pelvic pain.
c. The interview is a primary source because it is found in a library sponsored by the 5th World Congress on Controversies in Obstetrics, Gynecology, and Infertility.
d. The interview is a secondary source because it is found online.

Information Literacy Quiz for Physical Therapy
Primary vs. Secondary and Scholarly vs. Popular Resources

5. Which of the following is most likely to be a primary source?
a. Portney, Leslie and Watkins, Mary (2000). *Foundations of Clinical Research: Applications to Practice*. New Jersey: Prentice Hall.
b. Decoster, Laura C. 2005. The Effects of Hamstring Stretching on Range of Motion, *JOSPT* 35:6:377-387.
c. Smith, John. (2005, June 8). Why local physical therapy practices are thriving. *Mainline Newspaper*, pp. B7.
d. Olsen, Diana. (2004, September/October). Young and Vulnerable. *Advance for Physical Therapists* 5 (3), 45-46.

6. Which of the following is a characteristic of scholarly journals?
a. They report on current events.
b. Issues are usually published weekly.
c. Articles include bibliographies or references.
d. The intended audience is the general public.

7. In a scholarly journal, article illustrations
a. are not included.
b. include statistics, graphs, and photos to support the text.
c. are linked to advertising.
d. always include a photograph of the author(s).

8. You are reading an article in the *Strength and Conditioning Journal* on plyometrics. Of the following choices, the most likely author is:
a. a staff writer for *Running* magazine.
b. an amateur weight lifter preparing for the Olympics.
c. a university professor conducting research on plyometrics.
d. a reporter for *The Advance for Physical Therapists and Physical Therapist Assistants* website.

9. Which of the following would be considered a scholarly resource?
a. Portney, Leslie and Watkins, Mary (2000). *Foundations of Clinical Research: Applications to Practice*. New Jersey: Prentice Hall.
b. Burgett, S. (News reporter). (2005, April 25). *Women's Health Issues and Physical Therapy* [Television broadcast]. Johnstown: National Broadcasting Corporation.
c. Smith, John. (2005, June 8). Why local physical therapy practices are thriving. *Mainline Newspaper*, pp. B7.
d. Olsen, Diana. (2004, September/October). Young and Vulnerable. *Advance for Physical Therapists* 5 (3), 45-46.

10. In which of the following physical therapy resources would you most likely find an evidence-based research article?
a. *JOSPT*
b. *Muscle and Fitness*
c. *Scientific American*
d. *Prevention* Magazine

APPENDIX E: UPPER LEVEL INSTRUCTION SAMPLES

English 407
Fall 2005
Information Literacy Outcomes

Research

- Students will identify a topic and develop a thesis statement.
- Students will identify a variety of appropriate scholarly resources which they will use to conduct research to support their thesis.
- Students will select discipline specific keywords to use in their research.
- Students will gather necessary information to correctly cite resources using MLA format.

APPENDIX E: UPPER LEVEL INSTRUCTION SAMPLES

English 407
Information Literacy Quiz

1. One characteristic of a scholarly journal is
    a. colorful advertisements
    b. presence of an abstract summarizing the article content
    c. articles written by staff writers on a variety of subjects
    d. available at the local newsstand

2. You are not sure of the correct format to use when citing a resource found on the World Wide Web in your research paper. Which of the following choices is your best course of action?
    a. Copy the information into your paper without providing a citation to the original source, since it is not necessary to cite webpage content.
    b. Refer to the *MLA Style Manual* (which is also available at the library circulation desk) in order to cite the original source properly.
    c. Simply enclose the borrowed text in quotation marks, thereby eliminating the need to cite the source.
    d. Include a copyright symbol © in your text to clearly identify the borrowed material.

3. Why should I consider EZ Borrow a useful aid to my senior research project dealing with hippotherapy?
    a. Using EZ Borrow, I can often locate additional research materials that target very specific topics in a particular discipline.
    b. EZ Borrow is only useful if I can travel to other schools in the area, but unfortunately I can't.
    c. EZ Borrow generally finds information already available in the Saint Francis Library book collection.
    d. I have never heard of EZ Borrow, nor have I used it.

4. A critical step in the research process is
    a. Consulting a full-text database.
    b. Identifying alternative keywords related to your research topic.
    c. Using the library's online catalog.
    d. Starting your topic investigation using an Internet browser.

5. You are required to locate peer-reviewed articles on a topic that was assigned to you in class. Where would you find this information?
    a. popular magazines
    b. encyclopedias
    c. journals
    d. newspapers

6. Which of the following examples demonstrate correct punctuation using MLA style?
    a. Hostetler says that Amish society is "defined by religion" (76).
    b. Hostetler says that, Amish society is "defined by religion" (76).
    c. Hostetler says that "Amish society is defined by religion."
    d. Hostetler says that Amish society is "defined by religion." (76)

APPENDIX E: UPPER LEVEL INSTRUCTION SAMPLES

English 407
Information Literacy Quiz

7. Gopnik, Blake. “Cultural Fabric; There’s Nothing Patchwork About [These] Quilts…” *Washington Post* 19 Feb. 2003\: C01. This citation is appropriate for a
    a. book
    b. encyclopedia
    c. newspaper article
    d. World Wide Web site

8. Read the following original book passage from *Bluebeard* written by Kurt Vonnegut.

    "So—of all the people who know about my locked potato barn, the one who finds the mystery most intolerable is surely Circe Berman. She is after me all the time to tell her where the six keys are, and I tell her again that they are buried in a golden casket at the foot of Mount Ararat"(51)

    Now choose an appropriate example of paraphrasing the original content from the following choices:
    a. Circe Berman is intrigued because the potato barn remains locked. When she asks, she is told that the keys to unlock it are buried in a foreign land (Vonnegut 51).
    b. Circe Berman is intrigued because the potato barn remains locked. When she asks, she is told that the keys to unlock it are buried in a foreign land.
    c. Circe Berman is after me all the time to tell her where the six keys are, and I tell her again that they are buried in a golden casket at the foot of Mount Ararat.
    d. “six keys…are buried in a golden casket.”

9. Which of the following is the correct citation format for a republished book:
    a. Atwood, Margaret. Surfacing. New York: Signet, 1972.
    b. Atwood, Margaret. Surfacing. 2nd ed. New York: Signet, 1980.
    c. Atwood, Margaret. Surfacing. 1972. New York: Signet, 1980.
    d. None of the above.

10. When material is alphabetized for a Works Cited page

    a. The Awakening would come after Native Son.
    b. The Awakening would come after A Farewell to Arms.
    c. The Awakening would come after Jennie Gehardt.
    d. All of the above.
    e. None of the above.

APPENDIX E: UPPER LEVEL INSTRUCTION SAMPLES

Sociology 400: Applied Sociology
Information Literacy Course Outcomes/Assessment

(1) Students will understand the difference between scholarly and non-scholarly sources of sociological information. (/in-class assignment & quiz)
(2) Students will learn where and how to access sociological literature and data through the use of the SFU library and its resources. (/in-class workshop & quiz)
(3) Students will learn how to brainstorm research ideas through the use of information technology. (/in-class workshop and quiz)
(4) Students will learn how to map out their concepts for their research projects. (/in class workshop & quiz)
(5) Students will learn the process/steps for writing a sociological research paper, including writing an Annotated Bibliography and a Literature Review. (/research paper)
(6) Students will learn about plagiarism and other ethical issues in the research/writing process. (/tutorial & quiz)

APPENDIX E: UPPER LEVEL INSTRUCTION SAMPLES

Sociology 400: Applied Sociology
Information Literacy Quiz

1. You are reading an article in the journal *Affilia* on parenting education for low-income mothers. Of the following choices, the most likely author is:
    a. a staff writer for *Parenting Magazine*.
    b. a volunteer worker from "Mom's House."
    c. a trained sociologist conducting research on parenting education for low-income mothers.
    d. a reporter for *Dateline*.

2. In a scholarly journal, article illustrations
    a. Are not included.
    b. Include statistics, graphs, and photos to support the text.
    c. Are linked to advertising.
    d. Always include a photograph of the author(s).

3. In which of the following sociological resources would you most likely find an evidence-based research article?
    a. The American Journal of Sociology
    b. Newsweek
    c. Prevention Magazine
    d. Sciences Digest

4. A concept map is
    a. An outline of the main points of a research paper.
    b. A visual way to represent information and interrelationships.
    c. A list of keywords, their alternate forms, and their synonyms.

5. Concept maps assist in
    a. Identifying keywords related to your topic.
    b. Identify relationships between ideas.
    c. Can be used to develop search strategies by combining terms.
    d. All of the above

6. Which of the following is not a primary source?
    a. A student's diary of his observations on a field trip to a juvenile detention facility
    b. A student's notes from an interview with a client in a juvenile detention facility
    c. Steve Liss's account of his observations of juvenile detention facilities in the book *No Place for Children*
    d. An encyclopedia article on the juvenile detention facilities

APPENDIX E: UPPER LEVEL INSTRUCTION SAMPLES

Information Literacy Quiz
Sociology 400: Applied Sociology

7. Of the following, select the list which contains ONLY primary sources:
    a. newspaper article about bullying in private schools, journal article reporting research about bullying in private schools, interview with the sociologist doing research on bullying in private schools
    b. picture of a bully, a person who has experienced being bullied, an article in Parenting Magazine about a bullying
    c. your sociology textbook, your sociology professor, the Internet
    d. journal article reporting research on bullying in private schools, an expert who conducts research on bullying in private schools, data from psychological tests conducted through counseling of bullies in private schools

8. The main distinction between primary and secondary sources is
    a. Primary sources are printed accounts of an event while secondary sources are verbal accounts of an event.
    b. Primary sources contain accurate information while secondary sources do not.
    c. Primary sources provide unedited words, images, or objects by persons directly involved in an event while secondary sources offer an analysis or restatement of an event.
    d. Primary sources cannot be found in electronic form while secondary sources can.

9. You need to compare unemployment rates on the local, state, and national level as part of your research. Using the U.S. Department of Labor website, you were able to locate the necessary information. What method will work best to present the information?

    a. Place the unemployment figures directly into the text of your research paper.
    b. Mention the trends in the unemployment rates, but state in your paper that the exact figures can be viewed at the U.S. Department of Labor website.
    c. Create and insert a new table into your research paper that contains only the necessary unemployment rates but also acknowledges the origin of the information.
    d. Copy all three tables directly from the website while noting that this is a class assignment.

10. You are writing a research paper on the hazards of smoking and visit the website of the tobacco producer Philip Morris. Which of the following criterion should you consider as most important?

    a. location
    b. bias
    c. photographs
    d. related links

APPENDIX F

INFORMATION LITERACY JUNIOR RETEST

APPENDIX F: INFORMATION LITERACY JUNIOR RETEST

Information Literacy Knowledge Junior Retest
Spring 2006

1. You are investigating the stockpiling of nuclear waste and its effects on man and the environment. Which of the following sources would present an overview of various sides of the issue?
    a. FirstSearch™ – AGRICOLA database
    b. FirstSearch™ – WilsonSelect Plus
    c. Hoover's Online
    d. CQ Researcher
    e. I don't know the answer

2. You've been asked by Dr. Zhang to locate a criticism of one of Shakespeare's plays. What do you do next?
    a. Use a keyword search in FRANCIS and look up the keywords "Plays-Criticism."
    b. Consult the Shakespearian Criticism Series located via FRANCIS.
    c. Obtain this item from the reserve collection located at the library's circulation desk.
    d. Employ the Metacrawler search engine to conduct a literature search of the World Wide Web.

3. Which of the following FirstSearch™ databases contains journal articles available in full-text?
    a. Worldcat
    b. Essay and General Literature Index
    c. WilsonSelect Plus
    d. Dissertation Abstracts
    e. I am not familiar with these databases.

4. Which of the following software applications would be most appropriate for my presentation titled "Battlefields of the Civil War?"
    a. Excel
    b. Word
    c. PowerPoint
    d. FrontPage
    e. None of the above

5. Which of the following examples demonstrate correct punctuation using MLA style?
    a. Hostetler says that Amish society is "defined by religion" (76).
    b. Hostetler says that, Amish society is "defined by religion" (76).
    c. Hostetler says that Amish society is "defined by religion."
    d. Hostetler says that, Amish society is "defined by religion." (76)

APPENDIX F: INFORMATION LITERACY JUNIOR RETEST

Information Literacy Knowledge Junior Retest
Spring 2006

6. Your assignment is to determine the proximity of two metropolitan airports to one another. Which of the following sources would be most helpful in determining this type of information?
    a. directory
    b. dictionary
    c. atlas
    d. periodical

7. You saved an image from a website you've visited because it's related to your research topic and now you've decided to paste it into a class PowerPoint™ presentation you are preparing. What is your next step?
    a. You need to request permission from the website owner to include the image.
    b. For educational applications such as this, you need only to cite the original source of the image.
    c. Since the image was obtained for free on the Internet, there is no need to cite it; you need only to cite purchased items.
    d. A determination cannot be made based solely on the information provided here.

8. You are asked to write a position paper on a controversial issue. Which of the following approaches will allow you to best incorporate statistics to support your opinion on the topic you choose?
    a. Make only indirect reference to statistics since numbers speak for themselves.
    b. Provide visual representations, such as pie-charts, to represent complex data sets.
    c. Ignore contradictory statistical evidence.
    d. Show all statistics in various appendices located at the end of the paper.

9. One characteristic of a scholarly journal is:
    a. colorful advertisements
    b. presence of an abstract summarizing the article content
    c. articles written by staff writers on a variety of subjects
    d. available at the local newsstand

10. You are not sure of the correct formula to use when citing a resource found on the World Wide Web in your research paper. Which of the following choices is your best course of action?
    a. Copy the information into your paper without providing a citation to the original source, since it is not necessary to cite webpage content.
    b. Refer to various style guides within *The Brief Handbook* text used in *CORE 101* (which is also available at the library circulation desk) in order to cite the original source properly
    c. Simply enclose the borrowed text in quotation marks, thereby eliminating the need to cite the source.
    d. Include a copyright symbol © in your text to clearly identify the borrowed material.