THE EFFECTS OF PRE-REQUISITE LIBRARY RESEARCH INSTRUCTION ON THE INFORMATION SEEKING KNOWLEDGE AND BEHAVIOR OF COMMUNITY COLLEGE STUDENTS IN AN INTRODUCTORY NURSING COURSE

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by

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The undersigned, appointed by the dean of the Graduate School, have examined the dissertation entitled

THE EFFECTS OF PRE-REQUISITE LIBRARY RESEARCH INSTRUCTION ON THE INFORMATION SEEKING KNOWLEDGE AND BEHAVIOR OF COMMUNITY COLLEGE STUDENTS IN AN INTRODUCTORY NURSING COURSE

presented by Katherine E. Smith,

a candidate for the degree of doctor of philosophy

and hereby certify that, in their opinion, it is worthy of acceptance.

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DEDICATION

I dedicate my dissertation work to my family and friends. I especially thank my husband, Kenneth Smith, and my parents, O. Clifford and Charlene Boyer for their steadfast love and support, as well as my son Augustin, for his understanding and patience while Mommy worked on her "big homework." I thank my brother, Thomas Dobson, and my sister, Julia Dobson, for their faith in me. I will always appreciate the encouragement of my friends, especially that of my Library faculty colleagues, Damaris Schmitt, Rebecca Helbling, and Janice Hovis, who provided ongoing inspiration and assistance, as well as reality checks. I also thank Karla Seddon, Writing Specialist who provided patient proofreading, and Dr. Gail Heyne Hafer, Business and Economics professor, who reviewed the quantitative data. I am also grateful to the Reverend Father Abraham Arganiosa for his spiritual support. Finally, I want to thank God and the intercession of our Mother Mary and of the Saints. Thank you all—without your support and your belief in me, this dissertation would never have been accomplished.

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ABSTRACT

The nursing profession is evolving from basing patient care on tradition and expert opinion to emphasizing evidence based practice. Literature suggests that nurses do not have the information literacy skills required for evidence based practice, and that they have neither adequate instruction nor the experience needed to effectively, efficiently, and ethically find the information that they need. To help meet this need, this dissertation examines the effects of a pre-requisite information literacy credit course on the information seeking behavior of community college students in an introductory nursing course. I used a convergent parallel designed mixed-methods research approach, employing both a knowledge based assessment (n = 153) and a series of interviews/focus groups (n= 16) to test the hypothesis and sub-hypotheses. Students' exposure to the library (using library databases, receiving assistance from a reference librarian, or attending a "one-shot" library instruction session) was also measured. Using the Chi-square test for association, a statistically significant relationship was found between the correct answers on the knowledge based assessment and the completion of the course: X^2 (3, N = 153) = 19.03, $p < .00$; suggesting that students who completed LIB 101 performed significantly better on the knowledge based assessment than the students who did not complete LIB 101. A low, significant, and positive relationship was found between the completion of the course and the information literacy score, $r_{pb} = .26$, $p < .01$ using Point-Biserial correlation. Regression Analysis provided evidence that the library course was a significant predictor of the information literacy score, $t(150) = 2.12$, $p < .05$. Eleven themes supporting the quantitative study emerged from the interviews/focus

groups. Although the research supported the main hypothesis, there is much room for further study—not only within the confines of the effect of such a course on nursing students, but also the effect of information literacy instruction on both student and practicing nurses. The future of nursing relies upon evidence based practice, and, ultimately, evidence based practice relies on information literate nurses.

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Chapter One:

Introduction

The society of the twenty-first century is heavily dependent upon information. Individuals are continuously confronted by technological advancement which only serves to aid in the proliferation of information in their academic studies, in their occupations/workplaces, and even in their day-to-day personal lives. The sheer overabundance of information in and of itself does not allow for a more informed society: information may be inaccurate, misleading, biased, obsolete, or otherwise *bad.* Information literacy, the "ability to know when there is a need for information, to be able to identify, locate, evaluate, and effectively use that information for the issue or problem at hand" (National Forum on Information Literacy [NFIL], n.d), provides learners with the knowledge and experience necessary for self-directed inquiry and for learning from reliable content—regardless of the level, the subject matter, or the environment of the information need. The NFIL further describes information literacy as the "*key* competency" for personal, academic, and occupational effectiveness and success (NFIL, n.d.). One such occupation which increasingly relies on the ever-growing body of information is nursing. This dissertation will examine the effects of a pre-requisite

information literacy credit course on the information seeking behavior of community college students in an introductory nursing course.

Definitions of Terms

Throughout this study, several terms are used which may have varied meanings. In some cases, basic definitions are provided below while a more substantial exploration of the topic will be included in this chapter or in Chapter 2: Literature Review.

Boolean Operators: The basic Boolean operators are AND, OR, and NOT. AND connects terms and directs a keyword search to only produce items with both terms in the item record or description. OR directs a keyword search to produce items with either term or any of a group of terms. NOT directs a keyword search to produce records with the first term, but only when they do not include the second term. For example: Dog AND Cat will only find results with both terms in the descriptions. Dog OR Cat will find results with either or both terms in the descriptions. Dog NOT Cat will only find results that include the term Dog, but exclude those results that include both Dog and Cat.

Catalog: A library catalog is (usually) a searchable online inventory of a library's holdings based upon records—or descriptions—of each item.

Closed Access (Resources): Online resources which are restricted. Some, such as library databases, provide users access onsite via recognized IP addresses and remotely by

username/password login. This is as opposed to Open Access (Resources).

Database: While a database is simply a searchable electronic collection of information, for the purposes of the dissertation, database (or library database) denotes a Closed Access online collection of information to which a library subscribes to provide access to its users. Remote access is usually available, but requires users to input a password or other permission code. Items in databases are retrieved via searches which may search the records (descriptions) of items or the full-text of items (when available).

Evidence Based Practice (EBP): Refers to medical care based upon not only the knowledge/experience of the practitioner and the needs of individual patient, but also the best practices substantiated by current research. Evidence Based Practice will be further discussed and explored within the dissertation.

Information Literacy: The ability to efficiently, effectively, and ethically find, access, and use information. Information Literacy will be further discussed and explored within the dissertation.

Keyword Search: A keyword search is the most flexible basic search function in a library catalog or database. A keyword search can be manipulated to include Boolean operators which can narrow and/or broaden search terms. This is opposed to other basic search

functions—Title, Author, and Subject—which require specific language and order of terms.

LibGuide: A content management system produced by Springshare used by libraries to easily create subject web pages, to administer surveys and assessments, and to teach one-shots and other instructional sessions. The assessment administered as part of the dissertation research was created and hosted via the LibGuides survey/test instrument.

Nested Search: A sophisticated keyword search incorporating multiple Boolean operators and distribution logic. For example, a basic Boolean search for a research project on heroin use in teenagers might be: heroin AND teenagers. A nested search might be: heroin AND (teenagers OR adolescents).

One-shot: A library instruction session taught by a librarian during a regularly held session for a subject discipline course. One-shots maybe held during part of a class session or may meet several times during the course of a semester. These are usually focused on a library instruction topic rather than merely a tour or orientation to the library facility.

Open Access (Resources): Online resources which are freely available, meaning that one can click on a link or type in a URL and access the resource without any permission

(such as a password, recognized IP address, etc.). This is as opposed to Closed Access (Resources).

Current State and Outlook in Nursing

Increase in nursing information. Before the popular adoption of the internet, Verhey estimated that the amount of nursing information "doubles every 5 years" (1999, 252); and, within the last decade, Smith and Hazelton referred to the "rapid expansion in the number of nursing journals published, both regionally and internationally" (2008). While the number of nursing citations may not be doubling every five years, there is evidence that there has been a continual and substantial increase. For example, *MEDLINE*, a government bibliographic database from the U.S. National Library of Medicine (NLM), included over 22 million life sciences and biomedicine journal citations as of May 2015 (NLM, 2015a). The *MEDLINE* collection increased by an average of 416,022 citations each government fiscal year between 1995 and 1999; an average of 578,861 each year between 2000 and 2010, and an average of 729,803 each year from 2010 through 2013 (NLM, 2014). While the *MEDLINE* collection has not doubled every five years as suggested by Verhey's 1999 estimation, it has steadily approached doubling over a ten year span, having included 12,421,396 citations in 2004 (NLM, n.d.) and 22,376,811 (NLM, 2015b) citations a decade later.

Of course, *MEDLINE* includes only citations from scholarly literature. These numbers do not reflect nursing related websites and social media, such as blogs. Blogs are growing in number "exponentially" and in importance for health related information

for both patients and healthcare providers (Watson, 2012, 215). Watson suggested that those in health related occupations should "harness the informational, educational, networking, and supportive power of blogs" and "understand how to access and use blogs for professional use" (Watson, 2012, 215). Health and nursing related blogs, like other blogs, range in seriousness, credibility and usability; and, they can easily be found via open web search engines. Popular nursing blogs that I found in the top results list from various searches (such as "humorous nursing blogs," "top nursing blogs," and "best nursing blogs," among others) included:

- *Off the Charts*, hosted by the American Journal of Nursing [AJN] (AJN, n.d.) (referred to by Watson, 2012, 216)
- *Nursing Informatics* hosted by the Healthcare Information and Management Systems Society [HIMSS] (HIMSS, n.d.)
- *Innovative Nurse*, a personal blog by Kevin Ross, BSN, RN, and co-host of the RN.FM online radio show (Ross, n.d.)
- *The Nerdy Nurse*, a personal blog by Brittney Wilson, BSN, RN (Wilson, n.d.), who won the 2014 AJN Book Award for a book based on the blog, *The Nerdy Nurse's Guide to Technology* ("Book of the Year," 2015) (referred to by Watson, 2012, 216).
- *Nurse Eye Roll: Humor, Honesty, Nursey Shenanigans*, a personal blog by Kati Kleber, BSN, RN. Kleber has written two books, one for nurses—*Becoming Nursey: From Code Blues to Code Browns, How to Care for Your Patients and Yourself* published in 2014—and one for family/caregivers, *Admit One: What You*

Must Know When Going to the Hospital, But No One Actually Tells You published in 2016 (Kleber, n.d.; "A Bold Voice," 2015).

- NurseBuff: Nursing Humor and Lifestyle Blog, a personal blog by an unidentified "registered nurse" with which "stressed out nurses can relax, connect with other nurses from around the world, and simply have a great time" (NurseBuff, n.d.).

If the number of blog posts and other social media content related to the nursing profession is considered, Verhey's estimation of nursing information doubling every 5 years may be too conservative.

Increase in number of nurses and in number of nurses needed. Explosions in growth related to the nursing profession are not limited to the literature. Nursing, as a career, is growing; but, there remains a national shortage (American Nurses Association [ANA], 2013). Although the number of nurses nationwide continues to grow, those numbers cannot meet the steadily increasing demand. The number of registered nurses (RNs) employed in the United States rose from just over 2.5 million in 2010 (U.S. Department of Labor, Bureau of Labor Statistics [BLS] 2012) to over 2.7 million in 2014; the BLS predicted that the total number of RNs would increase 19% from 2012 to 2022 (2014). Despite the predicted increase, nursing organizations, such as the ANA, believe that there will still be a shortage of qualified nurses because: (1) 50% of the "nursing workforce" will soon be eligible for retirement, (2) aging demographics [with an assumed greater need for nursing care], and (3) health care reforms, such as the 2010 Affordable Care Act (to be discussed later), have the potential to impact healthcare (ANA, 2013).

On September 4, 2014, the ANA celebrated the 50th anniversary of the Nurse Training Act by publishing recommendations to the federal government regarding "federal funding, nursing education, and hiring practices" to encourage more people to enter the nursing profession. Specifically, the ANA called for "increased investment in nursing education and preparation" to not only meet the "dire need for one million new nurses by 2020" but to also prepare well-trained nurses (ANA, 2014). In response, Rep. Lois Capps (D-CA) introduced "Title VIII Nursing Workforce Reauthorization Act of 2015" in June of 2015 to extend and to expand education nursing grants. The bill was referred back to the House Committee on Energy and Commerce from the Health subcommittee in September, 2016, where it currently awaits amendment by voice vote. (H.R. 2713, 2015; H.R. 2713, 2016).

Ferguson's Career Guidance Center (FCGC), an online career research database providing job and industry profiles as well as other career-based information, concurs with the ANA and the BLS, stating that while the "employment prospects for RNs are excellent" ("Registered Nurses," 2015), the shortage of nurses will continue as nurses leave the profession due to "unsatisfactory working conditions"— such as mandatory overtime and understaffing directly due to the shortage—or to retirement. The FCGC predicts that the shortage will be exacerbated as improved technology increases available treatment options and as nurse practitioners in care centers absorb functions and responsibilities previously only held by medical doctors in private offices and hospitals ("Registered Nurses," 2015).

Affordable Care Act. A recent and continuing game-changer for the nursing profession has been the Affordable Care Act. While contentious debate regarding the legislation continues into 2016 political campaigns (Andrews & Kaplan, 2015), the United States, after years of unsuccessful efforts at health care reform, enacted the first comprehensive health care reform since the 1960's passage of Medicare and Medicaid. Originally introduced in September, 2009 by Representative Charles Rangel of the House of Representatives Ways and Means Committee as H.R. 3590, what became known as the Affordable Care Act (ACA) was signed into law on March 23, 2010 as the Patient Protection and Affordable Care Act, amended by the HealthCare and Education Reconciliation Act days later on March 30 (Ballard, 2011; Lathop & Hodnicki, 2014; "Patient Protection," 2010, "Health Care and Reconciliation, 2010), and upheld by the Supreme Court on June 28, 2012 ("National Federation," 2012). Although the ACA did not create a single-payer national health insurance or provide for health insurance as a human right for all United States citizens, it did provide for the goals of increasing access to health insurance, and concomitantly increasing access to preventive medicine:

- Insurance companies cannot drop coverage when the insured become sick or injured.
- Pre-existing conditions will not preclude insurance coverage.
- Expensive care will not put the insured at risk: lifetime caps are prohibited and annual caps are limited.
- The insured will have (increased) rights to appeal coverage rejection.
- Adult children (up to age 26) are coverable by parental/guardian plans.

- The insured will have (increased) access to preventable care services with no copay.
- The insured will have (increased) access to emergency services and certain covered emergency services must be covered regardless if the service was provided in or out of network.
- The insured will have an increased pool of primary care providers from which to choose, including nurse practitioners.

Ultimately, it provided for increased access to health insurance, preventive health services, and primary care providers (Ballard, 2011; Lathop & Hodnicki, 2014; "Patient Protection," 2010, "Health Care and Reconciliation, 2010).

The provisions regarding preventative and primary care have greatly increased the need for such care. The Congressional Budget Office (CBO) and the staff of the Joint Committee on Taxation (JCT) estimated that due to the ACA, beginning by 2016, between "20 million and 23 million people will receive coverage through the new insurance exchanges" (CBO, 2012). Hofer, Abraham, and Moscovice estimated that "between 15.07 million and 24.26 million" of those newly insured individuals will begin to seek primary and preventive care by 2019, requiring an increase in primary care providers (2011). A Henry J. Kaiser Family Foundation survey suggested that of those newly insured Americans, over a third would have not had a physical in the two years prior to coverage. The survey also provided support that the newly insured will not only have poorer health than those who have had ongoing health insurance, but that they will also have had fewer conditions diagnosed, much less treated (2011). Thus, as the

marginalized who have been without insurance become insured, they are likely to need more frequent and more specialized care—and, consequently, more access to providers.

Expanded role of nurses in American health care. The ACA alone has certainly increased the need for medical services in the United States. Moreover, the aging of the American population also has heightened the demand for medical care. In 2012, the U.S. Health Resources and Services Administration estimated that there were 5,860 designated Primary Care Health Professional Shortage Areas where individuals do not and cannot obtain primary care services due to provider shortages (Lathop & Hodnicki, 2014). By 2014, the estimate was updated to "approximately 6,100" (HRSA). To meet the growing demand, American health care across the nursing spectrum must—and is—changing. The role and responsibilities of nurses, whether those of an RN or those of a doctoral level nurse, have expanded. Lathop & Hodnicki discussed nurses' new roles as "full partners with physicians and other healthcare professionals" in the delivery of primary care services; and, they advocated for a growing role of "Advanced Practice Registered Nurses (APRNs) who hold the Doctor of Nursing Practice (DNP) degree" (2014). The National Governor's Association similarly recommended an increased use of nurse practitioners (2012).

Evidence based practice. The growth in the number of RNs, the shift from doctor to nurse practitioner as primary care giver, and the increased patient care responsibilities of nurses parallels the evolution of the practice of nursing from one emphasizing tradition and expert opinion to one where "clinical decisions" are made based upon "best research evidence coordinated with clinical expertise and patient values

and preferences" ("Evidence-Based Practice," 2010). The evidence based practice (EBP) outlines four stages:

1. Converting clinical problems into answerable questions involves formulating either general (background) or care-specific (foreground) questions, such as the following: Background question – What is the effect of tobacco smoking on the circulatory system? Foreground question – Does clinician counseling result in a higher rate of smoking cessation among smokers in primary care practice than written materials?
2. Locating best evidence with maximum efficiency involves information management skills including, especially, the use of electronic databases
3. Critically appraising evidence for its validity, importance, and usefulness involves application of specific criteria to determine the methodological rigor, significance, and generalizability of research findings.
4. Integrating this appraisal with clinical expertise and patient values involves considering how research-based best evidence corresponds to clinicians' prior experiences and unique knowledge of both the patient and the situation. ("Evidence-Based Practice," 2010).

Steps 2 and 3 parallel the concepts of information literacy, which will be discussed later in the chapter.

The nursing profession and its stakeholders have stressed the growing importance of evidence based practice due to "its potential to effectively handle clinical issues and provide better patient care" (Majid et al., 2011, 229) and its resulting increases in quality

of care and decreases in cost. As nurses become more responsible for patient care, they must rely more heavily on EBP and on medical literature. However, research into the information behavior and use of working nurses, as well as nursing students, suggested that a majority of nurses do not understand the concept of, much less use, EBP (Pagoto et al., 2007; Pravikoff, Tanner, & Pierce, 2005). Other studies (discussed later), provided evidence that nurses need stronger information literacy skills; the American Association of Colleges of Nursing [AACN] refers to "information literacy" as essential (2008). However, there is no set curriculum for information literacy in nursing programs. The Institute of Medicine [IOM] recognized the need for training in evidence based practice across healthcare professions [medical doctors, nurses, and pharmacists] (2009). The dissertation research examines the results of such training via an information literacy college credit course on student nurses.

Information Literacy

Defining and analyzing information literacy. Although what is commonly referred to as 'information literacy' has been given various labels throughout its history, librarians have been instructing students how to find and use information since the late nineteenth century. Some of the labels have included: information literacy, information competency, library instruction, the research process, and bibliographic instruction.

Paul Zurkowski (1974) seems to have been the first person to write about information literacy, using the term "information literates" as "hav[ing] learned techniques and skills for utilizing the wide range of information tools as well as primary

sources in molding information solutions to their problems" (6). Zurkowski estimated that "perhaps one-sixth" of the people of the United States would qualify as having such skills (1974, 7). The larger portion of the population, Zurkowski stated, "while literate in the sense that they can read and write, do not have a measure for the value of information, do not have an ability to mold information to their needs, and realistically must be considered to be information illiterates (1974, 6). Since then, the definition of information literacy has expanded and now includes critical thinking, the use of technology, and the ethical and responsible use of information, (Guskin, 2007, xi; Hardesty, Schmitt, & Tucker, 1986, 35). Although there are other existing definitions, standards, and measurements of information literacy, such as the Big 6/Super 3 developed mainly for elementary and high school students (Eisenberg, Berkowitz, Darrow, & Spitzer, 2000; Eisenberg, Berkowitz**,** Jansen, & Little**,** 1999; Needham, 2002; Robinson, 2008) for example, this research will be based upon information literacy as defined by two major divisions of the American Library Association (ALA): the Association of College and Research Libraries (ACRL) and the American Association of School Librarians (AASL). The ALA defines *Information Literacy* as the ability to "recognize when information is needed and…to locate, evaluate, and use effectively the needed information" (1989). The two divisions of ALA concerned with formal educational environments, the ACRL [higher education] and the AASL [K-12], have expanded upon the basic idea and have established specific standards and/or frameworks that are appropriate for different levels of students. Although the research focused on community college students, the AASL structure was considered pertinent to the research

because it provided conceptual ideas rather than formulaic criteria as were the ACRL structures at the time of the research development.

Library association division structures of information literacy. These four library profession based structures of Information Literacy: the AASL *21st Century Learners* and the ACRL *Competency Standards*, *Nursing Standards*, and *Framework*, provided a solid foundation to the research by aiding in the clarification of what was to be assessed, relative to freshmen level college/university students. Holding these standards and competencies in mind was necessary to better comprehend the various ways in and levels at which previous investigations had understood and explained information literacy.

AASL. Although the AASL is focused on K-12 education, its more open framework, as opposed to that developed by the ACRL (discussed later) in effect during the development of the research protocol, was considered as it was less restrictive and more open to interpretation and certainly did not apply only to school children. The AASL, in partnership with the Association for Educational Communications and Technology, had published the *Information Literacy Standards for Student Learning* (1998) that identified nine standards by which K-12 teachers could identify and describe the information literacy of their students:

- Standard One: The student who is information literate accesses information efficiently and effectively.

- Standard Two: The student who is information literate evaluates information critically and competently.

- Standard Three: The student who is information literate uses information accurately and creatively.

- Standard Four: The student who is an independent learner is information literate and pursues information related to personal interests.

- Standard Five: The student who is an independent learner is information literate and appreciates literature and other creative expressions of information.

- Standard Six: The student who is an independent learner is information literate and strives for excellence in information seeking and knowledge generation.

- Standard Seven: The student who contributes positively to the learning community and to society is information literate and recognizes the importance of information to a democratic society.

- Standard Eight: The student who contributes positively to the learning community and to society is information literate and practices ethical behavior in regard to information and information technology.

- Standard Nine: The student who contributes positively to the learning community and to society is information literate and participates effectively in groups to pursue and generate information (AASL, 1998).

These were restructured and simplified in 2007 with the AASL publication, *21st Century Learners.* The 2007 publication outlined four main information literacy goals for K-12

(arguably any) students—that they should be able to use their own knowledge and skills as well as tools and other resources to:

- inquire, think critically, and gain knowledge;
- draw conclusions, make informed decisions, apply knowledge to new situations, and create new knowledge;
- share knowledge and participate ethically and productively as members of our democratic society;
- pursue personal and aesthetic growth (2007, 3).

The AASL *21st Century Learners* was considered during the development of the dissertation research, based upon the idea that a 21st century nurse unquestionably must be a 21st century learner and should be able to meet the AASL criteria and suggested outcomes. The AASL further categorizes the outcomes by the "skills, dispositions in action, responsibilities, and self-assessment strategies" for each standard (2007, 4-7). The *21st Century Learners* stresses the importance of the "cognitive processes" and the "significant role" of libraries in student learning (Farmer, 2013, 173). These—especially the "dispositions"—circle back to the concepts within the ACRL *Framework* to be discussed later.

ACRL.

Competency Standards. In the *Information Literacy Competency Standards for Higher Education (Standards)* (2000), the ACRL defined five standards of information literacy, outlining that the information literate student:

- determines the nature and extent of the information needed;

- accesses needed information effectively and efficiently;
- evaluates information and its sources critically and incorporates selected information into his or her knowledge base and value system;
- uses information effectively to accomplish a specific purpose;
- understands many of the economic, legal, and social issues surrounding the use of information and accesses and uses information ethically and legally (2000, 8-14).

Although the ACRL also provided performance indicators and outcomes for each of the five standards, each standard was easily transferable to the concept of a nursing student with a basic grounding in EBP who should be able to:

- determine the nature and extent of the medical question—can the student nurse express the information need and formulate a question?
- construct keyword searches to address the main ideas—can the student nurse utilize Boolean and other search strategies?
- access relevant information from medical literature and/or other credible sources—can the student nurse:
    - differentiate between popular and scholarly (medical) resources?
    - identify a peer reviewed article?
    - quickly find and access resource(s) appropriate and applicable to the question?

- evaluate information and its sources critically and incorporates selected information into his or her knowledge base and value system—can the student nurse:
    - apply critical thinking methods to the new information?
    - add the new information, whether accepted or rejected, to his/her knowledge base regarding the question topic?
- use information effectively in a response to the medical question—can the student nurse employ the new knowledge to the information need?
- understand many of the economic, legal, and social issues surrounding the use of information and accesses and uses information ethically and legally—does the student nurse understand the difference between open web accessible information and the information available through the college library?

Reflecting upon the ACRL *Standards* in light of the nursing faculty's vision of a nursing student with an information literacy level appropriate to novice EBP as illustrated above helped with the development of the questions for both the quantitative and the qualitative investigations.

Nursing Standards. The Information Literacy Competency Standards for Nursing (*Nursing Standards*) were approved by the ACRL Board of Directors in 2013. Developed to fill the gap created by the related, but dissimilar addressing of health and nursing information by the Medical Library Association and by the ACRL, the Nursing Standards created competencies that could be shared between the two associations. The *Nursing Standards* focused on nurses in academia—from the associate

through the doctoral level—as well as to practicing nurses and those completing continuing education. The *Nursing Standards* defined the term nurses as "nursing students, nursing faculty and practicing nurses" (ACRL, 2013).

The Information Literacy Standards for Nursing were designed to:

- provide a framework for faculty and students of nursing at the associate, baccalaureate, master's, and doctoral levels in the development of information literacy skills for evidence-based nursing practice;
- encourage the use of a common language for nursing faculty and librarians to discuss student information seeking skills;
- guide librarians and nursing faculty in creating learning activities that will support the growth of information literacy skills over the course of a program of nursing education and for lifelong learning;
- provide administration and curriculum committees a shared understanding of student competencies and need; and
- provide a framework for continuing education in the area of information literacy for the field of nursing practice and research (ACRL, 2013).

Although the term framework is used in the introduction to the *Nursing Standards*, the *Nursing Standards* are, indeed, standards and are closely related to the 2000 ACRL *Standards for Information Literacy* and include specific nursing related outcomes/ performance indicators. However, as the *Nursing Standards* apply to nurses at all levels, including nurses at post-doctoral levels, some of the standards were not applicable to the

students in the dissertation study: community college students newly admitted to an associate level nursing program.

Framework. Both the *Standards* and the *Nursing Standards* include criteria based upon ideas regarding information literacy from the turn of the century. In July 2011, following the five-year cycle of review as per the association policy (2016), ACRL created a task force to review the *Standards* and to determine if they should be retained, revised, or withdrawn (2015). In response to the recommendation that they be revised (ACRL 2015), the association tasked a second committee to develop the *Framework for Information Literacy for Higher Education (Framework)*. Issued separately from the *Standards*, the *Framework* does not necessarily update them; but, instead, offers a new, flexible way to think about information literacy without specified boundaries. The *Framework* was developed around the idea that both higher education and information are dynamic and is composed of six "frames"—each of which, in turn, is comprised of a threshold concept, knowledge practices, and dispositions. The ACRL defined the three terms:

- threshold concepts: "ideas in any discipline that are passageways or portals to enlarged understanding or ways of thinking and practicing within that discipline"
- knowledge practices: "demonstrations of ways in which learners can increase their understanding of these information literacy concepts"
- dispositions: "ways in which to address the affective, attitudinal, or valuing dimension of learning" (ACRL, 2015, 2)

Because no one threshold concept was considered more important than another, the *Framework* presented them in alphabetical order:

- Authority Is Constructed and Contextual
- Information Creation as a Process
- Information Has Value
- Research as Inquiry
- Scholarship as Conversation
- Searching as Strategic Exploration.

The *Framework* was designed to be flexible so that libraries and librarians could adapt it based upon their needs; however, current discussions of the threshold concepts, knowledge practices, and dispositions suggest that librarians are struggling with comprehension and application—instead of being flexible, the framework may be too vague to be useful. For example, Amigos Library Services held a webinar April 17-18, 2016 entitled, *Information Literacy: Adapting to the New Framework.* One problem discussed was that some librarians likened the knowledge practices to "what we [the librarians] want them [the students] to know" and the dispositions to "what they [the students] know or can demonstrate after instruction" (Hunt, 2016). Yet, others associated dispositions to "what they [the students] do" which, in turn, "develop the knowledge practices, a knowledge base" (Hunt, 2016). The threshold concepts were often referred to as "nebulous" (Hunt, 2016), but purposefully so in order that they could be variously applied. As a participant in the webinar, I noted that it seemed "very chicken and the

egg-like." Which comes first, the knowledge practice or the disposition? Does one ever come first, or are they continuously changing and developing in relation to each other? Another recurring question during the webinar had to do with measurement. How would such nebulous concepts, practices, and dispositions be measured, if the possibility even exists? Participants in the webinar suggested that the *Framework* need not necessarily replace the *Standards*, but that the two structures should complement one another (Hunt, 2016).

Reflection upon the research results in comparison to the *Framework* suggested the need for further study and possible application of it in relation to the information literacy levels of beginning nursing students. The *Framework* was heavily influenced by the theory of Metaliteracy (discussed later) and provided an expanded definition of Information Literacy based upon its tenets:

> Information literacy is the set of integrated abilities encompassing the reflective discovery of information, the understanding of how information is produced and valued, and the use of information in creating new knowledge and participating ethically in communities of learning (ACRL, 2015).

This new definition of information literacy with its iterative, cyclical idea of information literacy presented a clearer concept of the information continuum on which nursing students may find themselves. Although published after the research protocol was established, the development of the *Framework* definition helped in the visualization of information literacy, as well as EBP, as ever-evolving, individualized, yet connected,

domains. The *Framework* will be revisited in the Chapter Five discussion of future implications and research.

Nursing Association References to Information Literacy

The American Association of Colleges of Nursing stresses EBP in *The Essentials of Baccalaureate Education for Professional Nursing Practice [Essentials*], and these will be examined more fully in the later EBP discussion. However, it should be noted that the *Essentials* do specifically refer to information literacy. For example, among the nine outcomes for which the nursing baccalaureate program should prepare a nurse is the ability to "[U]se skills of inquiry, analysis, and information literacy to address practice issues" (2008, 12). Additionally, the *Essentials* includes the statement, "Computer and information literacy are crucial to the future of nursing" (2008, 17). The *Essentials* provided corroboration from the nursing profession, not just the nursing faculty of the Campus that the nursing profession is embracing the somewhat nebulous idea of information literacy as an important component of EBP and of the nursing profession in the 21st century. The AACN does not have an *Essentials* for associate level nurses; the baccalaureate level *Essentials* was referred to as graduates of both associate degree and baccalaureate degrees both sit for the "same NCLEX-RN licensing examination" (AACN, 2015).

Information Literacy Requirement for Student Nurses at the College

Establishment of the requirement. The faculty of the district-wide nursing department of Large Metropolitan Community College (hereafter referred to as "the College") have been concerned about the low level of information literacy—and, thus the ability to successfully engage in EBP nursing—of not only their current nursing students, but their graduated practicing nurses as well. Over a period of six years, the nursing faculty of the College had re-envisioned and re-developed the nursing curriculum, including incorporating a required information literacy/library research course, Introduction to Library and Online Research (LIB 101, discussed below), as a pre-requisite to the nursing program, effective Fall 2013. Although the general education program of the College does not require such a course, the nursing faculty determined that one was necessary for the nursing program. The College *Nursing Program Handbook* characterizes Associate Degree nurses as making a "commitment to continuous learning and self-development," and that they should be able to "use[s] nursing research findings to improve practice" [to continuously learn in the profession via EBP] as an expected graduate competency (St. Louis Community College, 2013, 6-7).

LIB 101. Introduction to Library and Online Research (LIB 101) is a one-credit hour course through which students explore and learn about searching, evaluating, using, and citing information resources from the open web, from the College library catalog, and from the College library databases. The LIB 101 course profile, including the course objectives and the student learning outcomes, were heavily influenced by the ACRL *Standards* and can be reviewed in Appendix A.

Nursing faculty interest in the research. The nursing faculty at one of the College campuses, [hereafter referred to as "the Campus"], were interested in how such a pre-requisite would affect the information literacy knowledge and skills of the nursing students at the College, particularly those students in the introductory nursing course, Fundamentals of Nursing [NUR 101]. Informal discussions with nursing faculty addressed the lack of credible, much less professional, resources students were increasingly depending upon for outside research assignments such as case studies and care plans. Although students' lack of research skills is bemoaned across the disciplines, the Campus nursing faculty referred to the increased importance in the health professions where life or death circumstances that can arise from poor practice. They further explained the College nursing faculty decision to add the pre-requisite LIB 101 when other important pre-requisites were removed (such as a second college composition course) as based upon a desire for nursing students to enter the program already knowledgeable about finding a scholarly article in a nursing journal and already understanding why nurses should not rely upon search engines such as Google or popular websites such as *WebMD* for medical information. The nursing faculty stressed that the curriculum is already tightly scheduled and barely provides the time to address all the nursing learning outcomes needed for nurses to pass the certification board examinations. They could not spend valuable nursing instruction time on information access and evaluation and hoped that the pre-requisite would help improve student nurses' EBP abilities. Ultimately, the nursing faculty wanted evidence to support their change in curriculum and to know if the LIB 101 prerequisite "did what…was hoped"

and “met [their] needs” (L. Kaufman & J. Walsh, personal communication, March 18, 2013; L. Kaufman, personal communication, April 29, 2013; L. Kaufman, personal communication, May 3, 2013; L. Kaufman & L. Kokotovich, personal communication, August 27, 2013).

Library faculty interest in the research. The library faculty of the Campus were likewise interested in the effect of LIB 101 on the nursing students. While Campus library faculty had had supporters among other discipline and subject faculty—faculty who regularly invited them to instruct their students in information literacy—nursing was the first (and remains the only) department to collectively express the need for systematic information literacy instruction of their students. Library faculty were thrilled that faculty from another discipline had not only endorsed library and information instruction as helpful, but had specifically required it in their curriculum. They hoped that the course, which was open to all students, not necessarily nursing students, would deliver the adequate background anticipated by the nurses. The library faculty believed that the generalized course instruction and activities, while remaining open to other disciplines and subject areas, provided avenues for pre-nursing students to gain the information literacy background needed to successfully complete the nursing curriculum. However, the library faculty, perhaps more so than the nursing faculty, wanted evidence to either support that belief or to suggest possible adjustments to the course (D. Schmitt, R. Helbling, J. Hovis, personal communication, Spring 2013-Spring 2015).

Pre-Dissertation Research

Two previously completed projects in which I was involved helped guide the development of the dissertation research. The first, part of a college-wide General Education assessment in 2008, included an assignment assessment of anonymized English Composition papers regarding the number and quality of sources used as well as the frequency of attribution. The assignment assessment provided me with a better understanding of the information literacy performance of students than what I had held previously based upon various instruction and classroom assessment techniques during library instruction sessions, such as "muddiest point" and "one minute" essays (Angelo & Cross, 1993).

My earlier (proposed Fall 2011, completed Spring 2012) sabbatical project investigating the effect of the General Transfer Degree program on the information literacy levels of students at the College was instrumental to the development of the dissertation research (Smith, 2012). The Sabbatical project considered if there was evidence that students at the College gained information literacy skills during the General Education program. Samples of students at the four campuses of the College in both the developmental/remedial college orientation course and the general education capstone course were included in the study to compare skills at the beginning and at the end of the General Transfer Degree (Smith, 2012). Lessons I learned during the project that influenced the dissertation research included:

- incorporating an "I don't know" option in the knowledge assessment tool to discourage lucky guesses.

- concentrating on one Campus, rather than the collective College.
- obtaining buy-in from the full contingent of faculty (only a small percentage of the orientation and capstone faculty district wide agreed to participate).
- offering a higher dollar enticement. A $20 gift card was an insufficient amount to entice community college students—who are rarely on campus except for classwork due to heavy workloads, familial responsibilities, and other conflicts—to either remain on campus or return to campus to participate in focus groups.

Overview of Dissertation

Overview of the Literature Review. An extensive literature review was completed to provide a solid foundation and working theoretical framework. This research combines two ideas: "information literacy" and "evidence based practice nursing." The latter follows the former in that an information literate person can effectively, efficiently, and ethically access and use appropriate information sources relative to his or her need (based upon the ACRL *Standards*). The information literate practitioner of evidence based nursing, therefore, effectively, efficiently, and ethically accesses and uses the best information appropriate to the medical and non-medical needs of his or her patient. How then would the information literacy of a practitioner of evidence based nursing be measured?

A number of theoretical frameworks and/or models were appraised and aspects of each were incorporated into the research process. Two concepts related to what the nursing students do not know, Anomalous States of Knowledge and Competency and

Confidence, also provided important foundational understanding to the research process. Nursing students may not know that they should know more about academic resources and may feel confident in their ability to find and use inappropriate resources from an open web search engine or possibly from their mobile phone's basic voice driven information application. Nurses, as well as well as nursing students, may also be affected by computer and/or information anxiety; the concepts of information, library, and computer anxiety were also important to consider. The information literate practitioner of evidenced based nursing would need to have the confidence to find and use information from unfamiliar resources, many of which are only accessible online. Other frameworks related to Information Behavior investigated included Chatman's four concepts of Information Poverty and her work with Small Worlds. The population to be studied was composed of community college students, a demographic often considered to be economically disadvantaged. Such students might be hesitant to step out of their trusted circles of family and friends—and, as they become nurses—nurse colleagues.

Because nurses have a high level of responsibility—they literally hold human lives in their hands—nursing can be considered a high reliability organizational (Weick, 1987). As with any medical field, as patients are individuals, there is no opportunity for nurses to regularly experiment with trial and error. Nurses must rely upon their previous knowledge and the shared knowledge of the community within their healthcare setting. As the nursing literature suggests, the shared knowledge is local and limited—an important concept to consider when developing the assessment design.

Overview of the Research Question. The literature review examined information literacy assessment techniques ranging from informal classroom assessments of short, guest lectures to institution-based testing for course outcomes assessment and for testing out of credit based courses, to formal, standardized assessments, such as Project SAILS (Project SAILS, 2012). Additionally, the literature review also covered instruction and assessment of information literacy in relation to evidence based nursing, as well as obstacles to their stated ideal (the information-literate EBP nurse). Within the nursing literature, research into the evidence based practice abilities of practicing nurses and into various methods of information literacy instruction and their effectiveness was reviewed. The effects of a separate information literacy course, adopted as a pre-requisite, rather than a nursing-specific information literacy intervention, had not been studied. This led to the following overarching research questions:

- Conceptual Question: How does the completion of a one-credit hour information literacy course affect the information behavior and the information literacy skills of samples of students in an introductory nursing course?
- Research Question: Specifically, how does a sample of Fundamentals of Nursing (NUR 101) students who have had no prior formal information literacy instruction locate, access, and use information compared to a sample of NUR 101 students who have completed the one credit hour Introduction to College and Online Literacy (LIB 101)?

Specifically, the study addressed the following questions:

1. What resources do students in the samples tend to rely on for research, and why do they rely upon them? (Source Selection)

2. How do students in the samples tend to evaluate and to verify—to determine credibility and reliability—of information resources? (Source Evaluation)

3. Do students in the samples understand the idea of scholarly research published in peer reviewed resources? Can they recognize it and do they know how to find it? (Identification of Scholarly Resources)

4. How do nursing students in their first program semester search for health and/or other information? Do they understand basic keyword search techniques? (Use of Keyword Search Techniques)

Overview of the Methodology. A convergent parallel designed mixed-methods investigation addressed the research questions regarding the basic information literacy levels of students in NUR 101, the introductory nursing course. The investigation assessed two groups—one enrolled in NUR 101 prior to the establishment of the LIB 101 pre-requisite and the second enrolled in NUR 101 after completing the pre-requisite of LIB 101. The research was undertaken to determine such basic information literacy levels before and after the implementation of the LIB 101 pre-requisite via individual student knowledge-based assessments administered to both groups, as well as by holding student interviews and/or focus groups with a representative sample from both groups.

Overview of the Findings.

1. What resources do students in the samples tend to rely on for research, and why do they rely upon them? The resources relied upon by the students was addressed in both the student knowledge-based assessment and in the interviews. Overall, the frequencies of assessment answers suggested that students, regardless of completion, relied most heavily on open web sites, with some additional reliance on library databases and on textbooks. However, in the interviews, the nursing students who had completed LIB 101 had realized the weaknesses of the open web—even when they witnessed nursing professionals using it.

2. How do students in the samples tend to evaluate and to verify —to determine credibility and reliability—of information resources? While there was not a significant relationship between the two samples addressing the question in the knowledge-based assessment, the interviews provided evidence that students found the open web unreliable and were often disappointed in their search results—however, that disappointment and unreliability were not considered serious enough compared with convenience for students to exclude them. The interviews also indicated that students are aware of the need critically evaluate information—and that they are poor critical thinkers.

3. Do students in the samples understand the idea of scholarly research published in peer reviewed resources? Can they recognize it and do they know how to find it? Results were mixed: *Hypothesis c* was statistically supported by Question 8

of the quantitative portion of the study, but analyses of the other related questions did not provide any evidence of a relationship between the scholarly article related queries and course completion. Evidence from the interviews suggested that students who completed LIB 101 not only understand the concept of scholarly articles as published in academic journals, but also feel prepared to find them, whereas students who did not complete LIB 101 feel ill-prepared to do so.

4. Both the quantitative and qualitative studies suggested that the first sample of students does not feel comfortable with searching in general, while students from the second sample feel comfortable with using keyword search techniques. Evidence suggested that the sample of students who had completed LIB 101 could correctly utilize Boolean operators in appropriate collections whereas students who had not completed LIB 101 were unaware of Boolean searching.

The evidence provided by the project in its entirety suggests that, yes; students who complete LIB 101 prior to enrollment in NUR 101 significantly demonstrate better information literacy behavior than the students who do not complete the information literacy course.

Contributions to the Field. While the study is valuable to the nursing and Library faculty of the Campus, its importance extends beyond the boundaries of the Campus and of the College. The future of nursing worldwide relies upon evidence based practice, and, ultimately, evidence based practice relies on information literate nurses.

This study can contribute to a better understanding of the information literacy levels demanded by evidence based nursing by providing supporting data as to the levels of incoming nursing students who have and who have not completed a one-credit-hour information literacy pre-requisite.

Chapter Two:

Literature Review

An extensive literature review was completed to provide a solid foundation and working theoretical framework for this study. The literature review focused on two ideas: "information literacy" and "evidence based practice nursing." The latter follows the former in that an information literate person can effectively, efficiently, and ethically access and use appropriate information sources relative to his or her need (based upon the ACRL *Standards*). The information literate practitioner of evidence based nursing; therefore, effectively, efficiently, and ethically accesses and uses the best information appropriate to the medical and non-medical needs of his or her patient. How then would the information literacy of a practitioner of evidence based nursing be assessed, evaluated, and/or measured? This literature review will examine pertinent theoretical frameworks and the applications of the frameworks to the assessment of information literacy, followed by an exploration of information literacy assessment at the undergraduate level, and culminating in an investigation of information literacy and/or evidence based practice in nursing education and professional practice.

Theories and Frameworks

Information Behavior, a subset of Information Science, is concerned with how information is sought and used. Information theories and frameworks considered during the development and the application of the research are individually described below with

a brief allusion to its impact followed by a discussion of how the theories interconnected in the research project.

Anomalous States of Knowledge. The idea that individuals do not realize what they do not know or what they ought to know forms the basis for Nicholas Belkin's theory of Anomalous States of Knowledge (ASK). Belkin theorized that, at a cognitive level, a "user's state of knowledge with respect to a topic is in some way inadequate with respect to the person's ability to achieve some goal" (Belkin, 2005, 45). This inadequacy could be due to a number of different problems—not only the lack of knowledge. The underlying support to the ASK hypothesis is the "cognitive viewpoint" (Belkin, 2005, 46), which is the idea:

> that any processing of information, whether perceptual or symbolic, is mediated by a system of categories or concepts which, for the information-processing device, are a model of his world. (Belkin, 46, quoting de Mey 1977, p. xvii)

Belkin's ASK hypothesis attempts to "explain why people integrate in information-seeking behavior, and how that reason can be responded to through a person's interaction with information (Belkin, 2005, 47). The cognitive viewpoint, however, presents questions as to its inherent dismissal of information as social phenomena. Bernd Frohmann posited that the cognitive viewpoint removes external influences of society—of social sciences such as history, politics, etc.—from information. Frohmann argued that this diminution of "social practices" to "a noumenal reality" (1992, 376) suggested that information must then be governed by natural laws; and he, via the cognitive viewpoint, likened information (needs, use, behavior) to commodities within capitalism

(368). Frohmann concluded that " 'use-centric' promise of the cognitive viewpoint is compromised" (384) and cannot provide a comprehensive LIS framework with which to approach an understanding of information and information behavior. ASK provided an important layer in the theoretical frameworks supporting the research into the nursing students with the idea that many such students may have little to no idea of open and closed access resources to support their profession; yet, taking Frohmann's critique into account, societal influences on the students' cognitive viewpoint must also be considered.

Competency and Confidence. Gross and Latham conducted multiple studies of students, particularly university undergraduate and community college students, to determine not only the information literacy skills of students, but, to also measure the students' views of their skills utilizing a psychological framework based upon the Dunning-Kuger theory: that those who are incompetent do not realize their incompetence, while those with developed skills often outperform what they estimate that they can achieve (Kruger & Dunning, 1999; Latham, 2011; Latham & Gross, 2008). Theoretically, they advocated that as "competence is developed, an individual's ability to self-assess also improves" (Latham & Gross, 2012, 581). Gross and Latham provided evidence that college and university students with low levels of information literacy skills "tend to greatly overestimate their skills," and, because of this, believe that they do not need instruction in information literacy (Gross & Latham 2009, 430). Their research suggested that, at least in the realm of information literacy, "confidence is not a reliable predictor of competence" (Latham & Gross, 2008, n.p.) Additionally, Gross and Latham submitted that students with low competency levels of information literacy "prefer people

and the Internet as sources" (Latham & Gross, 2013, 445). Competency and Confidence, like ASK, provided two important aspects to incorporate into the research—the first concerning the possibility that nursing students overestimate their ability to find nursing information and the second regarding a possible reliance on other nurses as "people" and Google as the "internet" for information (Latham & Gross, 2013, 445).

Metaliteracy. Thomas Mackey and Trudi Jacobson contended that the "[s]tandard definitions of information literacy [were] insufficient" to reflect the "revolutionary social technologies" of the digital age (2011, 63). In response, they developed metaliteracy as a framework with which to study information literacy in relation to other necessary 21st century technologies and literacies as they emerge and develop, such as social media, media literacy, and computer literacy. Metaliteracy removed the focus of information literacy skills from a "discrete" "skills-based approach to learning" to one focused on critical thinking in relation to the collaborative digital environment (70) and metacognition. Although Mackey and Jacobson proposed metaliteracy as a new concept, others had previously recommended similar expansions to the idea of information literacy. For example, Simmons faulted information literacy—as defined by the ACRL *Standards* as well as by "the voluminous published literature"—for "focus[ing] narrowly on the acquisition of skills" (2005, 299). Simmons called for instruction librarians to provide students with a "meta-awareness" (302) by instructing them in the "larger philosophical, economic, and social issues surrounding information" (300). Pilerot also found the concept of metaliteracy "somewhat problematic" as she saw metaliteracy causing information literacy to become "defined in relation to tools rather

than to knowledge" (2014, n.p.). Pilerot's critique regarding "tools" suggested that metaliteracy might mire information literacy in early 21st century instruments (i.e., social media) rather than transcend resource formats. Metaliteracy remained an important concept to consider in the research as nurses must be well versed in the tools of both medicine and information science. As these tools--for both medicine and information science--continue to evolve, perhaps metaliteracy should be examined as environments and tools change; nevertheless, it should also not limit itself to specific segments of environmental and tool evolutions. The knowledge and ability should transcend specific tool operation.

Anxiety. Mellon (1986) and Wurman (1989) used the term "anxiety" to define the overwhelmed, frustrated, and fearful feelings information users can experience when confronted by an unfamiliar information resource or by too much information. Mellon originated the term *Library Anxiety* as a result of her two-year qualitative study of writing students. She found that over seventy-five percent of the students "described their initial response to the library in terms of fear or anxiety" (1986, 162). Mellon, as well as Onwuegbuzie, Jiao, and Bostick, discussed library anxiety as only affecting those students who use or are considering using library resources (Mellon, 1986, 162; Onwuegbuzie et al., 2004, 30). Wurman more expansively identified *Information Anxiety* as the fear and frustration "produced by the ever-widening gap between what we understand and what we think we should understand" (1989, 34). *Computer anxiety* was described by Simonson, Maurer, Montag Torardi, & Whitaker as a sense of fear experienced when one uses, or thinks about using, a computer (1987). The research of

Beckers, Wicherts, & Schmidt suggested that computer anxiety has a greater basis in a stable personality "trait," rather than a temporary "state" (2007, 2860); the condition is not limited to the old, the uneducated, nor the inexperienced computer user. Thus, they suggest that even digital natives are susceptible to computer anxiety and that there is no quick fix for it (Beckers, Schmidt, & Wicherts, 2008, 19). Library, information, and computer anxiety were crucial to the development of the study. Steps taken to minimize uncertainty and anxiety will be further addressed in the methodology.

High Reliability Organizational Culture. While nurses certainly face time pressures and efficiency measures, they are more importantly responsible for human life and safety. Thus, the profession is based upon a high reliability organization (HRO), defined by Weick as a collaborative body "in which reliability is a more pressing issue than efficiency" (1987, 12). This is an important construct to consider because HRO have, according to Weick, "unique problems in learning and understanding" that could negatively impact performance when no solution is attained (12), such as the limited or inability to learn by trial and error. Reliable performance, then, is dependent upon the provision of alternatives to learning by trial and error. Weick posited that "stories" and "simulations," as alternatives, should increase the reliability of the organization because the individuals belonging to the organization can have a greater knowledge of the system and of the possible "errors that might occur" (113). Additionally, because the individuals are aware of how others have approached and resolved possible errors, they are more confident in their ability to handle new errors as they arise. Although Weick focused for the most part on air traffic controllers and nuclear reactor operators, he does specifically

refer to the nursing profession in regards to obstacles to reliability: “nurses commit medical errors when they forget that the chart is not the patient” (120). To be highly reliable, HROs require both decentralization and centralization (124): in the nursing profession, it could be theorized that nurses must have the variety of stories and simulations (via research and case studies) in lieu of trial and error; yet, they must also build a culture of shared beliefs and ideals (as opposed to standards and tradition based nursing).

HRO culture greatly impacted my view of the importance of information literacy in the nursing arena. In the greater community college view, information literacy may be thought of as important to creating a well-informed citizenry; however, within the context of an HRO, information literacy can be understood as vital to effective patient care with a possible greater dependence on a community built upon shared evidence and shared responsibility. The idea that nursing should be considered an HRO was corroborated by the research of Quigley and White (2013). Although it was published after this research project was devised, Quigley and White provided evidence that the theoretical framework of an HRO can be successfully applied to nursing and to other medical situations—particularly to hospital-based fall measurement and improvement. Quigley and White proposed a model to evaluate a program intended to result in a reduction of patient falls in the hospital setting which included “organizational, unit, and patient level data” and “shared responsibility” among stakeholders (2013). They concluded that such a model not only appropriately views the hospital setting as an HRO, but also facilitates evaluation. They suggested that the adoption of such a model in investigations into a

variety of hospital based questions could help to identify and highlight best practices in "safe hospitals" (2013). The HRO of nursing units can be thought to also be tied to the ACRL *Nursing Standards* in that information is not only to be found "efficiently"—but "effectively" (ACRL, 2013).

Small Worlds and Information Poverty. Chatman developed the theory of Information Poverty in an attempt to explain how members of disadvantaged groups can be impacted by perceptions of self-doubt and by fears of taking information risks, thus remaining information poor (1996, 205). Influenced by the idea that information poverty and economic poverty were linked (205), Chatman utilized multiple theoretical frameworks to research and devise a theory of information poverty, including theories of insiders/outsiders, gratification, alienation, and diffusion. Chatman utilized Wilson's idea of a small world—"a constricted place of information, a narrow psychological space" (Wilson, 1983, 152) to research how the economically disadvantaged meet their information needs within the confines of their limited circles. Although a 2001 article (Burnett, Besant, & Chatman) expanded the small worlds idea to additional circles, Chatman primarily focused on the economically disadvantaged (1985, 1987, 1991) and developed four fundamental concepts of information poverty: Secrecy, Deception, Risk-Taking, and Situational Relevance/Utility (1996). From these concepts, Chatman suggested six statements that collectively serve as a theoretical framework to describe and further study the information poor:

1. People who are defined as information poor perceive themselves to be devoid of any sources that might help them.

2. Information poverty is partially associated with class distinction. That is, the condition of information poverty is influenced by outsiders who withhold privileged access to information.
3. Information poverty is determined by self-protective behaviors which are used in response to social norms.
4. Both secrecy and deception are self-protecting mechanisms due to a sense of mistrust regarding the interest or ability of others to provide useful information.
5. A decision to risk exposure about our true problems is often not taken due to a perception that negative consequences outweigh benefits.
6. New knowledge will be selectively introduced into the information world of poor people. A condition that influences this process is the relevance of that information in response to everyday problems and concerns (197-8).

Her research also suggested that information poverty and economic poverty were not necessarily related, but that the information poor belong to a "very localized …world[s] in which norms and mores define what is important and what is not" (Chatman, 1996, 205). Ultimately, Chatman recognized the limits of the Theory of Information Poverty, and she stressed the need for further research (1996, 205).

Nurses, as professionals, may not be thought of as affected by the theory of Information Poverty. However, health care does have a variety of hierarchical distinctions. Although state regulations differ, Registered Nurses (RNs) are usually licensed by examination and may have earned an associate's (ADN) and/or a bachelor's

(BSN) in nursing. In the nursing hierarchy, they outrank licensed practical nurses (LPNs), but, in turn, are eclipsed by advanced practice registered nurses (APRNs) who have earned at least a Master's in Nursing (MSN) and often a Doctor of Nursing Practice (DNP) or a PhD. APRNs also must pass specific certifications. For example, to become a certified Registered Nurse Anesthetist (CRNA) a nurse must complete an accredited graduate level program and pass the National Certification Examination (NCE) by the National Board of Certification and Recertification for Nurse Anesthetists (NBCRNA). CRNAs additionally must complete at least 40 hours of continuing education and recertify every 2 years (U.S. Department of Labor, Bureau of Labor Statistics, 2015). Additionally, regardless of the nursing hierarchy, nurses are typically viewed in a lower class than physicians in the hierarchies of healthcare.

Within the confines of the research project, it was found to be a fruitful framework for identifying some of the problems of Campus students, many of whom meet Chatman's criteria of information poor. Community colleges have traditionally been thought of as comprising a proportionately large number of disadvantaged students—mainly disadvantages stemming from socio-economic issues (income poverty, digital divide, first generation college student, etc.). The composite Campus student profile paralleled such an understanding: the average Campus student was aged 28 years (a non-traditional student with gaps in education and in technology familiarity), and attended school part-time while working full-time and/or part-time. Additionally, the composite Campus student was not only reliant on financial aid, but also required extra-agency public and private assistance. (St. Louis Community College, n.d.). The theory of

Information Poverty, although critiqued by Chatman herself, impacted both the way that the students were defined, and also the way that research was completed; I purposefully tried to minimize the possibility of embarrassing, intimidating, or causing discomfort to students who may have adopted "self-protective behaviors" and "self-protecting mechanisms" due to information poverty (Chatman, 2006, 197-8).

Undergraduate Information Literacy Studies.

The difficulty in designing an examination of information literacy in regards to students at The College lay not in the scarcity of options, but, conversely, in the abundance as there were no discipline specific ideal institutional templates found. Additionally problematic was the lack of a specific assignment which could be assessed--negating the possibility of assessment ideas traditionally linked to information literacy, such as document review of student bibliographies (Hinchliffe, Kubiak & Hunt, 2003; Belanger, J., Zou, Rushing Mills, Holmes, & Oakleaf, 2015; Carbery & Leahy, 2015; and Lowe, Booth, Stone, & Tagge, 2015) or essays describing the research process (Nutefall, 2014). Thus, studies in a variety of disciplines, including nursing and general studies, were reviewed; and, Information Literacy specifically related to nursing and EBP will be further investigated later under Re-envisioning Nursing Education.

Assessment Tool. A review of previous information literacy assessment which focused on general studies ranged from assessment of full credit information literacy courses (Daugherty & Russo, 2011; Hufford, 2010; Larsen, Izenstark, & Burkhardt, 2010) to that of information literacy content presented in courses of other disciplines (Johnson, Anelli, Galbraith, & Green; 2011). While these were helpful for overarching

ideas and discussions of the methodology and results, they did not help with the creation of the assessment tools. Assessment tools as addressed in the literature included formal testing, such as the *Information Literacy Test* originally developed by the James Madison University (JMU) Center for Assessment and Research Studies and the JMU Libraries (Madison Assessment, 2012) and the *Project SAILS* (Standardized Assessment of Information Literacy Skills) (Project SAILS, 2012) originally developed by Kent State University, as well as those developed by outside agencies, such as the Educational Testing Service (ETS)'s iSkills assessment (Educational Testing Service, 2012; Katz, 2007). These proprietary resources were helpful when considering measurable tools; however, because they were proprietary, I had limited access to the actual tools as opposed to descriptions of the tools. Additionally, the limited access obtained suggested that the assessment questions were focused more upon course or program learning outcomes and not more generalized information literacy proficiency. For example, Project SAILS included a question requiring students to identify parts of Superintendent of Documents Classification System (SuDoc) item records (Project SAILS, 2012). As such outcomes were beyond those of either the ACRL *Standards* or the AACN *Essentials*, Project SAILS was considered as a possible multiple choice format example, but not for the actual assessment questions.

Interviews, Focus Groups, and Observations. Another form of research included focus groups with other subject faculty to assess competencies (Tyron, Frigo, & O'Kelly, 2010). While the research project was not going to focus on faculty viewpoints, I gained some insight and some ideas as to the development of the nursing student focus

group protocol by informally meeting and discussing nursing research assignments with the nursing faculty. Additionally, observations of classroom activities (Bellard, 2005; Sundin & Francke, 2009) as well as of information literacy instructional sessions (Helbling, K., conference presentation, "Authentic Assessment: Evaluating the Growth of Student Research Skills," Missouri Library Association Annual Conference, Oct. 6, 2011; Swoger (2011) suggested the incorporation of observations of students. Although based on observations in "one-shot" session classes, the presentation and the article provided ways in which observation of a task might be used within an interview or focus group situation. Ultimately, observation was not included in the protocol as the use of the library—even the library website—was thought to possibly influence students in their information seeking.

Nursing and Evidence Based Practice (Nursing Information Literacy Studies).

Evidence based practice is "the integration of individual clinical expertise and patient preferences and values with the best available external clinical evidence from systematic research" (Sackett, Straus, Richardson, Rosenberg, & Haynes, 2000). Healthcare stakeholders, including professional organizations, federal agencies, and even insurers, have acknowledged that EBP not only improves patient outcomes, but that it also lowers healthcare costs (Melnyk & Fineout-Overholt, 2011). Nursing literature has long referred to the necessity of information literacy, as required for EBP, primarily due to the positive effects of EBP nursing on patient outcomes as opposed to outcomes from tradition/expert opinion based nursing (Heater, Becker, & Olson, 1988). However, such sentiments are often coupled with lamentation that patient care based on EBP is not

regularly delivered by healthcare practitioners (McGinty & Anderson, 2008; Melnyk et al., 2005); when it is, it is often based upon information informally gained from colleagues, not from nursing literature (Marshall, West & Aiken, 2011). Hart (2008) reviewed extant literature related to "informatics competency" (321) and practicing nurses in the United States and found "a large number of gaps in the nursing profession that render US nurses unprepared for evidence-based practice" (328) stemming from the problem that not only had competencies for nurses only been defined in 2002, but also that a true baseline had not yet been determined.

Barriers to EBP. The literature does provide insight into why healthcare practitioners, particularly nurses, do not deliver evidence based care. Pravikoff, Tanner, and Pierce (2005) surveyed nurses across the United States and found that among the respondents:

- Only 46% recognized the term "evidence based practice."
- While 61% reported needing to find information on the job, 58% reported not referring to research reports and over 80% had never utilized the resources of a hospital library.
- 76% had never used the *CINAHL* database and 58% had never used the *MEDLINE* databases—77% reported that they had "never received instruction in the use of electronic resources."

Ultimately, Pravikoff, Tanner, and Pierce determined that "RNs in the United States aren't ready for evidence-based practice" (2005, 50).

The problem is not limited to the United States. Majid et al. (2011), found in a study of Singapore nurses that the majority surveyed could not apply an "appropriate search strategy" for nursing related topics. Just as their U.S. counterparts do, Singaporean nurses relied upon colleagues' knowledge and experience more willingly than on published clinical evidence, paralleling the previously referred to findings of Chatman and of Gross and Latham in regards to preferred resources. Similarly, O'Leary and Mhaolrunaigh found that when making clinical decisions, nurses in Ireland most often relied upon their colleagues--suggesting Chatman's *Small Worlds*--and "prepackaged" information (such as hospital guidelines) rather than accessing medical literature (2012). Nationally and internationally, the nursing literature suggests a need for information literacy to be included in nurse preparation and continuing education.

In the defense of these nurses, the literature also provides evidence of various impediments to EBP:

- Lack of time (primarily due to demanding patient caseloads as well as understaffing)
- Little or no instruction and/or experience in:
    - EBP
    - Information Literacy
    - Information Technology
- Negative attitudes about EBP stemming from misconceptions
- An environment that does not encourage EBP within the healthcare field

- Lack of resources (access to hospital library databases, print journals, etc.) (Pagoto et al., 2007; Pravikoff, Tanner, & Pierce, 2005)

Furthermore, as a number of states, including Missouri, do not require any continuing education for RN licensure (American Nurses Association, 2011); there is often no incentive nor are there available opportunities for practicing nurses to overcome such barriers. The College nursing faculty added the Information Literacy requirement in an attempt to prepare the College nursing graduates for EBP.

Re-envisioning Nursing Education. The National League for Nursing (NLN) continued its 2003 mandate for a new form of nursing education, including outcomes relating to EBP in its 2005 Position Statement. However, as the NLN itself noted, while "tomorrow's education must be researched based" (2005, 1); such a "transformation" has yet to emerge (NLN, 2005, 3). Nayda and Rankin found that students in a BSN program did not understand the concept of information literacy, nor did they understand its role in successful nursing education and professional practice (2008). Pravikoff, Tanner, & Pierce advocated "that information literacy, research use, and evidenced-based practice are [sic] integrated into the curricula of all RN education programs" (2005, 50). Barnard, Nash, and O'Brien were less all-inclusive, suggested that "meaningful" partnerships should be cultivated between librarians and nursing faculty (2005, 505). The following articles address the inclusion of EBP or information literacy instruction as an important component of nursing education and focus on a variety of approaches. Reflecting upon these inclusion attempts helped to solidify the project hypotheses and protocol.

Integrated Curriculum. Pre-dating the NLN's 2003 mandate, Shorten, Wallace, and Crookes (2001) researched the effects of a "curriculum integrated information-literacy programme" as part of a course in the Bachelor of Nursing degree program at the University of Wollongong, Australia. Although it was unclear as to which course included the intervention, it was applied to a group of students in their first year of the nursing program (Shorten, Wallace, & Crooks, 2001). The intervention was composed of traditional lectures and "laboratory/tutorial sessions" presenting "three specific 'library-based' learning activities and complementary assessment tasks, which were directly related to the content area of their 'fundamental clinical nursing' subject" (Shorten, Wallace, & Crookes, 2001). While it referred to neither the Dunning-Kruger Effect nor to Gross and Latham, confidence and competence were at the heart of the study:

> The teachers who implemented and evaluated the curriculum-integrated information-literacy programme had a strong philosophical stance that the purpose of the programme was more than merely to provide the students with skills and knowledge for the development of information literacy. They considered that if students felt confident in their electronic database searching then they would be more likely to 'give it a go' and that this experience of learning would lead to competence. Great care was taken by all the teaching staff, and in particular by the faculty librarian, to ensure that the teaching and learning activities were designed in such a way as to enhance the likelihood that students would encounter 'successful searching' as their first experience of the library's electronic databases (Shorten, Wallace, & Crookes, 2001).

Additionally, the assessment of the integrated curriculum program was twofold: to assess not only the students' information literacy skill attainment, but to also assess "changes in student confidence level in searching for information" (Shorten, Wallace, & Crookes, 2001). The treatment group who completed the program took both a pre- and a post-program assessment; the control group (a group of second-year students who had not completed the program) also took the post-program assessment. The evaluation included both a scored objective assessment and a "self-assessment of confidence" (Shorten, Wallace, & Crookes). The authors reported that the difference between the control and the treatment groups' answers on the objective assessment were significant while only some of the self-assessment of skills were significantly different. Anecdotal evidence was reported that indicated that the treatment group continued to better perform the control group through their third year of the nursing program. There was no indication if their confidence levels remained higher in regards to some of the skills—how might confidence and competency have affected the study?

Online Tutorials. Two studies (Weiner et. al, 2012; Edwards & O'Connor, 2011) investigated the effects of online tutorials aimed to improve information literacy. While both involved the assessment of module tutorials, each focused less on information literacy than on other 'college' ideas. Weiner, Pelaez, Chang, and Weiner (2012) surveyed first year biology and first year nursing students to determine "the student perspective on changes needed in online tutorials dealing with information literacy" (196). The students were surveyed not for how well they learned or incorporated the material, but how they perceived the tutorials. Surprisingly, although the students were

required to utilize primary research articles, the seven-module online tutorial did not include library databases. Likewise, minimizing the role of information literacy in nursing, Edwards and O'Connor researched the effects of a Blackboard module tutorial developed by nursing faculty and "technology support staff" at a central Illinois community college (2011, 15). The tutorial included seven modules, only one of which focused on library resources and documentation. Although Module 6 focused on library research and the APA citation format, the word "librarian" appears nowhere in the article, while "information" appears only once. The assignments and pre- and post-survey results were reviewed and analyzed by nursing faculty with some assistance from the nursing advisors (Edwards & O'Connor, 2011, 5-6, 12). Per the surveys, students for the most part responded favorably to questions regarding the instructional content; yet, they responded negatively about "inaccessible faculty and a lack of technology knowledge…on the part of some faculty" (Edwards & O'Connor, 2011, 13), which suggests that the nursing faculty might have poor information literacy skills as evidenced in the previously discussed studies of practicing nurses. The authors also noted the challenges that faculty face in keeping nursing curriculum current—that two year nursing programs are overloaded with content. This corresponds to the revision of the nursing curriculum at the College, where the administrators have set a limit on the number of credit hours that a nursing program can require within the program—including the pre-requisites.

Ongoing Library Instructional Sessions. Duncan and Holtslander (2012) used Charmaz's Grounded Theory in a qualitative study of eleven senior (fourth year) nursing

students at a Western Canadian university. The eleven students attended library sessions (of unspecified length and thoroughness) focusing on web site evaluation, source comparison, keyword and subject searching, and some specific instruction on the *CINAHL* database during their first year of nursing instruction at the technical institute. During the third year of study (at the university), the students attended a second library session that introduced the university's web site and focused on nursing resources, particularly *CINAHL* using subject heading searches. Although the authors noted that the students considered themselves "confident about their search skills" (26), they overwhelmingly expressed frustration in selecting keywords or in using subject headings and struggled with searching both *CINAHL* and open web search engines. Duncan and Holtslander noted that an emphasis on *CINAHL* is "essential" as it is a specific nursing database; however, they also spoke to the difficulty students face when searching for information more generally—especially when they do not know alternate keywords or specific subject headings (2012).

Harkening back to Belkin, how do librarians and nursing faculty teach nursing students to search for topics about which they know little? Additionally, where do nursing students, in general, fit within the concept of information confidence as investigated by Gross and Latham (2012)? Do they tend to see themselves as having high level skills when, in reality, they do not have such skills? Does that level of confidence transfer to their professional work after graduation? Such questions suggest the need for investigation beyond the confines of the study.

Tutorials Combined with Librarian Instruction. Schutt (nursing faculty) and Hightower (librarian) researched the effects of online instruction developed collaboratively between nursing and the library (2009). The end result was a library database tutorial module housed in WebCT complemented by librarian led face-to-face and synchronous online instruction and discussion via Wimba for the RN-BSN Educational Advancement for Registered Nurses (EARN program). This intervention differed from previously related materials as the program student body was composed of non-traditional students who had an average of 5 years nursing experience and because a substantial portion of the program was delivered online. Prior to the intervention, the students already attended a required orientation session, a "5-hour computer training seminar" (Schutt & Hightower, 2009, 102) and had completed the one credit hour Computers in Nursing course. The intervention module was comprised of three instructional sessions, each followed by an assignment. The first assignment related to the module had to do with resource selection. Less than half of the twenty-two students who completed the assignment chose a relevant database. The second assignment focused on *Academic Search Premier*, with a learning objective of using a database with a wider scope to find two articles: one for patients and one for health care professionals. While the 21 students who completed the assignment were able to find a research article suitable for a healthcare professional, their findings of literature for patients were of basic news information articles that did not demonstrate or explain exercises—as the assignment required. For the third assignment, students were to demonstrate the ability to develop fruitful search terms and to correctly incorporate

Boolean operators. Only six of the 22 students who completed the assignment did so correctly. Overall, students provided "overwhelmingly positive" (104) feedback; one student commented, "I believe the skills I have learned will help me in the EARN program and the rest of my career" (104). Additionally, nursing faculty expressed the idea that they, too, expanded upon their research skills through the process.

Evaluating Information from Websites. Information evaluation, particularly that on the free web, has been conventionally taught by librarians and other information professionals by the use of checklists of criteria (including such indicators as currency, advertisements, author/creator credentials, objectivity, etc.) to establish credibility. Fallis and Frické (2002) investigated the effectiveness of such criteria-based evaluation techniques for determining accuracy of health-related websites. Their research failed to find a correlation between such checklists and accuracy, suggesting that the traditional checklist based instruction of evaluation needs further study and revision. In light of the literature previously discussed concerning practicing nurses who have little or no access to resources such as subscription databases and print journal collections, the need for nursing students to learn effective ways of evaluating freely available resources for accuracy becomes vital.

Summary

Frameworks related to what the nursing students do not know, particularly Anomalous States of Knowledge and Competency and Confidence, provided important foundational understanding to the research process. Nursing students may not know that they should know more about academic resources and may feel confident in their ability

to find and use inappropriate resources from an open web search engine or possibly from a mobile phone information application. The literature review also suggested that practicing nurses may share the same concerns. Additional Information Behavior theories developed by Chatman, specifically Information Poverty and Small Worlds, regarding the disadvantaged were important to consider as the population to be studied was composed of community college students, a demographic often considered to be disadvantaged in many ways, including socio-economically and educationally. Such students might be hesitant to step out of their trusted circles of family and friends—and, as they become nurses—nurse colleagues. Other pertinent Information Behavior theories which drove the research included Metaliteracy and Information and Computer Anxiety. These were important to consider in the design of the protocol. For example, if a student is uncomfortable using a computer, a navigation observation might be overwhelming, frightening, and possibly harmful to him/her. Beyond Information Behavior, Weick's High Reliability Organization theory was also important to consider as nurses have high levels of responsibility. Nurses must rely upon their previous knowledge and the shared knowledge of the community within their healthcare setting, and, as the nursing literature suggests, the shared knowledge is local and limited, cycling back to Chatman, Belkin, and Gross and Latham.

The literature review examined information literacy assessment techniques, as well as instruction and assessment of information literacy in relation to evidence based nursing. Within the nursing literature, research into the evidence based practice abilities of practicing nurses and into various methods of information literacy instruction and their

effectiveness was reviewed. The effects of a separate information literacy course, adopted as a prerequisite, rather than a nursing-specific information literacy intervention, had not been studied. This assessment led to the research questions and to the methodology as addressed in Chapter Three, Methods.

Chapter Three:

Methods

The faculty of the district-wide nursing department of the College have grown increasingly concerned with the low level of information literacy (and thus the ability to successfully engage in evidence based practice nursing) of their current nursing students and of their graduated practicing nurses. In spite of the College mandate limiting the number of credit hours comprised in associate level programs—including any and all pre-requisites—the nursing faculty of the College incorporated a required information literacy/library research course, Introduction to Library and Online Research, (LIB 101), as a pre-requisite to the nursing program in the newly re-envisioned and re-developed nursing curriculum, effective for students entering the program as of Fall 2013. In defending the pre-requisite to the college district and campus based curriculum committees, the nursing faculty stressed the importance of graduating nurses who can continue self-directed learning—especially that based on the ever changing health care literature. The nursing faculty and the library faculty at one of the College campuses, the Campus, were interested in how such a pre-requisite will affect the information literacy abilities of the nursing students at the college, particularly those students in the introductory nursing course, Fundamentals of Nursing, hereafter referred to as NUR 101. What effects would the pre-requisite have—at least on student nurses? This research project into the basic information literacy levels of students in NUR 101 assessed two groups, the first of which was composed of students who enrolled in NUR 101 without having taking the LIB 101 pre-requisite (the control group, hereafter referred to as

NOLIB). The second (the treatment group, hereafter referred to as LIB) was composed of students who had enrolled in NUR 101 after completing the pre-requisite of LIB 101. The research was undertaken to determine such basic information literacy levels before and after the implementation of the LIB 101 pre-requisite via individual student knowledge-based assessments administered to both groups, as well as by holding student interviews and/or focus groups with a representative sample from both groups.

Through this study, the investigation attempted to address the research questions:

Conceptual Question: How does the completion of a one-credit hour information literacy course affect the information behavior and the information literacy skills of students in an introductory nursing course?

Research Question: Specifically, how does a sample of Fundamentals of Nursing (NUR 101) students who have had no prior formal information literacy instruction locate, access, and use information as compared to a sample of NUR 101 students who have completed the one credit hour Introduction to College and Online Literacy (LIB 101)?

Hypothesis: Students who complete LIB 101 prior to enrollment in NUR 101 will demonstrate significantly better information literacy behavior than the students who do not complete the information literacy pre-requisite.

In this study, information literacy behavior is manifest through four specific behaviors: source selection, source evaluation, identification of scholarly research, and appropriate use of information search techniques.

1. Source Selection

   Question: What resources do students in the samples tend to rely on for research, and why do they rely upon them?

   Hypothesis 1a: NOLIB students will utilize limited open access collections of information freely available to the general public. LIB students will know—and know how—to utilize broader collections of information including library databases and discipline-specific information.

   Hypothesis 1b: NOLIB students will rely mostly on information with little or no evaluation from the open web. LIB students will rely on resources with at least a minimum of vetting via inclusion in a library catalog or database collection.

2. Source Evaluation

   Question: How do students in the samples tend to evaluate and to verify —to determine credibility and reliability—of information resources?

Hypothesis 2: NOLIB students will not demonstrate an understanding of how to evaluate information—especially that found on the open web. LIB students will identify some means of evaluating information.

3. Identification of Scholarly Research

Question: Do students in the samples understand the idea of scholarly research published in peer reviewed resources? Can they recognize it and do they know how to find it?

Hypothesis 3: The NOLIB students will not recognize aspects of scholarly research and will be unable to identify means of finding such research. The LIB students will demonstrate a better understanding of the characteristics of and the means of accessing scholarly research.

4. Use of Keyword Search Techniques

Question: How do nursing students in their first program semester search for health and/or other information? Do they understand basic keyword search techniques?

Hypothesis 4: The NOLIB students will not demonstrate the knowledge and ability to determine search strategies. The LIB students will demonstrate the ability to use Boolean operators and other keyword search strategies.

If librarians have a clearer understanding of such students' information behavior, librarians (and institutions of higher learning) might provide nursing students with more understandable, relevant, and usable information literacy instruction. By improving the instruction of information literacy concepts to the known information behavior of nursing students, librarians can better help such students improve their understanding and use of information, as well as their academic, professional, and life-long success. Ultimately, by instilling the tenets of information literacy knowledge and skills in their professional preparation, librarians can empower future nurses to practice evidence based nursing.

The research into the information literacy of the Campus nursing students was finalized as a convergent parallel designed mixed methods assessment of the LIB 101 prerequisite on the information literacy levels of the those students beginning the nursing program. The project assessed the basic information literacy levels of two groups of students in NUR 101—one enrolled in NUR 101 prior to the establishment of the LIB 101 pre-requisite (NOLIB) and the second enrolled in NUR 101 after completing the pre-requisite of LIB 101 (LIB). I determined such basic information literacy levels before and after the implementation of the LIB 101 pre-requisite via individual student knowledge-based assessments administered to both groups, as well as by holding student interviews and/or focus groups with a representative sample from both groups. Both the quantitative and the qualitative portions were developed, executed, and evaluated with the definitions and concepts described in Chapters 1 (Introduction) and 2 (Literature Review).

Quantitative Investigation

Knowledge-based assessment. Assessment ideas traditionally linked to information literacy such as document review of student bibliographies (Hinchliffe, Kubiak & Hunt, 2003) were considered. I was involved with the project with the College as part of a General Education assessment in 2008 which included an assessment of anonymized English Composition assignments regarding the number of sources used and the frequency of attribution. However, in consultation with the Campus nursing department and the dissertation advisor, an assignment assessment was rejected as the research for the first semester of nursing is based upon solely one primary case study/research article. Instead, a knowledge-based assessment of their information seeking and use (Appendix C) was developed and administered to the students enrolled in NUR 101 at the College. As discussed in Chapter Two, the knowledge assessment was developed after researching several such assessments, including the JMU Information Literacy Test, Project SAILS, and ETS iSkills.

Question format and presentation depended greatly upon the results from a previous assessment developed and administered during a sabbatical project to determine if there were any significant differences between the information use and behavior of community college students in a developmental freshman orientation course and in the sophomore level capstone course for the Associate in Arts degree (General Transfer Studies). For example, all knowledge-based questions included an answer choice of "I do not know." The “I do not know” option permitted a more accurate measurement of what

students did know or did not know than would have been possible by students "best guessing."

At least one outcome from each ACRL standard, excluding Standard 4, were addressed in the research protocol, which helped to corroborate and to justify the protocol decisions that had been finalized prior to the publication of the *Nursing Standards*, (available in full in Appendix B). Standard 4, "The information literate nurse, individually or as a member of a group, uses information effectively to accomplish a purpose" (ACRL, 2013) was not reflected in the research protocol in regards to the suggested outcomes. Questions relating to some of the outcomes, such as Standard Five Performance Indicator Three, bullet a: "Correctly cites references in required format (APA, MLA) for all works used in a project" (ACRL, 2013), were considered too specific, rigid, or formal for the research and were rejected during the project development. It should also be remembered that the *Nursing Standards* addressed desired information literacy among practicing nurses and doctoral level nurses as well as those pursuing two year registered nursing programs. Many of the outcomes, such as Standard 4.Performance Indicator 1.f, "Initiates changes in performance of patient care when information or evidence warrants evaluation of other options for improving outcomes or decreasing adverse events" (ACRL, 2013) would be inappropriate for assessing the information literacy of pre-nursing students as they would not yet have had any such experience.

Measures/Variables. The questions were limited, but addressed library resources (both print and online), freely available online resources, documentation, search

strategies, and information evaluation. The questions were structured to mitigate bias and carefully constructed to not include library jargon. The assessment also asked for basic demographic information. The development and choice of the assessment questions were based upon knowledge points determined from review of the information literacy and nursing literature as previously discussed, feedback from Campus nursing and library faculty, and the learning outcomes from the LIB 101 course profile. The nursing faculty stressed the need for nursing students to be able to find scholarly research for their case studies—a skill that they found particularly lacking in the nursing students.

The 17 question survey (Appendix C) included two demographic questions, two questions about resource preference, nine information literacy assessment multiple choice questions (each including only one correct answer as well as a "I do not know" option), three questions about library exposure, and one question about completion of LIB 101. Each student's correct answers on the nine information literacy assessment questions were summed to provide the continuous variable of the information literacy score. Three additional questions regarding library research assistance, library database use, and previous other library instruction session attendance were also asked. The responses to these were combined to provide a continuous variable of library exposure/experience. The 17 questions were set up in the following manner:

1. Permission

2. Demographic/Age

3, 4. Sources Used

5-13. Knowledge-based Assessment

14-17. Library Exposure

The first two questions, having to do with permission and age, were not relevant to the hypotheses and are discussed below. Questions 3-17 will be fully addressed in Chapter Four: Findings.

Permission. The first question provided the overview of the study and a Yes or No question to proceed and to grant permission to use the results as part of the research project. The LibGuide software allowed certain questions to require answers. Question number 1 had to be answered by yes to allow continuation of the assessment. Only one student answered in the negative. That student was not asked further questions, and that submission was removed from the total responses.

Age/Demographic. While future studies may want to examine information literacy in regard to age, race/ethnicity, and/or other demographic lenses, this study was primarily interested in ensuring that student responders were all adults. All responses indicated an age of 18 years or older.

Assessment Tool. How would the questions then be administered? Several options were explored regarding the assessment tool. I had previously relied upon a paper assessment for the sabbatical project. However, the student population for that study included developmental reading students, and an online assessment tool had been thought to possibly skew the results due to various computer/college/test anxieties. As the nursing students in NUR 101 have been in college for at least two years and have been using Blackboard and other course management systems during that time, online tools were considered appropriate. Additionally, the anonymity (no possibility of

identifying a student by a certain ink color, etc.) as well as the aggregating, exporting, and analysis advantages of online tools helped in the decision making.

StudentVoice is the assessment software officially used by the College. Use of the product is restricted to the college district Office of Institutional Research, Planning, and Assessment staff. I approached the office with the proposed research; unfortunately, the office was unable to provide the assessment tool due to unspecified constraints.

Blackboard's testing and surveying instruments were then considered; however, certain aspects of the CMS's tools seemed inappropriate for this investigation. For example, the participants would need to be enrolled in a Blackboard course (whether credit-bearing or a special shell created for the research) to access and complete the assessment. Administering the assessment in the NUR 101 Blackboard course would be inappropriate as the nursing faculty would be able to retrieve aggregated responses and would also be able to see who had (or had not) participated. Creating a Blackboard course for the express purpose of the assessment was also deemed inappropriate as a number of college district employees, including library administration and Blackboard coordinators, would then have access to similar information sets: the names of all the students, regardless as to whether they voluntarily participated or not, as well as the information about whether or not they participated and their assessment results.

Open access survey software, such as SurveyMonkey and PollCat, were also considered; however, the College frowns on assessment administered with non-sponsored tools beyond basic classroom assessments (CATs). Ultimately, the survey/assessment tool embedded in the LibGuide software to which the college libraries subscribe

(Springshare, 2013) was used. The LibGuide product provided for anonymity as well as for aggregating the responses and formatting them easily to be exported into Excel and into SPSS for analysis. Another positive aspect of this tool was that it could be temporarily embedded in the Nursing LibGuide each semester—for only the day of assessment administration. This allowed students to quickly access the assessment link through the LibGuide at the time of assessment, but then prevented them (or future nursing students) to access the assessment and possibly share questions with sample groups. As a final positive aspect, the nursing students were introduced to the Nursing LibGuide which provided knowledge of a resource which could be perused after completing the assessment or during the assessment should they have chosen not to participate. Appendix C provides the full survey as it appeared in the LibGuide software.

Participants.

Samples. A convenient, voluntary sample method was utilized. Community college students admitted to the two-year Associate in Applied Science Nursing Program and enrolled in NUR 101, Fundamentals of Nursing at one of the college campuses were targeted. Each semester, a cohort of students is admitted to one section of the seven-credit-hour introductory nursing program course offered at the Campus of the College. It was anticipated that the assessment would be administered in the Fall and Spring of academic year 2013-14 to approximately forty students without the LIB 101 prerequisite in Fall of 2013 and by another forty students who would have completed the prerequisite in Spring 2014. However, because there is a two year waiting list for the nursing program at the Campus, both the Fall 2013 and the Spring 2014 sections were for the most part

populated by students who were "grandfathered" and admitted to the program without the prerequisite. Thus, the research period was extended—the assessment was administered to an additional two cohorts of students in NUR 101 (Fall 2014 and Spring 2015). Although the knowledge-based assessment was administered to 153 students total, the grandfathering of students College-wide continued during academic year 2014-15 which resulted in the NOLIB group including 124 students and the LIB group only 29. There was no discrete cohort of NOLIB students as opposed to LIB students: the NUR 101 cohorts each semester (except for Fall, 2013) were composed of both NOLIB and LIB students. The total numbers of NOLIB and LIB students participating each semester were graphed for visual comparison in Figure 1.

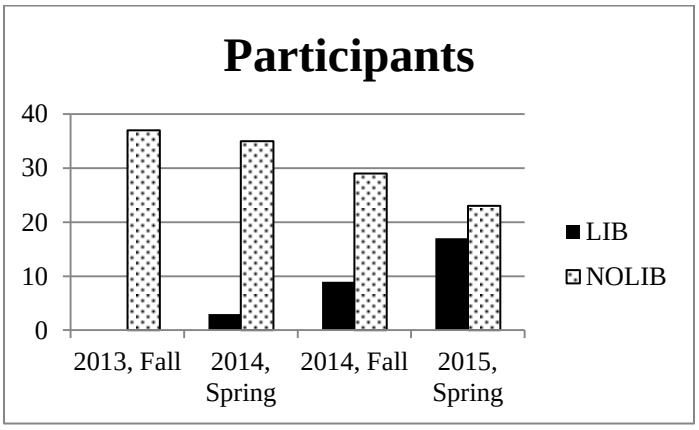

Figure 1. Participants (LIB and NOLIB) per semester.

Recruitment. The Nursing Department at the Campus supported the research and provided time for the administering of the survey prior to the "Library Research" component of the nursing program orientation during the first day of class. I accompanied the Nursing liaison librarian to the one-shot library instruction session after the students received their Blackboard online course instruction session in a classroom

with a computer lab. Before the Nursing librarian provided the library instruction session, I introduced the voluntary study and invited the students to participate. There were no external incentives for students to participate in the survey; however, the Nursing faculty interrupted me during the introduction of the assessment to encourage students to participate to help improve the Nursing Program. The Nursing faculty then left to allow the students the choice of whether or not to participate with no pressure from their course instructors. In addition to the consent question preceding the survey questions in the online form, all students received a copy of the consent form (Appendix D) to keep. Students also received a separate invitation (Appendix E) to participate in qualitative focus group research. Those who were interested could complete the bottom half of the form with a first name and a contact method—email address and/or phone number. Students were requested to return the form by placing them in a stack at the back of the room after completion of the survey—regardless if it was filled out or not. Students were then shown how to access the online survey via a temporarily available link in the Nursing Course LibGuide for completion. Students were provided approximately 25 minutes to complete the survey. All who participated were able to complete the survey in the time allowed.

Procedure. The questions were presented in the same order for all participants, all four semesters of the study during the first class meeting/orientation session for each NUR 101 section, except for the final administration when the nursing faculty requested a later date:

2013, August 27, 9:00 am

2014, January 21, 11:00 am

2014, August 17, 9:30 am

2015, February 2, 2:00 pm

When administering the survey, I first read a description of the survey and the consent form to the class. The same information was provided as the first question of the online survey. I then distributed consent forms and demonstrated the path from the Nursing LibGuide to the temporary survey link, again stressing the voluntary nature of participation. Directions, including the encouragement to answer "I do not know" rather than to guess, were then read. I stressed several times that the study was voluntary: that students were not required to participate, that the Nursing faculty would not be privy to either their answers or even their participation, and that students did not have to answer all questions. The students were then provided twenty-five minutes to complete the survey. All participants completed the survey within the allotted time. There was only one survey period for each class, and the testing period took place at the classes' regularly scheduled meeting time.

Data analysis. The responses to the knowledge assessment submitted to the LibGuide were saved in spreadsheet form. The output was then uploaded to SPSS for analysis. The quantitative analysis will be described in Chapter Four: Findings.

Qualitative Investigation

Semi-structured interviews and/or focus groups. Tyron, Frigo, & O'Kelly assessed faculty competencies via observations within focus groups (2010). While the research project was not going to focus on faculty viewpoints, I gained insight and ideas

as to the development of the nursing student focus group protocol. Additionally, observations of information literacy instructional sessions (Helbling, K., conference presentation, "Authentic Assessment: Evaluating the Growth of Student Research Skills," Missouri Library Association Annual Conference, Oct. 6, 2011; Swoger, 2011), although based on observations in "one-shot" session classes, suggested ways in which observation of a task might be used within an interview or focus group situation. Ultimately, observation was not included in the protocol as the use of the library—even the library website—was thought to possibly influence students in their information seeking. Instead, the focus groups/interviews were structured around open ended questions designed to facilitate comparison, but which would still allow for the exploration of emergent issues. Semi-structured individual interviews or small focus groups were conducted, dependent upon the schedules and preferences of the volunteer sample. The semi-structured format allowed for the clarification of both questions and answers. The interviews/focus groups were designed to last approximately 30 minutes and included reference to questions from the knowledge-based assessment as well as open-ended questions about information experiences, needs, and sources (Appendix H).

Sample. A convenient, voluntary sample method was utilized for the qualitative portion, as well as the quantitative. A voluntary sample consisting of 12-16 students was sought in the proposed one year term and 24-32 students with the second year extension; however, participation ended up being much less. In the best case scenario, half of the participants would be from among the students in NUR 101 before the pre-requisite and half from among the students after the institution of the pre-requisite. Although a sample

of approximately 40 students was sought, only 16 participated. Eight interviews/focus groups were held as scheduled to the preferences of the participants:

2013, November 22, 11:00 am (4 participants)

2014, March 5, 11:00 am (1 participant)

2014, March 7, 11:00 am (3 participants)

2014, September 22, 12:00 pm (2 participants)

2014, October 3, 11:00 am (1 participant)

2015, February 20, 12:15 pm (1 participant)

2015, February 23, 3:15 pm (1 participant)

2015, March 2, 12:00 pm (3 participants)

Recruitment. The consent form for the knowledge-based assessment included an additional sheet with a statement about the interviews/focus groups and requested contact information for any student who considered participating. Before the knowledge-based assessment was administered, the focus group/interview opportunity was discussed and students were invited to participate. Gift cards in $25 and $100 amounts were offered as incentives. I personally provided $25 gift cards to each interview/focus group participant with an additional $100 gift card to be awarded to a randomly drawn name from among the interview/focus group participants at the conclusion of the study. To ensure that no student felt compelled to participate, in both cases, the nursing faculty did not receive any responses—I collected the paper responses together with the consent forms for the assessment. The electronic responses were directly sent to me via the LibGuide (Appendix E). Additionally, the NUR 101 instructors agreed to electronically distribute

the same request at least twice during each semester requesting that interested students contact me by email or by telephone.

Data analysis. Both inductive and deductive processes were utilized in the data analysis.

Inductive Analysis Process. The inductive process began with the transcription of each interview. Each transcription was then reviewed and salient points were coded with keywords. I also made use of memos and bracketing to add impressions, in an attempt to identify possible patterns as they emerged, etc., and these notes were also including in the coding as recommended by Cresswell (2008, 193-4). While beginning with some basic questions as outlined in the protocol, I had hoped to follow a modified form of grounded theory and had planned to reanalyze previous data, pursue disconfirming data, expand the sample, and modify questions and the data collection as the research continued. However, as participation was lacking, this was difficult. Of the eleven interviews were scheduled, only eight took place—with sixteen total participants. Merely three of whom had completed LIB 101. Thus, the inductive process was restricted to an analysis of the eight transcripts for emergent themes. The transcriptions were read multiple times and, as Cresswell outlined (2008, 198-199), I developed coding—identifying terms or phrases. Sometimes the code notation was a noun, for example, "database" or "scholarly source"; other times, the code was an adjective, such as "overwhelming" or "frustrated." Coding also referred to student actions or beliefs, including "reliance on google" and to experiences such as "Comp 2" and "exposure," the last two indicating that a student had referred to a previous one-shot session or use of the

library within the confines of a non-nursing course assignment. These codes were then compiled and compared, resulting in emergent themes which were reviewed in association with the hypotheses.

Deductive Analysis Process. Following Creswell's description of "traditional" coding (2008, 199), I returned to the transcripts after completing the inductive analysis to review them in light of the themes to ascertain if there were additional examples that had been missed. While few additional examples were realized from the deductive process, it was still fruitful and helped me to solidify the addressing of the emergent themes. As only three of the interviewees had completed LIB 101, I was able to separate thoughts from those who had completed LIB 101 (L) from those who had not completed LIB 101 (NL).

Summary

The literature review as compiled in Chapter Two led to the development of the conceptual question: How does the completion of a one-credit hour information literacy course affect the information behavior and the information literacy skills of samples of students in an introductory nursing course? The conceptual question led to the development of an overarching research question: Specifically, how does a sample of Fundamentals of Nursing (NUR 101) students who have had no prior formal information literacy instruction locate, access, and use information compared to a sample of NUR 101 students who have completed the one credit hour Introduction to College and Online Literacy (LIB 101)? This, in turn, led to four specific questions to be addressed:

1. What resources do students in the samples tend to rely on for research, and why do they rely upon them?
2. How do students in the samples tend to evaluate and to verify —to determine credibility and reliability—of information resources?
3. Do students in the samples understand the idea of scholarly research published in peer reviewed resources? Can they recognize it and do they know how to find it?
4. How do nursing students in their first program semester search for health and/or other information? Do they understand basic keyword search techniques?

A mixed-methods investigation was developed to address the research questions regarding the basic information literacy levels of students in NUR 101. The investigation assessed two groups—one enrolled in NUR 101 prior to the establishment of the LIB 101 prerequisite (NOLIB) and the second enrolled in NUR 101 after completing the prerequisite of LIB 101 (LIB). The research was undertaken to determine such basic information literacy levels before and after the implementation of the LIB 101 prerequisite via individual student knowledge-based assessments administered to both groups, as well as by holding student interviews and/or focus groups with a representative sample from both groups. The findings from the research will be discussed in Chapter Four: Findings.

Chapter Four:

Findings

The findings from both the quantitative and the qualitative portions of the research are detailed in this chapter, beginning with a look at the individual questions from the assessment. Each question is addressed and examined via the Chi-square test for association. Then, the overall correct responses are compared to the incorrect or "I don't know" responses to the knowledge-based assessment. SPSS analyses of the knowledge-based assessment follow, including a Chi-square test to see if any relationship exists between the number of correct answers on the assessment and completion of the library course as well as a Point-Biserial correlation and a multiple regression analysis to test if either completion of the library course or library exposure (based upon library and library resource use) could help to explain the assessment scores. The chapter concludes with the findings from the qualitative portion of the research and outlines eleven themes that emerged from the interviews/focus groups.

Responses to the individual questions on the knowledge-based assessment were problematic—small numbers invalidated some results. Additionally, significant relationships between the individual question correct responses and completion of the library course were not regularly found. However, significant relationships were found among the students' total information literacy scores, the completion of the library course, and exposure to the library. These findings were supported by the emergent themes from the qualitative research.

Quantitative Results

Following is a breakdown of the knowledge-based questions and answers. The survey included nine information literacy assessment multiple choice questions (each including only one correct answer as well as an "I do not know" option) to assess information literacy knowledge. Percentages were used rather than total numbers as the total numbers were disproportionate—the total number of the participants who had completed LIB 101 (29) was approximately one-quarter (23%) of the total number of participants (124).

Individual Information Literacy Questions and Responses.

Sources Used. Questions 3 and 4 attempted to capture what sources students most commonly used to BEGIN (Question 3) and to rely upon MOST (Question 4) for completing course assignments. Chi-square analysis of the sources used by those who had not completed LIB 101 to those who had were attempted; unfortunately, 11 cells in the Chi-square analysis of Question 3 (Figure 2) and 12 cells in that of Question 4 (Figure 3) had expected count of less than 5 which invalidated the results.

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	6.660[a]	7	.465
Likelihood Ratio	8.076	7	.326
N of Valid Cases	153		

a. 11 cells (68.8%) have expected count less than 5. The minimum expected count is .19.

Figure 2. Invalidation of Chi-Square Test for Question 3.

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	10.075[a]	8	.260
Likelihood Ratio	10.848	8	.210
N of Valid Cases	153		

a. 12 cells (66.7%) have expected count less than 5. The minimum expected count is .19.

Figure 3. Invalidation of Chi-Square Test for Question 4.

As no determination could be made regarding any significant difference among the sources relied upon by the NOLIB and LIB students, the response frequencies for the two questions were then examined to see what students reported using, as outlined in Table 1.

Table 1

*Sources Relied Upon by Students (*N *= 153, NOLIB 124, LIB 29)*

	NOLIB		LIB	
Source	Begin	Most	Begin	Most
Wikipedia	3 (2%)	1 (1%)	0 (0%)	1 (3%)
Textbooks	25 (20%)	9 (7%)	5 (17%)	6 (21%)
Social Sites	1 (1%)	0 (0%)	0 (0%)	0 (0%)
Search Engines	76 (61%)	70 (57%)	17 (59%)	14 (48%)
Reference Resources	5 (4%)	5 (4%)	5 (4%)	0 (0%)
Other Books/eBooks	1 (1%)	5 (4%)	0 (0%)	0 (0%)
Magazines/Journals	0 (0%)	8 (7%)	0 (0%)	1 (3%)
Library Databases	12 (10%)	24 (19%)	7 (24%)	6 (21%)
Other	1 (1%)	1 (1%)	0 (0%)	0 (0%)

Note: Totals of percentages are not 100 for each characteristic because two students did not answer both questions.

In retrospect, the question was flawed as students in the interviews/focus groups expressed confusion as to the difference between the magazines/journals and the library databases options, and others did not know what was meant by search engines and/or by reference books.

Knowledge-based Assessment.

Frequencies. An excel-based worksheet of the frequencies of responses charted for each of the nine Information Literacy Questions (Survey Questions 5-13) are included in Appendix F. Appendix F includes percentage totals of each answer choice for the full sample, for those who did not complete LIB 101, and for those who had completed LIB 101.

Quantitative Analysis. Chi-square tests for association were completed on each question, comparing all of the answers submitted by the students who had completed LIB 101 with those students who had not completed the course. Small numbers in certain cells within the SPSS analysis invalidated the results for the questions as shown from the output in Figure 4:

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	23.946[a]	8	.002
Likelihood Ratio	22.083	8	.005
Linear-by-Linear Association	8.346	1	.004
N of Valid Cases	153		

a. 9 cells (50.0%) have expected count less than 5. The minimum expected count is .19.

Figure 4. Invalidation of Chi-Square Test for Question 5-13.

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The variables were transformed for each question to reflect either a correct response or an incorrect response, including the "I don't know" option (as opposed to either a correct or several incorrect responses); then, the Chi-square test for association using a *p* value of 0.05 was re-run to see if a relationship existed between completion of LIB 101 (COMPLETION) and if each question had been correctly answered or not. A table of Chi-square results for Questions 5-13 (Table 2) follows the narrative section.

Question 5. Which of the following is the best way to verify the accuracy and credibility of articles or other research found on the Web? A statistically significant relationship between correctly answering Question 5 and Completion was not found: X^2 (1, N = 153) = 0.061, p = .805. The evidence suggested that students who complete LIB 101 do not significantly better know how to evaluate and how to verify the accuracy and credibility of articles or other research found on the Web than do students who did not complete LIB 101.

Question 6. If you found some great articles from a Google search, but the web sites require payment to fully access the articles, what should you do? A statistically significant relationship between correctly answering Question 6 and Completion was not found: X^2 (1, N = 153) = 1.469, p = .226. The evidence suggested that students who complete LIB 101 do not significantly know better to check with their academic library/with a librarian when confronted by a for-pay article than do students who did not complete LIB 101.

Question 7. When should you cite your sources? A statistically significant relationship between correctly answering Question 7 and Completion was not found: X^2

(1, N = 153) = .671, p = .413. The evidence suggested that students who complete LIB 101 do not significantly better know when to cite sources than students who did not complete LIB 101.

Question 8. Which of the following is not necessarily a characteristic of a scholarly article? A statistically significant relationship between correctly answering Question 8 and Completion was found: X^2 (1, N = 153) = 4.495, p = .034. The evidence suggested that students who complete LIB 101 do significantly better understand the characteristics that differentiate scholarly articles from other types of articles than students who did not complete LIB 101.

Question 9. What is the most important aspect of a scholarly article that differentiates it from a popular resource? A statistically significant relationship between correctly answering Question 9 and Completion was not found: X^2 (1, N = 153) = 3.595, p = .058. The evidence suggested that students who complete LIB 101 do not significantly better understand the importance of peer review as a major difference between scholarly and popular resources than do students who did not complete LIB 101.

Question 10. What is an academic journal? A statistically significant relationship between correctly answering Question 10 and Completion was not found: X^2 (1, N = 153) = .105, p = .746. The evidence suggested that students who complete LIB 101 cannot significantly better identify the definition of an academic journal than can students who did not complete LIB 101.

Question 11. Which of the following resources from EBSCOhost would be the preferred resource to find a nursing scholarly research article? A statistically significant

relationship between correctly answering Question 11 and Completion was not found: X^2 (1, N = 153) = 2.768, p = .096. The evidence suggested that students who complete LIB 101 cannot significantly better identify a nursing database from interdisciplinary databases than can students who did not complete LIB 101.

Question 12. To find information about the "management of asthma in children" in most library resources, the best search function to use is the _____? A statistically significant relationship between correctly answering Question 12 and Completion was not found: X^2 (1, N = 153) = 1.106, p = .293. The evidence suggested that students who complete LIB 101 cannot significantly better identify the need to begin with a keyword search for a complex search than can students who did not complete LIB 101.

Question 13. Which of the following searches would be the most effective way to search for the "management of asthma in children" in most library resources? A statistically significant relationship between correctly answering Question 13 and Completion was found: X^2 (1, N = 153) = 5.070, p = .024. The evidence suggested that students who complete LIB 101 can significantly better identify a correctly developed nested Boolean search than can students who did not complete LIB 101.

Only 2 of the 9 knowledge-based questions (Questions 8 and 13) showed a significant relationship between the correct response and the completion of LIB 101. Why this might be the case will be discussed later in Chapter Five regarding the hypotheses.

Table 2

*Students Correctly Answering Question NOLIB (*n *= 124) and LIB (*n *= 29)*

	NOLIB		LIB			
Question	*n*	%	*n*	%	$X^2(1)$	*p*
5 (Verify)	44	36	11	38	.061	.805
6 (Pay)	89	72	24	83	1.469	.226
7 (Cite)	66	54	18	62	.671	.413
8 (Scholarly)	46	37	17	59	4.495	.034*
9 (Review)	37	30	14	48	3.595	.058
10 (Journal)	60	48	15	52	.105	.746
11 (Nursing)	15	12	7	24	2.768	.096
12 (Keyword)	55	44	16	55	1.106	.293
13 (Boolean)	14	11	8	27	5.070	.024*

*$p < .05$.

***Overall Correct Answers*.** After analyzing each individual question, the overall performance on the knowledge-based assessment was investigated. Total numbers were transformed to percentages as the total numbers were disproportionate--the total number of the participants who had completed LIB 101 (29) was only approximately one-fifth (19%) of the total number of 153 participants (124). Graphing percentages of students with the number of correct answers resulted in a normal distribution with a slight skewing towards the right (Figure 5).

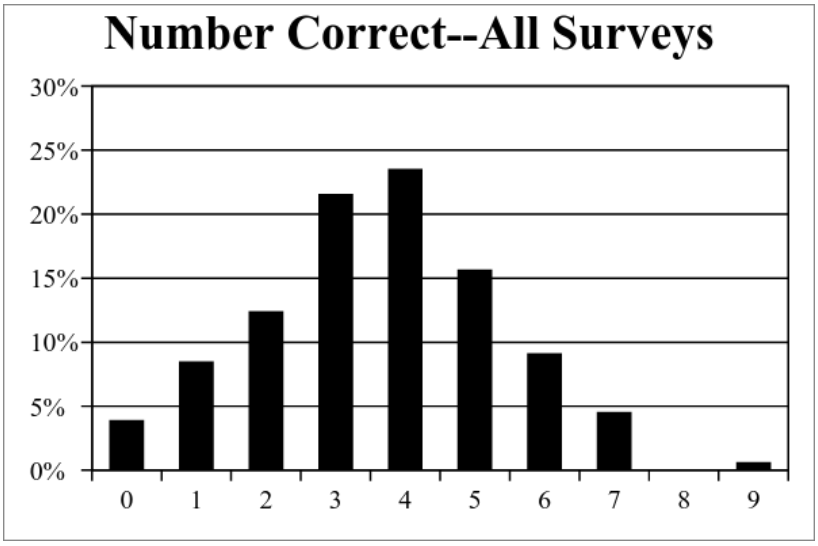

Figure 5. Number of correct responses by percentage of students, all participants.

More students placed in the left (lower scoring) side of the bell curve for the nine Information Literacy questions. This was not thought to be unexpected as only 19% of the assessed students identified as having completed LIB 101.

The percentages were then examined in regards to the two courses. The following graph, Figure 6, shows the percentage of students who had answered that number of questions correctly on the assessment. Those counts and the resulting bell curves suggested that students who had completed LIB 101 improved via a higher total knowledge-based assessment score versus those students who had not completed LIB 101.

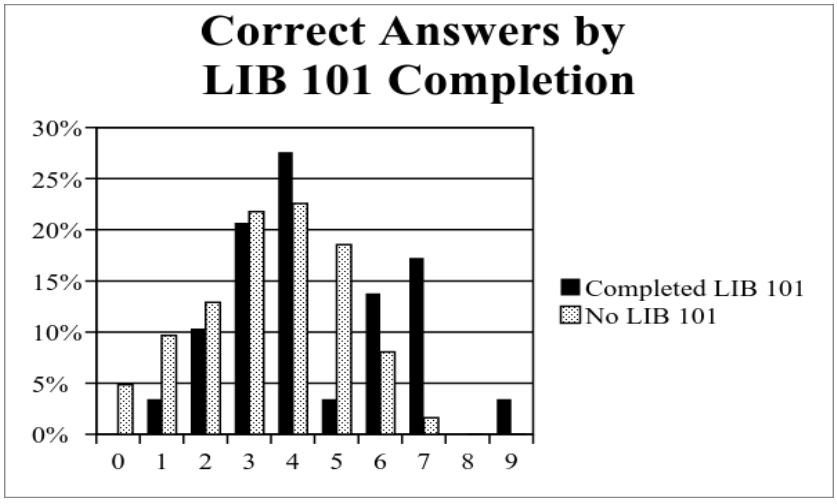

Figure 6. Number of correct responses per LIB and per NOLIB groups

Quantitative Analyses.

Chi-Square. A Chi-square test for association was performed to see if a relationship existed between the number of correct answers to the knowledge-based assessment (Correct) and the completion of LIB 101 (Completion). Unfortunately, nine cells (50%) had an expected count of less than 5; invalidating the results. The ten category variable Correct was transformed into a four category Correct2 variable with correct answer ranges of 0-1 (1), 2-4 (2), 5-6 (3), and 7-9 (4). The Chi-square test for association was repeated with the Correct2 variable in place of the Correct variable, and a statistically significant relationship between Correct2 and Completion was found: X^2 (3, N = 153) = 19.03, p = .00. The statistically significant relationship between Correct2 and Completion suggested that students who complete LIB 101 performed significantly better than the students who did not complete LIB 101.

Point-Biserial Correlation. Question numbers 14 (had the student ever asked for research assistance at a college/university library), 15 (had the student used a library database) and 16 (had the student attended a library instruction session), were combined to form a continuous variable of LIBRARY (library exposure) to see if library exposure or information literacy instruction outside of LIB 101 affected the nursing student's information literacy levels. As there would then be a continuous variable compared to a dichotomous variable, a Point-Biserial correlation was used to determine how well completion of the library course (COURSE) and library exposure (the combined three questions) (LIBRARY), correlate to and help to explain students' information literacy scores (CORRECT). Per the Point-Biserial correlations as laid out in Table 3, significant relationships exist between the dependent variable and each of the independent variables. A low, significant, and positive relationship exists between the completion of the course and the information literacy score, $r_{pb} = .26$, $p = .01$, which indicates that students who completed the library course tended to have higher information literacy scores on the knowledge-based assessment than students who had not. A low, significant, and positive relationship exists between library exposure and the information literacy score, $r_{pb} = .23$, $p = .01$, which indicates that students with more forms of library exposure tend to have higher information literacy scores than those who have fewer forms of library exposure from visiting the library, using the library databases, or having a librarian visit a previous class.

Table 3

Correlations and Descriptive Statistics (N = 153)

Variables	1	2	3
1. CORRECT	--		
2. LIBRARY[a]	.26**	--	
3. COURSE	.23**	.30**	--
M	3.63	1.56	.19
SD	1.75	1.10	.39

Note. Libraries[a]: *Combined Questions 14-16, continuous variable.*

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

The results of the Point-Biserial Correlation suggested that library exposure may positively affect correct responses on the knowledge-based assessment as well as the course. Unfortunately, as there was overlap of LIB 101 completion and library exposure among the students, a more specific conclusion could not be drawn from the Point-Biserial correlation. Thus, regression analysis was then used as well to analyze the data.

Multiple Regression Analysis was utilized to determine how library exposure (LIBRARY), as previously defined, and completion of the LIB 101 course (LIB 101) would help to explain students' information literacy scores (CORRECT). While the *n* of 153 may be considered low for multiple regression analysis, VanVoorhis & Morgan

(2007) referenced Green's 1991 study into how many cases multiple regression analyses requires, as well as Harris' 1985 formula for determining the "absolute minimum number of participants," to provide a "general rule of thumb… [of] no less than 50 participants for a correlation or regression with the number increasing with larger numbers of independent variables (IVs) (48)."

The analysis (Table 4) indicated that the model including the independent variables together accounted for approximately 9% of the variance in information literacy scores ($R^2 = .09$; $R^2_{adj} = .08$), $F(3, 150) = 7.71$, $p = .001$. Library exposure (LIBRARY) was a significant predictor of the information literacy score, $t(150) = 2.52$, $p < .05$; as was the library course (COURSE), $t(150) = 2.12$, $p < .05$. Holding the library course constant, as students were exposed to the library and its resources, the information literacy score was estimated to increase by 0.52 points (95% *CI*: 0.07, 0.59). Holding exposure to the library and library resources constant, completion of the library course affected the information literacy score by an estimated increase of 1.45 points (95% *CI*: 0.05, 1.50).

Using a tolerance cut-off level of 0.20 and a VIF cut-off of level 4, the Collinearity Statistics indicate no issue with multi-collinearity among the variables. An outlier diagnostic was also conducted using a Leverage cut-off value of .099, which returned no outliers.

Table 4

Regression Statistics (N = 153)

Variable	*b*	*SE b*	*β*	*t*	*pr*	*sr*	95% *CI* Lower	95% *CI* Upper
1. CORRECT/Intercept	2.98	.24	--	12.54***	–	–	2.51	3.44
2. LIBRARY[a]	.33	.13	.21	2.52*	.20	.20	.07	.59
3. COURSE	.77	.36	.17	2.12*	.17	.17	.05	1.50

Note. Library[a]: *Combined Questions 14-16.*

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

Qualitative Results.

Both inductive and deductive processes were utilized in the data analysis following Cresswell's (2008) model of coding for grounded research. Recordings of each interview/focus group were transcribed with additions in brackets of points from the field notes taken by hand during the proceedings. Each transcription was then reviewed and coded with keywords at least four times. The codes were then compiled and compared, resulting in emergent themes which were reviewed in association with the hypotheses. After completing the inductive analysis, the transcripts were again reviewed in light of the identified themes to ascertain if there were additional examples that had been missed. As only three of the interviewees had completed LIB 101, I also was able to separate thoughts from those who had completed LIB 101 (L) and from those who had not completed LIB 101 (NL).

Emergent themes. The resultant emergent themes are merely outlined below. They will be discussed in relation to the hypotheses in the Chapter Five. Bullet points are used when the statements were not from particular transcripts and in no specific order while P1/P2 and Researcher are used to identify ordered statements that occurred in an exchange/conversation.

Emergent Theme 1: The dependence on search engines, especially from "my phone" for information. Students, even those who had completed LIB 101, expressed a great dependence on Google for information seeking and often referred to convenience:

- I used to use Yahoo; I use Google now (NL).
- I always use Google….I really think that knowledge is all at the fingertips now (NL).
- I Bing it…It's on my phone (NL).
- Well, generally…my phone (NL).
- First thing I do is Google (NL).
- Usually, first thing I do is Google [laughs] (L).
- I'll Google what I need, and then I will look at different sources (L).

Emergent Theme 2: Disappointment that sought information is not found. Although the students continued to depend upon Google for information, including that for nursing information, they felt defeated because the information sought was not always found or prohibitively expensive to access when found via an open search engine.

- Sometimes, 'cause when you're typing in certain things that you're looking for and they're specific, it doesn't find it for you (NL).

- I do Google it, but then I look to see if it's from like *Nursing Journal* or whatever, and a lot of them do seem to ask for pay…so I just move on. I've never paid for anything on there, a lot of times, you don't know who you're dealing with and can't trust them (NL).

Emergent Theme 3: Frustration with information found via Google that may be unreliable or biased. Although the students continued to depend upon Google for information, including that for nursing information, they were also frustrated by the information that they identified as suspect.

- Some of that information's not real reliable (NL).
- I use Google…but, you know, most of the time the sites that you get—they are not the most, not correct, not right (NL).
- I always Google, then I have to look at the websites that pop up because of course some of those are not reliable (NL).
- When you get to it, you find that you don't get the right information that you are looking for…waste a lot of time (NL).
- Sometimes if you…just try to get quick information and you're looking for something and then you think, 'That's not right!' and you know that it's not accurate but just to get something quick, but you're still like, "Hey, that's not right (NL).

Students also referred to the problem of finding biased information and that much of the information that they come across—whether via searching or having it come to them, such as on Facebook—is slanted.

- [Discussing finding sources on vaccination] Oh, yeah, it's like one extreme or the other…it's like you're stupid and I'm not going to listen to what you say. It's hard to come together (NL).
- Like on Facebook, some people are way this side, some people are way that side and very few people are like hey let's come together and discuss this (NL).

Emergent Theme 4: Reliance on textbooks, especially nursing textbooks.

Students rely on their nursing textbooks because they have been instructed to do so by the nursing faculty and because of the disappointing and frustrating results that they have encountered on the open web.

- I use my [nursing] book to find out what websites to trust (NL).
- I always have like a text book source to go with it (NL)
- Going out we actually have a book, *MedServe* textbook that we had to buy, so we're supposed to go to that first. Sometimes I'll look for general, like I'll google something, like I'll google a disease and then all these websites pop up and then I'll just jot down some information but then I'll always go back to my text (NL).

Even those who had completed LIB 101 expressed an initial reliance on the nursing textbook: "I'd say we [nursing students] use the textbook for most information" (L).

The use of textbooks had also been reinforced across the curriculum. An NL student who had substituted College Composition II for the LIB 101 requirement explained that her research "information came from the [text] book that we were

reading." She further discussed that instead of requiring individual research, the instructor "would give us something to read and then some questions to answer" (NL). The interview accounts suggested that the nursing students relied heavily on their textbooks—a reliance that does not allow for learning from updated information.

Emergent Theme 5: Reliance on peers and others within circles who may not be good sources. Supporting Chatman's *Small Worlds* and *Information Poverty* models, students, upon experiencing problems finding the information, reported asking peers and others with whom they've had contact for help—even if better informed individuals were known and/or accessible.

- I asked another student to help me, that was my first problem. [Laughs.] I should have asked the [Nursing] teacher (NL).
- If I can't find it on the internet, then I'll go to a person. I try to find it on the internet, but if it looks like these not enough information, then I'll go find someone to ask (NL).
- [Exchange]

  P1: I was looking for the dosage calculations test book; it was very difficult to find (NL).

  Researcher: Were you using the library catalog?

  P1: No, just the website…the website search box (NL).

  Researcher: Do you mean the search box on the libraries page?

  P1: No, they just told us to search the college website (NL).

Researcher: You mean that you were searching the main college website? Like the search box on [the college website]?

P1: Yeah, the search box at the top (NL).

Researcher: They, the nursing faculty told you to search that way?

P1: No you have to take the test before you are actually in the nursing program; that's what the academic advisor told me to do (NL).

Emergent Theme 6: Fears that information and the profession are changing too quickly to keep up and that nurses (and nursing students) feel as though they don't have the time or the resources to do so. Students are "overwhelmed" and "scared" by the amount of information of which they need to be aware and the rate at which information is changed or updated in the nursing profession.

- As far as other resources, as far as being current and being in the right for procedures and everything, I don't really know where I would go to yet…what's so scary about it is it's got to be [current and accurate] because everything changes so fast in science and medicine and there's nothing that you're ever going to know 100%. It's like they're finding new stuff every day (NL).
- It makes it so hard 'cause…what they're teaching us now is going to be different in six months probably (NL).
- We have so many new rules and the guidelines for each hospital is different, each floor is different, so, like no matter how, so like trying to find research would be, you would think that would be an easy thing with the internet and

everything, but then you think of all the other things that you have to deal with and you just, ugh (NL).

- There are so many; I never know where to go…I never know where do I start (NL).
- I don't know what I'm looking for. It's overwhelming (NL).
- I opened [the databases] page up and I'm like, God, I don't know (NL).
- I'm scared of the library as a whole, it just seems overwhelming to me, it's like walking into a bookstore, it's so embarrassing (NL).

Students also referred to computer and access issues in regards to keeping up to date and worried about not only remaining current with the professional standards, etc., but also with the hardware and software and the connections required.

- Most hospitals have gone to paperless charting and because the nurses are responsible for educating patients on meds and things like that, definitely the knowledge on how to use the internet correctly and how to find what you're looking for, and you know, basic computer skills and working knowledge of different hospital programs and basic computer lingo. I guess like, I don't know what like 2 gigabytes means, like, I think, I just need to know how much stuff I can I save, just basic ways to maneuver around a computer and know how to save things and print things out…it's kinda like when I made fun of my parents for not knowing how to use the VCR…and now my nieces and nephews come over and they're like making I-movies and I'm like, what? I have no idea what you're doing (L).

- Every semester I've learned something new about the computer that, I mean, even with the laptop that I just got, I'm like, oh, I didn't know that I could do this (L)!
- [About working at a rural hospital] and there's probably no Starbucks or places like that, that we have wifi now, and even there unless you have a smartphone or your own laptop, you know, to access that, because, you know there're not any computers for people to use. Like you can't walk into Bread Company and sit down at a computer and even if you do have a computer, they don't offer, like printing services…or assistance. No one at Bread Co. is going to help you (L).

Emergent Theme 7: Practicing health care professionals confirm the use of Google. Students shared that the professionals that they shadow use Google as a basis for patient care.

- When I was doing my clinicals at [local hospital], I googled, I can't remember what this lady had, but I googled it because my nurse, my clinician, she was like, 'I don't even know what that is, I never heard of it,' so I googled it (NL).
- [Exchange]

  Researcher: Say you're working in the hospital and you have a question… would you be more likely to go back to your textbook or talk to a nurse?

  P1: Nurses Google (NL).

  P2: Yeah, they do, I watch them all the time (NL).

- Doctors do it [Google] (NL).

The students expressed the view that if Google is good enough for practicing nurses—and even doctors—it should be adequate for their needs. Yet, as earlier reviewed, they were unsatisfied with and leery of the results.

Emergent Theme 8: No clear understanding between an article database and a library catalog, much less database collections and their vendors, leading towards a desire for print resources with which they have a degree of certainty. Although some initially stated that they used article databases, as the conversations developed, it became clear that they either did not know how or did not even know what article databases were. When asked about finding information for research papers, one student began:

[exchange]

P1: I do go to the main library and search the databases (NL).

Researcher: Great…what databases do you use?

P1: Um, the main library…it just has that subject or title (NL)?

Researcher: Do you mean the library catalog where you find…

P1: Yeah, the library catalog (NL).

Researcher: So, you usually go to books?

P1: Yeah, I like books…I can actually see, hold them (NL).

Another student confessed, "I don't know even if you guys still use the thing [motions with hands]—card catalog" (NL).

Some students reported using periodical databases to research for other courses; however, student experiences varied. Another student, after some questions, clarified

that her experience with databases was limited to the "hot topic" (NL) databases *CQ Researcher* and *Opposing Viewpoints*. Identifying the database collection by the more generic vendor provider was common, as yet another student stated: "I would go to EBSCO first. I remember it from [English] class" (NL). An exchange among three students, all who had not completed LIB 101, again provided evidence that there was confusion about database collections as opposed to the database vendor:

P1: I like Ebso (NL).

P2: You mean Ebsco (NL)?

P1: Yeah, I went to that (NL).

P3: I used CINAHL (NL).

P2: It was the same thing (NL).

P3: Was it (NL)?

Note: These students were aware of EBSCOhost nursing databases at the time of the interview because they had just completed their scholarly article assignment. Unfortunately, they shared that they had struggled with the assignment and that two of them had had to redo it with nursing faculty assistance because they had initially completed the assignment with magazine articles.

Emergent Theme 9: Students want to be provided sources because they understand the need for, but are poor at, critical evaluation of information. Some realize the need to evaluate information and think that they can make good judgements just by reading the information, the appearance of the source, and/or the domain:

- After I read through it, I can just tell (NL).

- By the look of the website, yeah, the look and what they have on there (NL).
- I use my [nursing] book to find out what websites to trust (NL).
- I tend to trust sites that have a dot org or a dot edu after them instead of a dot com (NL).
- [Exchange]

P1: Don't they say like not to trust dot coms (NL)?

P2: Yeah, dot orgs, I thought that we were supposed to use dot orgs (NL).

P1: Possibly, I don't remember (NL).

P2: I don't remember which one…(NL).

Because they realize that they are lacking in critical thinking skills, they want to be provided with sources that they should and should not use:

- [Nursing faculty should provide] maybe the proper websites that they can go to...to get reliable information (NL).
- …nursing students would have like a list of websites that are reliable (NL).
- I remember that at the beginning they said don't use *WebMD*, so it would be nice if we had a list [of what to use] (NL).
- I know the one that I know she told us not to go to, it was like Medweb? Medweb.com (NL)?

Such desired lists are not limited to websites. The nurses also desired navigation to certain nursing journals (such as the navigation of subject specific databases that is included in the course objectives of the LIB 101 course):

- [if] we could only go through some specific journal articles, that would be helpful (NL).
- It'd be easier if we had one or two options (L).
- I just pick one [database] and click on it because I don't know the difference (NL).

As Google was reinforced in the professional arena, so was the idea of presented information as one student shared, "I guess 'cause in the hospital, it's like they have lists of how to do each procedure, so we go to that a lot" (NL).

Emergent Theme 10: Students are intimidated by and are unprepared for the scholarly article assignment. Due to the interviews varied by time in comparison to that of the scholarly article assignment, Emergent Theme 10 represents only the views of the control group. All three students who had completed LIB 101 were interviewed prior to the assignment. The following responses are all from students who had not completed LIB 101. Some interviews happened before the assignment, and the some students were unfamiliar with the term:

[Exchange]

Researcher: Do you know what I mean by a scholarly article?

P1: No (NL).

P2: No, not really (NL).

Some had just been assigned the project and were lost:

- It's kind of scary to me. I mean how do you know if it is research or not (NL)?
- I'm looking at this and I know that it's due in 6 weeks and I'm going, where do I start (NL)?

- [Exchange]

  P1: Well, I would just go to the library site and use that Search It and then put in the keyword that I was looking for (NL).

  Researcher: What if you wanted to only find the scholarly articles?

  P1: Oh, well, that's like what we've been trying to figure out all week (NL).

Others, because of having worked through the scholarly article assignment or from varied past experiences had some idea:

- There were keywords that we're supposed to use, that the research is done, not just…abstracts (NL).
- It would be more like a medicine based magazine versus like a regular…like health fitness, like someone in the medical field wrote this (NL).
- I used to work in a med-school library, so I feel like I have the know-how to search for the article through a journal because I used to have to do that kind of stuff, but it is kind of scary when you're, like is this actually what you're looking for, you know, and is it…right, like, definitely not *Wikipedia* (NL).

Others shared that they had incorrectly completed the project:

- I didn't realize that you had to have a study (NL).
- I wasn't sure what was meant by research (NL).
- I didn't know if it was research that it had to say research and that it should have results and all…my article was wrong, and I had to find another one (NL).

- [Exchange]

  P1: I did my whole project wrong; it was; it wasn't research, it didn't have the methods (NL).

  P2: Mine too. I needed clinical trials and stuff (NL).

Emergent Theme 11: Completion of LIB 101 provided information seeking skills, knowledge of various information collections, improved information behavior, and confidence. The three interviewees who completed LIB 101 shared the following statements that suggested the impact of having completed the information literacy course on their ability to find the resources that they needed in their introductory nursing course:

- We looked at biased and unbiased resources and learned that it's important to know if something biased before we trust it (L).
- I would know to go to nursing journals to find unbiased information (L).
- [I know] how to type it in…the best keywords to use for scholarly articles (L).
- If I need to look up like insulin, then I can look up insulin and then maybe I need to look at type 2 diabetes so I can narrow it from there. So I start broad just to kind of see what pops up and then get more specific as I get the information (L).
- I feel like as a nursing student, having taken that 101 course, that I'm able to find the information, and since everything is evidence based practice now, it will be helpful when I need to a research project to cite that evidence based information (L).
- When I took the capstone [for the general education degree, an option that some nurses take along with the technical program], I had like this big research paper

and I got books through MOBIUS, so I guess that I do use books [as well as databases] (L).

- Yeah, I know that this doesn't' sound modest, but yeah, I do feel like…I kind of have a little bit of an edge over some students (L).

Summary

The findings from both the quantitative and the qualitative portions of the research suggest that completion of the library class does affect the information literacy of students in their first semester of nursing classes: students who complete LIB 101 prior to enrollment in NUR 101 significantly demonstrate better information literacy behavior than the students who do not complete the information literacy course. While small numbers in certain cells invalidated the Chi-square analysis of individual answers to each knowledge-based assessment question, relationships do exist among the completion of the library course, library exposure, and the students' ability to correctly answer basic questions about information literacy. Emergent themes from the interviews and focus groups help support the results from quantitative data as well as the frameworks and models used to design the study, such as Chatman's *Small Worlds* and Latham and Gross' *Confidence and Competency*. The evidence provided by the project in its entirety suggests that, yes; students who complete LIB 101 prior to enrollment in NUR 101 significantly demonstrate better information literacy behavior than the students who do not complete the information literacy course. Overall, the frequencies of the assessment answers suggested that students, regardless of completion, relied most heavily on open web sites, with some additional reliance on library databases and on textbooks.

Although students distrusted information found on the open web and were often disappointed in their search results, that disappointment and untrustworthiness were not considered serious enough compared to convenience for students to exclude them.

The evidence also indicated that students are aware of the need to critically evaluate information—and that they are aware of their poor critical thinking skills. Evidence also suggested that students who completed LIB 101, as opposed to those who have not, can appropriately search with Boolean operators and locate, access, and use scholarly literature. Chapter Five: Discussion of Results will further explore the findings in relation to the initial hypotheses that were developed based upon such previous works.

Chapter Five:

Discussion of Results and Their Application to the Hypotheses

Chapter Four addressed the findings from both the quantitative and the qualitative portions of the research. Interview and focus groups revealed relationships and supporting themes between the library course and the correct responses to the knowledge-based assessment. Chapter Five, now, will apply the findings to the initial research question: how do Fundamentals of Nursing (NUR 101) students who have had no prior formal information literacy instruction locate, access, and use information compared to a sample of NUR 101 students who have completed the one credit hour Introduction to College and Online Literacy (LIB 101)? The findings will then be applied via individual examinations of the four sub-questions and their resulting hypotheses in light of the results of the knowledge-based assessment and of the Emergent Themes from the interviews. Table 5, for easier comparison, can be found following the discussion of the hypotheses. The discussion will then return to the theoretical frameworks upon which the research project was developed, discuss ideas for future research, and conclude the study.

Hypotheses Subsets

Hypothesis 1: Source Selection

1. What resources do students in the samples tend to rely on for research, and why do they rely upon them?

Hypothesis 1a: NOLIB students will utilize limited open access collections of information freely available to the general public. LIB students will know—and know how—to utilize broader collections of information including library databases and discipline-specific information.

Hypothesis 1b: NOLIB students will rely mostly on information with little or no evaluation from the open web the open web. LIB students will rely on resources with at least a minimum of vetting via inclusion in a library catalog or database collection.

Questions 3 and 4 of the knowledge-based assessment attempted to capture what sources students most commonly used to BEGIN (Question 3) and to rely upon MOST (Question 4) for completing course assignments. Because the Chi-square analysis was invalidated due to low response rate to some questions, the frequencies of answers (Appendix F) were examined for any differences among the answers of the two samples. Overall, the frequencies showed that students, regardless of completion, relied most heavily on open web sites, with some additional reliance on library databases and on textbooks.

The two questions could also have been better worded. For example, were students confused by format versus type of periodical? The inclusion of magazines and

journals as well as online databases (which primarily include magazines and journals in the STLCC collection) may have required students who accessed magazines and journals via the library databases to choose between use of the print periodicals and use of the periodicals via an online collection. Additionally, per the interview/focus group transcriptions, nursing students are instructed to primarily rely upon their textbooks for most NUR 101 assignments and for other pre-requisite courses, such as Anatomy and Physiology. Finally, the question was general in nature—the phrase for "college papers/presentations/projects" was used because, as these were nursing students and the assessment was administered at the beginning of their nursing curriculum, they would not yet have been assigned nursing projects. Would the responses have been different if the assessment had been administered later in their nursing curriculum and the question was limited to nursing papers/presentations/projects rather than any college assignment?

Interviews addressed the types of resources the students relied upon for research. Emergent Themes 1 and 11 provided some evidence that while all the students interviewed began with an open web search due to their familiarity with Google (or another search engine) as well as convenience (many began researching with their phone or other mobile device), the students who had not completed LIB 101 continued to rely primarily upon the open web for most of their resources, while those who had completed LIB 101 followed up with library database and sometimes library catalog searches. However, this was not only a matter of convenience (or laziness); Emergent Theme 7 suggested that in their reliance on Google, student nurses are replicating what they see professionals doing in healthcare locations. Emergent Theme 4 supported the

knowledge-based assessment to some degree, in finding that student nurses rely heavily on their textbooks. Again, the fact that the resource questions were vague as well as that the knowledge-based assessment was administered at the beginning of the first semester of nursing classes compared to the interviews taking place about mid-semester may have affected the outcomes. Nursing students may not have relied as heavily upon their textbooks in pre-nursing courses (reflected in the knowledge-based assessment) but began doing so once the nursing curriculum began. Finally, reliance on peers was not included as an option in the knowledge-based assessment, but it was referred to by several interviewees.

Consequently, although possibly due to the timing of the assessment and an uncertainty of the response options, H1 was not statistically supported by the quantitative portion of the study. However, the interviews from the qualitative portion did provide some evidence that the second sample did rely less heavily on open web resources found via search engines. Unfortunately, the low level of participation in the interviews (and especially the low level of participation by students who had completed LIB 101) may have limited the ability to get a closer approximation of the second sample's relied upon resources.

Hypothesis 2. Source Evaluation

2. How do students in the samples tend to evaluate and to verify—to determine credibility and reliability—of information resources?

Hypothesis 2: The first sample of students will not demonstrate an understanding of how to verify information—especially that found on the open web. The second sample will identify some means of verifying information.

Hypothesis 2 was addressed by Question 5 of the knowledge-based assessment. Question 5 measured how many students would identify the "best" way to verify the accuracy and credibility of articles or other research found on the web. The Chi-square analysis suggested that there was not a significant relationship between the correct answer on Question 5 and completion of the LIB 101 course. When the frequencies (Appendix F) were examined, slightly more students who had completed LIB 101 answered correctly (A) than those who had not completed the course; however, more students who had completed the course also responded with one of the incorrect options (B). One positive result was that none of the students who had completed the course said that *Wikipedia* should be used to verify accuracy and credibility of online sources, but a few students who had not completed LIB 101 did. That a number of students who had completed LIB 101 thought that the best way to verify information on the open web was to see if the site itself linked to known reputable web sites or other resources suggested that information evaluation—especially that of open web sites—may not be stressed enough in the LIB 101 course.

Accuracy, credibility, and reliability of sources—particularly freely accessible online resources—was addressed in the interviews. Emergent Theme 3 provided evidence that students found the web unreliable and were often disappointed in their

search results. That disappointment and unreliability, though, did not deter students from using freely available online sources. Emergent Theme 9 indicated that students are aware of the need to critically evaluate information, but they are poor critical thinkers. Most students wanted lists of sources or of specific collections to find answers, rather than wanting to learn techniques of critical thinking.

To summarize, H2 was not statistically supported by quantitative evidence. However, the interviews did provide some evidence that the nursing students, whether or not they had completed the LIB 101 course, realized that dependence upon open web search engines (whether through a computer, tablet, or phone) was problematic due to the quality of the information found. The interviews suggested that the students did attempt to critically think about information, but often lacked the knowledge and skills to do so. Again, perhaps methods of critically thinking about and evaluating resources need to be expanded and/or emphasized in the LIB 101 course.

Hypothesis 3: Identification of Scholarly Research

3. Do students in the samples understand the idea of scholarly research published in peer reviewed resources? Can they recognize scholarly research, and do they know how to find it?

Hypothesis 3: The first sample of students will not recognize aspects of scholarly research and will be unable to identify means of finding such research. The second sample will demonstrate a better understanding of the characteristics of and the means of accessing scholarly research.

Questions 8, 9, 10, and 11 of the knowledge-based assessment focused on scholarly sources. Chi-square analysis found that there was a statistically significant relationship between completion of the course and Question 8—identifying from a list the characteristic not necessarily associated with a scholarly article. However, Chi-square analysis found no statistically significant relationships between completion of the course and Questions 9, 10, and 11 (identification from provided lists: the most important aspect of a scholarly article that differentiates it from a popular resource, the basic definition of an academic journal, and the health related database). Question 10 may have been affected by the use of academic journals (usually in a generalized fashion) by faculty of some general education. For example, anecdotally, English Composition instructors, especially those teaching ENG 102 and assigning a formal research paper, require the use of one article from an academic journal. Personal experience in teaching the "one-shots" for such classes has shown that the academic journal requirement does not necessarily require students to identify and use scholarly articles (some faculty merely require any article—including essays and opinion pieces—from an academic journal), but it does serve to introduce students to academic sources. As the English department is one of the more library-friendly departments, it may be that the students who did not complete LIB 101 were aware of academic journals in general (Question 10), and had heard the term "peer reviewed" (Question 9), but were not aware of various sections of primary research, such as literature review, methods/methodology, etc. as asked in Question 8. Question 11 may have been problematic as some nursing students do find scholarly

articles in *Academic Search Elite* and in *Science Full-Text* as well as *CINAHL* and other health related databases. It may have been that of the small sample of students who completed LIB 101, only a few had used and/or would recognize *CINAHL*; similar to the findings from Pravikoff, Tanner, & Pierce's survey of the information literacy skills of practicing nurses (2005).

Student concepts of scholarly articles and/or health related databases were addressed in the interviews via Emergent Themes 8 and 10. Emergent Theme 8 suggested that, on one hand, many of the students in the first sample had no clear understanding between an article database and a library catalog, much less specific discipline related databases. The students who were familiar with the databases found the collection of databases "overwhelming" and did not know where to begin. On the other hand, students from the second sample identified health related databases for article use, and one student also referred to the use of MOBIUS, the library consortium through which students at the College can borrow materials from other academic libraries, as well as interlibrary loan use for articles not available through the College Libraries in full-text. Emergent Theme 10 provided evidence that the students who did not complete LIB 101 cannot describe a scholarly article and that, if they had already been assigned the related nursing assignment, felt unprepared and intimidated by it. Unfortunately, all three interviewees who had completed LIB 101 had not yet been assigned the nursing scholarly article project. However, after it was described to them, they did feel prepared to meet the challenge due to their experiences in LIB 101. Again, timing may have affected the outcomes of both the knowledge-based assessment as well as the interviews; in

particular, the timing of the interviews was not static and included some students who may have revisited concepts while completing or at least contemplating the nursing scholarly article assignment as opposed to others who had not yet received the assignment.

H3 was statistically supported by Question 8 of the quantitative portion of the study, but the Chi-square analyses of Questions 9, 10, and 11 did not provide any evidence of a relationship between the scholarly article related queries and course completion. The Emergent Themes from the qualitative investigation suggested that students who completed LIB 101 not only understand the concept of scholarly articles as published in academic journals, but also feel prepared to find them.

Hypothesis 4: Use of Keyword Search Techniques

4. How do nursing students in their first program semester search for health and or other information? Do they understand basic keyword search techniques?

Hypothesis 4: The first sample of students will not demonstrate the knowledge and ability to determine search strategies. The second sample will demonstrate the ability to use Boolean operators and other keyword search strategies.

Questions 12 and 13 of the knowledge-based assessment attempted to assess students' abilities regarding keyword searching. Chi-square analysis found a statistically significant relationship between identifying the correctly written nested Boolean search and course completion, providing evidence that the second sample of students was able to

demonstrate Boolean search skill knowledge while the first sample could not. The Chi-square analysis of Question 12, regarding identifying the best search function to use to begin to find resources on a complicated topic, did not suggest a significant relationship and the frequencies of answers was examined. Again, while it is not a significant finding, it should be noted that the first sample included "Title Search" and "I do not know" as answers whereas the second sample limited answers to either "Keyword Search" or "Subject Search," suggesting that they (the second sample) was at least more familiar with search functions for topical information. The Emergent Themes 9 and 11 from the qualitative study suggested that students who had not taken LIB 101 did not feel comfortable with searching in general while students who had completed the course felt comfortable using keyword search techniques. Overall, H4 was supported in part by both the quantitative and the qualitative portions of the study.

Table 5

Hypotheses and Applicable Knowledge-based Assessment Questions (Quantitative) and Emergent Themes (Qualitative)

Hypothesis	Question from Assessment	Emergent Theme from Interviews
H1a and H1b: Source Selection	3: Sources used to begin research assignments 4: Sources relied on the most for research assignments	1: Dependence on Search Engines for information 4: Reliance on textbooks 7: Practicing health professionals confirm the use of Google 11: Completion of LIB 101 improved information behavior and increased confidence
H2: Source Evaluation	5: Sources to verify accuracy and credibility	3: Frustration with unreliable information found via Google 9: Students want sources provided because they understand the need for, but are poor at, critical thinking
H3: Identification of Scholarly Research	8: Characteristic not necessarily that of a scholarly article 9: Most important aspect that differentiates scholarly articles from others 10: What is an academic journal 11: Which EBSCOhost database used to find scholarly nursing articles	8: Desire for certainty via print sources stemming from lack of clarity between article databases and catalog and between article databases and vendors. 10: Students are intimidated by and are unprepared for the scholarly article assignment
H4: Use of Keyword Search Techniques	12: The best search function to find a sophisticated topic 13: Which is the most effective (correct Boolean) search	9: Students want sources provided because they understand the need for, but are poor at, critical thinking 11: Completion of LIB 101 improved information behavior and increased confidence

Research Question

The entirety of the research study was based on the Conceptual Question: How does the completion of a one-credit hour information literacy course affect the information behavior and the information literacy skills of samples of students in an introductory nursing course? From that, the Research question developed:

Specifically, how does a sample of Fundamentals of Nursing (NUR 101) students who have had no prior formal information literacy instruction locate, access, and use information as compared to a sample of NUR 101 students who have completed the one credit hour Introduction to College and Online Literacy (LIB 101)?

Hypothesis: The findings will indicate that the students who complete LIB 101 prior to enrollment in NUR 101 will significantly demonstrate better information literacy behavior than the students who do not complete the information literacy course.

In addition to the evidence presented with the subsets of the Hypotheses, the Chi-square test for association found a statistically significant relationship between the transformed knowledge-based assessment data (Correct2) and course completion (Completion): X^2 (3, N = 153) = 19.03, p = .00. The statistically significant relationship between Correct2 and Completion suggested that students who complete LIB 101 performed significantly better than the students who did not complete LIB 101. Likewise, the Point-Biserial correlation found relationships between each of the independent variables (COURSE and LIBRARY) and the Information Literacy Score

(CORRECT). A low, significant, and positive relationship was found between the course level and the information literacy score, $r_{pb} = .26$, $p = .01$, which also indicates that students who completed LIB 101 tended to have higher information literacy scores on the knowledge-based assessment than students who had not. However, a low, significant, and positive relationship was also found between library exposure and the information literacy score, $r_{pb} = .23$, $p = .01$, indicating that students with more forms of library exposure tend to have higher information literacy scores than those who have fewer forms of library exposure. Similarly, the Regression Analysis suggested that while the completion of LIB 101 (COURSE) was a significant predictor of the information literacy score: $t(150) = 2.12$, $p < .05$, it also indicated that library exposure (LIBRARY) was a significant predictor: $t(150) = 2.52$, $p < .05$.

The results of the Point-Biserial Correlation and the Regression Analysis suggested that the LIB 101 course overlap with library exposure might have affected the students' submission of correct responses on the knowledge-based assessment. Additionally, the Emergent Theme 11 suggested that the completion of LIB 101 prepared students for the evidence based professional training in the nursing curriculum by providing them with information seeking skills, knowledge of various information collections, improved information behavior, and confidence. The evidence provided by the project in its entirety suggests that, yes; students who complete LIB 101 prior to enrollment in NUR 101 significantly demonstrate better information literacy behavior than the students who do not complete the information literacy course.

Returning to the Theoretical Frameworks

The performance of the student nurses on the knowledge-based assessment, as well as their experiences and beliefs regarding information shared during the interviews, can be tied to Chatman's theory of Information Poverty and to Belkin's Anomalous States of Knowledge: student nurses are marginalized by lack of previous knowledge and access (as are many community college students), and many do not realize the limitations of their information seeking behavior. In the interviews, the student nurses often referred to their various small worlds—their families, their nursing class cohort, and clinical units. Students also often referred to the information world as "scary" and "overwhelming" and worried about needing to keep up with various software programs and other technologies used by different hospitals, clinics, medical offices, etc., suggesting that the students suffer from library, information, and/or computer anxiety as originally theorized by Mellon. Such varied literacies, in turn, hinted at Mackey and Jacobson's idea of the need for Metaliteracy in the digital age. Lastly, the fruits of the study are also reflected in Gross and Latham's theory of Competency and Confidence (based upon the Dunning-Kruger effect)—although this seemed somewhat cyclical: students who did not have critical thinking skills and did not know what scholarly nursing literature was thought that they could just find resources on the open web and make a decision regarding its credibility and reliability simply based upon a quick read-over. Others, once confronted with the knowledge that their skills simply wouldn't work for evidence based nursing, lost that confidence and felt "intimidated." Those who completed the LIB 101 class seemed to make parallel strides in competency and

confidence. That is, while they gained some confidence by being more knowledgeable and experienced than their NOLIB peers, the LIB students might lose that confidence as additional gaps surfaced.

Future Study

There is much room for further study—not only within the confines of the effect of LIB 101 on the nursing students of the Campus—but the effect of information literacy instruction on nursing students at the College, as well as on both student nurses and practicing nurses, generally. Beside the need for future attempts to overcome the limitations of the possible course overlap with library exposure—particularly exposure from general education course instruction and assignments—unfortunate timing, low participation (especially in the difficulty of including students who had completed the course due to "grandfathering"), awkwardly worded questions, and other limitations herein discussed, one example of future avenues of investigation was suggested by the interviews. One of the words most used by the students in the interviews was "overwhelm" and statements from several participants suggested that the nursing students felt overwhelmed not only by the amount of information to become a nurse, but also by the rate of change of information in the nursing field. Missouri is one of the states that does not require nurses to complete formal continuing education (American Nurses Association, 2011). Given the findings of this study, the lack of formal continuing education is particularly is troubling. The future of nursing relies upon evidence based practice, and, ultimately, evidence based practice relies on information literate nurses.

Additionally, the findings of the research did not specifically refer to the conceptual frameworks of Metaliteracy and of High Reliability Organizations. However, some statements from the qualitative portion, including references to the need to understand hospital software and communications as well as the trust placed in nurses, suggested the need for further such related investigations. The need for nurses (and student nurses) to be technically savvy and to be continuous learners in regards to quickly changing and developing tools, devices, software, etc., requires nurses to be literate in much more than information literacy. Simple tools such as the thermometer and blood pressure cuff have changed dramatically and may differ in application in various medical settings. More complex tools, such as software based and online nursing charts, may require specialized and ongoing training. How does the ongoing development of such tools and their use affect nurses and their ability to effectively provide patient care?

How does the theory of High Reliability (Organization) affect nurses? Nursing class cohorts as well as clinical units could be framed as within a High Reliability Organizational Culture as defined by Weick. These first year student nurses, while not yet feeling the pressure of the responsibility for others' health and life, are burdened by the high stakes of the nursing courses and of the test-based licensure examinations. As such, they tend to follow already determined paths, such as wanting to know what articles to use, what procedures to follow, etc., rather than innovating and devising new paths. While the concept was important to the development of the research, the findings did not specifically address how nurses hold a high level of responsibility--the very lives of their

patients. How does this responsibility weigh on nurses and student nurses and how does it affect their ability to incorporate new concepts in nursing?

Finally, as the ACRL *Framework* was adopted after the development of this study, research in light of the *Framework* threshold concepts should be undertaken. How does the flexibility of the Framework lend itself to Nursing? Is the malleable nature of the Framework conducive to researching EBP or is a more exacting set of standards more useful?

Conclusion

A perfect storm is brewing in the nursing profession. As the profession increasingly relies upon its practitioners to keep current and to deliver care grounded in evidence based practice, nurses will increasingly need to effectively find and use the pertinent information from an ever-growing body of research. This study provides evidence that an information literacy course significantly affected the information literacy skills of student nurses in a community college nursing program. By continuing to research with the goal of improving the instruction of information literacy concepts by better understanding the information behavior of nursing students, librarians can help such students improve their understanding and use of information—and their abilities to engage in evidence based practice nursing. By empowering nursing students with information literacy knowledge and skills, librarians can perhaps help nurses to better treat and assist their patients and to ultimately improve healthcare in the nation.

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Appendix A

LIB 101: Introduction to Library and Online Research
Course Profile

St. Louis Community College

COURSE PROFILE: GENERAL EDUCATION COURSES

1. **Course Title:** Introduction to Library and Online Research
   Short Title: Intro to Library/Online Resrch
2. **Course Number:** LIB: 101
3. **Course Level:** 100-199 Beginning level credit courses
4. **Course Description:**
   This course offers students instruction in using library resources, including the Internet, online databases, and the library catalog. Through a combination of hands-on practice and lectures, students will learn to locate, evaluate, and manage information efficiently and effectively.
5. **Credit Hours:** 1.00
6. **Weekly contact hours:**
   a. **Lecture Hours:** 1.00
   b. **Lab Hours:** 0.00
   c. **Studio Hours:** 0.00
   d. **Activity Hours:** 0.00
   e. **Clinical Hours:** 0.00
   Workplace
   f. **Learning Hours:** 0.00
   g. **Other Hours:** 0.00
7. **Requisites:**
   Prerequisite: Reading Proficiency
8. **Course profile acceptance in the general education category:**
9. **Explain why this course should be considered as a general education course.** (See general education requirements).

   This college-level course is designed to broaden students' awareness of the varied types and formats of information that are available to them. In addition, students learn the fundamental skills and concepts of information literacy that allow them to locate, evaluate, organize, synthesize and document information. These are the very skills that enable students to be independent life-long learners. Introduction to Information Literacy provides an overall view of how scholarly and popular information is organized and accessed. This view and the specific skills learned in this class are essential for students who intend to continue their studies in the liberal arts or sciences. Finally, students who successfully complete this course meet the Missouri state goals for Managing Information, which are "to develop students' abilities to locate, organize, store, retrieve, evaluate, synthesize, and annotate information from print, electronic, and other sources in preparation for solving problems and making informed decisions. "

10. **Upon successful completion of the course, the student will know or understand:**
    1. Determine information needs by exploring topics from various perspectives using oral and written sources
    2. Develop information-seeking strategies to locate and retrieve information through traditional and electronic means using appropriate ethical standards
    3. Acquire information comprehensively and efficiently
    4. Analyze information relative to need and awareness of various perceptual and cognitive filters

5. Organize information systematically using appropriate methodology proportionate to the scope of the inquiry
6. Synthesize information to construct meaning and integrate prior and new knowledge
7. Use information to solve problems, present arguments or make informed decisions
8. Evaluate information, problem-solving processes and product through reflection and revision to ensure continuous improvement

11. **Upon successful completion of the course, the student will demonstrate the ability to:**
    1. Communicate information needs in the form of a question after conducting background research in various sources. (MI - A)
    2. Describe and distinguish between the various formats of information. (MI - D)
    3. Describe and demonstrate effective search strategies for at least 3 different information needs. (MI - B, C)
    4. Through hands-on practice with various databases, solve at least 2 specific information problems. (MI - G)
    5. Demonstrate the features and use of a specific database. (MI - C, D, G)
    6. Review at least three sources of information, e.g., an electronic database, a standard reference source, a scholarly journal. (MI - D, G, H)
    7. Create a comprehensive annotated bibliography project. (MI - B, C, D E, F, G, H)
12. **Expected knowledge/skills goal reinforcement objectives**

Mathematics										
Competency	A	B	C	D	E	F	G			
SLO										
Assessment										
Social and Behavioral Sciences										
Competency	A	B	C	D	E	F	G	H	I	J
SLO										
Assessment										
Life and Physical Sciences										
Competency	A	B	C	D	E	F				
SLO										
Assessment										
Humanities and Fine Arts										
Competency	A	B	C	D	E	F	G			
SLO										
Assessment										
Interdisciplinary Studies										
Competency	A	B	C	D	E	F	G			
SLO										
Assessment										
Global/Intercultural										
Competency	A	B	C	D						
SLO										
Assessment										
Valuing										
Competency	A	B	C	D	E	F	G			
SLO										
Assessment										
Higher Order Thinking										

Competency	A	B	C							
SLO										
Assessment										
Communicating										
Competency	A	B	C	D	E	F	G	H		
SLO										
Assessment										
Managing Information										
Competency	A	B	C	D	E	F				
SLO										
Assessment										

13. **Minimum Requirements:**

a. Writing Requirements: Students must demonstrate mastery of course material by completing written assignments.

b. Projects: Students must demonstrate the use of information sources such as periodical databases or library catalogs. Students must complete a comprehensive bibliography project.

c. Performance: Students must demonstrate an understanding of search strategies such as the use of Boolean operators through hands-on assignments.

d. Other: Students must participate in collaborative activities.

Appendix B

The Information Literacy Competency Standards for Nursing

Retrieved from http://www.ala.org/acrl/standards/nursing

Standard One

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

Performance Indicators:

The information literate nurse:

1. Defines and articulates the need for information.

   Outcomes include:

a. Identifies and/or paraphrases a research topic, or other information need such as that resulting from an assigned research project or literature review.
b. Consults with instructor/advisor for appropriateness of topic, clinical question, research project, or research question.
c. Forms a focused question by breaking it down into unique concepts to search for individually (e.g., PICO, PICOT, PICOTT).
d. Develops a hypothesis or thesis statement and formulates questions based on the information need.
e. Explores general information sources including textbooks, organizational websites, government websites, and resources of their employer, to gain background information on a topic
f. Differentiates between general and focused topics.
g. Identifies the concepts of a research question, and then finds subject headings, limiters and keywords that map to these concepts.

2. Identifies a variety of types and formats of potential sources for information.

   Outcomes include:

a. Identifies the various disciplines publishing research on the concepts of the question (e.g., health sciences, biology, psychology).
b. Identifies the publication types in the progression from background (e.g., encyclopedia, textbooks) to foreground research (e.g., primary literature).
c. Identifies likely type of publication where appropriate information is published (e.g., popular vs. trade vs. scholarly, current vs. seminal, primary vs. secondary vs. tertiary).
d. Considers experts or other researchers as potential information resources.
e. Identifies the value and differences of potential resources in a variety of formats (e.g., multimedia, database, website, data set, audio/visual, book, graph).
f. Recognizes that information may need to be constructed with raw data from primary sources or by primary research.

g. Recognizes that potentially useful information or data in a variety of formats may be proprietary, have limited access, or may be freely available online.

3. Has a working knowledge of the literature in nursing related fields and how it is produced.

Outcomes include:

a. Recognizes how scientific, medical, and nursing practice information is formally and informally produced, organized, and disseminated.
b. Recognizes the primary sources of nursing: Empirical/original research, conference proceedings, dissertations, technical reports, or informal online communication.
c. Recognizes the secondary sources of nursing: Reviews, systematic reviews, meta-analyses, evidence summaries, or guidelines.
d. Identifies professional associations of the field and their literature.
e. Identifies sources that are specific to the field, e.g. manuals, handbooks standards, etc.
f. Recognizes that knowledge can be organized into disciplines and combinations of disciplines (multidisciplinary) that influence the way information is accessed.
g. Recognizes the value of archival information, recognizes how its use and importance may vary with each discipline, and recognizes the importance of preservation of information.

4. Considers the costs and benefits of acquiring the needed information.

Outcomes include:

a. Determines the availability of needed information and makes decisions on broadening the information seeking process beyond locally held resources.
b. Takes advantage of continuing education opportunities to acquire new skills.
c. Formulates a realistic overall plan and timeline to acquire the needed information.
d. Recognizes that information needed may be in a foreign language and that translation may be necessary.
e. Locates research instruments (questionnaires, scales, interview guides) and identifies if they are appropriate to their populations.
f. Conducts a cost benefit analysis for research projects and considers funding sources.
g. Interprets the complexities of accessing full text and the various publishing models.

5. Reevaluates the nature and extent of the information need.

Outcomes include:

a. Understands that research is an iterative process, and a process of discovering what research has been published on a topic to focus a research question.
b. Evaluates and refines original PICO(TT) question in relation to the literature found.
c. Points out evidence gaps in the literature.
d. Describes criteria used to make information choices.

Standard Two

The information literate nurse accesses needed information effectively and efficiently.

Performance Indicators:

The information literate nurse:

1. Selects the most appropriate investigative methods or information retrieval systems for accessing the needed information.

   Outcomes Include:

a. Recognizes where to look for research literature and other sources of evidence at each stage of the research process.
b. Investigates the scope, content, and organization of information retrieval systems.
c. Selects efficient and effective approaches for accessing the information needed from an information retrieval system.
d. Locates primary or secondary quantitative or qualitative data.

2. Constructs and implements efficient and effectively-designed search strategies.

   Outcomes Include:

a. Formulates a strategic approach to searching the diverse resources available to address each element of the PICO(TT) question.
b. Identifies keywords, synonyms and related terms for the information needed.
c. Identifies the differences between keyword and subject searching and articulates how to use each independently, or in combination, to complete a comprehensive search.
d. Navigates hierarchies of subject terms (e.g., MeSH and CINAHL) and utilizes scope notes, subheadings, and searching in a thesaurus.
e. Constructs a search strategy using appropriate commands for the information retrieval system selected (e.g., Boolean operators, truncation, and adjacency; internal organizers such as indexes for books).
f. Recognizes similarities and differences across user interfaces (e.g. field codes, command languages, and search parameters).
g. Develops search strategies to locate nursing theories and philosophies.
h. Implements search strategies to locate grey literature such as conference proceedings, theses, dissertations, and white papers.
i. Follows citations and cited references to identify additional, pertinent articles.

3. Retrieves information online or in person using a variety of methods.

   Outcomes Include:

a. Uses various search systems to retrieve information in a variety of formats (e.g., the library catalog, general and specialized databases, and authoritative websites).
b. Uses various classification schemes and other systems to locate information resources within the library.
c. Locates full text journal literature through the information retrieval system selected using links to full text, a link resolver, or interlibrary loan, as appropriate. Does not artificially limit to only readily available full text within the database.
d. Uses online or in-person services when assistance is needed (e.g., interlibrary loan, document delivery, librarians, library staff, primary investigators).
e. Uses surveys, letters, interviews, experiments, and other forms of inquiry to retrieve information or data, as appropriate for the research area or discipline.

4. Refines the search strategy if necessary.

Outcomes Include:

a. Uses limiters (e.g., year, population, age, English-language, geographical location, human studies).
b. Uses publication type limits to identify and locate the appropriate level of evidence within the information retrieval system (e.g., qualitative studies, reviews of literature, controlled trials, evidence-based clinical practice guidelines, meta-analyses, and systematic reviews).
c. Adjusts search strategy to access clinical opinions, research, or evidence summaries according to information need.
d. Selects appropriate subject headings from records of relevant articles to refine search statements (aka “pearl growing”).
e. Assesses the quantity, quality, accuracy, currency, and relevance of the search results and the limitations of the information retrieval systems or investigative methods, to determine whether alternatives should be sought and utilized.
f. Identifies gaps in the information retrieved and determines if the search strategy should be revised.
g. Repeats the search using the revised strategy or new systems or methods as necessary.

5. Extracts, records, and manages the information and its sources.

Outcomes Include:

a. Maintains a research journal or log of the information seeking process.
b. Selects the most appropriate technology for the task of extracting the needed information (e.g., copying, scanning, exporting to bibliographic management software).
c. Creates a system for organizing the information utilizing file management concepts.
d. Differentiates between the types of sources cited; understands the elements and correct syntax of a citation for a wide range of resources.
e. Records all pertinent citation information for future reference.

Standard Three

The information literate nurse critically evaluates the procured information and its sources, and as a result, decides whether or not to modify the initial query and/or seek additional sources and whether to develop a new research process.

Performance Indicators:

The information literate nurse:

1. Summarizes the main ideas to be extracted from the information gathered.

Outcomes include:

a. Applies the understanding of the structure of nursing, health, or medical research articles and uses sections, such as the abstract and conclusion, to summarize the main ideas.
b. Selects main ideas from the text.
c. Identifies the elements of the question addressed, and/or restates the main ideas of the information source to address the question.

d. Identifies verbatim material that can then be appropriately quoted.

2. Selects information by articulating and applying criteria for evaluating both the information and its sources.

Outcomes include:

a. Distinguishes among facts, points of view, and opinion.
b. Differentiates clinical opinion from research and evidence summaries.
c. Recognizes assumptions, prejudice, deception, or manipulation in the information or its use.
d. Considers resources from a variety of disciplines beyond nursing, including education and teaching, psychology, business, leadership and management, public health, health care administration, demographics, and social sciences.
e. Examines and compares information and evidence from various sources in order to evaluate reliability, validity, accuracy, authority, currency, and point of view or bias.
f. Recognizes the cultural, historical, physical, political, social, or other context within which the information was created, and understands the impact of context on interpreting the information.
g. Distinguishes between the methodologies used in nursing, health, and medical research studies, and analyzes the structure and logic of supporting arguments and methods.
h. Identifies gaps in the literature as research opportunities.

3. Synthesizes main ideas to construct new concepts.

Outcomes include:

a. Synthesizes divergent information to answer a research question and generalizes relative research to a related question.
b. Recognizes interrelationships among concepts and combines them into potentially useful primary statements and/or summary of findings with supporting evidence.
c. Extends initial synthesis, when possible, at a higher level of abstraction to construct new hypotheses that may require additional information.
d. Utilizes computer and other technologies (e.g. spreadsheets, databases, multimedia, simulators, and audio or visual equipment) for studying the interaction of ideas and other phenomena.
e. Employs analytic methods to critically appraise the literature and other evidence to determine and implement the best evidence for nursing practice.
f. Recognizes that existing information can be combined with original thought, experimentation, and/or analysis to construct new concepts.
g. Interprets primary quantitative or qualitative data to address the question.

4. Compares new knowledge with prior knowledge to determine the value added, contradictions, or other unique characteristics of the information.

Outcomes include:

a. Values the need for continuous improvement based on new knowledge.
b. Discriminates between valid and invalid reasons for modifying evidence-based practice.
c. Uses consciously selected criteria to determine whether the information contradicts or verifies information used from other sources.

d. Draws conclusions based upon information gathered.
e. Tests theories with discipline-appropriate techniques (e.g., simulators, experiments).
f. Determines probable accuracy by questioning the source of the information, limitations of the information gathering tools or strategies, and the reasonableness of the conclusions.
g. Integrates new information with previous information or knowledge.
h. Determines whether information provides evidence relevant to the information need.
i. Includes information that is pertinent even when it contradicts the individual's value system, being careful to maintain a neutral position.

5. Validates understanding and interpretation of the information through discourse with other individuals, subject-area experts, and/or practitioners.

Outcomes include:

a. Participates in classroom and virtual/electronic discussions for validating understanding and interpreting the information.
b. Works effectively in small groups or teams.
c. Seeks expert opinion through a variety of mechanisms (e.g., interviews, electronic communication).
d. Utilizes, and/or contributes to, and shares evidence of best practices with, interprofessional teams, professional association discussion lists, networks, and at professional conferences.
e. Initiates and facilitates professional discourse and discussions as a team member, mentor, practitioner, preceptor, and/or educator.

6. Determines whether the initial query should be revised.

Outcomes include:

a. Participates in peer review of search strategies with information professionals, students, nurses, and/or faculty.
b. Draws conclusions based on a combination of personal training and research.
c. Determines if original information need has been satisfied or if additional information is needed.
d. Reviews search strategy and incorporates additional concepts as necessary.
e. Reviews information retrieval sources used and expands to include others as needed.

7. Evaluates the procured information and the entire process.

Outcomes include:

a. Reviews and assesses the procured information and determines possible improvements in the information seeking process.
b. Applies the improvements to subsequent projects.

Standard Four

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

Performance Indicators:

The information literate nurse:

1. Applies new and prior information to the planning and creation of a particular product.

Outcomes Include:

a. Organizes the content in a manner that supports the purposes and format of the product or performance (e.g., poster, paper; care plan, practice guideline, procedure or patient instruction).
b. Articulates knowledge and skills transferred from prior experiences to planning and creating the product.
c. Selects, analyzes, organizes, summarizes and/or synthesizes, and integrates the new and prior information, including raw data, quotations and paraphrasings, in a manner that supports the purposes of the product.
d. Utilizes technologies to communicate, organize, collaborate, and prepare the product or performance.
e. Manipulates digital text, images, and data, as needed, transferring them from their original locations and formats to a new context.
f. Initiates changes in performance of patient care when information or evidence warrants evaluation of other options for improving outcomes or decreasing adverse events.
g. Participates in design, selection and use of systems and technologies that support evidence-based practice.
h. Designs original research studies to address gaps in the literature.

2. Revises the development process for the product.

Outcomes Include:

a. Maintains and reviews a journal or log of activities related to the information seeking, evaluating, and communicating process to discover potential areas to target for process improvement.
b. Reflects on past successes, failures, and alternative strategies.
c. Applies devised improvements to subsequent projects and activities.
d. Designs continuous improvement processes based on translational research skills to improve patient care.

3. Communicates the product effectively to others.

Outcomes Include:

a. Chooses a communication medium and format that best supports the purposes of the product or performance (e.g., written, verbal, nonverbal, and emerging technology methods) and the intended audience (e.g., peers, work groups, patients).
b. Communicates clearly and succinctly in a style that supports the purposes of the intended audience.
c. Employs principles of design in the visual display of information and data.
d. Uses information and communication technologies to advance patient education, enhance accessibility of care, analyze practice patterns, and improve health care outcomes.
e. Articulates to a variety of audiences the evidence base for practice decisions, including the credibility of sources of information and the relevance to the practice problem confronted.
f. Contributes to the scholarly conversation, moving it forward by adding individual analysis.

g. Conducts original research to produce information to address identified gaps, and publishes findings.
h. Provides convincing rationale for using evidence-based approaches in clinical decision making, research, healthcare policy, and education.

Standard Five

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

Performance Indicators:

The information literate nurse:

1. Understands many of the ethical, legal and socio-economic issues surrounding information and information technology.

Outcomes include:

a. Identifies and discusses issues related to privacy and security in both print and electronic environments.
b. Identifies and discusses issues related to free vs. fee-based access to information.
c. Identifies and discusses issues related to censorship and freedom of speech.
d. Follows HIPAA guidelines to ensure protection of health care information.
e. Does not allow personal bias to influence acquisition or communication of health information.
f. Uses books, articles, media and images for written or oral presentations within the scope of fair use or the permission of the owner, demonstrating understanding of intellectual property, copyright, and fair use of copyrighted material.

2. Follows laws, regulations, institutional policies, and etiquette related to the access and use of information resources.

Outcomes include:

a. Uses formal conventions when engaged in electronic communication. (Includes a greeting, content written in full sentences, and suitable to a business environment.)
b. Complies with institutional policies on access to information resources.
c. Recognizes the complexities of accessing full text and the various publishing models.
d. Reads and complies with the academic integrity guidelines of the institution to which they are affiliated.
e. Complies with and teaches students and peers about concepts of academic integrity and plagiarism, and about appropriate behavior online and in the classroom.
f. Follows copyright restrictions in regard to course reserves and course management environments.
g. Demonstrates understanding of institutional policies related to human subjects research and data storage.

3. Acknowledges the use of information sources in communicating the product or performance.

Outcomes include:

a. Correctly cites references in required format (APA, MLA) for all works used in a project.
b. Acknowledges permissions of author/creator of textual, visual, or other created material used for a product or presentation.
c. Includes information about attribution in course design.

Appendix C

Nursing Assessment (Knowledge-based Assessment)

1. Dear Participant:

My name is Katherine (Katy) Smith, and I am a faculty member at the Meramec Campus, St. Louis Community College and a doctoral candidate at the University of Missouri. I ask for your participation in a research project about students and their information knowledge and use. Participation will be the completion of a short questionnaire about information and libraries. It is estimated to take approximately 10-15 minutes.

Your participation in this project is completely voluntary. Your choice to participate (or not) will not impact your grade or your status with St. Louis Community College. Your participation will be confidential; responses will be sent directly to the researcher with no name or STLCC ID number. All information that is obtained during this research project will be kept secure and will be accessible only to project personnel. It will also be coded to remove all identifying information.

There is no risk anticipated as a result of participating in this research—other than what might be experienced in normal life. The results of this study may be used for a dissertation, a scholarly report, journal articles, and/or conference presentations. In any publication or public presentation, pseudonyms will be substituted for any identifying information.

If you have any questions about this research project, please feel free to contact me by email, email, or telephone as listed below. If you have any questions about your rights as a research participant, please contact Dr. Vernon Kays' office at 314-984-7664. Thank you for your consideration, Katherine (Katy) Smith, MAILS Reference Librarian kesmith@stlcc.edu 314-984-7620

If you DO want to participate, please answer "Yes" to proceed to the questionnaire/survey. You will receive a print copy of the permission should you wish to review it. Please answer the questions to the best of your ability. If you do not know an answer, please answer with the "I do not know" answer option--please do not try guessing.

If you DO NOT want to participate, you do not need to do anything.

*

- Yes
- No

2. What age category includes your age? *

- 17 or younger
- 18 through 21
- 22 through 30
- 31 through 40
- 41 and over
- I prefer not to answer

3. What resource do you tend to use **to begin** your research for college papers/presentations/projects?

Please choose one:

- Wikipedia
- Textbooks
- Social Networking Sites (Facebook, Twitter, etc.)
- Search Engines (Google, Bing, Yahoo, etc.)
- Reference Resources (Encyclopedias, almanacs, etc.)
- Other Books and/or Ebooks
- Magazines or Journals
- Library Databases
- Other

4. What resource do you tend to use **the most** for researching college papers/presentations/projects?

- Wikipedia
- Textbooks
- Social Networking Sites (Facebook, Twitter, etc.)
- Search Engines (Google, Bing, Yahoo, etc.)
- Reference Resources (Encyclopedias, almanacs, etc.)
- Other books and/or Ebooks
- Magazines or Journals
- Library Databases

- Other

5. Which of the following is the best way to verify the accuracy and credibility of articles or other research found on the Web?

- See if similar information is found on other reputable websites or other resources
- See if the web site links to known, reputable web sites or other resources
- Check Wikipedia
- Check Snopes.com
- I do not know

6. If you found some great articles from a Google search, but the web sites require payment to fully access the articles, what should you do?

- Pay for the articles because that is the ethical thing to do
- Contact the websites because they may allow you free access because you are a student
- Contact your instructor because he or she may have the password for the web sites
- Contact a librarian because you may have free access to those articles through the library
- I do not know

7. When should you cite your sources?

- When you use a unique word, phrase, sentence, or passage directly from the original source
- When you use your own words to communicate the main idea and the details from the original source
- When you use your own words to summarize the main ideas from a number of resources
- All of the above
- I do not know

8. Which of the following is not necessarily a characteristic of a scholarly article?

- Photographs or other illustrations
- Literature review
- Methods or methodology
- References/works cited/bibliography

- I do not know

9. What is the most important aspect of a scholarly article that differentiates it from a popular resource?

- Peer review
- Internal citation
- Multiple authors
- Author biography
- I do not know

10. What is an academic journal?

- A diary kept by researchers, professors, and/or students about their research in order to archive and to cite their work
- A diary kept by students to record their progress in a degree or certificate program
- A publication that includes articles written by specialists in a particular field for other specialists in that same field
- A publication that includes articles written by journalists or other writers for the general public
- I do not know

11. Which of the following resources from EBSCOhost would be the preferred resource to find a nursing scholarly research article?

- Academic Search Elite
- CINAHL
- Masterfile Elite
- Science Full Text
- I do not know

12. To find information about the "management of asthma in children" in most library resources, the best search function to use is the:

- Author Search
- Keyword Search
- Subject Search
- Title Search

- I do not know

13. Which of the following searches would be the most effective way to search for the "management of asthma in children" in most library resources?

- "management of asthma in children"
- children, asthma, management, treatment
- children and asthma and (management and treatment)
- children and asthma and (management or treatment)
- I do not know

14. Have you ever asked for research assistance at an STLCC or other college/university library?

- Yes
- No
- I do not know

15. Have you used an STLCC library database to find information?

- Yes
- No
- I do not know

16. Have any of your previous classes at STLCC visited the library or had a librarian visit for an information instructional session?

- Yes
- No
- I do not know

17. Have you previously completed or are you currently enrolled in LIB 101, Introduction to Library and Online Research?

- Previously completed LIB 101
- Currently enrolled LIB in 101
- No
- I do not know

Appendix D

Paper Knowledge-based Assessment Consent

Dear Participant:

My name is Katherine (Katy) Smith, and I am a faculty member at the Meramec Campus, St. Louis Community College. I ask for your participation in a research project about students and library and/or information understanding and use. Participation will be the completion of a survey/questionnaire about information and libraries. It is estimated to take approximately 10 to 15 minutes.

Your participation in this project is completely voluntary. Your choice to participate (or not) will not impact your grade or your status with St. Louis Community College. Your participation will be confidential—responses will be sent directly to the researcher. All information that is obtained during this research project will be kept secure and will be accessible only to project personnel. It will also be coded to remove all identifying information.

There is no risk anticipated as a result of participating in this research—other than what might be experienced in normal life. The results of this study may be used for a dissertation, a scholarly report, journal articles, and/or conference presentations. In any publication or public presentation, pseudonyms will be substituted for any identifying information.

If you DO want to participate, you will answer the first question of the survey as "YES." The printed copy is for you to keep.

If you DO NOT want to participate, you do not need to do anything.

If you have any questions about this research project, please feel free to contact me by email, email, or telephone as listed below. If you have any questions about your rights as a research participant, please contact Dr. Vernon Kays' office at 314-984-7664.

Thank you for your consideration,

Katherine (Katy) Smith, MAILS
Reference Librarian
kesmith@stlcc.edu
314-984-7620

Appendix E

Interview/Group Invitation

Invitation to Participate!

Effects of a Prerequisite Library Research Instruction Credit Course
on Community College Students in an Introductory Nursing Course

Katy Smith, the librarian who administered the survey at the beginning of the semester will soon be conducting focus groups as part of her research to better understand how students use information. Would you be willing to participate in a personal or group interview? The interviews/groups would take about 30 minutes and can be scheduled at your convenience, possibly 30 minutes before or following a nursing class meeting. Those chosen to participate (which will probably be anyone who volunteers) will each receive a $25 Visa or MasterCard gift card. Additionally, at the end of the study period, there will also be a drawing for a $100 gift card (one in addition to the original $25 one). So, for 30 minutes of your time, you'll definitely receive $25 and possibly $125! Please contact Katy, kesmith@stlcc.edu for more information or to volunteer. Thank you for considering!

_____

Name (first name only is fine!)

_____

Contact (however you would wish to be contacted, email, mobile, etc.)

Appendix F

Knowledge-based Assessment Answer Frequencies

Question 3. What resource do you tend to use **to begin** your research for college papers/presentations/projects?

Please choose one:

A. Wikipedia

B. Textbooks

C. Social Networking Sites (Facebook, Twitter, etc.)

D. Search Engines (Google, Bing, Yahoo, etc.)

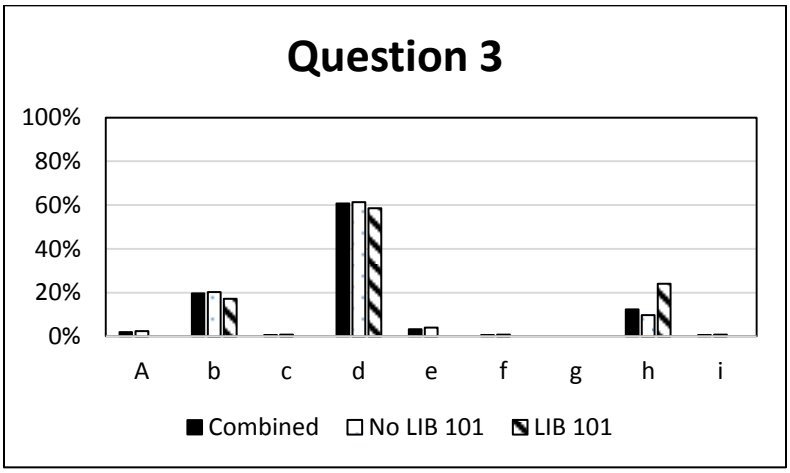
E. Reference Resources (Encyclopedias, almanacs, etc.)

F. Other Books and/or Ebooks

G. Magazines or Journals

H. Library Databases

I. Other



Question 4. What resource do you tend to use **the most** for your research for college papers/presentations/projects?

Please choose one:

A. Wikipedia

B. Textbooks

C. Social Networking Sites (Facebook, Twitter, etc.)

D. Search Engines (Google, Bing, Yahoo, etc.)

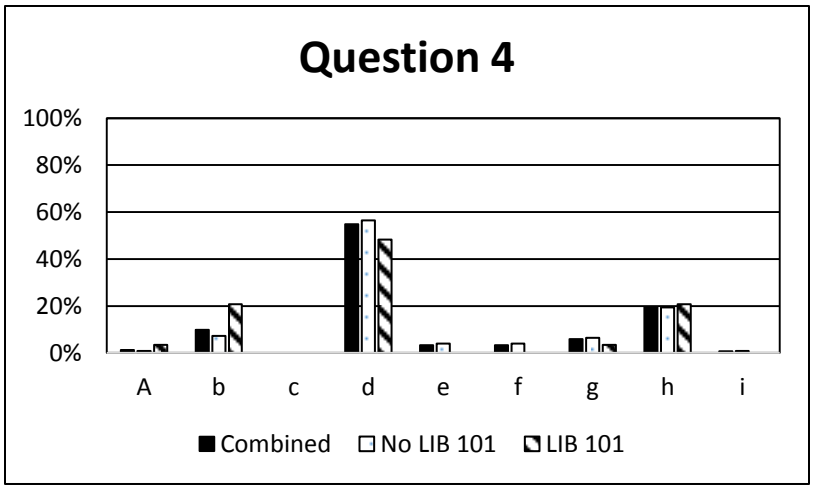
E. Reference Resources (Encyclopedias, almanacs, etc.)

F. Other Books and/or Ebooks

G. Magazines or Journals

H. Library Databases

I. Other



Note: For the following, the correct answer is bolded in the multiple choice list and is indicated in the graph with a capital letter.

Question 5. Which of the following is the best way to verify the accuracy and credibility of articles or other research found on the Web?

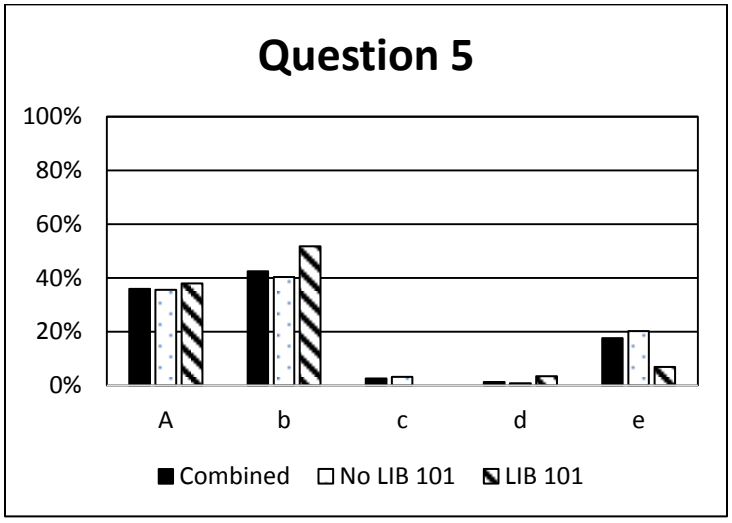
A. See if similar information is found on other reputable websites or other resources

B. See if the web site links to known, reputable web sites or other resources

C. Check Wikipedia

D. Check Snopes.com

E. I do not know



Question 6. If you found some great articles from a Google search, but the web sites require payment to fully access the articles, what should you do?

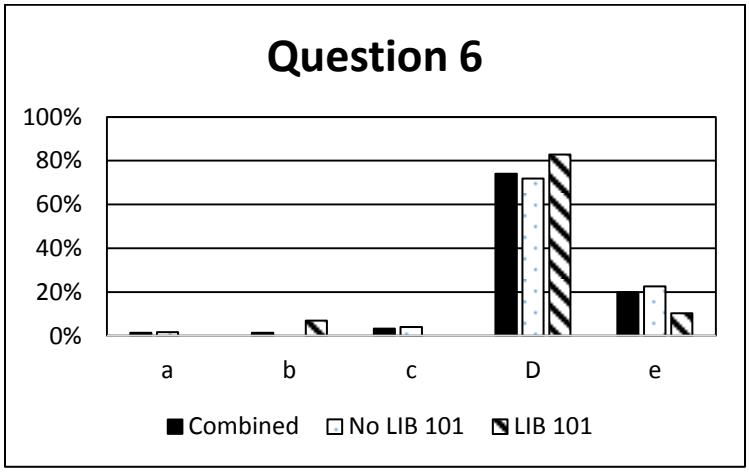
A. Pay for the articles because that is the ethical thing to do

B. Contact the websites because they may allow you free access because you are a student

C. Contact your instructor because he or she may have the password for the web sites

D. Contact a librarian because you may have free access to those articles through the library

E. I do not know



Question 7. When should you cite your sources?

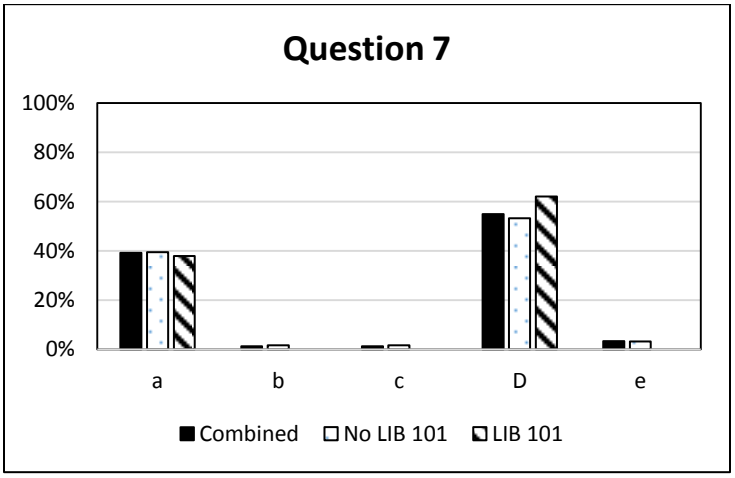
A. When you use unique word, phrase, sentence, or passage directly from the original source

B. When you use your own words to communicate the main idea and the details from the original source

C. When you use your own words to summarize the main ideas from a number of resources

D. All of the above

E. I do not know



Question 8. Which of the following is not necessarily a characteristic of a scholarly article?

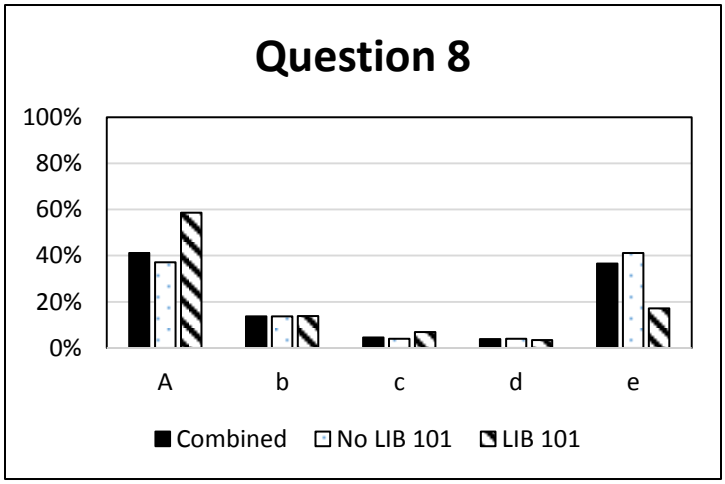
A. Photographs or other illustrations

B. Literature review

C. Methods or methodology

D. References/works cited/bibliography

E. I do not know



Question 9. What is the most important aspect of a scholarly article that differentiates it from a popular resource?

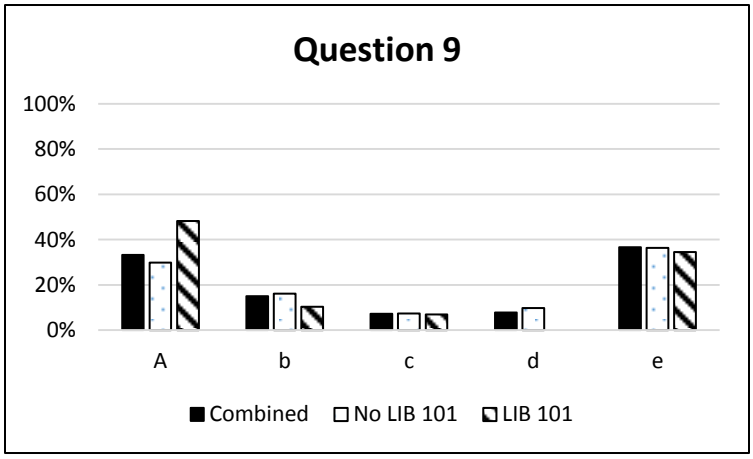
A. Peer review

B. Internal citation

C. Multiple authors

D. Author biography

E. I do not know



Question 10. What is an academic journal?

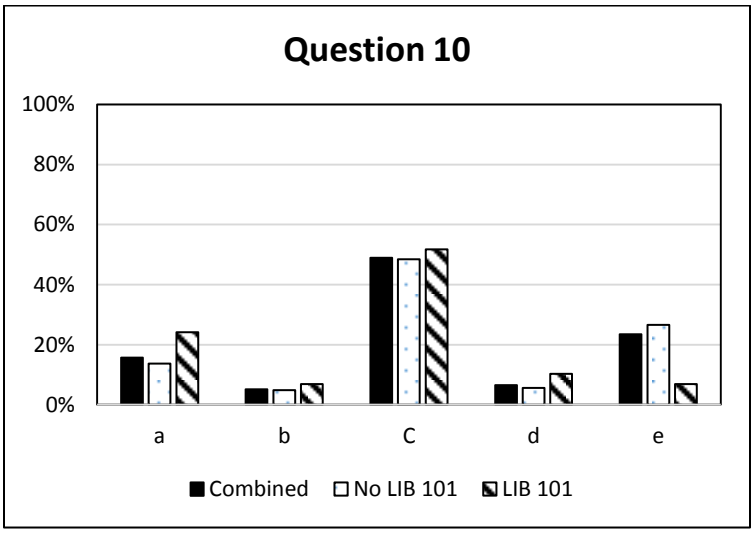
A. A diary kept by researchers, professors, and/or students about their research in order to archive and to cite their work

B. A diary kept by students to record their progress in a degree or certificate program

C. A publication that includes articles written by specialists in a particular field for other specialists in that same field

D. A publication that includes articles written by journalists or other writers for the general public

E. I do not know



Question 11. Which of the following resources from EBSCOhost would be the preferred resource to find a nursing scholarly research article?

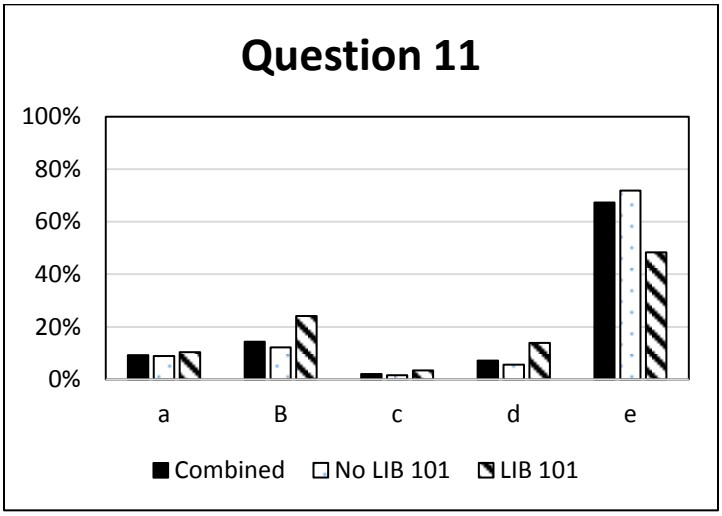
A. Academic Search Elite

B. CINAHL

C. Masterfile Elite

D. Science Full Text

E. I do not know



Question 12. To find information about the ‘management of asthma in children” in most library resources, the best search function to use is the:

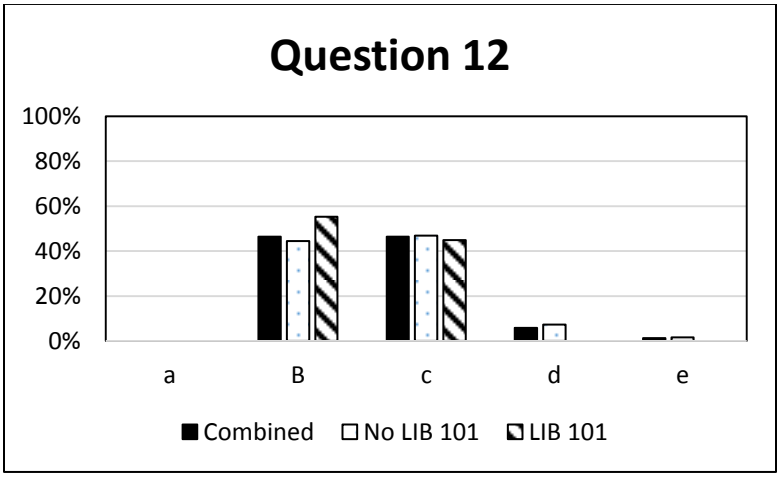
A. Author Search

B. Keyword Search

C. Subject Search

D. Title Search

E. I do not know



Question 13. Which of the following searches would be the most effective way to search for the "management of asthma in children" in most library resources?

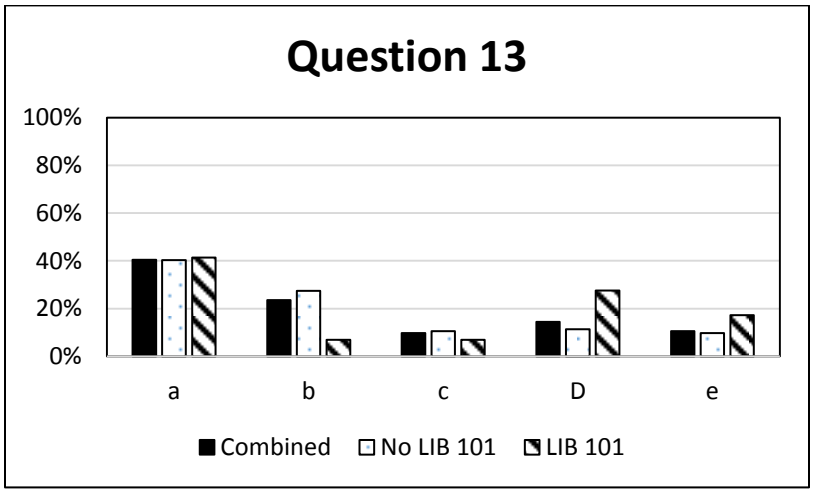
A. "management of asthma in children"

B. Children, asthma, management treatment

C. Children and asthma and (management and treatment)

D. Children and asthma and (management or treatment)

E. I do not know



Appendix G

Interview/Group Interview Consent

Dear Participant:

My name is Katherine (Katy) Smith, and I am a faculty librarian at the Meramec Library, St. Louis Community College. I ask for your participation in a research project about students and library and/or information understanding and use. Participation will be the completion of an interview/focus group about information and libraries. It is estimated to take approximately 30 minutes.

Your participation in this project is completely voluntary. Your choice to participate (or not) will not impact your grade or your status with St. Louis Community College. Your participation will be confidential—responses will be sent directly to the researcher. All information that is obtained during this research project will be kept secure and will be accessible only to project personnel. It will also be coded to remove all identifying information.

There is no risk anticipated as a result of participating in this research—other than what might be experienced in normal life. The results of this study may be used for a dissertation, a scholarly report, journal articles, and/or conference presentations. In any publication or public presentation, pseudonyms will be substituted for any identifying information.

If you DO want to participate, Please sign the bottom of this form. The second copy is for you to keep. After signing, we will begin the focus group/interview.

If you DO NOT want to participate, you do not need to do anything.

If you have any questions about this research project, please feel free to contact me by email, email, or telephone as listed below. If you have any questions about your rights as a research participant, please contact Dr. Vernon Kays' office at 314-984-7664.

Thank you for your consideration,

Katherine (Katy) Smith, MAILS
Reference Librarian
kesmith@stlcc.edu
314-984-7620

I hereby consent to participate in the Focus Group/Interview Research:

Signed _____ Date _____

Appendix H

Student Focus Group/Interview Protocol

Research question: How do community college students in a 100 level introductory nursing course (NUR 101) research to find information for college papers/presentations/projects and/or for their own knowledge?

Background: Students will have already completed a short survey in class. The focus group/interviews will help flesh out the understanding of the results of the survey.

Data Collection Method: I will hold a focus group or individual interviews with NUR 101 students of St. Louis Community College, LMCCC1

Participants: Students will be interviewed in a focus group setting or individually, depending upon scheduling and availability.

Sample Size: I anticipate a sample size from 8 to 10 students.

Ethical Issues: Permission to interview and to record the audio proceedings will be obtained. Those who do not provide consent will not participate. The first names of the students will be recorded for ease in transcription; however, that information will not be shared as part of the results; instead, students will be identified by number rather than by name.

Data Collection Protocol: I will request student participation during the administration of the survey. The focus group participants will be chosen purposefully in that both course sections should be represented; but still randomly from among those interested. The focus group will last approximately thirty minutes and will take place outside of the library proper. The focus group will be audio-digitally recorded and transcribed. Once transcribed, the recordings will be destroyed. The focus group guidelines and questions follow below.

Focus Group Guidelines

Introduction

Good morning! I'm Katy Smith, and I'll be moderating today's focus group on the research and information seeking of NUR 101 students. We have scheduled 30 minutes to complete this focus group/interview. Thank you again for arranging your schedules to participate. The purpose of this focus group is to record your information use. Please feel free to make comments, negative or positive, about the things we will be discussing. This is a free-flowing discussion, and there are no right or wrong answers. Before we get started, let's go over some disclosures and ground rules.

Disclosures

1. CONFIDENTIALITY. Everything that you say here will be kept strictly confidential. Nothing said in this group will ever be associated with any individual by name. I also ask that you similarly maintain the confidentiality of what is said in the group.

2. VOLUNTARY PARTICIPATION. Your participation in this group is entirely voluntary. You may stop participating at any time. You do not have to answer any questions that you do not wish to answer. You may withdraw from the group at any time with no consequences.
3. AUDIORECORDING. This session is being digitally audio-recorded so that I can write an accurate report of the discussion—not of who in particular said what. If there are any objections we will not record the session. Are there any objections?
4. Great! Thank you! Thank you for arranging your schedule today to be here for this session. I truly appreciate you giving me your time and opinions.

I know that we all know and respect each other; but, to ensure that everyone's input is shared and valued, we do have some ground rules to help us make the focus group productive.

Ground Rules

1. Please talk one at a time and in a voice as loud as mine.
2. Please avoid side conversations with your neighbors.
3. We need to hear from everyone in the course of the discussion, but you don't have to answer every question.
4. Please listen to each other.
5. Feel free to respond directly to someone who has made a point. You don't have to address your comments to me to get them on the table. Criticism of others or their ideas is not allowed.
6. Say what is true for you and have the courage of your conviction. Don't let the group sway you and don't "sell out" to group opinion.
7. We will finish on time.

Focus Group Questions:

1. Opening Question
    - How do you usually find the information that you need?

2. Key Questions
    - How do you find information to meet your needs?
    - How do you research to find information to complete a course research assignment?
    - What information skills and knowledge should NUS 101 students have to succeed in college/the nursing program?
    - What information skills and knowledge should people have to live successful lives?

3. Exit Question

VITA

Katherine (Katy) Elizabeth Smith was born in St. Louis, MO on December 4, 1972, the daughter of Thomas (deceased) and Charlene Dobson, and was raised in St. Louis, MO by O. Clifford and Charlene (Dobson) Boyer. After earning her high school diploma from Mehlville Senior High School in 1991, she earned a Bachelor of Science from Southeast Missouri State University with a double major in Historic Preservation and in American Studies and a minor in Art History. After graduating summa cum laude in 1994, she began a graduate degree in History; however, life occurrences intervened. Katy returned to graduate school in 1999 for a Master of Arts in Information Science and Learning Technologies from the University of Missouri while working as a library assistant for St. Louis County Library (SLCL). Upon completion of the degree in 2001, she held professional librarian positions with SLCL, until 2005 when she joined St. Louis Community College (STLCC), Meramec as library faculty. While a faculty member at STLCC, in 2006 she was accepted as a part-time doctoral student at the University of Missouri Graduate School to pursue the Doctor of Philosophy in Information Science and Learning Technologies.