Transferability: The Application of Information Literacy Competencies to Academic Area-of-Interest Course Research Paper Among Adult College Students in an Undergraduate Liberal Arts Program

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Abstract
This non-experimental exploratory sequential study was undertaken to assess the extent to which adult students can transfer and apply information literacy competencies, based on the AAC&U Information Literacy VALUE Rubric, to a research paper required in an area of interest, intermediate or advanced level course. Participants were enrolled in an undergraduate liberal arts college degree program in a school designed on the andragogical model of adult education. Participants had completed a 2-credit information literacy course during a previous semester. To ascertain the students' information literacy competencies, course research papers were assessed using three of the five components of the rubric. The targeted components were the ability to: determine the extent of information needed, use information effectively to accomplish a specific purpose, and access information ethically and legally. Based on the achieved scores, the students demonstrated a greater ability to find appropriate scholarly resources, and to incorporate those ideas into their research papers than the ability to acknowledge and credit authorship of original sources.
Transferability: The Application of Information Literacy Competencies to Academic Area-of-Interest Course Research Paper Among Adult College Students in an Undergraduate Liberal Arts Program

By
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Submitted in partial fulfillment of the requirements for the degree Ed.D. in Executive Leadership

Supervised by
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Dedication

I must first pay tribute to my mother, Lurline Harding Hutchinson, who went to great lengths to ensure that I had an excellent educational foundation. My gratitude and admiration to the first teacher who inspired me, Mrs. Thelma Johnson Burke of Cambridge Primary School in Jamaica, West Indies, who saw so much in me and gave me the opportunities to excel.

To a few of the inspiring leaders with whom I’ve had the privilege to work, George Philip of Grace, Kennedy & Company Ltd, Jamaica, Claire Jaggerman of New York City Department of Health, and Dr. James Schleifer, Dean of Libraries at The College of New Rochelle, my sincere thanks to them for giving me the latitude to use my initiative and to execute many related endeavors.

I would like to note my immeasurable appreciation to my Dissertation Chair, Dr. Shelley Jallow, to my Committee Member, Dr. Carol Alleyne, for your steadfastness and support in guiding me through this arduous journey, and to my Executive Mentor, Dr. Kristine Southard who encouraged me through many difficult hurdles. A special thanks to Dr. Gilbert Louis and Professor Bright Nsowaa for your relentless assistance in guiding me through the myriad possibilities in harnessing the instruments of statistical analyses and to Dr. William O’Bannon who guided me through the final challenges of articulating the meaning of the data.

Finally, but of utmost importance, my thanks to my two raters, Marie Octobre and Michael Kahn, who accomplished the strenuous task of assisting me in rating the many
research papers evaluated in this study. To the campus directors and the many instructors and students who participated in the study, my sincere gratitude. To my cohort-mates and teammates, from whom I have learned so much, you have kept me focused through our many challenges and I extend to you my infinite appreciation and respect.
Biographical Sketch

Lilleth Beckford is currently Associate Professor/Librarian/Instructor/Branch Campus Library Manager at Gill Library, The College of New Rochelle. Lilleth attended the University of the West Indies (Mona, Kingston, Jamaica) from 1971 to 1974 and graduated with a Bachelor of Arts/Library Studies degree. She attended St. John’s University from 1990 to 1993 and graduated with a Masters of Library Science degree in 1993. She attended Queens College from 2004 to 2007 and graduated with a Masters of Arts/Urban Studies degree in 2007. She came to St. John Fisher College in the summer of 2014 and began doctoral studies in the Ed. D. Program in Executive Leadership. Lilleth Beckford pursued her research in information literacy and adult students in higher education under the direction of Dr. Shelley Jallow and Dr. Carol Alleyne and received the Ed. D. degree in 2017.
Abstract

This non-experimental exploratory sequential study was undertaken to assess the extent to which adult students can transfer and apply information literacy competencies, based on the AAC&U Information Literacy VALUE Rubric, to a research paper required in an area-of interest, intermediate or advanced level course. Participants were enrolled in an undergraduate liberal arts college degree program in a school designed on the andragogical model of adult education. Participants had completed a 2-credit information literacy course during a previous semester. To ascertain the students’ information literacy competencies, course research papers were assessed using three of the five components of the rubric. The targeted components were the ability to: determine the extent of information needed, use information effectively to accomplish a specific purpose, and access information ethically and legally. Based on the achieved scores, the students demonstrated a greater ability to find appropriate scholarly resources, and to incorporate those ideas into their research papers than the ability to acknowledge and credit authorship of original sources.
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Chapter 1: Introduction

Introduction

Among the many competencies required for academic success, competency in information literacy is as critical in ensuring that all categories of students are fully engaged at college (Price & Baker, 2012). These competencies are fundamental to the student’s ability to gain new knowledge, to use that comprehension to collaborate with others, and to create new knowledge, at college, at work, and in lifelong learning (Association of College and Research Libraries, 2002; Keane, Keane, & Blicblau, 2016; Rotherham & Willingham, 2009). This study is focused on the information literacy competencies of adult students and their application of those skills to a discipline-specific research paper. The focus on adult students stems from more than a decade of the researcher’s experience in working with adult students.

In the context of college, adult students may have left formal education at a young age, possibly during middle or high school. During the time spent outside of formal education, adult students would have garnered new learning through life or work. Students then bring that learning to college. In returning to school, adult students usually are motivated to pursue their education, and have some self-concept relevant to their ways of knowing. Adult students associate a purpose to their need for knowledge, apply self-directed learning and utilize alternative learning methods such as online, asynchronous applications (Caruth, 2014). Information literacy has been defined by the Association of College and Research Libraries as the aptitude to “recognize when
information is needed and can locate, evaluate, and use effectively the needed information” (American Library Association Institutional Repository, 2000, p. 2).

Data from the National Center for Education Statistics stated that between 2000 and 2010 total undergraduate enrollment increased by 37%, while between 2010 and 2014 enrollment decreased by 4%. However, undergraduate enrollment is projected to increase 14% from 17.3 million to 19.8 million students between 2014 and 2025. (National Center for Education Statistics, [NCES], 2016d). Contrastingly, the National Student Clearinghouse Research Center reported progressively decreasing college enrollment over the last 4 years, with a 14.5% decrease at fall 2016 (National Student Clearinghouse Research Center, 2016). Despite the conflicting data, adult students continue to be an increasingly higher percentage of new undergraduate enrollment. Data revealed that during the period 2000 to 2012, there was an equal rate of enrollment, 35%, for both students under age 25 as well as for students above age 25. Additionally, for the period 2012 to 2023, the rate of increase for students aged 25 and over, has been projected at 20% with a lower projected rate of 12% for students aged 25 and under (NCES, 2016a).

In a report from the National Center for Education Statistics, Nontraditional Undergraduates/Definitions and Data (2015), adult students have been defined as being over age 24, have delayed college enrollment after high school, have family responsibilities, have encountered financial constraints, carried work responsibilities, and are non-residential. Adult students return to college for various reasons: to pursue vocational credentials (Rabourn, Shoup, & BrckaLorenz, 2015); for personal development or to acquire advanced skills (Cruce & Hillman, 2012); loss of a job or
gaining military veteran status (Rosser-Mims, Palmer, & Harroff, 2014); and the need to 
increase earning power or the need to provide for their family (O’Neill & Thomson, 
2013). Other reasons for returning to college were having the ability to contribute to a 
particular field or professional discipline, to enhance involvement in community groups 
or endeavors, or to facilitate participation in issues of political or social justice (Ritt, 
2008).

A major phenomenon that has affected the enrollment of adult students will be the 
large percentage of the adult population – the baby boomers, who have been projected to 
reach retirement during the next decade and will account for 20% of the U.S. population 
by 2030 (Colby & Ortman, 2015). Baby boomers are defined as “born during the post-
World War II baby boom in the United States” and “began turning 65 in 2011” (Colby & 
Ortman, 2015, p. 5). Many of the baby boomers will not be retiring, as health status has 
been improving among this group and life expectancy has increased (He, Goodkind, & 
Kowal, 2016). Some baby boomers may continue to work past retirement age as they 
may not have sufficient finances to afford them the opportunity of retirement, and these 
factors may determine their decision to keep working or return to work (Harter & 
Agrawal, 2014). Additionally, many baby boomers may start college for the first time or 
return to college to equip themselves for continuing work or returning to work.

Adult students approach their education more purposefully than traditional 
students as the prior group is usually motivated to reenter formal education after a life-
changing event (Jinkens, 2009). As stated by the National Center for Education Statistics, 
“traditional enrollment in postsecondary education is defined as enrolling immediately 
after high school and attending full time” (NCES, 2016c, para. 5). The major difference
in traditional and non-traditional students may not necessarily be in the age but in their mindset to learning, in “how students perceive education: its value, what is and is not important, and the general approach of what to learn and how to learn it” (Jinkens, 2009, para. 4). If adult students learn differently, then colleges need to design instruction and teaching styles that result in expected learning outcomes for adult students.

Based on arguments from a metadata study differentiating pedagogy and andragogy, Chan (2010) posits that adult students should be taught using andragogical principles rather than with the pedagogical principles used in teaching traditional college students. Pedagogy has been defined as “the art and science of teaching children (Ozuah, 2005, p. 83). Andragogy has been defined as the “art and science of helping adults learn” (Knowles, 1984, p. 6). Caruth (2014) conducted a metadata analysis of studies on the use or non-use of andragogical principles in teaching of adult college students and made the case that Knowles’s assumptions of adults’ need to know, self-concept, prior learning experience, readiness to learn, learning orientation, and motivation to learn should be applied. Chen (2014) interviewed adult college students who took a psychology course to assess the impact of adult learning theories on their learning experiences. Five themes emerged from the findings, confirming that adult learning principles play an important role in facilitating adult student learning. The themes were a personal reflective process, emotional conflict, self-assessment, experiencing conflict, and change in behavior (Chen, 2014).

Harper and Ross (2011) studied the application of andragogical design to interdisciplinary courses in an undergraduate program offered to adult students. Findings disclosed that participants undertook the challenge of managing their own education in a
positive manner, “looked forward to their classes,” showed good decision-making, as seen in their coursework, and molded themselves “not to the academic world but picturing themselves beyond the academic world in their career post-graduation” (Harper & Ross, 2011, p. 166). Holton, Wilson and Bates (2009) worked with 404 adult students in a postgraduate degree program to develop an assessment instrument, the Andragogic Practices Inventory (API). The researchers deemed this necessary since previously, there was no measurement used in the practice to assess the theory of andragogy. Findings revealed the study successfully measured five andragogical principles and six process design elements (Holton et al., 2009).

Among the many capabilities required for academic success, competency in information literacy is required at a high proficiency level for all categories of students to be fully engaged at college (Price & Baker, 2012; Rabourn et al., 2015). An information literate person recognizes the need for information and the type of information that is needed, has the skills to find relevant information through multiple media (physical and virtual), can analyze and evaluate the information, and use the information to create new knowledge (American Library Association Institutional Repository, 2000). Between 2014 and 2016, the latter competencies were reformatted into six frames described as “a set of knowledge practices, and a set of dispositions” (Association of College & Research Libraries [ACRL], 2016). Since the latter framework was unveiled in 2016 and was still being developed during the planning of the proposed research study, the 2000 standards were used.

Assessing students’ information literacy competencies at college, particularly while they are at the junior and senior levels, helps solidify all the skills to which they
have been exposed during college and prepares them for the world of work. Three studies were found to have examined information literacy with specific relevance to adult students (Cooke, 2010; Head, 2012; Rapchak, Lewis, Motyka, & Balmert, 2015).

The importance of information literacy skills in various workplace contexts has been documented in studies by Asselin, Early, and Filipenko (2005) who examined government personnel in an education ministry, Baker (2013) with accountants, Birdsong and Freitas (2012) with nontraditional adult learners pursuing just-in-time training programs, and Goodman, Finnegan, Mohadjer, Krenzke, and Hogan (2013) with adult participants from a variety of countries and educational attainment through The Program for the International Assessment of Adult Competencies (PIAAC) of the Organization of Economic Cooperation and Development (OECD). Another study was conducted with adults enrolled in a community vocational training program which prepared participants with the information literacy skills needed for the workplace (Hemming, Symons, & Langille, 2002).

Studies have shown that there were some aspects of information literacy that warranted the most attention in the workplace. Those information literacy skills that were cited as very important in the workplace were posited by Head (2012) who found that employees most needed to know how and where to find information, to use a variety of information sources and go beyond the Internet, to determine the best result in the context of the assigned task, and to produce a suitable finished product from the information gathered. Closely aligned to Head’s findings were those of Travis (2011) who found that the most pertinent information literacy skills were the ability to conduct research using advanced search options, to use evaluation criteria, to use more than one source to verify
accuracy, and to incorporate ideas found in sources when creating their own work (Travis, 2011).

**Problem Statement**

“Overall undergraduate college enrollment has been progressively decreasing over the last 4 years” (National Student Clearinghouse Research Center, 2016, p. 2), but adult students have been enrolling at an increasingly higher rate than traditional college students. Projection data for 2012 to 2023 showed the rate of increase for students aged 25 and over at a rate of 20%, with a lower projected rate of 12% for students under the age of 25; thus, adult students will remain an important component of new college enrollees (NCES, 2016c).

Traditional students have been categorized as those entering college directly from high school (NCES, 2016c). Adult students have characteristics such as: they are over age 24, have delayed college enrollment after high school, have family responsibilities, have encountered financial constraints, carried work responsibilities, and are non-residential (NCES, 2016c). Adult students returned to college for specific purposes such as acquiring vocational credentials, fostering personal development, increasing employability, expanding earning power, extending the ability to contribute to a specific area of interest, or, facilitating engagement in political or social activity (Cruce & Hillman, 2012; O’Neill & Thomson, 2013; Rabourn et al., 2015; Ritt, 2008; Rosser-Mims et al., 2014).

Problems are compounded to some extent as colleges have not been offering the required support to enrolled adult students by using appropriate andragogical methodology in course designs (Jasper, 2012; Jinkens, 2009; Rabourn et al., 2015).
Despite the exposure to information literacy training, many adult students are not transferring the principles learned in standalone information literacy courses to other area-of-interest courses such as those in the arts, humanities, natural sciences, and social sciences, or to research in the workplace and in lifelong learning (Birdsong & Frietas, 2012; Butcher & Street, 2009; Kuglitsch, 2015; Louys, Hernandez-Leo, Schoonenboom, Lemmers, & Perez-Sanagustin, 2009; Travis, 2011). In attempting to ascertain the most important information literacy skills required in the workplace, Head (2012) found that the most needed were the ability to find relevant information, to use a variety of information sources for an assigned task, to evaluate search results and determine the most useful the assigned task, and to create a finished product from the information gathered.

**Theoretical Rationale**

Two theoretical frames were used as underpinnings for the study, the Information Literacy Competency Standards (American Library Association Institutional Repository 2000), and the adult learning theory, also known as andragogic theory formulated by Knowles (1984). The information literacy framework formed the main underpinnings for this study. The information literacy guidelines were developed by the American Library Association (ALA), Association of College and Research Libraries (ACRL) as Information Literacy Competency Standards. Although not directly used in this study, it is noteworthy to mention here that the competency standards were replaced by the Framework for Information Literacy which consists of six frames aligned with characteristics of knowledge practices and dispositions associated with the learner (ACRL, 2016). Information literacy is defined as a set of skills which includes the ability
to "recognize when information is needed, and can locate, evaluate, and use . . . the needed information" (American Library Association Institutional Repository, 2000, p. 2). Although the competency standards consist of five components as established by the AAC&U, only three of those measures were utilized in the study. The three measures state that students should be able to: determine the extent of information needed; can use information effectively to accomplish a specific purpose, and access and use information ethically and legally. See Appendix A. The three selected competencies were identified as the most important for future academic, workplace, and lifelong learning applications. This framework was used since the researcher studied the information literacy competencies of adult students, a population of students with which the researcher has worked.

The theoretical framework of information literacy has its foundation in “bibliographic instruction” or “library instruction” (Mittermeyer, 2005, p. 203) which was offered by academic librarians in colleges and universities. During the 1970s and 1980s, with the increasing prominence of the computer in the digital storage, dissemination and communication of information, any discussion on information literacy has inextricably included basic computer skills and digital skills (Cope & Kalantzis, 2000; Lea, Street, & Jacobs, 2013; Lloyd, 2010; Mackey & Jacobson, 2014).

**Information literacy theoretical framework.** The information literacy guidelines have been used to assess information literacy in academic settings particularly but also in workplace settings. Studies have focused on the two aspects of information literacy: the skills-based applications of finding information in various sources and media, physical as well as digital; and the cognitive competencies of evaluating,
synthesizing, integrating, re-packaging and then communicating information as newly-created knowledge. The literature has shown that some studies on information literacy assessment have used the standard quantitative experimental methods of pretest, treatment, and posttest as in Eshet-Alkalai and Chajut (2010), Gross, Latham, and Armstrong (2012), Mittermeyer’s (2005), seminal work, and Salisbury and Karasmanis (2011). Others have undertaken the qualitative methods of focus groups, surveys, or interviews to get directly from the respondents the views and ideas on their information-and research-related experiences (Gunn, Hearne, & Sibthorpe, 2011; Travis, 2011).

Information literacy may be assessed as a standalone exercise (Miller, 2014) or as embedded into subject-specific academic areas such as business management (Gunn et al., 2011) with medical students (McClurg, Powelson, Lang, Aghajafari & Edworthy, 2015); and in the workplace (Kuglitsch, 2015; Louys et al., 2009; Travis, 2011). The current study utilized another method of assessment, that is, applying a rubric to completed academic projects, such as have been done with e-portfolios, journals and research papers (Belanger et al., 2015; Diller & Phelps, 2008; Farrell & Badke, 2015; Hoffman & LaBonte, 2012; Luetkenhaus, Borrelli, & Johnson, 2015).

There have been several arguments of criticism against the information literacy theoretical framework. Within the field of information literacy and academic research practice, the traditional images of the Gutenberg printing press and printed documents have remained stalwart pillars even in this digital age of the 21st century. However, information sources have become increasingly digitized and with the growing need to access information through electronic means, the lines of information literacy have been blurred and have bled into computer literacy, which is the ability to use the tool, the
computer (Kapitzke, 2003). The author contends that the information literacy framework built on bibliographic instruction of libraries up to the late 20th century, has proven more of a hindrance than advancement of critical literacy practice. Another criticism is on the duality of information literacy, that is, the technical information management skills and the cognitive skills of engaging with the information, which should help the user in not only self-awareness, but awareness of the community around them (Ward, 2006).

Other criticisms are that the assessment of the competencies has the tendency to be aligned with the individual student’s growth and development but should be assessed within the context of a community and not in isolation as is usually the case in academia (Harris, 2003). Another criticism is that the design and delivery of instruction in information literacy should factor in the peculiarities within the assumed homogeneous groups termed “students” as the standards designed for one group would not necessarily fit all within the group (McNicol & Shields, 2014). Literacy is defined as the ability to communicate effectively in writing, and in the context of information literacy, there is an argument that the literacy element of information literacy should be the mandate of librarians. This is built on the premise that since librarians teach information literacy, focused mainly on the reading of information, they should undertake teaching the writing of information as well (Sutherland, 2009).

The complexities of information literacy as a field of study became more pronounced in the 1970s when the term extended “beyond mere locating of information to include understanding and evaluating of that information” (Behrens, 1994, p. 312). The advent of the computer and exponential growth of digital sources and content, information literacy has grown to mean the user’s relationship with text, the content, and
technology, the tool, (Lloyd, 2010). Mackey and Jacobson (2014), working with the Metaliteracy Learning Collaborative, contended information literacy had blossomed beyond the confines of libraries, librarianship, and traditional academic research to encompass the emerging technologies and many other approaches to literacy: media literacy, cyber literacy, visual literacy, mobile literacy, and health literacy.

**Adult learning theory:** Since adult students were the participants of the proposed study, mention must be made here of the foundational philosophy of the adult learning theory, andragogy, which Knowles defined as the “art and science of helping adults learn,” (Knowles, 1984, p. 6). The term was coined by German educator, Kapp, around 1933, and it was considered in the context of vocational training and self-education. By the 1920s, another German, Rosenstock-Huessy, regenerated the term and promoted it within a cultural context of using the past to build on self-improvement towards a better future (Wang, 2009). The term was later popularized in the United States by Knowles who developed four assumptions for application in adult learning within the context of the workplace and in higher education (Wang, 2009). This theoretical framework has been selected, since the philosophy of andragogy formed the basis for the establishment of the school for adult students, the school in which the study was undertaken. Epidemiological examination of andragogical theory has been used by Chen (2014), Holton et al. (2009), Aldridge (2012), and Ross-Gordon (2011).

Some of the criticisms of the theory of andragogy have been proffered by Taylor and Kroth (2009) through their meta-analysis of design and application of the theory. Central to andragogy is its student-focused education as compared to pedagogy, defined as teacher-focused education. The theory of andragogy is articulated as Knowles’s (1984)
six assumptions which are based on the understanding that adults have lived experiences and beliefs which they then bring to new educational experiences. The authors also contend, based on the synthesis of the reviewed studies, that the theory had not been tested scientifically. Similar assessment has been made by Rachal (2002) who contended that despite the application of andragogy in adult education, there is no clear understanding of the theory and that “much of the debate has swirled around the philosophical underpinnings of the concept rather than its empirical efficacy” (Rachal, 2002, p. 211).

**Statement of Purpose**

The purpose of this quantitative study was to measure the ability of adult students to apply the information literacy competencies to a research paper. The transferability was based on the use of principles participants had learned in a standalone, information literacy credit-bearing course. Those principles were applied to a course research paper in a discipline-specific course during a subsequent semester. Three of the five measures of the AAC&U Information Literacy VALUE Rubric were used to assess the final research paper which is required from students who had been registered in an area-of-interest course at intermediate B-level coded as 400 through 699, or at advanced C-level coded as 700-899 in the college’s course description catalog.

**Research Questions**

The research questions which were used to guide the research study were based on three of the five measurements of the Information Literacy VALUE Rubric. They are:

1. At what level of demonstrable ability are adult students who successfully completed an information literacy course of study, able to demonstrate their
ability to determine the extent of information needed to complete an assigned research and information-rich task?

2. At what level of demonstrable ability are adult students who successfully completed an information literacy course of study, able to demonstrate their ability to use information effectively by communicating, organizing and synthesizing information to complete an assigned research and information-rich task?

3. At what level of demonstrable ability are adult students who successfully completed an information literacy course of study, able to demonstrate their ability to access and use information ethically and legally to complete an assigned research and information-rich task?

**Potential Significance of the Study**

The findings of this study could be relevant to colleges, to adult students, to employers, and to lifelong learners. The study informs the small body of empirical work on information literacy among adult students. Additionally, the findings will be useful to colleges from five perspectives: in the area-of-course development and instructional design in customizing courses for the adult student; in enhancing course offerings which could result in increased enrollment numbers; and in boosting programs across academic disciplines and departments when information literacy is embedded in academic disciplines and not taught as a standalone course. It should be noted that only one study found had examined the applied andragogical principles to the teaching of information literacy among adult learners (Rapchak et al., 2015). This study, however, examined teaching information literacy as a standalone course rather than applied to a discipline-
specific academic course. The latter technique provides students with opportunities to apply transferability of the skills learned to the course.

The results of the study can inform the design/redesign of information literacy courses and/or additional training to enhance learning in the adult student. Some studies have looked at information literacy applied during intermediate and senior years in college and in relation to discipline-specific courses such as conducted by Roberts and Bhatt (2007) with engineering students, Vecchiola (2011) with students in the design disciplines such as art and architecture, Gunn et al. (2011) with business management courses, Miller (2014) with graduate students, McClurg et al. (2015) with medical students, and Farrell and Badke (2015) across a selection of academic disciplines. The intention of the research is to study the techniques of information literacy principles among adult students and to ascertain to what extent they have retained and transferred the principles to courses across the spectrum of academic disciplines at a later point while they are in college.

The study could prove useful to employers as they move toward hiring potential employees from graduates of colleges which have included the 21st century information literacy skills in their course offerings. A recent U.S. Department of Labor report stated that, in an effort to strengthen the institutional resources of community colleges, the U.S. government launched the Trade Adjustment Assistance Community College and Career Training (TAACCCT) grant program in partnership with community colleges to “meet workers where they are, empowering adult learners with the tools they need to succeed in the workforce” (Perez, 2017, p. 9). As purported in an argument by Aldridge (2012), 21st
century workers need to be skilled in areas of global knowledge, self-direction, writing, critical thinking, and adaptability.

Students could learn from the proposed study, those information literacy competencies which they need to develop while they are in college, to be effective in the workplace. Those skills have been identified as the ability to find information, to use a variety of information sources and go beyond the Internet, to use some traditional sources such as print, micro-formats, organizational knowledge base, to determine the best result in the context of the assigned task, to retrieve information in varying formats, and to produce a suitable finished product from the information gathered (Head, 2012). Students could be guided by the study in that they need to also develop the skills of conducting research using advanced search options, to use evaluation criteria, especially when searching the Internet, to use more than one source to verify accuracy, and to incorporate ideas found in sources when creating their own work (Travis, 2011).

**Definitions of Terms**

*Adult students (nontraditional students)* – Being over the age of 24, have family responsibilities, have work responsibilities, delayed entry to college after high school, non-residential living arrangements (i.e., not on campus), enrolled part-time. (NCES 2016c).

*Andragogy* – “The art and science of helping adults learn” (Knowles, 1980, p. 43).

*Digital literacy* – Having the competencies to use “a subset of technologies that include hardware and software … for educational, social and/or entertainment purposes in schools and at home” (Ng, 2012, p. 33).
Discipline-specific course – An area-of-interest course taken in the academic disciplines of the arts, humanities or the sciences.

Information literacy framework – Based on a cluster of interconnected information literacy core concepts - Authority is Constructed and Contextual; Information Creation as a Process; Information has Value; Research as Inquiry; Scholarship as Conversation; and Searching as Strategic Exploration. (ACRL, 2016).

Information literacy (IL) – A set of abilities requiring individuals to "recognize when information is needed and are able to locate, evaluate, and use effectively the needed information” (American Library Association Institutional Repository, 2000, p. 2). The guidelines were later reformatted and incorporated into Framework for Information Literacy Competency Standards for Higher Education, 2016.

Metaliteracy learning collaborative – The Collaborative is composed of librarians, disciplinary faculty members, and instructional designers from several State University of New York (SUNY) institutions, was fund in 2012 by an Innovative Instructional Technology Grant to offer a rich learning tool for its students. Metaliteracy promotes critical thinking and collaboration in a digital age, providing a comprehensive framework to effectively participate in social media and online communities. It is a unified construct that supports the acquisition, production, and sharing of knowledge in collaborative online communities. Metaliteracy challenges traditional skills-based approaches to information literacy by recognizing related literacy types and incorporating emerging technologies (Mackey & Jacobson, 2014).

**Rubric** – A document that gives “the expectations for an assignment by listing the criteria or what counts, and describing levels of quality from excellent to poor” (Reddy & Andrade, 2010, 435).

**VALUE** – Valid Assessment of Learning in Undergraduate Education Rubrics is part of the Liberal Education and America’s Promise (LEAP) initiative and provides rubrics or scoring guides to assess students’ own authentic work, “produced across their diverse learning progressions and institutions, to determine whether and how well students are meeting graduation level achievement in learning outcomes that both employers and faculty consider essential” (Association of American Colleges & Universities, 2004, para. 3).

**Chapter Summary**

This chapter presented a statement of the problem, the theoretical framework on which the study is designed and developed, the research questions that are answered by the study, and potential significance of the study. The document is divided into five chapters, references, and appendices. Chapter 2 presents an extensive review of the literature. Chapter 3 details the methodology which conforms to rubric assessment of course research papers of students at undergraduate level. Chapter 4 outlines the findings of the study, and the last chapter concludes with summary, implications, and recommendations for future studies.
Chapter 2: Review of the Literature

Introduction and Purpose

Among the competencies required for college students to attain 21st century academics is the set of skills included in information literacy. Information literacy has been defined by the Association of College and Research Libraries as the aptitude to "recognize when information is needed and are able to locate, evaluate, and use effectively the needed information" (American Library Association Institutional Repository, 2000, p. 2). In 2014 to 2016, the latter competencies were reformatted into six frames described as “a set of knowledge practices, and a set of dispositions” which have been incorporated into conceptual frames as: Authority Is Constructed and Contextual; Information Creation as a Process; Information Has Value; Research as Inquiry; Scholarship as Conversation; and Searching as Strategic Exploration (ACRL, 2016).

The locus in which the study was conducted is a liberal arts college that serves only adults students. Adult students are characterized as over age 24, have delayed college enrollment after high school, have family and work responsibilities, and are non-residential (NCES, 2016c). The rate of enrollment of new adult students in United States’ colleges has shown remarkable increases within recent years. Between 2000 and 2011, the percentage of enrolled adult students over age 25 (41%) has been larger than the 35% of those enrolled students under age 25 (NCES, 2016b). For the period 2011 to
2021, the latter report also showed a projected increase of 14% in the enrollment of adult students while a lower percentage of 13% for the students less than 25 years.

**Information Literacy**

**Historical overview and theoretical framework.** The term information literacy was coined by Zurkowski in 1974 when he was the president of the Information Industry Association, the IIA (Behrens, 1994). He submitted a proposal to the National Commission on Libraries and Information Sciences (NCLIS) recommending that a national goal be established for the United States to reach a level of information literacy within the next decade (Behrens, 1994). Zurkowski’s emphasis, however, was slanted towards the private sector information industry services and focused on people who were searching for information in non-library, nongovernmental, and business environments. Zurkowski was the first to articulate traditional connection of information activities, both in libraries and in the private sector, as well as in non-library information environments. Zurkowski recommended then, that information resources should be applied in a work situation; that techniques and skills were needed for using information tools, and that information was used in problem solving (Behrens, 1994).

In 1976, Burchinal, a librarian, presented a paper at a symposium at the Texas A&M University Library. He described information literacy skills as being able to efficiently and effectively locate and use information to solve problems and make decisions (Burchinal, 1976). He, too, emphasized then, the need for the US to “systematically create information literacy for all adults in the nation”. He further went on to say that skills went beyond conventional literacy of simply being able to read and write but more towards equipping the individual with the ability “to comprehend and
apply our new communication capabilities creatively across a spectrum of society’s needs” (Burchinal, 1976, p. 11).

Another outstanding proponent of the term was Owens, also a librarian, who, in considering the future of libraries and librarianship, connected information literacy to active citizenship. He purported that being able to garner the necessary information, gave citizens the ability to make more informed decisions and can ensure survival in a democratic society (Behrens, 1994). Taylor, another librarian, also connected libraries and librarianship to information literacy, positing that “many problems could be solved using information, that knowledge of information resources, both people and organizations, is necessary, and that there are strategies for the acquisition of information” (Behrens, 1994, p. 311).

During the 1980s, the interrelatedness and intricate connections between the information content became even more pronounced. The methods and tools for disseminating information became more distinct, with Time Magazine renaming “Person of the Year” in 1982, to “Machine of the Year,” the computer. This feature of the machine inspired Horton to examine and compare information literacy to computer literacy. He described computer literacy as having two components, understanding hardware and software, and further explaining that information literacy extends beyond computer literacy. It was this pronouncement that brought the concept “into the realm of computer-aided information manipulation” (Behrens, 1994, p. 311). This theme, demonstrating the link between information content and methods of access and dissemination of information, was promulgated through the rest of the 1980s into current times.
An extensive literature review was conducted through a wide gamut of relevant databases and catalogs. RSS (Real Simple Syndicated) automated alerts feeds were set up in some databases to provide newly published and relevant studies over a 2-year span. From the review of the literature, six themes emerged: characteristics of information literacy and its relationship to digital literacy, information literacy in academia, information literacy at work, information literacy and adult learning theory and its relevance to adult students, and rubrics assessment and information literacy.

Digital literacy is defined as having the competencies to use “a subset of technologies that include hardware and software . . . for educational, social and/or entertainment purposes in schools and at home” (Ng, 2012, p. 33). With the use of the computer playing a major role in accessing, locating, evaluating, and using information to collaborate, create, and share new information, basic computer skills (BCS), sometimes termed information and communications technology (ICT), have been deemed necessary competencies for functioning in the 21st century. In proposing a framework for digital literacy, Eshet-Alkalai (2004) offered five subcategories as photovisual literacy, reproduction literacy, information literacy, branching literacy, and socio-emotional literacy. Goldhammer, Naumann, and Kebel (2013) examined basic computer skills in the assessment of speed and ability (p. 264).

A further articulation of information literacy was made by Mackey and Jacobson (2014). While working with the Metaliteracy Learning Collaborative, they further developed the framework on information literacy by expanding the theory and practice to include four elements: collaborate, participate, produce, and share (Mackey & Jacobson, 2014). Mackey and Jacobson pointed out that in the new millennium, the concept of
information had blossomed beyond the confines of libraries, librarianship, and traditional academic research to encompass the emerging technologies and many other approaches to literacy: media literacy, cyber literacy, visual literacy, mobile literacy, and health literacy.

**Information literacy in the college context.** Competency in information literacy (including digital literacy) is required at a high proficiency level for all categories of students to be fully engaged at college (Price & Baker, 2012). Research has shown that students are not transferring the principles learned in standalone information literacy courses to other area-of-interest courses such as those in the arts, humanities, natural sciences, and social sciences (Farrell & Badke, 2015; Gunn et al., 2011; McClurg et al., 2015; Roberts & Bhatt, 2007; Vecchiola, 2011).

Studies which reported assessment of information literacy in colleges as students entered, or were in their first years, were Ellis and Salisbury (2004), Gross et al. (2012), Gunn et al. (2011), Hulett et al. (2013), Leutkenhaus, Borrelli, and Johnson (2015), and MacFagden (2007). Those who reported assessment during intermediate years were Eshet-Alkalai and Chajut (2010), Holden (2010), Markauskaite (2007), and during those done the senior years were Kao, Tsai, and Shih (2014), Kelly, Coburn, Hegarty, Jeffrey, and Penman (2009), McClurg et al. (2015), Roberts and Bhatt (2007), and Vecchiola (2011). Assessment of information literacy among students at the graduate level was reported by Miller (2014), Oberprieler, Masters, and Gibbs (2005), Oblinger (2012), and Travis (2011). One study assessed students at the doctoral level (Ivanitskaya, Laus, & Casey, 2005) and several at varying levels within each study: Kilic-Cakmac (2010), Kuglitsch (2015), Mittermeyer (2005), Molteni and Chan (2015), and van Weert (2004).
The information literacy theory will form the broadest set of theoretical underpinnings for the dissertation research. Similarities and differences in the methodology of the first category are: two of the selected studies were conducted prior to the students entering college (Mittermeyer, 2005; Oberprieler et al., 2005). Other studies were done during the first week of the semester or as the semester progressed, those being Gross et al. (2012), Molteni and Chan, (2015), Salisbury and Karasmanis, (2011), Hulett et al. (2013), Ivanitskaya et al. (2005), Yager, Salisbury, and Kirkman, (2013), and Leutkenhaus et al. (2015).

Mittermeyer (2005), Salisbury and Karasmanis (2011), and Molteni and Chan (2015) used quantitative research methods to examine the information literacy skills of incoming undergraduate students. In the Mittermeyer (2005) study, 3,000 incoming students from 15 universities received their survey through regular mail. The 1,029 participants of the study conducted by Salisbury and Karasmanis (2011) completed their paper-and-pencil 20-questions survey during the first week of the semester while in tutorial group meetings. Findings showed that students entered college with some level of information literacy skills. For the questions about discovery tools, the largest percent chose Google and only 14% chose library database. In relation to questions about recognizing a journal citation, a large percentage, 77%, could not identify items in that academic format. Overall assessment was that a large majority of the respondents, two thirds, was not at the proficiency level that would allow them to achieve higher order skills and develop new knowledge practices. The findings of the Salisbury and Karasmanis (2011) study showed findings consistent with other similar research done by Mittermeyer and Quirion (2003), and Mittermeyer (2005).
Oberprieler et al. (2005), aimed to ascertain the level of both information technology and information literacy of 350 healthcare students, based on the curricula and course designs. Oberprieler et al. (2005) employed a triangulation research method by conducting an online pre-term assessment; then a pre-term intensive course in basic computer skills within 2 weeks of classes. This was followed by a final repeat online assessment at the end of the semester. Results showed that the performance in the pre-term intensive course which included basic computer use and word processing, showed an improvement at the end of the course. For basic word processing, average grades improved from 36% to 69%. Oberprieler et al. (2005) concluded that “All first year students . . . need computer competencies as a communication and learning tool in the first weeks of study” (p. 595).

For educational interventions of students with below-proficiency level information literacy skills, Gross et al. (2012) used a variety of empirical research methods such as tests, surveys, interviews and focus groups. The instrument used was the Information Literacy Test (ILT), which was administered to 580 college students over a period of 3 years in a community college. The authors used the explanatory sequential mixed methods – first a quantitative study, followed by a qualitative ethnographic study, by administering the ILT interventions followed by ASE process model, ASE stands for analyze, search, and evaluate. At the end of the process, students had to be able to evaluate the type of information needed, search for information using keywords, and evaluate the relevant information. The findings showed that the use of assessment through ASE, in-class as well as workshop sessions, and the types of questions as initiated by the students, did result in improved skills levels.
The findings from the Gross et al. (2012) study relates to the Mittermeyer (2005) study which showed that 77% of the participants did not give the correct answer and this demonstrated that there were significant gaps in the incoming students’ information literacy competencies. The research tool had strong validity as it was developed and used by many researchers in the field of information literacy. Salisbury and Karasmanis (2011) reported that students entered college with some level of information literacy skills but two thirds of the respondents did not have the required prior learning that would enable them to “fully grasp new concepts” (p. 43). This study is consistent with other similar reports from Mittermeyer (2005).

Three studies from Molteni and Chan (2014), Salisbury and Karasmanis (2011), and Oberprieler et al. (2005) all examined traditional healthcare students. The purpose of the Molteni and Chan study was to discover the relationship between participants’ self-confidence in doing information literacy tasks and the proficiency with which they performed those tasks. Participants were health sciences junior and senior students who were taking a required health science course. A 24-question two-part online survey was administered to a class of 324 students while only 239, (74%), participated. Much like the findings of Gross et al. (2012), Molteni and Chan (2014) found that there was a significant difference between what the participants claimed they can do in response to the self-assessment (first survey) and their actual performance in information literacy tasks. The sample size of participants in the study was small but it had huge implications for the profession as students who “undervalue library instruction … may not be as receptive to assistance and learning opportunities as others who feel that their skills will improve” (p. 6).
The study by Salisbury and Karasmanis (2011) was undertaken to discover the information literacy competency levels of students upon entering university. A paper and pencil survey of 20 questions was distributed to 1,029 students during the first week of the semester on five campuses of the multi-campus university. The questions were grouped into two categories: demographic information including information-seeking preferences, and basic threshold skills such as search strategies and search tools. The survey was administered during tutorial group meetings.

Results were grouped in survey areas of discovery tools, search strategy, evaluating internet site, citation recognition, referencing, and identifying peer reviewed journal article. Responses indicated that the students’ first preference of a source for getting information was through Google (35%), only 14% chose the most efficient answer, library database. When asked to isolate specific concepts in their research topic, only 33% identified three of those significant concepts. Only 23% answered correctly when asked to assess the relevance of citations and knowing how to find them. The overall findings suggested that students do enter college with some of the threshold skills necessary for academic research but the majority, 77%, did not.

In the study by Hulett et al. (2013) they assessed first year health science students to ascertain the entry level of information literacy skills with which students were entering college. The researchers used a pre- and post-experience survey, using a questionnaire of 20 items which asked about their information-seeking preferences as well as to test their basic threshold skills relating to search strategy, document types, search tools, and their understanding of scholarly information. A diagnostic tool, the online Inquiry/Research Quiz was developed. This tool had 10 questions and provided
synchronous feedback as the quiz was being completed. There were additional online tutorials and a mid-year quiz before a final posttest. The overall results of the posttest scores showed a marked improvement over the pretest results, but answers for some sets of questions such as the best tools for scholarly articles and recognizing sources based on citation information, showed only marginal improvement, (from 23% to 58%), which suggested that there was still room for improvement.

Ivanistkaya, Lau, and Casey, 2005 undertook a study at Central Michigan University to develop an online tool for assessing how students’ research attitudes and perceptions correlate to their performance of those research skills. The research was done using two cohorts: the RRSA-Health Professions version was used with 26 students in the doctoral program of the Health Administration course while the RRSA-Multidisciplinary version was used with 95 participants from different schools of the college. The researchers did an exploratory sequential mixed method study: first, examining previously completed information literacy exercises, conducting a focus group of the CMU librarians and following up with three classes of assessment which entailed multiple choice questions, skill-based problems, and measures of students’ attitudes of assessment. The rigors of the RRSA tools afforded the students the opportunity to receive immediate feedback on any incorrect answers, guided them to academic research services and resources, and prepared them to demonstrate the use of high-order skills in their research papers.

Yager et al. (2013) conducted a study as a method towards identifying the most appropriate form of assessment, test or rubrics, of research and information literacy skills in first year students at La Trobe University in Melbourne, Australia. They used the
blended approach – sequential explanatory method of the diagnostic online Inquiry/Research Quiz as used by Hulett et al. (2013). The quiz was offered in the first week of class and later followed up in week 6 with a rubrics-assessed course-based assignment. Results showed that there was positive significant correlation between the test scores and the total scores on the assignment rubric. Based on the results from the rubric used to assess assignments, and relevant to other empirical research on the topic, the researchers posited that the rubric was a valid method of evaluating students’ information literacy skills.

Like the proposed study, Leutkenhaus et al. (2015) undertook a study at Washington State University to assess the achievement of information literacy and critical and creative thinking components of student learning outcomes associated with a research project. The project was a collaboration between librarian and instructor of a first-year course, Roots of Contemporary Issues, and included 105 students during two semesters of the 2012-2013 academic year. The course consisted of a set of four library research assignments (LRAs) and ended with a final academic essay. Students were directed and guided through general topic idea to research questions to thesis statement. Students were required to find research sources in specific formats such as books and articles. They then had to articulate in writing how the sources helped to answer their research questions. At level IV of the LRAs, students had to submit an outline of the research paper as well as a bibliography of selected sources. The final essay consisted of five to seven pages using six source documents. The assessment covered six areas: thesis development, source quantity, nature of sources, sources analysis, historical roots, argument building, bibliography, and footnotes (citations).
The results which were evident in the independent sample $t$-tests, showed that students performed better in the spring semester than in the fall semester in some of the learning outcomes areas. For the learning outcomes nature of sources, source analysis, argument building, and bibliography, there were not significant differences between both semesters. However, through analysis of the data, the dependent sample $t$-tests showed that students preformed best in outcome areas of source quantity, nature of sources, bibliography and footnotes/citation. The cognitive skills were assessed as well since students had to not only find a requisite number of relevant source documents, but “to write about and engage with sources they gathered” (Leutkenhaus et al., 2015, p. 53). The learning outcomes which presented the highest challenges were source analysis and thesis development.

Some limitations were that the study by Leutkenhaus et al. (2015) was based on the first year the course was instituted, with little time to assess norms in student performance. All the raters except for the librarian were course instructors; the study included too few participants who were online students and students from the Vancouver campus, to allow for weighted sampling among all campuses and online. Additionally, norming practice of rating the papers by more than one rater was not done due to time constraints. Despite all the shortcomings, the study used firm methodological processes and contributes to the practice of information literacy application in undergraduate learning.

Another theme which evolved included studies focused on the application and integration of information literacy skills within the context of discipline-specific college courses. The information literacy principles and practices were applied and examined by
Roberts and Bhatt (2007) with engineering students, Vecchiola (2011) with students in the design disciplines such as art and architecture, Gunn et al. (2011) with business management courses, Miller (2014) with graduate students, McClurg et al. (2015) with medical students, and Farrell and Badke (2015) across a selection of academic disciplines. These assessments are most pertinent to the current study as this researcher collaborated with faculty of discipline-specific courses in embedding information literacy treatments into those courses.

Roberts and Bhatt (2007) at Drexel University, during a two-semester project period involving 700 students in freshman engineering class, integrated information literacy skills into two courses, humanities 107 and engineering 101. Both courses were parts of the engineering requirement, freshman engineering design sequence. The purpose of the study was to determine if students learned more skills when the teaching and learning design concepts are relevant to their lives or their studies, and when information literacy learning opportunities are made available at the “point of need” (Roberts & Bhatt, 2007, p. 246).

Humanities 101 was a required class focused on English composition and writing in the humanities. In this course students were introduced to technical writing and research skills, in a setting which afforded the ease of introducing core information literacy skills. These core competencies would be the ability to define information need, locate and evaluate information resources, and use those sources in their papers and reports. In engineering 101, which is a foundational course in engineering disciplines, the students were exposed to various engineering disciplines and the process of engineering design. Both courses complimented each other in that the information literacy skills
allowed the students to develop competencies to develop and idea, research alternatives, and explore design methodologies, all towards completing a final project report. A hybrid class model which included online tutorials in five sections was made available for student use. The sections were finding books, finding journals, searching databases, finding patents, and citing references. Each section ended with a quiz.

The reports were then evaluated based on written content and correct use of source information. The feedback from the students and the engineering faculty showed that 75% of the respondents stated that the online tutorial helped them in the completion of their final project. The researchers concluded that colleges “addressing various learning styles through active learning strategies motivates students to explore a variety of approaches to acquire information-seeking skills” (Roberts & Bhatt, 2007 p. 250). One limitation of this study is that librarians were not involved in the grading of the final research project but could only rely on feedback from faculty.

Vecchiola (2011) conducted a collaborative study on the integration of information literacy into an architecture course at Washington University in St. Louis, Missouri. The study was done at the Architecture School in the Sam Fox School of Design and Visual Arts and was conducted over a 2-year period involving 70 to 80 students each year. The participants were students enrolled in two courses, architectural history I and II. Information literacy concepts were integrated into the course curriculum and the latter design supported students in completing research projects which required them to demonstrate their research skills. Students were expected to gain “familiarity with key architectural traditions through time and [develop] critical awareness of diverse factors that shape the built environment” (Vecchiola, 2011, p. 76). Students were given
successive research process assignments which afforded the students opportunities to apply acquired information literacy skills and demonstrate research competencies in their final research projects.

Results showed that students could use research sources and identify, find, and use images and articles on buildings and architects. The collaboration between librarians and architecture faculty resulted in the integration of information literacy skills in an in-depth research course and was sequentially built into research process assignments and helped to advance the information literacy skills of the students.

Another study was done by Gunn et al. (2011) at the University of Auckland, New Zealand, which examined through a case study, the integration of information literacy skills into a business course for first year management students. The structure of the study was most appropriate for applying to three courses, management 101, a compulsory stage 1 course; GSE graduate programs, mostly mature students returning to college; and Interdisciplinary programs, mostly graduate students taking business-oriented courses. Online tutorials were designed to facilitate the participants need for flexible, self-paced, and web-based services that were available asynchronously.

Based on statistical analyses of correct answers out of total of 100%, the number of completed quizzes, and mean scores presented, the results showed that 92% reported completing all the quizzes; 96% found the instructions clear; 90% felt the tutorials had achieved the stated objectives; 81% felt they had learned useful skills; and 60% said they would refer to the tutorials in future. There was additional assessment based on 125 of the 150 questionnaires sent to randomly selected students who had completed the quizzes. The case study showed that “embedding information literacy skills into courses, through
online resources, is an approach that reflects the changing technological environment and opens up new opportunities for teaching and learning” (Vecchiola, 2011, p. 8). This principle supports the conceptual framework of the current dissertation research.

Miller (2014) compared the information literacy skills of undergraduate students and postgraduate students at a small university in Australia. The purpose was to ascertain the difference in levels of information literacy skills and to what extent demographics influenced the application of those skills. An online questionnaire with 25 test questions was designed on the model of the Australian and New Zealand Institute for Information Literacy (ANZIIL) framework and based on the ACRL Information Literacy Standards for Higher Education (American Library Association Institutional Repository, 2000). The tool was administered over the course of two semesters to 64 information studies students, 23 undergraduates and 41 postgraduates.

Descriptive statistics were used to present the results although they were not tested for statistical significance and the author did not control for confounding variables. Results showed that postgraduate respondents scored an average of 77%, while undergraduates scored an average of 69%. The average scores for undergraduates in the 20-30 age range were 81%, while those in the 30-40 age group averaged 65%. The scores for both undergraduate and postgraduate students “indicate deficiencies in information literacy skills in several areas, including parsing citations, strategies for locating specific content, and defining an information need” (Miller, 2014, p. 105). The author acknowledged limitations in the use of choice tests for higher order thinking which is associated with information literacy. Additionally, there were serious limitations in the fact that the author did not test the results for statistical significance. The argument
presented in this study supports the argument made in the current dissertation research that adult students need layered information literacy learning integrated into the academic work all the way through.

McClurg et al. (2015) assessed information literacy competence of undergraduate medical education students at the University of Calgary, Canada. The study used a quantitative pre- and posttest design to ascertain if a combination of librarian-led small group information literacy instruction sessions, integrated with course content and instructor participation, together provided an effective method of imparting information literacy skills needed in the practice of evidence-based medicine (EMB). The study was based on collaboration between librarians and medical faculty and conducted over the duration of 3 years to students in the applied evidence-based medicine (AEBM) course. Students were exposed to five 15-minute EBM information literacy sessions presented by three librarians to 12 small groups of 15 students, with each group facilitated by a physician. Students completed an online survey before and after each session. A total of 160 students were sent the survey with only 144 responding to the pre-survey, while 112 students answered the post-survey with response rates of 90% and 75%, respectively.

Results showed that there was an increased level of confidence in the posttest results. Findings showed significant improvements of students’ competencies in discovering systematic reviews and practice guidelines, using limiters in research, using PICO (Patient, Intervention, Comparison, and Outcome) patient interviewing method, and in student’s confidence in using MESH, Medical Subject Headings (McClurg et al., 2015). The author’s premise espoused below supports part of the underpinnings of the current dissertation research:
We outline an innovative approach that can be adapted to different settings.

Learner’s ability to use their own devices, ask questions and address their own knowledge gaps during the 15 minutes of information literacy programming align with the following premises of adult learning [that]

- Adults are accountable for their own learning.
- Adults learn in the here and now.
- Adults learn best when they integrate learning with the rest of their lives.

(McClurg, 2015, p. 124)

An important review that informed the current dissertation research was one conducted by Farrell and Badke (2015), who examined barriers to situating information literacy in academic disciplines and offered strategies towards that end. They used phenomenographic evidence from focus groups of subject discipline faculty. The authors contend that the establishing of information literacy as an independent discipline, that of library science/information science, (LIS), has not assisted students in acquiring the information literacy practices and characteristics as required toward their becoming experts in an academic area of interest. The researchers used the City of New York CUNY information literacy integration model to formulate a set of interview questions to pose to academic discipline faculty within focus groups to articulate their “disciplinarity from an ‘information literacy’ perspective” (Farrell & Badke, 2015, p. 327).

The assessment was done among sociology faculty at Lehman College during the spring and fall of 2014. Three sets of questions were posed to faculty during three interviews which were recorded and later transcribed. Basic content analysis of the transcripts was done by the librarians, based on the eight matrices of the model. The
statements from the transcripts were later grouped into academic outcome statements. Evidenced in the focus group data were 163 learning outcomes which were the information behaviors desired by the sociology faculty. The outcomes were categorized in the “interplay of reading, writing and the use of both theoretical and quantitative information in the research process [which] would serve as the starting point for exploring the creation of new learning opportunities” (Farrell & Badke, 2015, p. 332). It was proposed that scaffolding learning opportunities much in line with this writer’s project, should be practiced in academia, integrating information literacy principles into both required as well as elective college courses.

Studies which have been done on the digital literacy component of information literacy examined students’ computer skills, were the studies of Oberprieler et al. (2005), Eshet-Alkai and Chajut (2010), Goldhammer et al. (2013), Grant, Malloy, and Murphy (2009), and Nelson, Courier, and Joseph (2011. Other studies examined digital literacies from a third perspective: Grant et al. (2009) looked at the differences between students perceived assessment of their computer skills and the actual performance of those skills, while Nelson et al. (2011) examined faculty’s perception of the digital needs of their students.

Both Eshet-Alkalai and Chajut, (2010) and Goldhammer et al. (2013), examined digital literacy among college students. Eshet-Alkalai and Chajut used an exploratory sequential mixed method, one previously done by Eshet-Alkalai (2004), using three varying age groups – 10 high school students, 10 university students, and 10 adults over age 30. The research was done over a 5-year period using a six-part “model of digital literacy” to ascertain to what extent experience, age, usability or generation gap affected
the performances in the six areas. The six areas were photo-visual literacy skill, reproduction literacy skill, branching literacy skill, information literacy skill, and real-time thinking skill. Results showed that digital literacy skills changed over time but varied among age groups. The findings showed outstanding differences in performance of different age groups: younger participants performed better than 30-40 age group in photo-visual and branching; the older age group performed better in reproduction, producing new knowledge and information literacy tasks.

Similarly, Eshet-Alkalai and Chajut (2010), Goldhammer et al. (2013), set out to develop a basic computer skills (BCS) scale to test the ability and speed of accessing, using, and providing information. They used an exploratory sequential mixed method study with 320 German 15-year old secondary school students as participants. First, the ICT Self-Efficacy Scale was used for determining students’ computer knowledge. The tasks were designed based on simulated computer environments using the mouse and keyboard. A seven-part hypothesis was used to develop the Basic Computer Skills Test in 15 tasks. Results showed variance of BCS speed and BCS ability between individuals and showed that participants with higher levels of ability worked at a higher speed.

Grant et al. (2009) conducted a mixed method sequential exploratory study with 200 college students in a business school in North Carolina. At first, a survey was used to gather students’ perceptions of their computer proficiency followed by a skills assessment to measure their actual performance. The applications on which the test was based were word processing, presentation, and spreadsheet, using the levels of proficiency as basic, moderate, and advanced. Results showed that in word processing, there was some differences between the students’ perception and the actual performance;
in presentation skills, there was no difference between perception and performance; and in spreadsheet skills there was a significant difference between perception and performance.

Nelson et al. (2011) conducted a study of faculty to ascertain what they deemed to be the most important digital capabilities that graduate students should have for them to be fully involved in a digital world. Based on the varying historical treatment of information literacy, the researchers decided on three components of information: “the skills and knowledge to use a variety of software applications and hardware devices . . .; the ability to critically understand digital media and applications; and the knowledge and capacity to be able to create new knowledge” (Nelson et al., 2011, p. 97).

A 20-topic questionnaire was sent to 244 faculty members, department chairs, and associate deans of 57 majors. Respondents were asked to grade, based on the Likert-type 4-point scale, how well the students in their major needed to know how to perform a specific task. Only 82 of the 244 faculty members completed the survey, showing a response rate of 34% and representing 43% of the academic majors available to the students. The analysis of the results using ANOVA, analysis of variance, rated equal of more than 3 and showed that four of the 20 areas needed to be known by all students. They were information research and retrieval, information validation, information communication, and using applications. At the top of the list of the categories in the 20 topics questionnaire, the one that rated highest was information literacy which included “research and retrieval, information validation, social responsibility, and legal aspects” (Nelson et al., 2011, p. 103). This study was pertinent to the researcher’s area of interest as the requisite course the students had to have completed for inclusion in the study was a
hybrid course with one-third of the coursework conducted online. Students had to be
digitally competent to complete the course successfully.

**Information literacy in the workplace.** Some studies show that information
literacy skills are not only important at college but are equally important in the
workplace, while others demonstrate the need for, and importance of, information literacy
in lifelong learning. Workplace assessment of information literacy has been documented
by Asselin et al. (2005) who examined government personnel in an education ministry,
Baker (2013) with accountants, Bielick, Cronen, Stone, Montaquila, and Roth (2013) on
all categories of workers, Birdsong (2012) with nontraditional adult learners pursuing
just-in-time training programs, Goodman et al. (2013) with adult participants from a
variety of countries and educational attainment through The Program for the International
Assessment of Adult Competencies (PIAAC ) of the Organization of Economic
Cooperation and Development (OECD), and Hemming (2002) on adults enrolled in a
community vocational training program which prepared participants with the information
literacy skills needed for the workplace. Only three studies were found to have examined
information literacy with specific relevance to adult students (Cooke, 2010; Head, 2012;
Rapchak et al., 2015).

Additional studies examined information literacy skills in the context of work or
in the lifelong learning continuum (Jinadu & Kaur, 2014; Louys et al., 2009; Oneill &
Thomson, 2013; Travis, 2011). Louys et al. (2009) assessed technology-enhanced self-
development of competences in the context of lifelong learning education. The
participants were adult members of Association of Participants Àgora in Barcelona,
Spain. Agora was a non-profit association of adults who did not have a degree but had a
willingness to learn. The researchers used TENCompetence infrastructure, a tool which
helped people in developing their competences, made them feel more in control of their
own learning, and made several people change their preferred way of learning from
following a predetermined learning path in a strict order, to being able to choose their
own learning path.

The project occurred in a computer room with personal computers and lasted for 6
weeks with 100 participants and 20 facilitators with each participant involved for a total
of 14 weekly hours. Participants could choose from 10 competence profiles within
information and computer technology skills areas such MS Word, e-mail usage, Internet,
MSPowerPoint, Windows management, files management, folders management, blogs
usage and English language (basic and advanced levels). For each competence,
participants could choose between several activities, ranging from three to over 20
activities per competence with activities ranging from 15 minutes to 3 hours of learning.
Results showed that the TENCompetence infrastructure can be successfully applied in the
challenging context of adult learning computer skills, even if they did not have the
necessary computer skills or planning skills beforehand. The Personal Development
Planner tool used “offered participants a new way of learning and this fostered their self-
organization and increased their motivation” (Louys et al., 2009, p. 80).

Travis (2011) set out to ascertain the information literacy skills that graduating
students from the California State University system take with them and transfer or apply
in the workplace. The researchers designed a quantitative research methodology using
two convenience samplings – one was alumni of the CSU system; the other, of students
who had attended a 4-year college in the United States. The survey instrument had five
sections with 43 questions. The CSU cohort started with 62 and ended with 54 usable surveys; non-CSU participants started with 71, ended with 44 usable surveys. Eleven different CSU campuses were added to 13 others for a total of 24 institutions represented. The disciplines represented both in undergraduate levels were social sciences, arts, humanities, business, sciences. The graduate levels represented were psychology, library science, social sciences, education, business administration, social work, and nursing.

Results showed that there were significant differences between those that achieved required learning outcomes in information literacy college requirements when compared with those who did not. Twenty-eight percent confirmed that they had fulfilled information literacy requirement at college; 23% could not remember. Of the 28% who did, 85% satisfied the requirement by completing a credit-bearing course. When asked to rate their IL skills before and after college, there was a marked difference between the students who had IL courses (37%) and those who did not – the latter rated their skills at a higher level (52%).

In relation to factors that had contributed to the development of their information literacy skills, 84% identified writing research papers, 33% identified assistance from librarians, and 27% identified library instruction sessions. With regard to which information literacy skills participants used on the job, the two equally rated top answers were: finding relevant information, and critical thinking, at 78%. Evaluating information came in at 69%. The study offers awareness for both academia and business. A large percentage of students (97%) consulted a librarian in person. Of significance is the low rating of librarians, online tutorials, and library instruction sessions as contributing to the growth of information literacy skills. The author posited that it seems:
significant that students rated doing research contributed more to gaining [IL] skills rather than passive learning activities such as sitting through a presentation or using an online tutorial. This strengthens the argument that information literacy should be embedded in courses and assignments rather than a standalone or one-shot model. (Travis, 2011, p. 29)

In this reviewer’s assessment, library students should not have been included in this study as IL is their area of expertise and practice so, to some, this inclusion may have skewed the results somewhat. Results showed that students do use information literacy skills in the workplace and that they “value the skills they gained from engaging in the finding, evaluating and applying information” (Travis, 2011, p. 29). The ability to transfer these skills learned in college applies not only to the workplace but to the practice of lifelong learning.

In Oblinger’s (2012) book, Game Changers: Education and Information, Aldridge reported on a study at the University of Maryland University College which has its foundation in serving adult students, starting with the introduction of the GI Bill in 1947. UMUC undertook an exhaustive, 5-year study on student engagement and persistence to examine its undergraduate curriculum in relation to the college’s ability to prepare its graduates for the “the highly specialized nature of today’s knowledge work” (Aldridge, 2012, p. 178). Using the data for the preliminary study, UMUC established Project SEGUE (Supporting Educational Goals for Undergraduate Excellence) to develop a transformational academic model that would propel the students from coursework to real work, would restructure the degree completion process for increasing retention, and would provide students and faculty with a more robust method of tracking students’
academic progress and simultaneously assessing the value of a UMUC degree. The research was designed to answer the question, “What should our students be able to do ‘out there’ that we are responsible for teaching them ‘in here’?” The researchers followed up by looking at a national survey of employers’ expectation of college graduates.

The Project SEGUE leadership team collaborated with industry experts to design a curriculum and identify appropriate learning outcomes based on real-world work demands. Program Outcome Guides (POGs) were developed and used to guide course content as well as program objectives. The faculty developed Course Outcome Guides (COGs) which identified specific learning outcomes for each individual course and matched the learning content and best practice learning activities.

Over a 2-year period, 700 faculty members in college divisions, departments, and disciplines worked to restructure and reduce the hundreds of courses which had grown significantly over the many decades. The redesigned courses included all the pieces for allowing UMUC students to succeed in the workplace: workforce-relevant skills, industry-driven knowledge, effective teaching and learning strategies, and ongoing assessment. The design of the curriculum “redirects the emphasis away from [students] contact hours and toward quality learning outcomes in line with real-world professional expectations” (Aldridge, 2012, p. 183). The researcher posited that as adult learners were returning to college in record numbers, technology-enhanced learning and adult-focused education needed to be a permanent component of the educational landscape (Aldridge, 2012).

**Information literacy and adult learning theory.** Adult literacy theories and practices have been originally espoused in the 1970s by Knowles who is accepted as the
father of andragogy, which is defined as the “art and science of helping adults learn” (Knowles, 1984, p. 6). Caruth (2014), in a meta-analysis of adult learning theory, described the historical development of the term and posits that Knowles’s andragogical model, which originally focused on four learning principles and over time, evolved into six assumptions, should be used for teaching adults in higher education. These assumptions include: adults need to know, self-concept, prior learning experience, readiness to learn, learning orientation, and motivation to learn. In addition to the six assumptions, Caruth (2014) further espoused the implementation of eight process design steps to effectively facilitate adult learning.

Adults students are characterized as over age 24, have delayed college enrollment after high school, have family and work responsibilities, and are non-residential (NCES, 2016c). Several studies have assessed the application of adult learning theories in academic settings. Some of those studies are by Chen (2014) who conducted self-directed and transformative learning principles in a discipline-specific (psychology) college course; Harper and Ross (2011) examined Knowles's (1984) theory of andragogy on the design of an undergraduate program on interdisciplinary studies; and Holton et al. (2009) who studied the development and use of andragogy as one of the dominant frameworks for teaching adults. Holton et al. (2009) used the exercise to work towards developing a survey instrument that could eliminate the shortcomings uncovered in prior research on andragogy.

In an extensive review of the literature on the practice of andragogy in higher education, research has shown that, for the most part, students in higher education are being taught pedagogically (Caruth, 2014). Caruth contended that adult students should
be taught andragogically following the Knowles’ andragogic model as the foundation, and embracing the eight process design steps for creating effective learning. The review contends that research supports the practice of the lack of andragogy in the teaching of college and university adult students and pedagogy has been the basis for the entire educational system even though adults learn differently than children learn, but were being taught as children were taught. The review differentiated between teaching of children and the teaching of adults: while in pedagogy, the instructor is in charge and is held entirely responsible for all learning which encompasses what is to be taught, how it is to be taught, when it is to be taught, and how it is to be measured.

Adult students should be taught on the premise that they need to know how to learn to become life-long, autonomous learners. Research demonstrates that adult students being taught andragogically become engaged in the learning process (Chen, 2014; Harper & Ross, 2011; Holton et al., 2009). Adult students are usually ready for learning, learn more, experience more meaningful learning, and enjoy learning (Caruth, 2014. In addition to promoting the six assumptions as developed out of Knowles’s principles, Caruth emphasized an eight-process design step as a method for creating effective learning (p. 5) with the thinking that it is equally important to apply the adult learning principles as well. Caruth contended that even though the principles of andragogy have been considered as the benchmark for adult teaching and learning over the past forty years, there has not been enough empirical research done. The focus of the few such studies has been on the aspect of self-directed learning, SDL. Knowles (1984) had defined SDL as adults having the responsibility of defining their own learning needs and satisfying those needs.
In alignment with the previous studies, Price and Baker (2012) examined adult students’ engagement at college. The study used a concurrent parallel design mixed method to examine two groups of students: one group with 125 adult students and one with 69 traditional-age seniors. The purpose of the study was to prove the hypothesis that adult students would score lower on survey items which were more related to traditional students’ experience. This study used the National Survey of Student Engagement (NSSE) tool which included various types of student engagement, such as Experience with Information Literacy. The findings showed that there were statistically significant differences between traditional and nontraditional students in 20 of the 42 core survey items. The adult students scored significantly lower than traditional students in these 20 items and these findings suggest that adult students were less academically engaged than traditional age students.

Studies which focused on adult learners in relation to information literacy are two in non-academic settings - Birdsong (2012), Butcher and Street (2009), and four in academic settings - Chen (2014), Harper and Ross (2011), Holton et al. (2009), and Oblinger, (2012). Both Birdsong (2012) and Butcher and Street (2009), reported on the adult learners’ need for information in health, income, and other daily life activities. In the Birdsong study, a multiphase mixed methods approach was used with more than 2,900 non-scholar adult participants over 50 years of age through a series of face-to-face classes and videos for a period of 6 weeks. Findings showed that participants developed skills, but the shortcomings were that since the study was not conducted in a classroom setting and the work was not graded, it was difficult to evaluate the results definitively. Butcher and Street used a sequential exploratory mixed method by first conducting an
ethnographic study to evaluate the information searching skills of four adults ranging between the ages of 40 to the 70s, followed up by one case study of two older men through a public library service. The assessment revealed that information literacy training provided through community learning centers afforded the non-scholar learning experiences which “act as catalysts for change and contribute to the development of a lifelong learning culture in which people expect and want to learn” (Birdsong, 2012, p. 70).

In examining the application of adult learning theory within the formal education context, Chen (2014) conducted self-directed and transformative learning principles in a discipline-specific (psychology) college course. Harper and Ross (2011) examined Knowles's theory of andragogy on the design of an undergraduate program on interdisciplinary studies. Holton et al. (2009) studied the development and use of andragogy as one of the dominant frameworks for teaching adults and used the exercise to work towards developing a survey instrument that could eliminate the shortcomings uncovered in prior research on andragogy.

Chen (2014) sought to discover how adult students responded to self-directed and transformative learning principles in a discipline-specific (psychology) college course. Andragogical principles were applied to nontraditional adult students in a psychology discipline-based course in a large, Midwestern U.S. college. The research used the theoretical underpinnings of the educational model for adult learning as purported by Knowles (1984), and Mezirow (1991). A qualitative study was conducted with 10 adult students between the ages of 29 to 57 who were enrolled in an American university with a college dedicated to adult students.
The foundational components of adult learning theories were built into an 11-week quarter-based upper-level, psychology course. The course was designed as an applied course that focused on the personal change process as applied within an interdisciplinary and experiential manner. The class met for 10 weeks with once-weekly sessions, each lasting for 3 hours and met in the evenings. Students did not have a textbook as the driving template but were instead asked at the beginning of the course to decide on a topic, an area of their life in which they wished to experience some personal change. The selected topics were approved by the instructor and this was done to reduce any risk or stress to the participants. It was explained to the students that they were not expected to engage in actual personal change but only to use the topics they had selected as a method for understanding psychological concepts.

There were two dimensions of scaffold assignments and activities to allow for customized learning experiences: levels of personal engagement and content type. With regards to personal engagement, students were given the opportunity to engage in the course and the activities not necessarily in relation to their own experience but may be of others. The simulation allowed for four outcomes: observation of others, personal relevance (observation of self), both through the discipline of the course (psychology) and the application of self-selected change application. The learning activities entailed discussion, simulation role-plays, current event debates, and small group application. Journaling was encouraged to reflect their learning during classroom time as well as from homework assignments.

A qualitative study using the interpretive phenomenological analysis (IPA) was used to study the adult learners. The researchers determined that the IPA “allowed for
rich meaning to be inductively derived from the data as well as offering tight controls to the data analysis, . . . for the overall convergence of themes, and the identification of themes and sub-themes” (Chen, 2014, p. 411). The questions which were used were concerned with the areas of evaluation of prior learning experiences, learning experiences relating to the course, and overall impact of learning from the course.

On registering for the course, students were told that they had the option to participate in an interview to discuss their learning experience at the end of the course when grading was completed. Near the end of the course duration, students were reminded of the interview via e-mail messages to solicit their participation. Each interview lasted for 45-minutes to 1 hour and the sessions were audiotaped. Students were purposefully sampled from the course and of a total of 30 enrolled in the course, 10 agreed to participate in the interviews.

Findings showed the presence and utility of adult learning principles. The results reflected five themes displayed as five phases for a model of learning which the researcher has designated as a “learning paradigm shift” (Chen, 2014, p. 412). These phases were: a personal reflective process, emotional conflict, self-assessment, learning Rubicon, and behavior change. The research confirmed that the andragogical principles can be applied in formal education settings which can foster this process, as change was experienced in the participants by the end of the course. This study was indeed relevant and applicable to the author’s research on two levels: it showed that andragogical principles may be applied to the students in the development of their information literacy skills; and that when applied with the context of a subject-specific course in the students’ area of interest, they can be advantageous.
Harper and Ross (2011) conducted a study using the application of Knowles's theory of andragogy on the design of an undergraduate program on interdisciplinary studies [IDS] at The University of Southern Mississippi. The research occurred out of necessity when the original IDS program was cancelled after Hurricane Katrina created havoc on the Gulf Coast states of the US. The study started in 2009 with five students and grew to 38 by 2011. The design of the program for IDS was both reflective and reflexive as students were afforded opportunity to reflect on their beliefs and values and their goals and future achievements.

Participants were students enrolled in the Interdisciplinary Studies program and the faculty involved came from an adult education perspective while some had advanced degrees in adult education. The design of the three core courses (IDS 301, IDS 401, and IDS 402) allowed learners to formulate their own degree plan with guidance from faculty, and focused on two disciplinary concentrations with a final research or creative portfolio format. The students were given the reigns to “conceptualize, carry out and write up a research or creative project that calls on the knowledge they have gained in their disciplines and applies to a problem or question that they choose” (Harper & Ross, 2011, p. 163). One of the main goals of the class was to get students to critically examine how their disciplines overlap and relate to each other.

The outcomes of IDS 301 would be a statement of the research question reflecting the topic they would be studying for the next 2 years. In the research-rich course, IDS 401, students were encouraged to conduct extensive academic (library) research on the topic they had chosen and the product were to be drafts of the introduction sections, literature review and methodology sections. For IDS 402, a senior capstone which was
writing intensive and included in a portfolio, was required and would also include a rough draft of the final project. The purpose of IDS 402 was to afford students the opportunity to maintain their progress towards graduation “into the future and beyond the undergraduate degree” (Harper & Ross, 2011, p. 164).

The findings showed that the application of the six assumptions to adult learning does work successfully when applied to curriculum development, teaching and advising as done through interdisciplinary studies program. Results showed that students liked having an end in sight; liked self-supervising their program; did better when they understood their learning and expected end results; improved on performance with guidance toward their own success; and got renewed passion in their own education (Harper & Ross, 2011). The authors reflected on the motivations that Knowles (1984) considered the foundational difference between "adults" and "children" and compare their own base of learners to those precepts, finding that perhaps there are more similarities than differences when the learner is in control of his or her learning.

Holton et al. (2009) gave a historical review of the development and use of andragogy as one of the dominant frameworks for teaching adults during the past 40 years. The authors pointed out that the major gap in andragogy research is the lack of a measurement instrument that adequately measures both andragogical principles and process design elements. The purpose of this study was to develop an instrument that could apply both the six assumptions of adult learning as well as the eight process design elements appropriate to adult learners. The authors analyzed in depth, the qualities and shortcomings of several measurement tools such as the Educational Orientation Questionnaire (EOQ) of 1979, the Educational Descriptor Questionnaire (EDQ) of 1982,
the Student Orientation Questionnaire (SOO) also of 1982, the Andragogy in Practice Inventor (API) of 1981 the Personal HRD Style Inventory (HRD) of 1987 created by Knowles, the Principles of Adult Learning Scale (PALS) of 1978, the Adapted Principles of Adult Learning Styles (APALS) of 1998, and the Online Adult Learning Inventory of 2004.

The instrument which was developed in this project was part of a comprehensive examination of andragogical principles and process design elements. The latter processes were examined to ascertain their effects on student satisfaction and learning outcomes in a postsecondary education setting. The tool was administered to 404 adults who were enrolled in an adult-oriented postgraduate degree program. Analysis revealed promising scales to measure five of the six andragogical principles and six of the eight process design elements. Of the theory’s six andragogical principles, five factors emerged with above 60% of the variance.

Holton et al. 2009 posited that this instrument is the most successful attempt to date to measure andragogical principles and elements. In relation to the seven of the eight andragogical process designs elements, six emerged as above 63% variance. Reliability of the scales used to measure andragogical principles of constructs such as experience, need to know, readiness, and self-directedness need to be strengthened by future research. Some choice of words used in the survey may have been unclear to participants, for example, the term learning experience within the context of the classroom, without the word classroom being used, may have been misconstrued. This study used the adult learning theory as its underpinning and is one of the theoretical frameworks. It holds promise for advancing research on andragogy, and subsequently advancing the dual
importance of both aspects of andragogical instructional strategies in both principles and design elements.

**Information literacy and rubrics assessment.** The study assessed the information literacy skills of adult students who were progressing towards the senior year or were on the cusp of graduating. The intent was to ascertain to what extent they had the ability to apply the information literacy principles acquired at college to potential research tasks in the workplace. The literature was examined for studies reporting the use of rubrics in the application of information literacy skills to a course research project and thus would predict a strong possibility that the competencies would be transferred to tasks undertaken in the world of work.

Reddy and Andrade (2010) conducted a meta-analysis of rubrics and made supportive arguments for their use in higher education; the assessment tool, RAILS, Rubrics Assessment of Information Literacy Skills, was used by Belanger et al. (2015) to assess the information literacy skills with various types of students’ assignments. Diller and Phelps (2008) used rubrics to assess ePortfolios of students. Hoffman and LaBonte (2012) assessed portfolios of writing and rhetoric assignments among first and third year students; Knight (2005) examined bibliographies in a first-year research and writing project. Rapchak et al. (2015) applied andragogical principles in assessing annotated bibliographies of adult students information literacy skills in an information literacy standalone undergraduate program. Leutkenhaus et al. (2015) looked at a term-length research multipart project which culminated in a final research paper. van Helvoort (2012) used rubrics to assess adult students’ information literacy skills in an information management course; and Lowe, Booth, Stone, and Tagge (2015) conducted rubrics
assessment of information literacy skills among first year students who had librarian interactions included in course design and execution.

Studies have shown that lack of the ability to apply information literacy principles to academic tasks has affected the performance of students throughout the educational journey. The literature is replete with assessment of students’ competencies in information literature, however, in recent years, researchers have moved beyond traditional assessment to the more “purposive assessment” by using rubrics (Howell, 2014, p. 400). Arguments supporting the use of rubrics in assessments have been purported by Belanger et al. (2015), Holmes and Oakleaf (2013), Montgomery (2002), Moskal and Leydens (2000), and Oakleaf (2009).

Rubrics have been defined as “agreed-upon learning values, focus on standards and concepts, aligned with educational theory, and provide results that can be applied to improve instruction” (Belanger et al., 2015, p. 624). The use of rubrics provides a method of “round[ing] out the assessment of student learning” (Montgomery, 2002, p. 34). Moskal and Leydens (2000) argued that scoring rubrics are applicable for assessing a broad range of subjects and activities and both analytic or holistic scoring rubrics may be used. Holistic rubrics assess the work as a complete product while analytic rubrics evaluate parts of the product. For the current study, analytic rubrics were used to assess selected components of each research paper examined in the study. Moskal and Leydens (2000) also argued that a pre-defined scheme for the evaluation should be developed before using the rubrics to create an acceptable level of objectivity to the rating process. The latter principle was echoed by Holmes and Oakleaf (2013), and Oakleaf (2009, 2011) who were proponents for the use of rubrics assessment with information literacy and
emphasized that “rubrics and raters must go through a norming process” which should engender consistent and reliable use of the rubrics by multiple raters (Holmes & Oakleaf, 2013, p. 599).

Assessment through rubrics provides evidence that the student is competent to apply the information literacy skills learned in college to the workplace. The proposed assessment tool, AAC&U Information Literacy VALUE Rubric, has been developed by the Association of American Colleges & Universities (ACRL) and was based on the standards of the ACRL. These rubrics have been applied to assess the information literacy skills with various types of students’ assignments such as in-class worksheets, annotated bibliographies, search histories, and research papers (Belanger et al., 2015), e-Portfolios (Diller & Phelps, 2008), and writing portfolios (Hoffman & LaBonte, 2012).

Reddy and Andrade (2010) conducted a meta-analysis of rubrics used in higher education and reported on students and instructor perception of rubrics, the effect of rubrics on learning, the use of rubrics in assessment of instructional designs or program designs, and the attention or lack thereof, paid to the validity and reliability in rubrics assessment. The advantages of rubrics use in assessment have been stated as laying out the expectations for an assignment, listing the criteria of what is deemed as important, and describing the levels of performance at all levels (Reddy & Andrade, 2010). Of the 20 articles reviewed for this meta-analysis, the major findings were that there were increased positive results in the studies where the students were co-creators of the rubrics or where students received the rubrics prior to the start of an assignment. Instructors’ perceptions of rubrics were equally negative and positive on rubrics use. Some instructors embraced rubrics assessments as objective guides for evaluating an assignment while
other instructors were reluctant to use the rubrics as they view the rubrics as a quick and accurate method of assigning grades. The evidence suggested that there was a direct link between rubrics and learning, and that there was a higher achievement level and deeper learning.

Rubrics assessment was used to determine the information literacy competencies of students in a general education program at Washington State University, Vancouver by Diller and Phelps (2008). E-Portfolios consisted of two pieces of self-selected coursework, artifacts or description of a completed assignment done during three learning goal courses, and these were evaluated against the rubrics. The researchers focused on only the three learning outcomes relevant to communication and information literacy. From the completed e-portfolios, 25 matched the criteria and included an even amount of transfer and entry-level students as well as have an equal spread of participants by gender and race. Of the three major categorical anchors of Emerging, Developing, and Integrating, findings showed that all students had a mean score with the range of Emerging, with transfer students scoring 2.57 on a 6-point scale and higher than the 2.07 of entry-level students. Additionally, there were not statistically significant differences in score by gender and race, although females scored higher than males. Also, there was some correlation between age and skill as older students’ scores were marginally higher than younger students. As reported by the researchers, there was reasonable evidence that their hypothesis that transfer students would score at the higher level of the Emerging category was correct.

Similarly, Hoffman, and LaBonte (2012) used portfolios of writing and rhetoric assignments among 50 randomly selected first and third year students from varying
academic levels at California State University Channel Island. Librarians and teaching faculty of writing and rhetoric courses in a general education program collaborated in authentically assessing student writing using three campus-based information literacy learning outcomes for general education. As in the Diller and Phelps (2008) study, students self-selected the completed products they included in the portfolios. Findings showed that the use of rubrics applied to student writing can provide substantial evidence of information literacy competencies.

In another study of information literacy assessment using rubrics, reported by Knight (2005), 260 bibliographies submitted by 30% of the students enrolled a first-year research and writing course, were analyzed. Collaboration was established between librarians and writing faculty. The rubrics were based on the Information Literacy Standards for Higher Education and were used to determine the level of mastery of the skills as stated in the learning outcomes for the course.

A relevant study which employed rubrics assessment and information literacy competency among adult students, did so by also addressing andragogical principles (Rapchak et al., 2015). The purpose of the research was to ascertain which aspects of information literature learning objectives were achieved and what gaps existed after students completed the course objectives. The rubrics were based on ACRL Information Literacy Standards and focused on finding, evaluating and citing various information sources. The study was done at Duquesne University School of Leadership and Professional Advancement with 14 undergraduate adult students during a calendar year. In the design of an information literacy course, the researchers applied andragogical principles, as established by Knowles (1970), taking into consideration the characteristics
of adult students, that is, they brought experiences to the learning process, approached learning more purposefully, and were more motivated to new learning.

The course consisted of five online sections and two face-to-face sections. The researchers had an independent party seek agreement from students to participate in the project and on approval, assistants followed up with collecting the annotated bibliographies which the students had done for course research papers. Raters first conducted norming sessions on sample annotated bibliographies and used six criteria (information need, source choice, summary, evaluation, connection to project, and citations) and four qualitative levels (excellent, proficient, developing, and unsatisfactory) in their assessment of the students’ work. Except for one bibliography, all others rated above the developing level and 93% of the students appeared to have mastered the techniques of finding appropriate sources. However, 79% of the students did not develop the competence of evaluating the sources they found. For the proposed study, Rapchak et al. (2015) has provided a seminal work which informed the methodology. The use of rubrics was applied in a different student product, the final essay in an area-of-interest course and closely examine the application and transfer of information literacy techniques to an academic product within a specific subject discipline.

Leutkenhaus et al. (2015) examined students completed course work linked to Library Research Assignments, LRAs, and a culminating research paper, using AAC&U information literacy rubric. The researchers assessed eight student learning outcomes using five levels of achievement in a foundational history course over an academic year, fall and spring. Findings showed that students did better on most but not on all the eight
areas in the spring semester, and that the two outcomes areas that garnered the lowest scores were thesis development and source analysis.

Rubric assessment was used to assess adult students’ information literacy skills in an information management course (van Helvoort, 2012). Participants were both day full time, and evening part-time students who had participated in a Digital Literacy workshop where they were introduced to using a scoring rubric and practiced by scoring an example essay of their classmates. The assigned essays were scored by the instructor using the same scoring rubric. In the workshop, students were encouraged to use the rubric in their own self-assessment for other research projects. Four months after the workshop, participants were sent a survey and asked if they were willing to be part of a focus group to assess whether they (students’) had used the rubric for any follow-up assignments. Sixty percent of the respondents reported that they had used the rubric for subsequent course assignments and had produced significantly better quality work garnering higher overall assignment grades.

Lowe et al. (2015) used rubrics to assess the information literacy skills among first year students across five undergraduate seminar programs in which there had been multiple collaborative efforts between librarian and teaching faculty. The librarian’s collaboration included contributions to course design and execution in varying levels of intensity aligned with the students’ information literacy competency levels. Similarly, with many of the other studies previously discussed, the culminating course research papers were the students’ assignments which were assessed. The Association of College and Research Libraries (ACRL) rubric was used as a part of the Assessment in Action (AiA) program. Findings revealed that in courses where librarians had a more intensive
level of collaboration, students scored significantly better in aspects assessed by the information literacy rubric.

**Gaps in the Literature**

In the extensive review, which had been undertaken to date, the gaps with respect to the proposed study are the scarcity of empirical studies relevant to adult students and information literacy. Only two studies were focused on the three main variables, information literacy, adult students, and rubrics assessment. A study by van Helvoort (2012) assessed adult students’ information literacy skills in an information management course but focused on the students’ self-assessment on the one hand, and the students’ use of the rubrics with reported subsequent research assignments. Additionally, Rapchak, et al. (2015) assessed information literacy skills of 230 undergraduate nontraditional adult students in an information literacy course. The course was a three-credit course which was offered for 8 weeks, both online and as well as face-to-face by library faculty during spring 2012 at Duquesne University. The latter study was the only research the reviewer has encountered that was closely related to this dissertation. One outstanding difference between the Rapchak et al. (2015) study and this dissertation study is that the latter included participants within a discipline-specific, area-of-interest course in which adult learners are enrolled. In the ensuing study, however, much emphasis had not been placed on the andragogical assumptions and process design steps as purported by Holton et al. (2009), Caruth (2014), and by Harper and Ross (2011).

The role of education is to prepare students, at all levels, for functioning effectively in the 21st century. Information literacy is at the core of the competencies required for success in college, in the workplace, and in lifelong learning endeavors, both
at local levels and within the global community (DiBenedetto & Myers, 2016). The argument for using rubrics to assess how students have transferred and applied their information literacy skills to a final course product is supported by the authors who posit that students need to be able to “transfer the knowledge gained into real world experiences” (DiBenedetto & Myers, 2016, p. 29). The authors further affirmed that the drive towards supporting students in acquiring information literacy skills went beyond use of the computer, and included critical thinking skills in finding, identifying, accessing, evaluating, and using information. Society places the responsibility of preparing students for the 21st century world on educators at high school level but more so in the college and university levels where they should be made “life ready” (DiBenedetto & Myers, 2016, p. 32).

**Chapter Summary**

Through the analysis and synthesis of the body of work related to the proposed dissertation research, the relevant themes of information literacy with its subthemes of digital literacy, information literacy in college, information literacy in and for the workplace, and for lifelong learning, and information literacy and rubrics assessment have been extensively reported here. The topics have been examined within the frameworks of information literacy (the Information Literacy VALUE Rubric), and the adult literacy assumptions, andragogy, purported by Knowles and developed by several theorists (Caruth, 2014; Merriam, 1995).

Some studies have examined the application of information literacy skills to students in a standalone context. Others have examined students’ information literacy competencies within the context of specific academic disciplines and have assessed
students’ ability to transfer and apply information literacy skills to other discipline-specific, academic courses. Emphasis has been placed on the use of rubrics in determining students’ ability to transfer information literacy skills to newly-created knowledge products (Belanger et al., 2015; Diller & Phelps, 2008; Hoffman & LaBonte, 2012; Knight, 2005). Additionally, studies have focused on the need for, and practice of, information literacy skills beyond college, in the workplace, and in lifelong-learning endeavors.

Chapter 3 outlines the research methodology. Chapter 4 provides research findings and Chapter 5 provides implications of the research and recommendations for the future.
Chapter 3: Research Design Methodology

Introduction

Twenty-first century academics require that students master the techniques of information literacy (Asselin et al., 2005; Breivik, 2005; Hulett et al., 2013; Rotherham & Willingham, 2009). These techniques are central to the student’s ability to gain new knowledge. This study is focused on the information literacy competencies of adult students and their application of those competencies to a discipline-specific research paper. Information literacy has been defined by the Association of College and Research Libraries, as a set of skills which equips an individual with the aptitude to "recognize when information is needed, and is able to locate, evaluate, and use effectively the needed information” (American Library Association Institutional Repository, 2000, p. 2).

This quantitative non-experimental study employed an exploratory research design by applying a grounded research method using quantitative data collection based on information literacy rubrics. The participants in the study were adult college students, attending a private college in northeastern United States. The assessment tool was based on the Information Literacy Competency Standards of the Association of College and Research Libraries, ACRL. The selected instrument was the Information Literacy Valid Assessment of Learning in Undergraduate Education (VALUE) Rubric of the Association of American Colleges and Universities, (2016). The Information Literacy VALUE Rubric consists of five measures with four levels per measure. (See Appendix A).
Research Context

The original plan was to conduct the study on two campuses but was later expanded to three campuses of a medium-sized, six-campus, private Catholic college in northeastern United States. Embedded in the college’s mission is a strong commitment to social justice. The college had a fall 2016 enrollment of 3,647 as detailed in Figure 3.1. To preserve the anonymity of the college, the pseudonym, Paragon College, will be used throughout. The college is comprised of four schools: Paragon School for Adult Students (undergraduate liberal arts); Paragon School of Arts and Sciences (undergraduate); Paragon School of Nursing (undergraduate and graduate); and Paragon Graduate School (Master’s degrees in many disciplines).

Figure 3.1. College-wide Enrollment by Schools, fall 2016.

The school for adult students had six locations and offered a program of study designed to facilitate the integration of prior learning and experiences with academic focus. Prior learning along with the students’ academic experiences were channeled together into new ways of knowing, preparing students for future educational and career
opportunities. The six campuses, scattered throughout the metropolitan area, are Campus B, Campus C, Campus D, Campus R, Campus S, and the main location, Campus M, where all the other schools were located. During fall 2016, the enrollment at the three branch campuses randomly selected for the study was 903 students who were registered in all three levels of study: introductory, intermediate, and advanced. All campuses excluding the main campus were in communities with predominantly African American and Hispanic populations.

Since spring of 2014, all students enrolled in the School for Adult Students were introduced, first to basic academic research in one introductory English writing course in their first semester, followed by a two-credit information literacy course in the following semester. The introductory English course was “designed to help new and returning students make the transition to the academic world [. . . and] stresses critical reading, active discussion and reflective writing” (Paragon College, 2016). In the English course, students were introduced to basic information literacy skills using two modules: an in-class 50-minute introductory library orientation on the resources and services of the college’s academic library, and secondly, a presentation on synthesizing and incorporating ideas from other sources into their created projects. In the following semester, usually the second semester for the student, they are offered a two-credit information literacy course taught by an academic librarian.

The researcher had been teaching the information literacy course at two of the six campuses for five semesters prior to the study. In the information literacy course, students received a more detailed exposure to information literacy competencies to help them “develop the research skills necessary for both completing college assignments and
sustaining life-long learning” (Paragon College, 2016). The design of the information literacy course included the use of physical as well as digital resources and methods. Learning was facilitated through self-paced modules composed of online tutorials, videos, and quizzes. The modules encouraged the blending of life experience with academic articulations through students’ presentations of life arts projects.

The degree plan had a three-tiered structure of introductory A-level, coded 100-399 intermediate B-level, coded 400-699; and advanced C-level, coded 700-899 courses, to be completed over a 4-year period. See Figure 3.2. In the first semester, new students are enrolled in A-level courses including the introductory English course. In the second semester, the students are enrolled in other introductory courses, including the research and information literacy course. By the second year, which would be the third semester, students are enrolled in intermediate B-level area of interest courses in the arts, humanities, sciences, and social sciences. At the advanced C-level, students may be enrolled in area of interest-courses as well.

![Course Sequencing Chart](image)

*Figure 3.2. Course Sequencing Chart.*

Students were exempt from the introductory English course if they were transfer students with an associate degree in the liberal arts, have an associated degree in another
area and at least 30 credits in the liberal arts, or, score at the required competency level in the writing entrance test (Paragon College, 2014). See numbering codes for intermediate B-level area-of-interest courses as portrayed in Figure 3.3.

---

**Course Descriptions**

Understanding the Course Code

Every course has a code number. Each number provides valuable information about the course it identifies. Information which will be helpful to you in choosing your courses and planning your curriculum.

Example: SOC 121 A or Z 6 credits

The first three letters (SOC) indicate the subject area (Sociology). The first three numbers (121) are the course numbers and indicate the level of the course.

- 100-399 stands for an introductory course
- 400-699 stands for an intermediate course
- 700-899 stands for an advanced course

An "A" in the seventh element in the code indicates the course is liberal arts; a "Z" signals the course as a professional/technical course.

Sometimes a course will have two codes because it includes two different subject areas or disciplines. For instance, the course code for "Science and Human Values" is:

- SCI 102A/3 credits
- HUM 102A/3 credits

**Figure 3.3.** Undergraduate Course Codes. Online Catalog 2017.

**Research Participants**

Research participants were students registered at three of the locations, Campus C, Campus R and Campus S in the Paragon School for Adult Students. The philosophical foundation of the school was based on Knowles’s theory of adult learning (Caruth, 2014). Those assumptions are articulated as the adult’s need to know, self-concept, prior learning experience, readiness to learn, learning orientation, and motivation to learn. The potential participants were selected through a process of stratified sampling of adult students registered in a B-level or C-level area-of-interest course coded from 400 to 699 or 700 to 899, as shown in Figure 3.3. The research papers, ranging from seven to 10 pages, was a requirement for the courses and were usually completed during mid-
semester, which is week nine of an 18-weeks program, the duration of a semester in the Paragon School for Adult Students. The purposive sampling frame was based on three eligibility elements. The first was that participants must have scored a C grade or above in the information literacy course. The College Administrative Processing System (CAPS) which manages enrollment and registration was used to confirm the second criteria that those students that matched the first criteria were registered at one of the three selected campuses. A third criterion, also checked through CAPS, was confirmation that those students were enrolled in a B-level or C-level area-of-interest course. The number of students taking intermediate or advanced level courses in business, communication, letters, psychology, and social sciences totaled 586, made up of 91 from Campus C, 303 from Campus S and 192 from Campus R. The three branch campuses were randomly selected as all had the same student demographics and all offered the information literacy course.

Four levels of personnel assisted in the research process: the researcher, a research assistant, two additional librarians as paper raters, and the course instructors. On approval from both the Institutional Research Board (IRB) of the study location as well as the IRB of the research candidate’s educational program, contact was made with the campus directors of the selected campuses. Communication was made with the campus directors much later in the spring 2017 semester than anticipated. The dean of the school had sent an approval letter to the three campus directors. Subsequently, the researcher communicated with the campus directors, and obtained approval for planned visits to the classrooms of all the courses matching B-level and C-level area-of-interest courses. During the scheduled first visit, which was further along in the semester than anticipated,
a letter of introduction (Appendix B) and an informed consent form (Appendix C) were taken by the researcher for meeting with each course instructor. The researcher gave a brief overview of the study and subsequently, solicited the instructor’s participation in the study, requesting their completing the Instructors Informed Consent Form (Appendix C). On the form, the instructor was asked to agree to collect a copy of the research paper that the student would be submitting as a requirement for the course.

Based on the data from the College Administrative Processing System (CAPS), 18 instructors for 18 courses were identified based on the criteria for the study. Of the 18, three instructors were eliminated at the outset: one did not want to participate, one had finished classes early (previously planned with campus director), and the third was willing but the students, en masse, decided they did not want to participate. Additionally, four other instructors/courses were eliminated since, for those courses, the instructors opted to assign a Life Arts Project (LAP) report with research components rather than both assignments – the LAP and the research paper. Completed informed consent forms were collected from eight instructors. In the 18 courses, there were 234 students registered to complete B-level and C-level courses. For the next 2 weeks, the research assistant accompanied the researcher to each of the other 15 classes, at both morning (10:00a.m. - 2:00p.m.) and evening (6:00 - 10:00p.m.) classes, first giving the students a brief overview of the study and soliciting their participation in the completion. During these visits, the students were given a letter of introduction (Appendix D) and a Students Informed Consent Form (Appendix E). First, the forms were distributed to the students while the researcher and assistant waited during class time to collect the completed forms. For some classes, the process was conducted at the beginning of the class, while
for others, at the end of the class. Some students opted not to participate and even though it was preferable to collect the completed forms in the class, other students asked to take them home and return them the following week.

After 3 weeks of visiting the campuses and meeting with instructors and students, 42 consents forms were collected from students willing to participate. From the consent forms, the research assistant created a table with the names of the students along with the descriptive data such as campus location, course code (for current course), gender, age range, ethnicity, current number of credits, and grade for the research course completed in a previous semester – the Research and Information Literacy (RIL) course. Options for age range were clustered into ages 26-35, 36-45, and 46 and over. Research papers were also collected from the instructors during the last 2 weeks of classroom visits. The list with students’ descriptive data was then cross-checked in CAPS by a staff person who had authorization to access the required information and was approved by the dean of the school.

The cross-checking resulted in the elimination of 17 possible participants. Some students who checked that they had taken the information literacy course had not done so, and others who checked it on the form had taken a different course, writing research papers, which included some similar components but was confused with the information literacy course. Others who agreed to participate incorrectly checked that they had received a grade above C in the information literacy course. In the end, 25 eligible participants remained viable. Approval was sought for the dissertation committee to solicit participants from a third branch campus. An additional six instructors of six B-level and C-level area-of-interest courses with 91 registered students were contacted and
this garnered an additional 24 participants, bringing the sample to 49: four from Campus S, 21 from Campus R, and 24 from Campus C.

**Data Collection Instruments**

Rubrics are beneficial in academic assessment as they lay out the expectations for an assignment, list the criteria of what is deemed as important, and describe the levels of performance for each level (Reddy & Andrade, 2010). Rubrics are regarded as instruments used in completing the process of learning: reading and hearing, understanding and absorbing, and transferring and applying. They provide a “round[ing] out the assessment of student learning” (Montgomery, 2002, p. 34). Rubrics have been defined as “agreed-upon learning values, focus on standards and concepts, aligned with educational theory, and provide results that can be applied to improve instruction” (Belanger et al., 2015, p. 624). Assessment through rubrics provides evidence that the student is competent to apply the information literacy skills learned in the information literacy course to the workplace and in future lifelong learning.

The assessment was done by evaluating an academic research paper using three of the five components of the AAC&U Information Literacy VALUE Rubric (See Appendix G). The original plan was to assess the research papers using two elements of the 5-component rubric but, on further examination, the researcher recognized the relatedness between *component e* (the ability to access information ethically and legally) and *component d* (the ability to use information effectively to accomplish a specific purpose) and had a discussion with, and received confirmation from the dissertation chair, for the inclusion of component e in the study. The research papers were not equally distributed due to stipulation of each rater. One rater could manage only 10 papers; the second rated
11 papers while the third rater scored 28 research papers. The study aimed to answer the following research questions:

1. At what level of demonstrable ability are adult students who successfully completed an information literacy course of study, able to demonstrate their ability to determine the extent of information needed to complete an assigned research and information-rich task?

2. At what level of demonstrable ability are adult students who successfully completed an information literacy course of study, able to demonstrate their ability to use information effectively by communicating, organizing and synthesizing information to complete an assigned research and information-rich task?

3. At what level of demonstrable ability are adult students who successfully completed an information literacy course of study, able to demonstrate their ability to access and use information ethically and legally to complete an assigned research and information-rich task?

The level of applicability demonstrated the student’s competencies in accessing, evaluating and effectively using information to complete research and information related tasks both in the workplace and for lifelong learning. The three selected measurements from the AAC&U Information Literacy VALUE Rubric were used to determine that the student can:

- Determine the extent of information needed;
- Use information effectively to accomplish a specific purpose;
- Access information ethically and legally.
The AAC&amp;U Information Literacy VALUE Rubric has been applied to assess the information literacy skills with various types of students’ assignments such as in-class worksheets, annotated bibliographies, search histories, and research papers (Belanger et al., 2015), e-Portfolios (Diller & Phelps, 2008), and writing portfolios (Hoffman & LaBonte, 2012). Examples of studies in which documentary evidence as final essay or capstone project have been assessed are Chen (2014), Farrell and Badke (2015), Leutkenhaus et al. (2015), and Turbow and Evener (2016). Quantitative research design using rubrics to assess a final essay, portfolio or capstone project has been used by Brown and Kingsley-Wilson (2010), Diller and Phelps (2008), Hoffman and LaBonte (2012), Knight (2005), Leutkenhaus et al. (2015), Montgomery (2002), Oakleaf (2009), and Rapchak et al. (2015).

**Norming sessions.** Norming is conducted in the use of rubrics to ensure inter-rater reliability and validity in the research, “the key to producing believable and actionable results” (Holmes & Oakleaf, 2013, p. 602). Although one norming session was planned, three were held with the researcher and two other raters. An agenda was prepared by the researcher to help guide the deliberations of the session. See Appendix D. The researcher facilitated the norming session and IRB approvals and consent forms were among the documents distributed. The deliberations included the purpose of the norming session, an overview of the study, close examination of the AAC&amp;U Information Literacy VALUE Rubric (Appendix A) and guidelines for using the rubric, rating levels for the three components used, rules of rating, and rules of norming as recommended by Holmes and Oakleaf (2013). Questions and concerns were addressed. Since only specific components of the research paper were being assessed, analytic scoring rubrics were used
rather than holistic scoring rubrics which were more appropriate for assessing the research paper in its entirety (Moskal & Leydens, 2000).

Three sample research papers, each displaying varying levels of information literacy competency, were selected by the researcher. At the end of the preliminary introductory and overview section, each rater was given a copy of Sample Paper A to rate individually and quietly. At the end of the allotted time, each rater posed their ratings for Sample Paper A and discussed their rationale for the score. When all scores and ratings were posed, disagreements were discussed and arguments were reconciled. The first norming session was unexpectedly lengthy and a second session was scheduled to assess the two remaining sample papers, B and C. Two additional norming sessions were conducted to complete the rating and scoring process of the two remaining sample papers. Intra-class correlation analysis was used to determine interrater reliability between the scoring of the three raters.

**Rating process.** The consent form for each student was coded using a code sheet (Appendices H, I, and J). The research assistant collected and redacted the ungraded research papers of any identifying data. The research papers were then coded using the unique identifying code from a list of assigned codes arranged by college campus. Cross-coded sheets for rating were compiled and one rating sheet was attached to each research paper (See Appendix K). A total of 49 eligible redacted research papers with accompanying rating sheets were distributed among the three raters and with an agreed-on 2-week expected rating time. The papers were not equally distributed as one rater agreed to manage 10 papers only. Despite being given a stipend for the rating tasks, the raters were full time employed librarians who could not dedicate all their time to this
rating process. In the end, between the two raters and the researcher, the rating process covered 4 weeks. Rated research papers and accompanying rating sheets were submitted to the researcher and raters were asked to destroy any additional study documents they may have used in the rating process.

**Data Analysis**

Scores for each rubric ranged from .5 to 4 to a maximum total of 12 for each research paper. Since interrater reliability was ensured through three norming sessions, each paper was scored by one rater. Each research paper had an accompanying grading sheet with the corresponding unique participant code. All research papers and the corresponding grading sheets were submitted to the researcher. The data on each grading sheet was rechecked and determination was made with regards to the characteristics of the data necessary for analysis.

The data entry design was developed for data input into the statistical analysis instrument, SPSS and the corresponding data from 49 grading sheets was input into SPSS. The study variables are presented using descriptive statistics, such as, means, standard deviation, and minimum/maximum values for continuous variables (interval/ratio level) and frequencies and percentages for categorical variables (nominal/ratio level). A series of bivariate tests (to determine normal distribution of two variables), including independent samples $t$-tests (for comparing the means of two independent samples), and one-way ANOVA (for analysis of variance of one single-category independent variable, such as rubric components scores). These were used to produce inferential findings toward identifying which student participant characteristics were related to rubric scores at a statistically significant level. Histograms and line graphs
were used to show skewness and kurtosis in the scores for each component of the rubric as well as for the total score on all the selected components. The assumption of the study was that 66% of the research papers would garner a score between 3 and 4 on one component, or a total between 9 and 12 on all three components. This assumption is based on statistical analysis of normal distribution, represented by a symmetrical, bell-shaped, normal curve of kurtosis (Vogt & Johnson, 2011, p. 257).

The proposed process was for the initial contact to be made with each campus by the second or third week of the semester. In an 18-week semester, initial contact was not made with course instructors until the 12th week of the semester. Planning and executing preliminary contact with potential stakeholders was most one of the most challenging component of the research process.

The initial phase of the study did not begin until three-quarters into the semester after approval from the IRB had been received. By that time, students and instructors were focusing on presentations and other final projects for the semester. This negatively affected the return rate of completed informed consent forms and subsequently, copies of students’ research papers. Additionally, the raters took 2 weeks longer than the agreed upon time for rating the research papers and the extended time delayed the completion of data collection and data analysis phases of the study.

**Summary**

The chapter described the quantitative non-experimental study purposed towards ascertaining the level to which adult students who were exposed to information literacy skills in a standalone information literacy course, have transferred those competencies to a research paper in an area-of interest, discipline-specific course. The examination
entailed sections on the research context, research participants, data collection instruments, and data analysis. All printed documentation as well as digital files have been backed up twice and saved in secure locations.

The following chapter reports on the analysis of data collected on the norming sessions, conducted by the three raters to attain inter-rater reliability, prior to the scoring of the research papers. In addition, analysis of the data collected from the scoring of the 49 research papers is presented through findings of the descriptive and inferential statistical models. Analyses of any correlation of dispositions of the participants and the scores for each rubric are presented. Also examined are any possible effect of information literacy course grades on the overall component scores, and possible effect of number of credits achieved to-date on the overall component scores.
Chapter 4: Results

This chapter first presents the findings of the norming sessions which were done to determine the level of agreement (agreement level) among three raters for each of the three sample research papers, a methodology posited by Oakleaf (2009). The norming sessions preceded the scoring of the 49 research papers used for the study. The chapter next presents the analyses on the assessment of the 49 research papers, through descriptive data and analyses, inferential data and analyses, and aligning the data to the research questions. The data analysis was conducted using SPSS and presented study variables using descriptive statistics, such as means, standard deviation, and minimum/maximum values for continuous variables (interval/ratio level) and frequencies and percentages for categorical variables (nominal/ratio level).

This quantitative non-experimental sequential exploratory study examined the extent to which adult students who had completed an information literacy course during a previous semester had transferred and applied the information literacy principles to a research paper. The research paper was a requirement for an area-of-interest course in which participants had been registered for the current semester of the study, spring 2017. Information literacy competencies are fundamental to the student’s ability to gain new knowledge, to use that comprehension to collaborate with others, and to create new knowledge, at college, at work, and in lifelong learning (Association of College and Research Libraries, 2002; Keane et al., 2016; Rotherham & Willingham, 2009).
Research has shown that despite the exposure to information literacy training, many adult students are not transferring the principles learned in standalone information literacy courses to other area-of-interest courses. In a liberal arts program, these courses would be in all the academic disciplines such as the arts, humanities, natural sciences, and social sciences. The competencies are also relevant for success in the workplace and in lifelong learning (Birdsong & Freitas, 2012; Butcher & Street, 2009, Kuglitsch, 2015; Louys et al., 2009; Travis, 2011).

This study assessed the evidence of transferred information literacy competencies to students' research papers, using three of the five components of the Association of College and Research Libraries (ACRL) Information Literacy VALUE Rubric. See Appendix A. In the context of the doctoral program and timeframe for completion of the study, not all five components of the rubric were used. The components chosen were used to establish the students’ ability to demonstrate that they could determine the extent of the information needed for the project (component a), that they could use information effectively to accomplish a specific purpose of the project (component d), and that they could access information ethically and legally (component e).

**Research Questions**

The selected rubric components are aligned with the research questions as posited in Chapters 1 and 3.

1. At what level of demonstrable ability are adult students who successfully completed an information literacy course of study, able to demonstrate their ability to determine the extent of information needed to complete an assigned research and information-rich task?
2. At what level of demonstrable ability are adult students who successfully completed an information literacy course of study, able to demonstrate their ability to use information effectively by communicating, organizing and synthesizing information to complete an assigned research and information-rich task?

3. At what level of demonstrable ability are adult students who successfully completed an information literacy course of study, able to demonstrate their ability to access and use information ethically and legally to complete an assigned research and information-rich task?

The level of applicability demonstrated the student’s competencies in accessing, evaluating and effectively using information to complete research and information-related tasks both in the workplace and for lifelong learning. The three selected measurements from the AAC&U VALUE Rubric were used to determine that the student can:

- Determine the extent of information needed;
- Use information effectively to accomplish a specific purpose;
- Access information ethically and legally.

Data Analysis and Findings

Rubrics assessment of information literacy skills have been postured and utilized in several studies. Reddy and Andrade (2010) conducted a meta-analysis of rubrics and made supportive arguments for their use in higher education; the assessment tool, RAILS, Rubrics Assessment of Information Literacy Skills, was used by Belanger et al. (2015) to assess the information literacy skills with various types of students’ assignments. Diller

**Norming and reliability analysis:** For interrater reliability analysis, intra-class correlations coefficient, ICC, was preferred over cohen’s kappa since there were more than two raters. This researcher deemed the use of intra-class correlation coefficient as appropriate in this analysis since the desired value should be as close to the 1.00 as possible, and as stated by Huck, “[Intra-class correlation coefficient (ICC), “a multi-purpose statistical procedure … can be used for either correlational or reliability purposes” (2012, p. 77).

The inter-item correlation matrix showed correlation between rater O and rater B at 1.000 and .997 respectively, and between rater B and rater K, at 1.000 and 971 respectively, determining that there was inter-rater reliability in the rating process. See Table 4.1.
Table 4.1

*Inter-Item Correlation Matrix*

<table>
<thead>
<tr>
<th></th>
<th>Rater O</th>
<th>Rater B</th>
<th>Rater K</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rater O</td>
<td>1.000</td>
<td>.997</td>
<td>.971</td>
</tr>
<tr>
<td>Rater B</td>
<td>.997</td>
<td>1.000</td>
<td>.986</td>
</tr>
<tr>
<td>Rater K</td>
<td>.971</td>
<td>.986</td>
<td>1.000</td>
</tr>
</tbody>
</table>

In the intraclass correlation coefficient analysis, both the single measures and average measures valued over .9 which rendered the interrater reliability as excellent. See Table 4.2.

Table 4.2

*Intraclass Correlation Coefficient*

<table>
<thead>
<tr>
<th></th>
<th>Intraclass Correlation&lt;sup&gt;b&lt;/sup&gt;</th>
<th>95% Confidence Interval</th>
<th>F Test with True Value 0</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lower Bound</td>
<td>Upper Bound</td>
<td>Value</td>
</tr>
<tr>
<td>Single Measures</td>
<td>.953&lt;sup&gt;a&lt;/sup&gt;</td>
<td>.647</td>
<td>.999</td>
</tr>
<tr>
<td>Average Measures</td>
<td>.984&lt;sup&gt;c&lt;/sup&gt;</td>
<td>.846</td>
<td>1.000</td>
</tr>
</tbody>
</table>

*Note.* Two-way mixed effects model where people effects are random and measures effects are fixed.

a. The estimator is the same, whether the interaction effect is present or not.
b. Type A intraclass correlation coefficients using an absolute agreement definition.
c. This estimate is computed assuming the interaction effect is absent, because it is not estimable otherwise.

**Interpretation of effect size.** All test assumptions related to parametric testing (to determine distribution of population with the designated characteristics) were examined, and tests revealed no significant problems. The tests included checks of normality, undue
influence of outlier scores, and linearity. Regarding missing data, there were complete data for all analyses, so there was no need to address missing values. The G*Power application was used (post hoc) to determine the statistical power of the sample of participants. The analysis indicated that a large size effect (based on cohen’s $d = .80$) between the means of two independent samples with power set at .80 and probability set at .05, would require a sample size of 52 study participants. Thus, the current sample of 49 study participants would provide approximately sufficient statistical power for the current analysis. Regarding the one-way ANOVA analysis, the G*power software indicated that a large size effect (cohen’s $f = .40$) between three mean scores with power set at .80 and probability set at .05, would require a sample size of 66 study participants. Thus, the current sample of 49 study participants is underpowered for the current analysis.

**Descriptive analysis.** A series of bivariate tests (to determine normal distribution of two variables), including independent samples $t$-tests (for comparing the means of two independent samples), and one-way ANOVA (for analysis of variance of one single-category independent variable, such as rubric components scores). Only the independent variable, the research and information literacy course (RIL) grade, was significantly related to the rubric scores and one-way ANOVA was used. Analysis of the data on student characteristics indicated that the average study participant was female ($n = 43; 87.8\%$), between the ages 26 to 35 ($n = 21; 42.9\%$), of a Black ($n = 32; 65.3\%$) racial/ethnic background, had taken 61-99 credits ($n = 25; 51.0\%$), and evidenced a RIL course grade of A ($n = 34; 69.4\%$). Regarding course level, study participants were divided about half between those enrolled in intermediate courses, 400s, 500s ($n = 20$;
40.8%); and half enrolled in advanced courses, 600, 700s, 800s \((n = 29; 59.2\%)\). The data also indicated that the average score for all components of the rubric was \((M = 7.86, SD = 2.38, MIN/MAX = 1.5 - 12.0)\); 2.97 \((SD = 1.06, MIN/MAX = 0.5 - 4.0)\) for component a (ability to determine the extent of information needed); 2.78 \((SD = .90, MIN/MAX = 0.5 - 4.0)\) for component d (ability to use information effectively to accomplish a specific purpose), 2.11 \((SD = .91, MIN/MAX=0.0 - 4.0)\) for component e (ability to access information ethically and legally). See Table 4.3.

Table 4.3

Descriptive Analysis of Student Characteristics \((n=49)\)

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>6</td>
<td>12.2</td>
</tr>
<tr>
<td>Female</td>
<td>43</td>
<td>87.8</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>26 to 35</td>
<td>21</td>
<td>42.9</td>
</tr>
<tr>
<td>36 to 45</td>
<td>16</td>
<td>32.7</td>
</tr>
<tr>
<td>46 and over</td>
<td>12</td>
<td>24.5</td>
</tr>
<tr>
<td>Race/Ethnicity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>32</td>
<td>65.3</td>
</tr>
<tr>
<td>Asian</td>
<td>5</td>
<td>10.2</td>
</tr>
<tr>
<td>American Indian/Alaskan Native</td>
<td></td>
<td>4.1</td>
</tr>
<tr>
<td>Hispanic</td>
<td>10</td>
<td>20.4</td>
</tr>
<tr>
<td>Number of Credits</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Under 60</td>
<td>8</td>
<td>16.3</td>
</tr>
<tr>
<td>61-99</td>
<td>25</td>
<td>51.0</td>
</tr>
<tr>
<td>100 and over</td>
<td>16</td>
<td>32.7</td>
</tr>
<tr>
<td>RIL Course Grade</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grade A</td>
<td>34</td>
<td>69.4</td>
</tr>
<tr>
<td>Grade B</td>
<td>11</td>
<td>22.4</td>
</tr>
<tr>
<td>Grade C</td>
<td>4</td>
<td>8.2</td>
</tr>
<tr>
<td>Current Course Level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intermediate 400s, 500s</td>
<td>20</td>
<td>40.8</td>
</tr>
<tr>
<td>Advanced 600, 700s, 800s</td>
<td>29</td>
<td>59.2</td>
</tr>
</tbody>
</table>
The distribution of the scores for all three components (a – ability to determine the extent of information needed; d – ability to use information effectively to accomplish a specific purpose; and e – ability to access information ethically and legally) was approximately normal, as the skewness and kurtosis were not three times each of the respective standard error. For example, for total rubric scores, the mean or average score is 7.86 with the lowest at 1.5 and the highest 12.0 respectively. The distribution of scores was approximately normal as the skew (-.74) was not the three times the standard error of the skew (.34) and the kurtosis (.37), was not three times the standard error of the kurtosis (.67), thus analysis shows normal distribution. See Table 4.4.

Table 4.4

<table>
<thead>
<tr>
<th>Variable</th>
<th>M (SD)</th>
<th>Minimum/Maximum</th>
<th>Skew (SE)</th>
<th>Kurtosis (SE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Rubric</td>
<td>7.86 (2.38)</td>
<td>1.5-12.0</td>
<td>-.74 (.34)</td>
<td>.37 (.67)</td>
</tr>
<tr>
<td>Component a</td>
<td>2.97 (1.06)</td>
<td>0.5-4.0</td>
<td>-.75 (.34)</td>
<td>-.50 (.67)</td>
</tr>
<tr>
<td>Component d</td>
<td>2.78 (.90)</td>
<td>0.5-4.0</td>
<td>-.60 (.34)</td>
<td>-.22 (.67)</td>
</tr>
<tr>
<td>Component e</td>
<td>2.11 (.91)</td>
<td>0.0-4.0</td>
<td>-.48 (.34)</td>
<td>-.07 (.67)</td>
</tr>
</tbody>
</table>

Analysis of rubric scores. This non-experimental sequential exploratory study addressed students’ application of information literacy principles, based on the three selected components of the five-part AAC&U Information Literacy VALUE Rubric, assessing students’ demonstration of competency to: determine the extent of information needed (component a); use information effectively to accomplish a specific purpose (component d), and access information ethically and legally (component e). This section examined the data on students’ performance for each of the three selected components of
the rubric and on the all components scores. In the research design, component a (ability to determine the extent of information needed) was aligned with research question 1; component d (ability to use information effectively to accomplish a specific purpose) was aligned with research question 2; and component e (ability to access information ethically and legally) was aligned with research question 3. Each component was weighted at a score between .5 and 4, with the score of 4 being the maximum for that component. The total score for all three components was weighted at a score between .5 and 12. Table 4.5 presents a bivariate analysis of student gender with rubric scores.

Table 4.5

<table>
<thead>
<tr>
<th>Variable</th>
<th>n</th>
<th>M (SD)</th>
<th>t/F(df)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Rubric</td>
<td></td>
<td></td>
<td>-.12 (47)</td>
<td>.91</td>
</tr>
<tr>
<td>Male</td>
<td>6</td>
<td>7.75 (1.64)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>43</td>
<td>7.87 (2.49)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Component a</td>
<td></td>
<td></td>
<td>-.33 (47)</td>
<td>.75</td>
</tr>
<tr>
<td>Male</td>
<td>6</td>
<td>2.83 (.93 )</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>43</td>
<td>2.99 (1.09)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Component d</td>
<td></td>
<td></td>
<td>-.07 (47)</td>
<td>.94</td>
</tr>
<tr>
<td>Male</td>
<td>6</td>
<td>2.75 (.61 )</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>43</td>
<td>2.78 (.93 )</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Component e</td>
<td></td>
<td></td>
<td>.15 (47)</td>
<td>.88</td>
</tr>
<tr>
<td>Male</td>
<td>6</td>
<td>2.17 (.68 )</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>43</td>
<td>2.11 (.95 )</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The data in Table 4.5 indicated that gender was not related to the total score since no significant difference was below .05, \( t(47) = - .12, p = .91 \), rubric a (ability to determine the extent of information needed), \( t(47) = - .33, p = .75 \), rubric d (ability to use...
information effectively to accomplish a specific purpose), \( t(47) = -0.07, p = 0.94 \), or rubric e (ability to access information ethically and legally), \( t(47) = 0.15, p = 0.88 \). Table 4.6 provides bivariate analysis of rubric scores by student age.

### Table 4.6

*Bivariate Analysis of Rubric Scores by Student Age Range (n=49)*

<table>
<thead>
<tr>
<th>Age</th>
<th>Total Rubric</th>
<th>Component a</th>
<th>Component d</th>
<th>Component e</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1.05 (2, 46)</td>
<td>.13 (2, 46)</td>
<td>1.80 (2, 46)</td>
</tr>
<tr>
<td>26 to 35</td>
<td>21</td>
<td>7.33 (2.71)</td>
<td>2.88 (1.15)</td>
<td>2.50 (1.04)</td>
</tr>
<tr>
<td>36 to 45</td>
<td>16</td>
<td>8.47 (2.22)</td>
<td>3.06 (1.06)</td>
<td>2.97 (0.76)</td>
</tr>
<tr>
<td>46 and over</td>
<td>12</td>
<td>7.96 (1.91)</td>
<td>3.00 (0.98)</td>
<td>3.00 (0.71)</td>
</tr>
</tbody>
</table>

There was no significant difference with relation to students’ age range and rubric scores, \( F(2, 46) = 1.05, p = .36 \), component a (ability to determine the extent of information needed), \( F(2, 46) = .13, p = .88 \), component d (ability to use information effectively to accomplish a specific purpose), \( F(2, 46) = 1.80, p = .18 \), or component e (ability to access information ethically and legally), \( F(2,46) = 1.54, p = .23 \). Table 4.7 provides bivariate analysis of rubric scores by student race/ethnicity.
Table 4.7

*Bivariate Analysis of Rubric Scores by Student Race/Ethnicity (n=49)*

<table>
<thead>
<tr>
<th>Variable</th>
<th>n</th>
<th>M (SD)</th>
<th>t/F(df)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Race/Ethnicity</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Rubric</td>
<td></td>
<td>1.14 (3, 45)</td>
<td>.35</td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>32</td>
<td>7.75 (2.34)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>5</td>
<td>9.40 (1.14)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>American Indian/Alaskan Native</td>
<td>2</td>
<td>6.00 (1.41)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hispanic</td>
<td>10</td>
<td>7.80 (2.93)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Component a</td>
<td></td>
<td>2.24 (3, 45)</td>
<td>.10</td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>32</td>
<td>2.97 (.98)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>5</td>
<td>3.70 (.67)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>American Indian/Alaskan Native</td>
<td>2</td>
<td>1.50 (.71)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hispanic</td>
<td>10</td>
<td>2.90 (1.29)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Component d</td>
<td></td>
<td>.96 (3, 45)</td>
<td>.42</td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>32</td>
<td>2.73 (.91)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>5</td>
<td>3.40 (.42)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>American Indian/Alaskan Native</td>
<td>2</td>
<td>2.50 (.71)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hispanic</td>
<td>10</td>
<td>2.65 (1.03)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Component e</td>
<td></td>
<td>.20 (3, 45)</td>
<td>.90</td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>32</td>
<td>2.05 (.93)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>5</td>
<td>2.30 (1.10)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>American Indian/Alaskan Native</td>
<td>2</td>
<td>2.00 (0.00)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hispanic</td>
<td>10</td>
<td>2.25 (.95)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The classification of race as used in this study is based on the categorization established by the U.S. Office of Management and Budget (1997). Data indicated that race/ethnicity was not related to the all component scores, $F(3, 45) = 1.14, p = .35$, component a (ability to determine the extent of information needed), $F(3, 45) = 2.24, p = .10$, component d (ability to use information effectively to accomplish a specific
The data further indicated that the total number of college credits the student had garnered was not related to all component scores, $F(2, 46) = .52, p = .60$, component a (ability to determine the extent of information needed), $F(2, 46) = .05, p = .95$, component d (ability to use information effectively to accomplish a specific purpose), $F(2, 46) = .52, p = .60$, or component e (ability to access information ethically and legally), $F(2, 46) = .92, p = .41$. 

### Table 4.8

**Bivariate Analysis of Rubric Scores by Student Number of Credits (n=49)**

<table>
<thead>
<tr>
<th>Variable</th>
<th>n</th>
<th>M (SD)</th>
<th>t/F(df)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number of Credits</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All Component</td>
<td>.52 (2, 46)</td>
<td>.60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Under 60</td>
<td>8</td>
<td>8.31 (.69)</td>
<td>.60</td>
<td>.60</td>
</tr>
<tr>
<td>61-99</td>
<td>25</td>
<td>8.02 (2.58)</td>
<td>.52</td>
<td>.95</td>
</tr>
<tr>
<td>100 and over</td>
<td>16</td>
<td>7.38 (2.60)</td>
<td>.92</td>
<td>.41</td>
</tr>
<tr>
<td>Component a</td>
<td>.05 (2, 46)</td>
<td>.95</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Under 60</td>
<td>8</td>
<td>3.19 (.65)</td>
<td>.95</td>
<td>.95</td>
</tr>
<tr>
<td>61-99</td>
<td>25</td>
<td>3.10 (1.08)</td>
<td>.52</td>
<td>.95</td>
</tr>
<tr>
<td>100 and over</td>
<td>16</td>
<td>2.66 (1.18)</td>
<td>.52</td>
<td>.95</td>
</tr>
<tr>
<td>Component e</td>
<td>.52 (2, 46)</td>
<td>.60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Under 60</td>
<td>8</td>
<td>2.69 (.75)</td>
<td>.60</td>
<td>.60</td>
</tr>
<tr>
<td>61-99</td>
<td>25</td>
<td>2.78 (.95)</td>
<td>.92</td>
<td>.41</td>
</tr>
<tr>
<td>100 and over</td>
<td>16</td>
<td>2.81 (.93)</td>
<td>.92</td>
<td>.41</td>
</tr>
<tr>
<td>Component e</td>
<td>.92 (2, 46)</td>
<td>.41</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Under 60</td>
<td>8</td>
<td>2.44 (.56)</td>
<td>.41</td>
<td>.41</td>
</tr>
<tr>
<td>61-99</td>
<td>25</td>
<td>2.14 (1.00)</td>
<td>.41</td>
<td>.41</td>
</tr>
<tr>
<td>100 and over</td>
<td>16</td>
<td>1.91 (.92)</td>
<td>.41</td>
<td>.41</td>
</tr>
</tbody>
</table>
Data indicated that the course level for which the research paper was required, intermediate or advanced, was not related to the all components scores, $t(47) = -0.81, p = 0.42$, component a (ability to determine the extent of information needed), $t(47) = -0.79, p = 0.44$, component d (ability to use information effectively to accomplish a specific purpose), $t(47) = -0.98, p = 0.33$, or component e (ability to access information ethically and legally), $t(47) = -0.23, p = 0.82$.

To determine the relational effect of RIL course scores on study rubric scores, since there were only four participants who had a RIL score of C (less than 5), categories B and C were collapsed. For inferential link, the collapsed B/C determined a more valid analysis as seen in Table 4.10.
Table 4.10

Bivariate Analysis of Rubric Scores by Student Course Level (n=49)

<table>
<thead>
<tr>
<th>Variable</th>
<th>n</th>
<th>M (SD)</th>
<th>t/F(df)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course Level</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All Component</td>
<td>-.81 (47)</td>
<td>.42</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intermediate 400s, 500s</td>
<td>20</td>
<td>7.53 (2.70)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Advanced 600, 700s, 800s</td>
<td>29</td>
<td>8.09 (2.16)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Component a</td>
<td>-.79 (47)</td>
<td>.44</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intermediate 400s, 500s</td>
<td>20</td>
<td>2.83 (1.15)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Advanced 600, 700s, 800s</td>
<td>29</td>
<td>3.07 (1.01)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Component d</td>
<td>-.98 (47)</td>
<td>.33</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intermediate 400s, 500s</td>
<td>20</td>
<td>2.63 (1.00)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Advanced 600, 700s, 800s</td>
<td>29</td>
<td>2.88 (.82)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Component e</td>
<td>-.23 (47)</td>
<td>.82</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intermediate 400s, 500s</td>
<td>20</td>
<td>2.08 (.94)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Advanced 600, 700s, 800s</td>
<td>29</td>
<td>2.14 (.92)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Rubric scores and RIL course grade distribution. Regarding the all components score, data indicated that mean scores for study participants with a RIL course grade of A ($M = 8.57, SD = 1.94$) were significantly higher than those with a RIL course grade of B/C ($M = 6.23, SD = 2.57$), $t(47) = 3.52, p<.001$. See Table 4.10.

Regarding component a (ability to determine the extent of information needed), and RIL course grades, analysis only differed at a level that approached statistical significance at .055, slightly more than .005, ($t(47) = 1.96, p = .055$). Regarding component d (ability to use information effectively to accomplish a specific purpose), data indicated that mean scores for study participants with a RIL course grade of A ($M = 3.02, SD = .69$) were significantly higher than those with a RIL course grade of B/C ($M = 2.23, SD = 1.08$), $t(47) = 3.05, p<.01$. Regarding component e (ability to access information ethically and legally), data indicated that mean scores for study participants with a RIL course grade of
A ($M = 2.40, SD = .88$) were significantly higher than those with a RIL course grade of B/C ($M = 1.47, SD = .64$), $t(47) = 3.69, p < .001$.

**Skewness and kurtosis.** For component a (ability to determine the extent of information needed), distribution of scores showed an overrepresentation of research papers that scored 4, skewness to a positive score. See Figure 4.1.

![Histogram](image)

*Figure 4.1. Distribution of Scores for Component a.*

For component d (ability to use information effectively to accomplish a specific purpose), and component e (ability to access information ethically and legally), analysis showed overrepresentation above the curve for the scores of 2 and 3. See Figure 4.2 and Figure 4.3. In the All Components rating, findings showed two outlier scores which were two low scores of 1.5, which, when tested for effects, were found to have undue effects on overall statistical findings. See Figure 4.4.
**Figure 4.2.** Distribution of Scores for Component d.

**Figure 4.3.** Distribution of Scores for Component e.
Levels of transferability and application. As noted in Chapter 3, the assumption was that 66% of the research papers (participants) would garner an all components score of 9 to 12, and 3 out of 4 on each component. For the overall expected outcomes of the study, only 49% of the participants have demonstrated the ability to transfer the information literacy competencies at the expected outcome level of 75%, that is, at an all components score of 9 to 12. See Table 4.7. This is below the expected number of participants who have demonstrated the ability to determine the extent of information needed, to use information effectively to accomplish a specific purpose, and to access information ethically and legally. Thus, in answering the over-arching research question, the expected percent of students were not able to demonstrate their ability to transfer and apply the designated competencies.
Research question 1. At what level of demonstrable ability are adult students who successfully completed an information literacy course of study, able to demonstrate their ability to determine the extent of information needed to complete an assigned research and information-rich task? To demonstrate competencies in component a, students should have determined the type of information needed by selecting scholarly sources relevant to the topic of the research paper. The data showed that 65.3% of the students (papers) scored a rating of 3 or above, .7% below the expected outcome. Thus, in answering Research Question 1, the expected percent of students were not able to demonstrate their ability to determine the extent of information needed. See Table 4.12.

Table 4.12

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
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</tr>
<tr>
<td>yes</td>
<td>32</td>
<td>65.3</td>
<td>65.3</td>
</tr>
<tr>
<td>Total</td>
<td>49</td>
<td>100.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Research question 2. At what level of demonstrable ability are adult students who successfully completed an information literacy course of study, able to demonstrate
their ability to use information effectively by communicating, organizing and synthesizing information to complete an assigned research and information-rich task?

To demonstrate competencies in component d, students should have analyzed, synthesized and incorporated ideas from the scholarly source documents into the research paper, supported by the sources selected. The data showed that 63.3% of the students (papers) scored a rating of 3 or above, 2.7% below the expected outcome. Thus, in answering Research Question 2, the expected percent of students were not able to use information effectively to accomplish a specific purpose. See Table 4.13.

Table 4.13

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>no</td>
<td>18</td>
<td>36.7</td>
<td>36.7</td>
<td>36.7</td>
</tr>
<tr>
<td>yes</td>
<td>31</td>
<td>63.3</td>
<td>63.3</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>49</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

Research question 3: At what level of demonstrable ability are adult students who successfully completed an information literacy course of study, able to demonstrate their ability to access and use information ethically and legally to complete an assigned research and information-rich task?

To demonstrate competencies in component e, students should have credited source documents, both as in-text citations and with reference list. The data showed that ratings for rubric e garnered the lowest scores of the three component scores, with only 28.6% of the students (papers) scoring a rating of 3 or above, at 37.4% below the
expected outcome. Thus, in answering Research Question 3, the expected percent of students were not able to access information ethically and legally. See Table 4.14.

Table 4.14

<table>
<thead>
<tr>
<th>Score for Component e - Achievement of 75% or Above Score 3 or Above</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
</tr>
<tr>
<td>-----------</td>
</tr>
<tr>
<td>Valid</td>
</tr>
<tr>
<td>no</td>
</tr>
<tr>
<td>yes</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

Summary of Results

Chapter 4 presented the findings on the level of ability with which students have transferred and applied information literacy competencies, learned in a previously completed information literacy, standalone course, to a course research paper in an intermediate (B) or advanced (C) level area-of-interest course in the liberal arts. The assessment was done with the use of three components of the AAC&U Information Literacy VALUE Rubric. In addition to analyzing the data for research papers, analysis was done on the data for the three norming sessions. A series of bivariate tests (to determine normal distribution of two variables), including independent samples t-tests (for comparing the means of two independent samples), and one-way ANOVA (for analysis of variance of one single-category independent variable, such as rubric components scores).

For component a (ability to determine the extent of information needed), the data showed that 65.3% of the 49 students demonstrated the ability, above the expected outcome level, to determine the extent of information needed for the research paper; for
component d (ability to use information effectively to accomplish a specific purpose), 63.3% of the students demonstrated the ability, above the expected outcome level, to use information effectively to accomplish a specific purpose, which, in the context of this study, writing a course research paper; and for component e (ability to access information ethically and legally), 28.6% of the students demonstrated the ability above the expected outcome level, to access information ethically and legally. There was no statistically significant difference for RIL score in relation to the score for component a (ability to determine the extent of information needed), at .055 (though almost significant).

However, there were statistically significant differences for the all components score, at .001; for component d (ability to use information effectively to accomplish a specific purpose), with $p$ value at .004, and for, component e (ability to access information ethically and legally), with $p$ value at .001, all three with $p$ values of <.005. The data indicated that students had not demonstrated the ability to acknowledge and credit the sources of the ideas used in their scholarship.

The following chapter revisits the problem statement, theoretical underpinnings, purpose of the study, and research questions, and aligns them to the findings. The analyses of the findings of the students’ performance scores are reiterated. Similarities and differences in course context, participants and methodology, compared with other key studies on information literacy assessment, are uncovered. The significance of the study to various stakeholders both within and external to academia, are given.
Chapter 5: Discussion

Introduction

Adult students returned to college for specific purposes such as acquiring vocational credentials, fostering personal development, increasing employability, expanding earning power, extending the ability to contribute to a specific area of interest, or, facilitating engagement in political or social activity (Cruce & Hillman, 2012; O’Neill & Thomson, 2013; Rabourn et al., 2015; Ritt, 2008; Rosser-Mims et al., 2014). Despite the exposure to information literacy training, many students had not been transferring the principles learned in standalone information literacy courses to other area-of-interest courses such as those in the arts, humanities, natural sciences, and social sciences or to research in the workplace and in lifelong learning (Birdsong & Frietas, 2012; Butcher & Street, 2009, Kuglitsch, 2015; Louys, 2009; Travis, 2011).

The purpose of the study was to assess the extent to which students have been able to transfer and apply three information literacy competencies, based on the AAC&U five-components information literacy rubric, to a research paper in an area-of-interest course, at intermediate or advanced level. The components of the rubric were selected to be aligned with the information literacy skills determined as most needed in the workplace, the ability to find relevant information, to use a variety of information sources for an assigned task, to evaluate search results and determine the most useful the assigned task, and to create a finished product from the information gathered (Head, 2012). Application of the three selected components demonstrated the student’s ability to:
determine the extent of information needed (access scholarly source materials relevant and suitable to the research paper topic); use information effectively to accomplish a specific purpose (incorporate ideas from source documents into research paper); and access information ethically and legally (acknowledge and attribute authorship of original ideas used in research paper).

The assumption of the study was that 66% of the research papers (participants) would garner a score of 75% or above, that is, a total on the three components of nine out of 12 possible maximum score, and three out of four possible maximum score on each component. The data showed that this assumption was not realized. For component a, which measures the student’s ability to determine the extent of information needed, data showed that 65% of the students (papers) scored a rating of 3 or above, demonstrating the ability to choose scholarly sources pertinent to the topic of the assigned task, the research paper. The implications are that, within the design of the information literacy course, course designs could include multiple modules on identifying scholarly sources and methods of access to categories of those sources. Additionally, multiple modules of the course could include evaluation of source materials with relevance to the academic discipline, or convergence of disciplines, to the topic of the research paper.

For component d, which measures the student’s ability to use information effectively to accomplish a specific purpose, the data showed that 63.3% of the students (papers) scored a rating of 3 or above, 2.7% below the expected outcome, demonstrating the level of ability that students had to incorporate ideas from the scholarly source documents into the research paper in a structured, logical argument, supported by the scholarly sources selected. The implications are that, within the design of the information
literacy course, more emphasis needs to be placed on academic writing styles with emphasis on methods of incorporating ideas from authoritative sources, additionally crediting the original authors of source documents.

Data showed that ratings for component e, which measures the student’s ability to access information ethically and legally, garnered the lowest scores of the all components scores, with only 28.6% of the students (papers) scoring a rating of 9 or above. The scores were at 37.4% below the expected outcome, thus demonstrating that students had not mastered the competency of crediting source documents, using in-text citations for quotes (short or long), summaries or paraphrases, and correctly formatting the reference list. The implications are critical since crediting and acknowledging sources are foundational to advancing scholarship. To eliminate plagiarism, users of information must credit the appropriate sources.

Implications of Findings

The findings of this study are relevant to employers, colleges and universities, and adult students. The study has informed the small body of empirical work on information literacy and adult students in academia, specific to using rubrics assessment of student scholarship within the academic disciplines. The intent of the study was to go beyond a check of pre-selected answers in an assessment tool, to the utilization of cognitive skills in analyzing, synthesizing and incorporating ideas from scholarly sources into a newly-created scholarly document.

The study has implications for the employers since the three components of the rubric focused on the most required information literacy skills in the workplace as reported by Travis (2011): the ability to find relevant information (ability to determine
the extent of information needed); critical thinking (ability to use information effectively to accomplish a specific purpose), and evaluating information (ability to access information ethically and legally). The argument is also supported by other studies that have reported the importance of information literacy skills in the 21st century workplace. (Asselin, 2015; Baker, 2013; Birdsong & Freitas, 2012; Goodman et al., 2013; Kuglitsch, 2015; Oblinger, 2012; Rapchak et al., 2015).

The findings are useful to colleges and universities in the development and instructional design of specific academic, or cross-disciplinary programs for the adult student. Discipline faculty may be encouraged to practice a scaffold approach to information literacy, a method that instructors use in the teaching of subject disciplines (Gilchrist & Oakleaf, 2012). The findings from this study could have implications in enhancing college course offerings, resulting in increased enrollment numbers. Students who learn that information literacy skills are integral to 21st century skills may choose to enroll in colleges which offer or emphasize information literacy competencies in their courses as against those colleges that do not. Additionally, the study may inform colleges serving adult students in the andragogical design of information literacy courses offered to that population of students.

Information literacy competencies are components of one of the 16 areas assessed in undergraduate education by the American Association of Colleges and Universities. The study has implications for adult students since potential students who recognize the importance of information literacy skills for success in college as well as in the workplace, may choose to enroll in a college that offers courses in information literacy competencies.
**Similarities and differences.** Comparisons to this study can be made with those studies in which information literacy assessment had been conducted as library-only, as in Gross et al. (2012), Miller (2014), and Mittermeyer (2005); as components of collaborations with discipline faculty as in Farrell and Badke (2015), Gunn et al. (2011), Luetkenhaus et al. (2015), as institution-wide assessments of information literacy as in Gross and Latham (2009), Hulett et al. (2013), and Ivanitskaya et al. (2004).

Similar studies which have moved beyond traditional assessment to the more “purposive assessment” by using rubrics (Howell, 2014, p. 400) included the study by Belanger et al. (2015) in which the assessment tool, RAILS, Rubrics Assessment of Information Literacy Skills, was used. Ten librarians who were raters conducted a norming session and later assessed 100 student artifacts that were received from nine academic institutions. Another similar study was by Hoffman and LaBonte (2012) which used rubrics assessment with writing portfolios and rhetoric assignments among first and third year students. Findings showed that of the three major categorical anchors of Emerging, Developing, and Integrating, all students had a mean score with the range of Emerging, the highest level. This is a difference when compared with the study being reported, in which the mean score for overall performance was at the Milestone level, equivalent to the Developing level in the Hoffman and LaBonte study (2012).

Similarities were also found in a study by Leutkenhaus et al. (2015), which looked at a research multipart project over an academic year, fall and spring semesters. The study culminated in a final research paper that is again, comparable to the currently reported study. The Leutkenhaus et al. study had one 2-hour norming session and addressed eight competencies at five levels of achievement, whereas the currently
reported study had three norming sessions, and entailed three learning outcomes at four levels of achievement.

Some differences were evident in studies such as one by Diller and Phelps (2008) which used rubrics to assess ePortfolios of students with a full range of course products to effect formative assessment. In the latter study, there was collaboration of students, instructors and librarians at the beginning of the semester, with very little time to do the preliminary work to execute the study during the semester. Differences were evident in the study by Rapchak et al. (2015) which focused on annotated bibliographies that adult students had completed in an information literacy standalone course and offered both as face-to-face and online interaction. There were 14 participants, 13 online and one face-to-face. Aligned with the findings being reported here, Rapchak et al. found that nine of the ePortfolios got the highest possible score of 3, in the performance category of Source Choice, which is comparable to the category of component a, accessing relevant source material, with 18 ePortfolios, the most in any category, receiving the top score of 4.

Another comparable study was by Lowe et al. (2015) which utilized sustained interaction between the librarians and the course faculty for the duration of the semester in which the study was conducted. An additional difference is that assessment was scored through levels of librarian-faculty interactions. Student achievement in information literacy was assessed through ratings of 30 research papers and results showed that writing assignments from courses with high librarian collaboration garnered higher scores than for assignments from courses with low librarian course engagement levels.
Limitations

This quantitative non-experimental, sequential exploratory study may be transferable for application in a liberal arts college that has a credit-bearing information literacy course that is offered during the first year of an undergraduate program. However, as stated in Chapter 4, the G*power software indicated that a large size effect (Cohen’s $f = .40$) between three mean scores with power set at .80 and probability set at .05, would require a sample size of 66 study participants. A larger number of participants may have resulted in a stronger effect size for the study. Also, the instructor was asked to agree to collect a copy of the research paper that the student would be submitting as a requirement for the course. This process proved extremely challenging as contacts and visits were made almost at the end of the semester when students and instructors were most focused on final projects and presentations.

Another limitation is in the number of participants from each campus. For one campus, there were only four participants so it was not feasible to conduct data analysis of possible correlation between rubric scores and campus locations. Optimally, an equal distribution of participants from each campus would have been preferable.

Correlate between the academic disciplines and related courses in which the students were enrolled could not have been undertaken as no attention was made to categorize the research papers by academic disciplines. Since participants were students in a liberal arts program, the courses for which the research papers were written ran the gamut of academic disciplines, the arts, humanities, social sciences and natural sciences.

Delimitations. The study was purposefully structured to be undertaken at three branches of the five-campus college sites. At least three visits to each site over a period
of 3 weeks, was extremely time-consuming and had to fit within the constraints of the 30-month duration of the doctoral program. Additionally, the study has limitations in the use of a selected three instead of all five components of the AAC&U VALUE Rubric. See Appendix A.

**Recommendations**

Information literacy competencies are fundamental to the student’s ability to access new knowledge relevant to the intended purpose for use, to use critical thinking in analyzing and synthesizing information, to collaborate with others in the creation of scholarship at college, in knowledge-creating tasks at work, and in lifelong learning (Association of College and Research Libraries, 2002; Keane et al., 2016; Rotherham & Willingham, 2009). The purposive methods of rubrics assessment have been supported by Howell (2014), Belanger et al. (2015), Holmes and Oakleaf (2013), Montgomery (2002), Moskal and Leydens (2000), and Oakleaf (2009). However, in many of the studies that utilized rubrics assessment, and were reviewed in Chapter 3, there have been a small number of participants, as was experienced in this study.

Assessment of information literacy is affected in varying ways: as library-only assessment, as librarian and discipline faculty collaborations, in individual session level, at course level, program level or institution-wide level. This study was unique in that it was neither standalone nor a collaboration with other discipline faculty. The research and information literacy course was offered to all students who were enrolled in the second-tier writing course during their second semester in the school for adult students at college. One factor that eliminated some potential participants was that there were transfer
students who had entered the college with credits for basic writing courses and were not required to register for the information literacy course.

**Recommendations for improved practice.** Correlation of students’ application of information literacy competencies within and across the disciplines by modules would have added a different dimension to scholarship. Determining the level of application of the information literacy competencies within the same study, to students in the arts, humanities, and/or the sciences, is an area for future study. One recommendation is that, in subsequent coursework, there is reinforcement of information literacy principles. This would require sustained collaboration between librarians or information literacy instructors and discipline faculty throughout all levels of the undergraduate program.

Another recommendation is that the rubrics assessment of the research papers could be followed up by interviews of selected participants. This undertaking could be carried out to get students experiences on their ability to apply the competencies to their area-of-interest course. This qualitative component could uncover any challenges students may have faced in the information literacy course or in transferring the competencies to their area-of-interest course.

Possibly, the design of the information literacy course needs to include more emphasis on, and reasons for, acknowledging sources. Additionally, both information literacy instructors as well as discipline course instructors should always emphasize the importance and purposes of in-text citations and reference bibliographies. Tantamount to achieving maximal demonstrated competencies, may be the necessity for librarians to collaborate with discipline faculty to facilitate situating information literacy in course contexts (Farrell & Badke, 2015).
Recommendations for future studies. For replicating this study, researchers may consider making initial contact with course instructors at or near the beginning of the semester as was originally planned by this researcher. The procedure would allow more time for instructors to incorporate the administration of the study into their course schedule. Additionally, initial communication with potential participants need to be made at or near the beginning of the semester. Students should be informed of the study and have time to decide to participate in the study. Earlier distribution of the informed consent forms to both instructors and students may have garnered more participants resulting in more research papers for the study.

Future researchers could consider using a quantitative experimental research method. This would entail assessing course research papers both at the beginning and at the end of a semester. Additionally, consideration could be given to using all the components of the AAC&U Information Literacy VALUE rubric.

Recommendations for promoting social justice. For the citizenry to be fully informed and make informed decisions, all members of a democratic society, from toddler to the aged, need to be equipped with the competencies of accessing information regardless of format, print or digital. All citizens should have the competencies to evaluate the information to determine if it is credible, reliable and relevant within the context of need. As reported by the Knight Commission (2009), people need information for them “to take advantage of life’s opportunities for themselves and their families. They need information to participate fully in our system of self-government, to stand up and be heard” (p. xi). It was the same year, 2009, President Barack Obama, in recognizing “the need for all Americans to be adept in the skills necessary to effectively navigate the
Information Age,” issued a declaration designation the month of October, National Information Literacy Awareness Month (The White House, 2009, para. 1). The declaration further stated that “[a]n informed and educated citizenry is essential to the functioning of our modern democratic society, and I encourage educational and community institutions across the country to help Americans find and evaluate the information they seek, in all its forms” (The White House, 2009, para. 4).

Conclusion

Colleges and universities are constantly mandated to substantiate the contribution of libraries and academic research to student success (Association of American Colleges and Universities, 2015) Building a culture of assessment on any campus requires dedication, time, and financial resources from across all units and all levels of staff (Farkas, Hinchcliffe, & Houk, 2015). As discussed in Chapter 3 and Chapter 4, rubrics assessment goes beyond traditional assessment to more purposive methods to determine information literacy competencies (Howell, 2014). Assessment using rubrics developed on the framework on competencies as established by the Association of College and Research Libraries, (ACRL) provides a valid method of assessment within academia.

This study has set out to determine the extent to which adult students who have successfully completed an information literacy course in one semester have been able to transfer and apply those competencies to a scholarly research paper in another discipline specific course. The answer to the overarching research question, evident in the data, is that students had not achieved the research assumption. For component a, which measures the student’s ability to determine the extent of information needed, data showed that 65.3% of the students (papers) scored a rating of 3 or above, demonstrating the
ability to choose scholarly sources pertinent to the topic of the assigned task, the research paper. For component d, which measures the student’s ability to use information effectively to accomplish a specific purpose, the data showed that 63.3% of the students (papers) scored a rating of 3 or above, 2.7% below the expected outcome, demonstrating the level of ability that students had to incorporated ideas from the scholarly source documents into the research paper in a structured, logical argument, supported by the scholarly sources selected. Component e, which measures the student’s ability to access information ethically and legally, garnered the lowest scores of the all components scores, with only 28.6% of the students (papers) scoring a rating of 9 or above. The scores were at 37.4% below the expected outcome, thus demonstrating that students had not mastered the competency of crediting source documents, using in-text citations for quotes (short or long), summaries or paraphrases, and correctly-formatted reference list.

To be able to succeed in the 21st century global society, citizens need to be informed and can evaluate and use information in collaboration with others to create new scholarship. Academia has the responsibility to ensure that graduates have been armed with the tools required for students to develop their full potential, and function successfully in a global community (Rotherham & Willingham, 2009). As information literacy librarians and discipline faculty collaborate to prepare students for future scholarship, for the workplace, or to be information literate citizens, purposive assessments can be undertaken to ascertain the level of our impact on the success of academia’s very important assets, the students.
References


Miller, R. E. (2014). Graduate students may need information literacy instruction as much as undergraduates. *Evidence Based Library & Information Practice, 9*(3), 104-106.


Ozuah, P. O. (2005). First, there was pedagogy and then came andragogy. *Einstein Journal of Biology & Medicine, 21*(2), 83-87.


Appendix A

ASSOCIATION OF AMERICAN COLLEGES & UNIVERSITIES [AAC&U]
INFORMATION LITERACY VALUE RUBRIC

INFORMATION LITERACY VALUE Rubric

The VALUE rubrics were developed by teams of faculty experts representing colleges and universities across the United States through a process that examined many existing campus rubrics and related documents for each learning outcome and incorporated additional feedback from faculty. The rubrics articulate fundamental criteria for each learning outcome, with performance descriptors demonstrating progressively more sophisticated levels of attainment. The rubrics are intended for institutional-level use in evaluating and discussing student learning, not for grading. The core expectations articulated in all 15 of the VALUE rubrics can and should be translated into the language of individual campuses, disciplines, and even courses. The utility of the VALUE rubrics is to promote learning at all undergraduate levels within a broad framework of expectations such that evidence of learning can be shared nationally through a common dialogue and understanding of student success. In July 2013, there was a connection to Dimension 3: Evaluate Information and Its Sources Critically.

Definition:
The ability to know when there is a need for information, to be able to identify, locate, evaluate, and effectively and responsibly use and share that information for the problem at hand. - Adopted from the National Forum on Information Literacy

Framing Language:
This rubric is recommended for use evaluating a collection of work, rather than a single work sample in order to fully gauge students’ information skills. Ideally, a collection of work would contain a wide variety of different types of work and might include: research papers, editorials, speeches, grant proposals, marketing or business plans, PowerPoint presentations, posters, literature reviews, position papers, and argument critiques to some extent. In addition, a description of the assignments with the instructions that initiated the student work would be vital in providing the complete context for the work. Although a student’s final work must stand on its own, evidence of a student’s research and information gathering processes, such as a research journal/diary, could provide further demonstration of a student’s information proficiency and for some criteria on this rubric would be required.
# INFORMATION LITERACY VALUE Rubric

**Definition:**

The ability to know when there is a need for information, to be able to identify, locate, evaluate, and effectively use and share that information for the problem at hand. - The National Porsche on Information Literacy

<table>
<thead>
<tr>
<th>Capstone 1</th>
<th>Milestone 2</th>
<th>Benchmark 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Determine the Extent of Information Needed</strong></td>
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<td></td>
</tr>
<tr>
<td>Differentiates the scope of the research question or thesis. Effectively determines key concepts.</td>
<td>Differentiates the scope of the research question or thesis. Effectively determines key concepts.</td>
<td>Effectively determines the scope of the research question or thesis. No difficulty determining key concepts. Types of information sources selected do not easily narrow search or research question.</td>
</tr>
<tr>
<td></td>
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<tr>
<td><strong>Access the Needed Information</strong></td>
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<tr>
<td>Accesses information using effective, well-designed search strategies and most appropriate information sources.</td>
<td>Accesses information using effective, well-designed search strategies and most appropriate information sources.</td>
<td>Accesses information using effective, well-designed search strategies and most appropriate information sources. No difficulty accessing or retrieving information.</td>
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<tr>
<td><strong>Evaluate Information and its Sources Critically</strong></td>
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<tr>
<td>Chooses a variety of information sources appropriate to the scope and depth of the research question. Identifies salient issues and reasoning or arguments presented. Effectively interprets and discusses the effectiveness of each information source.</td>
<td>Chooses a variety of information sources appropriate to the scope and depth of the research question. Identifies salient issues and reasoning or arguments presented. Effectively interprets and discusses the effectiveness of each information source.</td>
<td>Identifies various sources of bias and misleading information. Effectively interprets and discusses the effectiveness of each information source.</td>
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<tr>
<td><strong>The Information is Effective to Accomplish a Specific Purpose</strong></td>
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<tr>
<td>Evaluates information and its sources to determine whether the specific purpose is met.</td>
<td>Evaluates information and its sources to determine whether the specific purpose is met.</td>
<td>Evaluates information and its sources to determine whether the specific purpose is met.</td>
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<tr>
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<tr>
<td><strong>Access and Use Information Ethically and Legally</strong></td>
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</tr>
<tr>
<td>Students use correctly all of the following information use strategies: identifying sources of information, choosing appropriate sources, evaluating information, identifying criteria for assessing the usefulness and reliability of information, and selecting the most appropriate sources for the research question and purpose.</td>
<td>Students use correctly all of the following information use strategies: identifying sources of information, choosing appropriate sources, evaluating information, identifying criteria for assessing the usefulness and reliability of information, and selecting the most appropriate sources for the research question and purpose.</td>
<td>Students use correctly all of the following information use strategies: identifying sources of information, choosing appropriate sources, evaluating information, identifying criteria for assessing the usefulness and reliability of information, and selecting the most appropriate sources for the research question and purpose.</td>
</tr>
</tbody>
</table>

*Contacted Dimensions 2: Evaluate Information and its Sources Critically in July 2013*
LETTER OF INTRODUCTION TO INSTRUCTORS

April 17, 2017

The College [Redacted] Campus [Redacted]

New York, [Redacted]

Re: Transferability: The Application of Information Literacy Competencies to Academic Area-of-Interest Course Research Paper among Adult College Students in an Undergraduate Liberal Arts Program by Lilleth C. Beckford

Dear Professor …………………..:
My name is Lilleth Beckford and I am contacting you today on the approval of [Redacted]. I am doctoral student at St. John Fisher College, Ralph C. Wilson School of Education and as a part of my dissertation I am conducting a study. The study proposes to discover how students are using the information literacy skills which they have learned in the Research & Information Literacy course during fall 2016.

I am seeking your assistance in two ways, one, to allow me access to the students in your B-level course to introduce myself and the study and seek student voluntary participation in the study. A letter of introduction and an Informed Consent Form will be distributed to the students. This should take no more than 20 minutes.

Secondly, from those students who have agreed to participate, I would ask you to collect a copy of the students’ final course research paper which should not be your graded copy. The copy should be given to the researcher or the research assistant. Your agreement to facilitate this study is voluntary. However, if you agree, I am asking you to sign the attached Informed Consent Form.

Your participation in the study is voluntary and will not have any impact on your coursework or grades. The findings of the study will be beneficial to the College in the
design of the information literacy course and possibly provide support for extending the course to other schools in the College.
Sincerely,
Lilleth Beckford, Doctoral Student
Ralph C. Wilson, Jr., School of Education, St. John Fisher College, Rochester, NY14618
Appendix C

FOR INSTRUCTORS
INFORMED CONSENT FORM

ILTS ID: ____________________ Campus Location: __________________________

Semester & Year: spring 2017 [January - May] DAY & TIME:_________________

Instructor’s Name: _____________________________________________________

Area-of-Interest Course Teaching: [Course Code & Course Title]
_____________________________________________________________________

Description of the Study: The study is being conducted to assess how adult students who have already completed the Research & Information Literacy course [RIL], during fall 2016 semester have applied the information literacy skills learned, to an academic research paper in a B-level area-of-interest course in which they are currently enrolled. Why: The study is being done by a doctoral candidate who will be working towards an understanding of how adult students transfer the information literacy principles learned in an information literacy course, RIL, to a final research paper which is required as part of a discipline-focused course. The findings of the study will assist the college in the design of a more effective information literacy curriculum in the future.

If you have any questions or concerns about the study, please contact, Lilleth Beckford at lcb03386@sjfc.edu or at (347)661-4230.

WHAT: The name assigned is The Information Literacy Transferability Study

HOW: The study will require two tasks from you:

a) to allow time in Week 2 or 3 of spring semester for the researcher or representative to distribute the STUDENT INFORMED CONSENT form to students and allow for completion of said form in the class

b) to agree to collect from participating students at weeks 8-10, an ungraded copy of the research paper that the student will submit to you – the copy to be given to the Research Assistant, the researcher’s representative

WHO: Person from the study with whom you will interact will be the researcher and her representative [you will already be interacting with the students as their instructor]

PLEASE CHECK YOUR RESPONSES IN THE BOXES OVERLEAF
Do you confirm that you are teaching the B-level course as indicated above on this form? YES ☐ NO ☐

Are you willing to participate in the study by facilitating the distribution of THE STUDENT INFORMED CONSENT FORM? YES ☐ NO ☐

During the third quarter of the semester, are you willing to collect an ungraded copy of the final research paper from the participating students in your course and give to the researcher's representative? YES ☐ NO ☐

Thank you for your cooperation.

Lilleth Newby Beckford
Ed. D. Doctoral Candidate, St. John Fisher College
Cohort 7
Appendix D

LETTER OF INTRODUCTION TO STUDENTS

March 30, 2017

CNR Student

The College

[Redacted]

Rosa Parks Campus

144 West 125th Street

New York, NY 10027

Re: Transferability: The Application of Information Literacy Competencies to Academic Area-of-Interest Course Research Paper among Adult College Students in an Undergraduate Liberal Arts Program by Lilleth C. Beckford

Dear Student,

My name is Lilleth Beckford and I am contacting you today to request your participation in a research project which I am conducting as a part of my dissertation as a doctoral student at St. John Fisher College, Ralph C. Wilson School of Education. The study proposes to discover how students are using the information literacy skills which they have learned in the Research & Information Literacy course in fall 2016.

The project has been approved by the Dean of [Redacted] and is being conducted at your campus. Your enrollment information was made available to me on the approval of the Dean. The study would require that you submit a copy of your research paper which you would complete in the intermediate B-level course you are taking this semester, spring 2017. The research paper should be submitted to your course instructor. Based on your agreement to participate, I am asking you to sign the Informed Consent Form which is coded with a unique identifier. The research papers will be assigned your unique identifier and subsequently all identifying information would be removed from the research paper. Your participation in the study is voluntary and will not have any impact on your coursework or grades. The findings of the study will be beneficial to the
College in the design of the information literacy course and possibly provide support for extending the course to other schools in the College.

I hope that you can find **20 minutes** to complete the **Informed Consent Form**. If you have questions, please contact me by phone at [masked] or by e-mail at [masked] I appreciate your time in considering this request.

Sincerely,
Appendix E

INFORMED CONSENT FORM
FOR STUDENTS

ONLY FOR STUDENT 26 YEARS & OLDER

ILTS ID: ________________________ Campus Location: _______________________

Semester & Year: spring 2017 [January - May] AM or PM CLASS: _____________

Student’s Name: _________________________________________________________

Instructor’s Name: _______________________________________________________

Area-of-Interest Course Taking: [Course Code & Course Title]

________________________________

Your gender: _______ Your age range: 26-35 _____ 36-45 _____ 46 and over _____

Your Current Number of Credits: ____________

Your race - Please circle one:   White Black or African American         Asian
American Indian or Alaska Native Native Hawaiian or Other Pacific Islander

Description of the Study: The study is being conducted to assess how adult students who have already completed the Research & Information Literacy [RIL], during fall 2016 semester have applied the information literacy skills learned to an academic research paper in a B-level area-of-interest course in which they are currently enrolled.

WHY: The study is being done by a doctoral candidate who will be working towards an understanding of how adult students transfer the information literacy principles learned in an information literacy course, RIL, to a final course research paper which is required as part of a discipline-focused course. The findings of the study will assist the college in the design of a more effective information literacy curriculum in the future.

WHAT: The name assigned is The Information Literacy Transferability Study

HOW: The study will require two tasks from you.
   a) Complete a STUDENT CONSENT FORM to be distributed in this class today
b) At week 8, 9 or 10 in this semester [as determined by your Course Instructor], submit an ungraded copy of the research paper, which will be assigned by your Instructor for this course, to the researcher’s representative

WHO: Persons from the study with whom you will interact will be the researcher or representative

NOTE: There are no risks or discomforts associated with this study. Participation in this study is completely voluntary and will in no way affect your grade in this course. There are only two (2) questions and reading, and completing the form should take about 10 minutes.

When your research paper is received, all identifying information will be removed by the research assistant. The rated documents will be destroyed after 5 years. Results can be made available by contacting the researcher.

If you have any questions or concerns about the study, please contact, Lilleth Beckford at lcb03386@sjfc.edu or at (347) 661-4230

PLEASE CHECK YOUR RESPONSES IN THE BOXES BELOW

Did you complete the Experience, Learning & Identity (ELI) Course at least two semesters prior to the current semester?
YES ☐ NO ☑

Did you complete the Research & Information Literacy (RIL) Course last semester (Fall 2016)?
YES ☐ NO ☑

Did you receive a grading of C or above?
YES ☐ NO ☑

Are you willing to participate in the study by submitting copy of the course research paper in weeks 8 to 10, or whenever it is made available to the course instructor?
YES ☐ NO ☑

Thank you for your cooperation.

Lilleth Newby Beckford
Ed. D. Doctoral Candidate, St. John Fisher College
Cohort 7
Appendix F

AGENDA FOR NORMING SESSION

THE INFORMATION LITERACY TRANSFERABILITY STUDY
Transferability: The Application of Information Literacy Competencies to Academic Area-of-Interest Course Research Paper among Adult College Students in an Undergraduate Liberal Arts Program

Norming Session
Tuesday, June 20, 2017

Agenda

1. Welcome & Purpose
2. Overview of Study
3. Examination of the AAC&U Information Literacy VALUE Rubric
4. Rating Levels & Rules of Rating
5. Rules of Norming
6. Rating – Research Paper Sample 1
7. Discussion of Rating – Research Paper Sample 1
10. Rating – Research Paper Sample 3
11. Discussion of Rating – Research Paper Sample 3
12. Summing up Norming Process
13. Next Steps – Date to complete all assigned papers .................

Thank You!

Packets
Agenda
AAC&U Information Literacy VALUE Rubric
Rules of Rating (Holmes & Oakleaf, 2013)
Student Papers
Rating Sheet
IRB Consent Forms
Appendix G

AAC&U Information Literacy VALUE Rubric- Three Selected

THE INFORMATION LITERACY TRANSFERABILITY STUDY
Transferability: The Application of Information Literacy Competencies to
Academic Area-of-Interest Course Research Paper among Adult College Students
in an Undergraduate Liberal Arts Program

RESEARCH QUESTION: How have adult students who successfully completed an
information literacy course of study, based on andragogical framework, applied
information literacy learning in 3 (of the 5) components of the AAC&U Information
Literacy VALUE Rubric, to an area-of-interest course research paper, demonstrating the
ability to apply the information literacy competencies to a specific task?

Students should demonstrate that they are able to:

- Determine the extent of information needed.
- Use information effectively to accomplish a specific purpose.
- Access information ethically and legally
Appendix H

CODE SHEETS – FOR CAMPUS R

THE INFORMATION LITERACY TRANSFERABILITY STUDY
Transferability: The Application of Information Literacy Competencies to
Academic Area-of-Interest Course Research Paper among Adult College Students
in an Undergraduate Liberal Arts Program

Identifying Code:  R 2017-000

Student’s Name:

________________________________________________________________________

Student’s Unique ID Number:

________________________________________________________________________

Course Instructor’s Name:

________________________________________________________________________

Course Code & Name:

________________________________________________________________________
Appendix I

CODE SHEETS – FOR CAMPUS S

THE INFORMATION LITERACY TRANSFERABILITY STUDY
Transferability: The Application of Information Literacy Competencies to Academic Area-of-Interest Course Research Paper among Adult College Students in an Undergraduate Liberal Arts Program

Identifying Code: S 2017-000

Student’s Name:
________________________________________________________________________

Student’s Unique ID Number:
________________________________________________________________________

Course Instructor’s Name:
________________________________________________________________________

Course Code & Name:
________________________________________________________________________
Appendix J

CODE SHEETS – FOR CAMPUS C

THE INFORMATION LITERACY TRANSFERABILITY STUDY
Transferability: The Application of Information Literacy Competencies to Academic Area-of-Interest Course Research Paper among Adult College Students in an Undergraduate Liberal Arts Program

Identifying Code:   S 2017-001

Student’s Name: ____________________________________________________________

Student’s Unique ID Number: ________________________________________________

Course Instructor’s Name: __________________________________________________

Course Code & Name: ________________________________________________________
Appendix K

RATING SHEET for RESEARCH PAPER

THE INFORMATION LITERACY TRANSFERABILITY STUDY
Transferability: The Application of Information Literacy Competencies to Academic Area-of-Interest Course Research Paper among Adult College Students in an Undergraduate Liberal Arts Program

Identifying Code: ................................

Campus Location: .............................

Course Code: .................................

Gender: ........................................

Age Range: .................................

Current Number of Credits: ............

Ethnicity: .................................

RATING

Grade for RIL (during prior semester): .........................

Assessment of Research Paper - spring 2017

For Component a (ability to determine the extent of information needed) .................

For Component d (ability to use information effectively to accomplish a specific purpose) .................

For Component e (ability to access information ethically and legally) .........................

Total .................................