12-2012

The Relationship between Self-Directed Learning and Information Literacy among Adult Learners in Higher Education

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To the Graduate Council:

I am submitting herewith a dissertation written by Tiffani Reneau Conner entitled "The Relationship between Self-Directed Learning and Information Literacy among Adult Learners in Higher Education." I have examined the final electronic copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Educational Psychology and Research.

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The Relationship between Self-Directed Learning and Information Literacy among Adult Learners in Higher Education

A Dissertation Presented for the
Doctor of Philosophy
Degree
The University of Tennessee, Knoxville

Tiffani Reneau Conner
December 2012

Dedication

This dissertation is dedicated to my grandmother, Nellie M. Pinkston, for her unending support of me and my personal goals in life.

To my niece, Olivia Rae Conner, and my nephew, Jackson Charles Conner, I hope that my efforts will encourage each of you to pursue your passion and goals, letting nothing stand in your way.

Acknowledgements

I would like to express my gratitude and appreciation to my committee members, Dr. Ralph Brockett, Dr. Mary Ziegler, Dr. Gary Skolits, and Dr. Rachel Fleming-May for their support of me throughout this process. Special appreciation goes to Dr. Ralph Brockett for being available to discuss ideas and changes, for helping me process my thoughts and vision, and for spending many hours sitting in the west office editing and revising chapters. To Jason Black, I owe a debt of gratitude for helping me understand the SPSS output and different statistical tests.

This process was richer because of friends and colleagues I made while in the program. For many conversations and multiple hours spent talking I thank Allie and Amelia. Thanks to my parents, Jacquie and Terry for asking me questions and supporting me. Finally, I owe an unquantifiable amount of gratitude to Laura Angilee for holding me up when I needed it, for helping put concepts and ideas into clear images, and for voicing pride in me for completing this very personal goal.

Abstract

The purpose of this study was to investigate the relationship between self-directed learning and information literacy. Participants completed the Personal Orientation in Self-Directed Learning Scale ([PRO-SDLS], Stockdale, 2003) and the Information Literacy Test ([ILT], James Madison University, 2003). The PRO-SDLS is a self-report scale consisting of 25 statements about self-directed learning preferences in college classrooms. The ILT is a 60-item multiple-choice test that assesses the information literacy skills of college students. Correlation, ANOVA, and multiple regressions were used to test relationships and differences between self-directed learning and information literacy. Despite claims that teaching information literacy creates self-directed learners, composite scores on the PRO-SDLS and the ILT indicated no statistically significant relationship exists. Likewise, no statistically significant differences were found between the bachelors, masters, or doctoral level participant scores. While composite scores on the PRO-SDLS did not predict scores on the ILT, there was a negative, statistically significant relationship between the Initiative factor on the PRO-SDLS and ACRL (2000) Information Literacy Competency Standard 5 – Ethics & Understanding sub-scale of the ILT. Implications for practice and suggestions for further research are proposed along with discussions and conclusions.

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Chapter I

Introduction to the Study

The world is changing rapidly, dramatically, and exponentially. Society is currently experiencing a third wave, as Toffler (1980) described the information age, and individuals are asked to "solve problems independently and organically" (Bash, 2003, p. 15). The workforce needs knowledge-based workers as opposed to skills-based workers. Workers who lack the skills to locate, evaluate, and apply an unprecedented amount of information, costs companies over one billion dollars (American Library Association, 1989; Hancock, 1993). In his keynote address to the Higher Learning Commission of the North Central Association, Crow (2001) stated that technology requires "people not only have higher-level competencies in order to succeed in the working environment but also are capable of engaging in the self-directed lifelong learning necessary for flexible responsiveness to change" (p. 9). McGuiness (2005) stated, "due to societal changes, students need to learn the skills of self-directness" (slide 8).

Currently, the 21st century college campus experiences constant, dramatic change and administrators must address contributing factors including new expectations of students, new ways of thinking about education, new delivery systems and formats on the part of faculty, as well as dramatic demographic differences in both students and faculty (Bash, 2003). In discussing these factors, Newman (1999) stated, "Traditional institutions of higher education are vulnerable to … forces of change because, in some critical dimensions, they are out of sync with societal needs" (p. 1). Adult students typically return to college to

increase their skills due to changing demands of the work world (Jones, 2009; The Southern Regional Education Board, 2002). The over-25 student population in higher education is expected to outpace that of younger students by 2016 (Cordes, 2009). The percentage of students age 25 and over increased from 25 to 27 percent between 2000 and 2009. The National Center for Education Statistics ([NCES], 2011) projects this trend to continue through 2019 with a 23 percent projected increase. In order to keep pace with the expectations of traditional students, as well as meet the needs of non-traditional students, universities will have to address the forces of change in order to meet the needs of all students (Bash, 2003; Deggs, 2012).

Darden (2009) reported that, according to higher education administrators, the most important and most often overlooked recommendation of the Secretary of Education's Commission on Higher Education (Spelling Commission, 2006) is the focus of universities of the future (Gilfus Education Group, 2010). James J. Duderstadt, president emeritus at the University of Michigan, stated the "shelf-life of an education is very short" (Darden, 2009, p. 6), and individuals must continue to learn over their lifetime to continue employment (Darden, 2009; Jones, 2009). Stephen Joel Trachtenberg, president emeritus at George Washington University, stated work now requires individuals to ingest data and utilize it to develop new ideas and products (Darden, 2009).

Managers and business executives expect 21st century workers to be self-directed and to possess information literacy skills in order to succeed (Guglielmino & Murdick, 1997; International Federation of Library Associations, 2011; Oman, 2001; Williams, 1995). Both self-directed learning and information literacy require individuals to think critically, synthesize information, and quickly process that information to meet rapidly changing demands. The Association for College & Research Libraries ([ACRL], 2000) indicated that

an information literate individual possesses self-direction and engages in lifelong learning. "Information literacy is [sic] increasingly important in the … environment of rapid technological change and proliferating information resources" (ACRL, 2000, para. 3). Information literacy and lifelong learning allow people to understand and interpret content, improve their research skills, and become more self-directed (ACRL, 2000). According to the ACRL's (2000) Information Literacy Competency Standards for Higher Education, an information literate individual knows information is needed; articulates the information needed; accesses information efficiently; evaluates both information and its sources critically; incorporates information into his or her knowledge base; effectively uses information to achieve the intended goal; and understands the ethical, legal and socio-economic issues of information and technology.

Information literacy skills can and should extend beyond the classroom. The focus of information literacy instruction suggests that developing searching and evaluation skills helps cultivate self-directed students, who can utilize these skills in the world. According to the ACRL (2000), information literacy skills promoted personal success in "internships, first professional positions, and [increased] responsibilities in all arenas of life" (para. 8). Viewing information literacy as *a process* rather than *an end product* empowers people to interpret change as "transitional, not traumatic" (Hancock, 1993, p. 6).

Extending beyond the classroom into the work world, Sexton (n.d.) stated that workers who successfully take responsibility for their learning and careers exhibit six *invisible assets.* They:

1. Have an underlying sense of purpose, and believe that what they do makes a unique contribution.

2. Never surrender the art of dreaming and re-dreaming, self-directed learners continually envision what they want their lives to be.
3. Focus on their gifts, value their unique talents and skills, and leverage their strengths and manage their weaknesses.
4. See themselves as volunteers, not victims; they take responsibility for their choices and pursue their own definitions of success.
5. Act despite their fears.
6. Thrive on interdependence, they understand they are a part of a greater whole and that success is impossible without connections. (pp. 1-2)

Durr, Guglielmino, and Guglielmino (1996) indicated that, "workers in the information age have profoundly different needs from their predecessors" (p. 349). Formal education provides knowledge and skills that rapidly become obsolete, thus individuals must direct their own learning for workforce success. According to Durr, et al. (1996), businesses' focus on worker empowerment and self-directed work teams (Wellens, Byham, & Wilson, 1991), as well as the benefits of cost savings and a shortened training cycle, make self-directed approaches especially enticing. Self-directed learning and information literacy skills increase personal and career success for the 21st century learner and worker (ACRL, 2000; Durr, et al., 1996). Businesses desire employees who take initiative and responsibility for learning necessary skills. In addition, businesses rely on employees to locate and evaluate information to provide evidence to support business decisions (Durr, et al., 1996). With increasing demands for self-directed and information literate individuals in the business world, institutions of higher education need to know how the college experience, and specifically information literacy training, helps to create self-directed employees who can meet the challenges of the 21st century workplace.

Statement of the Problem

Self-directed learning in higher education fills the research literature (Brockett & Hiemstra, 1991; Hiemstra, 2010). Literatures about both self-directed learning and information literacy have articulated similar processes and outcome goals for learners. The research literature does not seem to show much overlap between the two fields of study (Appendix A). Given the similarities between self-directed learning and information literacy, crossing disciplinary lines could benefit both fields while providing opportunities for collaborative research and growth.

Empirical evidence linking self-directed learning preferences and information literacy skills is rare. The primary databases for education and educational psychology, ERIC and PsycINFO, retrieved only four articles, and the primary information and library science database, LISTA, returned six articles that discussed the two concepts together (Appendix A). Information literacy (IL) resources mentioned self-directed learning (SDL) as an outcome of information literacy skill acquisition, but did not provide a definition of self-directed learning or describe a particular set of skills, instead suggesting that only information literacy skills lead to self-direction. Authors writing about self-directed learning implied that self-directed learners possessed information literacy skills but the authors did not use term, information literacy, outright. In other words, the reader is left to determine how the resources were chosen to meet a learning need. Instead, self-directed learning steps, as articulated by Brookfield (1984) and Knowles (1975), assume learners possess information literacy skills.

The information literacy and self-directed learning literature focuses on learners' internal processes or the learning context, or setting. Self-directed learning literature is written for an audience of teachers and institutions as demonstrated by articles that focus on

developing skills through teaching methods and classroom techniques. John Carolus, S. J. was quoted as saying, “We think too much about effective methods of teaching and not enough about effective methods of learning" (Johns Hopkins University, n.d., para. 1). With this quote in mind, this study explored the learner side of information literacy and self-directed learning. In particular, this study investigated the behaviors of learners, using the PRO-SDLS instrument, and the skills of learners, utilizing the ILT assessment test.

Purpose of the Study

The purpose of this study was to investigate the relationship between self-directed learning and information literacy among adult learners in a formal, higher education setting. Considering self-directed learning preferences and information literacy skills in higher education makes it possible to better understand adult college student behaviors relative to finding and using information, and their approaches to learning and self-direction in higher education. The literature review discussed self-directed learning and information literacy in relation to higher education. Both fields explored similar concepts, processes and techniques (Brookfield, 1986). An obvious gap exists in the literature relative to the connection between self-directed learning and information literacy, and comparisons were made to illuminate similarities and differences between them.

Research Questions

The researcher developed three research questions to investigate the relationship between self-directed learning and information literacy. The questions are:

1. Is there a significant relationship between self-directed learning preferences and information literacy skills as determined by the two instruments (PRO-SDLS and ILT) used in this sample of adult learners in higher education?

2. Are there significant differences between self-directed learning preferences, information literacy skills, and selected demographic variables (Age, College GPA, Educational Attainment, and Ethnicity) in this sample of adult learners in higher education?
3. Are there significant relationships between the factors that comprise self-directed learning (Initiative, Control, Self-efficacy, Motivation) and the sub-scales defining information literacy (ACRL Standards 1, 2, 3, and 5) in this sample of adult learners in higher education?

Conceptual Framework

The conceptual framework follows two model theories, the Personal Responsibility Orientation (PRO) Model developed by Brockett and Hiemstra (1991) and the Information Search Process (ISP) Model developed by Kuhlthau (1983). Each model focuses on the individual and their interaction with a process. Below the two models are explained in detail with a rationale for inclusion provided.

Personal Responsibility Orientation (PRO) Model. Brockett and Hiemstra's (1991) PRO Model explored and explained the concept of self-direction in learning (teaching-learning) as well as learner self-direction (personality characteristic). The PRO model focuses on the learner's personal responsibility and assumes that this responsibility is wanted by the learner and is applicable to learning (Brockett & Hiemstra, 1991).

The PRO Model includes the characteristics of the teaching-learning situation, of the learner, and of the social context in which learning occurs. Using a primarily humanist foundation, their model assumes that learners possessed the basic capability of being responsible for their own learning (Fogerson, 2005). The PRO model (Figure 1) includes personal responsibility, self-directed learning, learner self-direction, and self-direction in

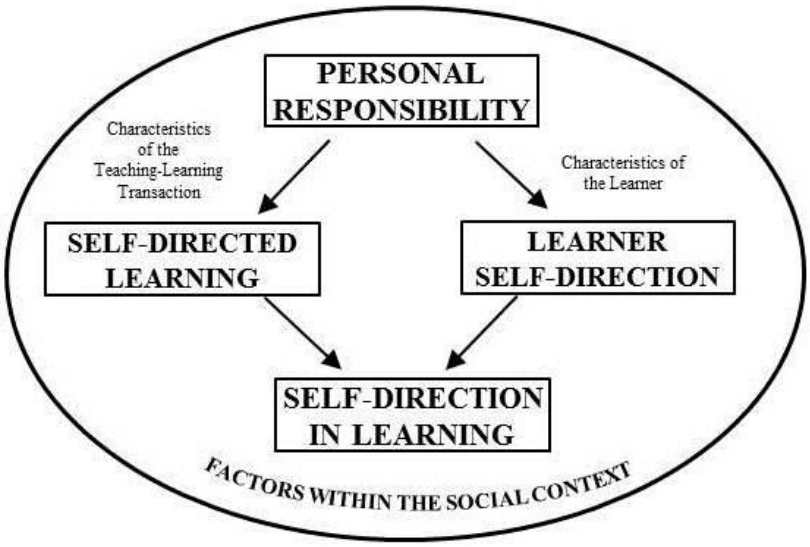

Figure 1. Personal responsibility orientation (PRO) model developed by Ralph G. Brockett and Rog Hiemstra (1991). Reproduced with permission.

learning. Individuals displayed personal responsibility when they assumed ownership for their thoughts and actions, in other words the control one had over personal responses to given situations. Holding the model together, and influencing all aspects of the model, was the context in which learning took place. According to Brockett and Hiemstra (1991), the potential for self-direction lies with the individual's ability and willingness to take control of their own learning endeavors.

The PRO Model makes an explicit distinction between intrinsic and extrinsic characteristics. Intrinsic characteristics that contribute to a learner taking personal responsibility for their own learning is *learner self-direction*. However, s*elf-directed learning* is an extrinsic characteristic of the teaching-learning transaction. In self- directed learning, the learner assumes primary responsibility for planning, implementing, and evaluating the learning experience while the teacher facilitates the process (Fogerson, 2005).

The term *self-direction in learning* appears at the bottom of the model and suggests that the aforementioned characteristics contribute to and affect the nature of the activity. Thus, the PRO model recognizes personal responsibility within the social context of learning

and highlights both intrinsic and extrinsic pressures that affect self-direction in learning. Stockdale's (2003) PRO-SDLS, based on the PRO Model, was developed as a way to measure self-directed learning in students at the college level (Conner, 2011b) and operationalizes the intrinsic and extrinsic characteristics of the PRO model.

Brockett and Hiemstra's (1991) PRO model attempted to explain the numerous definitions of SDL by incorporating aspects of personal responsibility, self-directed learning, learner self-direction, and self-direction in learning. The key element of the PRO model is the assumption that learners are willing and able to take control of their own learning (Brockett & Hiemstra, 1991). According to Garrison (1997), the PRO model showed a significant shift in the SDL discussion because it included a personal disposition element. However, Garrison mentioned Brockett and Hiemstra vaguely addressed the cognitive and metacognitive elements involved in the process of learning, and he indicated an absence of a clear explanation of critical reflection as a personality characteristic in the PRO model.

The PRO Model was one of the conceptual frameworks for this study because the PRO-SDLS was built on the model. The PRO-SDLS operationalized the teaching-learning transaction and learner characteristic components of the PRO model. Additionally, because the PRO model views self-direction in terms of both teaching-learning and learner characteristics, it is directly applicable to the formal college environment, and thus is a rational model to follow.

Information Search Process (ISP) Model. Kuhlthau's (1983) Information Search Process (ISP) model is well-documented in the information science literature. Kuhlthau (1983, 1988), based on professional experience and direct interaction with K-12 students, began an exploration of how students located information and received assistance. Kuhlthau

(1983, 2004) observed that when her students were searching for information they were routinely "confused, anxious, hurried, and frequently uninterested, annoyed, and frustrated" (p. 30). A series of key studies and articles over the past 25 years placed the ISP model in the spotlight for teaching information search and information literacy skills to students through a constructivist method. In a constructivist view, learners construct their own personal worlds and this construction utilized the whole person to create a dynamic process of learning. Kuhlthau explained that a constructivist view of learning was invaluable for understanding a learner's perspective.

Basing her theory on the work of theorists John Dewey, George Kelly, and Jerome Bruner, Kuhlthau (2004) placed information seeking in the broader context of the process of learning and implied a link between educational psychology and information science, suggesting that understanding information seeking from the learner's perspective is essential for teachers and librarians who teach students how to find information. According to Kuhlthau (2004), Dewey's work contributed a philosophical and historical foundation concerning constructivism. Kelly provided a perspective on feelings' association with constructing and re-constructing knowledge. And Bruner's research on perception further embraced the constructivist view of learning. Bruner considered constructivism as active process incorporating all aspects of individual experience.

Kuhlthau (2004) suggested that people construct meaning from information that they encounter. Searching for new information begins with uncertainty. This uncertainty creates doubt in the learner concerning the new information they found. At this point, according to Kuhlthau (2004), this new information may be discarded and the construction process stopped if the disruption, stemming from the doubt and confusion, is too heavy. Kuhlthau (2004) suggested an alternative to stopping the search process. For Kuhlthau (2004) learners

who developed a tentative hypothesis to be tested and evaluated incorporated new ideas into their existing system of personally held paradigms.

The ISP model consists of six stages 1) task initiation, 2) topic selection, 3) prefocus exploration, 4) focus formulation, 5) information collection, and 6) search closure. Kuhlthau (2004) discussed the stages and how they are carried out in three realms, the affective (feelings), cognitive (thoughts), and physical (actions). Figure 2 displays the model of the information search process illustrating the stages students go through when searching for information. The feelings range from uncertainty to satisfaction or disappointment. Students' thoughts shift from vague to focused and build into an increased interest in the topic. And the actions during the information search process moves from exploration to documenting the information that was found to be useful.

	Stages					
	Initiation	**Selection**	**Exploration**	**Formulation**	**Collection**	**Presentation**
Feelings (affective)	Uncertainty	Optimism	Confusion/ frustration/ doubt	Clarity	Sense of direction/ confidence	Satisfaction or disappointment
Thoughts (cognitive)	vague →			focused →	Increased interest	
Actions (physical)	Seeking relevant information exploring →				Seeking pertinent information documenting	

Figure 2. Model of the Information Search Process (ISP). Adapted from C. Kuhlthau, "Seeking meaning: A process approach to library and information services (2nd ed.) 2004. Copyright C. C. Kuhlthau, p. 82.

In stage 1, *initiation*, learners exhibit feelings of uncertainty while they are exploring and trying to find relevant information. Stage 2, *topic selection*, involves feeling optimistic when making initial decisions about a general topic and approach to obtaining the needed information. Stage 3, *prefocus exploration*, elicits confusion, uncertainty and doubt because the emphasis is on adequately exploring a topic to add understanding and form a focal point. Many find a turning point at stage 4, *focus formulation*, because as an individual's confidence builds, feelings of uncertainty are reduced (Kuhlthau, 2004). Stage 5 is

information collection wherein the learner and the system (database or search tool) interact most heavily. In the last stage, *search closure,* the learner feels relief and satisfaction if the process has gone well. At this stage, the task is to use the information gathered to complete the project or assignment. Kuhlthau (2004) included a post-process assessment of the search process, described as a time of reflection. The time of reflection links the information search process with self-directed learning process which includes reflection and reintegration of new knowledge.

The ISP model was chosen as the second conceptual framework because it directly addressed information searching, a common activity for learners and a common skill set taught in information literacy instruction. Additionally, the ISP uses a constructivist view of how learners interact with their personal worlds, and includes the whole person in the process of learning.

Overlapping models. The development of certain skills, listed below, addresses higher education's goal of graduating successful lifelong learners. Twenty-first century learners (Lawrence, 2007; Palloff & Pratt, 1999) must be flexible and adaptable to different modes of inquiry, information resources, and evaluation skills to handle the plethora of new information coming at them. Higher education institutions ensure their graduates are successful lifelong learners by teaching them the skills for self-directed learning and information literacy (Bruce, 2004; Hancock, 1993; Schloman, 2001). These skills overlap and complement one another because both focus on personal characteristics and knowledge, and give learners tools to gain self-confidence, curiosity, creativity, and resilience.

The two models, Brockett and Hiemstra's PRO, and Kuhlthau's ISP, align with one another because they focus on the whole person in context. The ISP focuses on the learner's feelings, thoughts, and actions while engaging in the process of searching for information.

Brockett and Hiemstra (1991) investigated behaviors (self-direction in learning) and characteristics (learner self-direction) within the social context. While the ISP can be perceived as a micro-level model, focusing on minute elements of the individuals feelings, while the PRO is a macro-level model, suggesting an emphasis on individual behaviors within a social context, the goal of both processes is transformation.

Stockdale's used four factors (control, initiative, self-efficacy, motivation) to operationalize the PRO model, the affective (feelings) elements are development of self-confidence, self-management, and self-direction and are represented by the factors: motivation (Stockdale & Brockett, 2011), self-efficacy (Bandura, 1997). The cognitive (thoughts) elements in the PRO model are based on Knowles' (1975) expectation of adult learners being self-directed and are operationalized as the motivation factor on the PRO-SDLS. Adult learners move towards thinking of themselves as self-directed and they utilize previous knowledge to inform new knowledge and actions. Finally, the physical (actions) elements are operationalized as initiative and control (Brockett & Hiemstra, 1991; Stockdale & Brockett, 2011) wherein a shift occurs in the individual from needing or wanting instruction towards learner autonomy.

While the activities of self-direction and information seeking are controlled and carried out by the learner, teachers can support and help develop the skills that encourage and underscore self-direction and information literacy. If, as the literature suggests, information literacy skills fosters self-directed learning preferences, then teaching the IL skills and process will help develop the learner characteristics of self-direction (motivation and self-efficacy). Knowles (1975, 1980) described self-directed learners as possessing the ability to perform certain internal tasks such as defining, discovering, and carrying out actions that support self-direction in learning (initiative and control). If we assume these

abilities are not innate, indicating the need for education, then these abilities/skills can be learned and by extension taught.

In the conceptual model of this study (Figure 3), the learner moves along a continuum. Both the ISP and PRO models are expressed in terms of the *realms* that Kuhlthau utilized to describe the stages a learner goes through when searching for information. In the ISP model, a learner moves from *actions* (physical realm) of exploration to documentation, and vague to clear *thoughts* (cognitive realm). In the PRO model a learner moves along a continuum as well, increasing personal actions as they move from teacher instruction to learner autonomy, and shifting thoughts of him/her-self as a dependent to independent learner. Further, the learner takes the process and application of the ISP and PRO models from the formal classroom setting into the global world, seeing multiple applications.

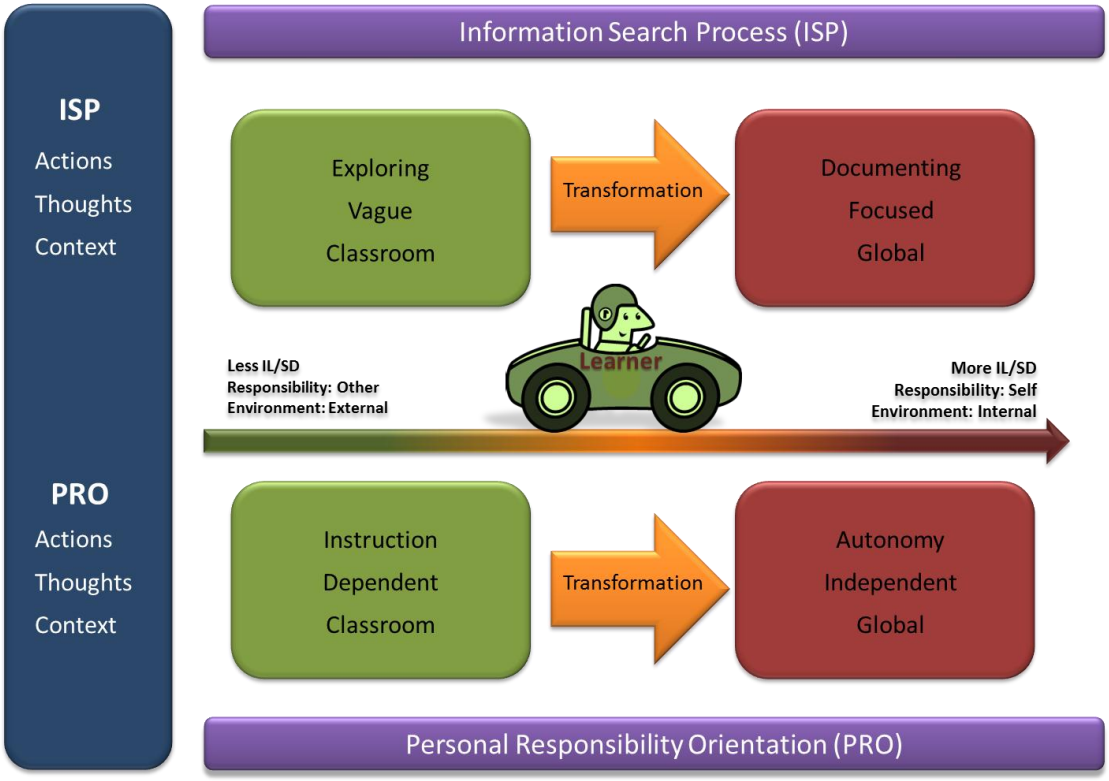

Figure 3. A conceptual model for the relationship between the Personal Responsibility Orientation model (Brockett & Hiemstra, 1991) and the Information Search Process (Kuhlthau, 1983).

Both models show the actions and thoughts occurring along a continuum within the *contexts* of a formal, educational classroom to the global environment, a micro to macro level shift. Both models express transformation of skills, abilities, and feelings. Students, by participating in a learning process should move from low self-esteem, or low self-confidence, to high confidence as the process is learned and new information is integrated into past knowledge. The transformation from less information literate and self-directed to more information literate and self-directed is indicated by a shift from viewing learning as someone else's responsibility, external motivations or initiative, to responsibility for one-self and the internal motivation to find, locate, and integrate information.

Significance of the Study

University and college mission statements frequently articulate that they graduate self-directed, lifelong learners, (ACRL, 2000; Long & Guglielmino, 2004; Lunyk-Child, et al., 2001). Middle States Commission on Higher Education (2002) defined information literacy as an intellectual framework and considered information literacy a "metaphor for the entire learning experience" (p. 2). Several other accrediting bodies, including the Western Association of Schools and Colleges, and the Southern Association of Colleges and Schools, indicate information literacy is a key outcome for college students (Thompson, 2002). Despite the goals and outcomes articulated by administrators and accrediting bodies, self-directed learning research has focused predominantly on process (Mocker & Spear, 1982), and motivation and personal responsibility (Garrison, 1997; Stockdale, 2003). And researchers in higher education have studied self-direction, defined as the learner's ability to guide and direct their learning, in the online learning environment (Song & Hill, 2007), rather than in the college experience as a whole.

Although self-directed learning and information literacy are topics identified in research literature and university mission statements (Boise State University, n.d.; Eastern Carolina University, 2012; The University of Iowa, 2010; Thomas College, n.d.), few studies have investigated the relationship between the two concepts for adult, non-traditional learners in higher education. Additionally, no research literature could be found that explored adult learners in professional degree programs and their information literacy skills or self-directed behaviors in the college environment. Since the non–traditional (over–25 years old) student population is expected to outpace traditional (18–24 years old) student population (Cordes, 2009; NCES, 2011), investigating the relationship between self-directed learning preferences and information literacy skills, is critical for institutions of higher learning to meet the demands of this growing population. This study attempted to fill this gap by investigating relationships between self-directed learning and information literacy in a formal, higher education setting.

Executives in higher education have suggested the college experience yields both self-directed and information literate graduates. Institutions of higher education advertise programs and graduates as possessing the necessary skills for the 21st century workplace, including self-direction and information literacy. The researcher chose the higher education environment because of the aforementioned claims by post-secondary representatives, interactions with students in the college classroom, a personal desire to effectively promote both concepts, as well as a desire to add to the body of knowledge concerning the specific needs of adult learners.

Adult learners, those expressing at least one non-traditional characteristic, are a growing population in higher education (Choy, 2002; Kasworm, 2003). Characteristics of non-traditional students include, “delayed enrollment, part-time attendance, financial

independence, full-time employment, having dependents other than a spouse, being a single parent, and not obtaining a standard high school diploma" (Deggs, 2011, p. 1543). Through information gathered from interviews with key university stakeholders at the organizational and programmatic levels, the researcher established that the university in this study focused on developing self-directed, information literate learners through several programs and approaches. Additionally, this university carried out numerous formal and informal surveys to determine students' significant progress on general education and information literacy skills throughout their enrollment and as an alumnus.

This study contributes to the body of knowledge in the two parent fields, adult education and information science by showing the potential for a connection between self-directed learning and information literacy. Both adult education and information science imply, state, and utilize skills that are also stated by the other field. For example, one element of adult education is self-directed learning, which assumes information literacy skills are possessed by adult learners (Caravello, 2000; Hancock, 1993; McKinzie, 1997). Associations such as the ACRL (2000) and the Society of College, National and University Libraries (2004), as well as literature by Bruce (2004), literature expressed a directive of information literacy and that one outcome of college is self-directed, lifelong learners. Scholars in adult education and information literacy will benefit from new knowledge about the connection between self-directed learning and information literacy because of the projected growth in this student population (NCES, 2011).

This research extended self-directed learning theory by looking at another concept, information literacy, which has not been fully explored by self-directed learning researchers. Interviews with directors of the programs under investigation supported the potential for this research to add to the knowledge base and contribute to current and future practice. By

determining whether there was a significant relationship between self-directed learning and information literacy, both fields of practice may be opened to new methods of instruction or venues for student's exploration and reflection. Adult education and information science (e.g., library science) share a long, rich history (Merriam & Brockett, 1997, 2007; Rachal, 1989) as well as a common interest; one that seeks to help adult learners become self-directed and competent users of reliable information. This study may help build new connections between two different, but related fields.

Assumptions

This research was a correlation study using survey design methods that employed Pearson's product moment correlations and multiple regression. Coefficient of correlation, like other general linear models of statistics, has three assumptions about the data and sample: normality, linearity, and homoscedacity. In this study, the data were expected to be normally distributed, the relationship between self-directed learning and information literacy was assumed to be linear, and the scatter was presumed to be the same (homoscedacity) throughout the data (Nau, n.d.; Visual Statistics Studio, n.d.).

Assumptions about the participants were that they answered the instruments honestly, the sample was representative of the population of interest (non-traditional students), and the participants were willing to participate in the research. Participant's risk of harm in contributing to the study was minimal given the survey design and data collection taking place in a computer lab. Involvement was confidential and anonymity assured by the use of randomized identification numbers with no connection to personal information. This study was reviewed through the researcher's resident institution to insure adequate protections and ethical design of this study prior to administration (Web Center for Social Research Methods, 2006).

Limitations

The limitations of this research were use of a single university, non-traditional students, two instruments, moderate reliability scores, small number of ethnically diverse participants, and access limits to students. The study was conducted at a private university and therefore results are not generalizable to college students overall. The results may simply reflect localized issues for the students attending this particular university. Second, participants were non-traditional adult learners, at least 25 years of age, and the results are not generalizable to traditional college student populations. The three programs studied catered to adult learners and are designed to be taken in conjunction with full-time employment, meaning classes are held at night and on weekends and required a minimum age (25+) or education level (60 credit hours, or a bachelors or masters degree) to be admitted. Third, self-directed learning preferences and information literacy skills were measured using only two instruments, the Personal Responsibility Orientation in Self-directed Learning Scale (PRO-SDLS) and Information Literacy Test (ILT). The PRO-SDLS measures learner behavior and preferences in relation to the teaching-learning environment (initiative, control) and learner characteristics (self-efficacy, motivation), while the ILT assesses information literacy skills. The instruments measure different things, therefore the argument that a link exists between the two concepts could be a limitation, but investigating the transfer of skills to preferences may yield new opportunities for research and teaching. Fourth, moderate reliability scores on the ILT for two of the four information literacy standards (ACRL, 2000) tested may present a limitation. Only total test scores are recommended to be used by the test developers. This may limit the investigation of research question 3. Fifth, although the ethnic-group representation at the university is higher than others in the region, the diversity of participants was small. The low numbers of non-

Caucasian respondents prevented analysis of data using the demographic variable, ethnicity. Finally, due to some members of the overall population taking online classes only or at a stage in their program wherein they no longer were required to come to campus, a limited number of students were accessible for inclusion. Thus the representative number of students was roughly 50% of the overall population across the three programs studied.

Delimitations

This research studied only non-traditional adult learners currently enrolled in a bachelors, masters, or doctoral program at single university. Current enrollment was necessary because the PRO-SDLS instrument is designed specifically for students engaged in the formal educational setting, rather than those who have already graduated. Participants completed the ILT assessment as a measure of their information literacy skills because the ILT is one of the most prominent and accepted tests of information literacy skills available that also meets validity and reliability standards. Only on-campus students were included in the sample studied.

Definitions

The following definitions were operationalized in this study.

Adult. Knowles (1980) identified adults as individuals who perform roles associated by our culture with adults such as worker, spouse, or parent and an individual who takes responsibility for their own life.

Adult learner. Merriam and Caffarella (1999) discussed adult learners in terms of the concept of andragogy, wherein a person moves from a state of dependence to self-directedness. Adult learners draw on their experiences; their readiness to learn is related to social roles; they desire immediate application of new knowledge; and internal sources control their motivation to learn.

Control. Control was expressed by Stockdale (2003) as relating to people's beliefs about themselves. Control is expressed as both self-confidence and self-efficacy in the adult education and psychology fields, respectively. Also, control is considered an "expectancy attribute of a self-directed learner" (Stockdale, 2003, p. 59).

Initiative. Initiative is defined as an introductory step or act or a leading action. Stockdale and Brockett (2011) operationalized this term in the teaching-learning interaction as "actions that demonstrate proactively assuming control and initiative for planning, implementing and evaluating the learning process" (p. 165).

Information literacy. Information literacy is a set of skills enabling individuals to "recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information" (ACRL, 2011, para. 3).

Instructional method. An instructional method, or instructional approach, according to Hiemstra and Sisco (1990) is didactic, Socratic, or facilitative. An instructor who controls most of the direction and content using lecture is using the didactic method. Socratic instructors use questions to lead the learner through a logical sequence of learning. And a facilitative instructor creates an environment that allows learning to occur naturally.

Motivation. Motivation is being purposeful, using "attention, concentration, imagination, passion, and other processes to pursue goals" (Wlodkowski, 2008, p. 3).

Self-directed learning. Self-directed learning (SDL) is a process or technique (Brookfield, 1985, 1986) applied to learning wherein learners diagnose their needs, formulate goals, identify resources, choose and implement appropriate strategies, and evaluate outcomes (Knowles, 1975). SDL is also transformational in that the learner begins to experience "internal changes in consciousness" following "a critical analysis of alternative possibilities" (Brookfield, 1986, p. 85).

Self-efficacy. Self-efficacy was defined as "people's judgments of their capacities to organize and execute courses of action required to attain designated types of performances" (Bandura, 1997, p. 391).

Outline of the Study

Chapter I presented the introduction and statement of problem, the purpose of the study, the significance of the study, assumptions, limitations, definitions, and the outline of the study. Chapter II will provide a review of the literature on self-directed learning (SDL) and information literacy (IL) and the instruments used to measure SDL and IL in higher education. Chapter III introduces the population and sample, instrumentation, procedure, and data analysis. Chapter IV details the results of the study and Chapter V will discuss conclusions based on the results and recommendations for future research.

Chapter II

Literature Review

Chapter II provides an overview of the literature on self-directed learning, information literacy, and the selected instruments measuring each concept. First, this chapter presents a detailed review of the search and decision making strategies employed, to assist future researchers in duplicating the process. Second, the chapter offers literature on adult learners, self-directed learning, and information literacy in relation to higher education. This section provides a review of the concepts as discussed within a situated setting representative of the setting for this study. Third, models of self-directed learning (SDL) and information literacy (IL) are presented and compared; providing justification for the study and the researcher's interpretation of the relationship. Fourth, selected instruments used to measure SDL and IL are discussed. Finally, the chapter concludes with a brief summary and introduction to Chapter III and the method.

Search Strategies and Selection

Searches of library catalogs, periodical databases, reference and bibliographic lists, and the World Wide Web uncovered literature concerning the following major concepts: adult learners, self-directed learning, information literacy, higher education; assessment instruments: Information Literacy Test (ILT), Personal Responsibility Orientation in Self-Directed Learning Scale (PRO-SDLS); and models: Information Search Process (ISP), and Personal Responsibility Orientation (PRO) model. The literature searches were conducted in subject, multi-disciplinary periodical, and dissertation databases covering education, social sciences and library and information sciences.

The final number of items reviewed included the following restrictions: a higher-education setting; operationalized definitions of SDL; a focus on learners rather than programs; and information literacy. A full description of the specific delimitations of the chosen literature and a table of the total number of items chosen for review, by database vendor, for each search strategy appears in Appendix A. The numbers should not be interpreted as exhaustive because key journals in the field of self-directed learning are not indexed at the time of investigation. Content for the *International Journal of Self-Directed Learning*, for example, could not be searched via search engines due to its format (portable document format [PDF]). The researcher consulted bibliographies and tables of contents from adult education and self-directed learning journals, citation analysis articles, and digests on self-directed learning to compensate for a lack of indexed access to self-directed learning resources.

Higher Education Context

This study investigated three components relative to the higher education context: adult learners in higher education, self-directed learning in higher education, and information literacy in higher education. Details about the literature covering each component investigated appear below.

Adult Learners and Higher Education

Adult learners, defined as aged 25+, according to Knowles (1975, 1984, 2005), are self-directed in their learning, and that the life experiences that adults bring to the classroom are not highly valued by instructors. Higher education institutions follow a pedagogical, prescriptive model of coursework and requirements, without differentiating between traditional and non-traditional students and their needs (Deggs, 2011; Hiemstra & Sisco, 1990; The National Academy for Academic Leadership, n.d.). If, as Bash (1999) and

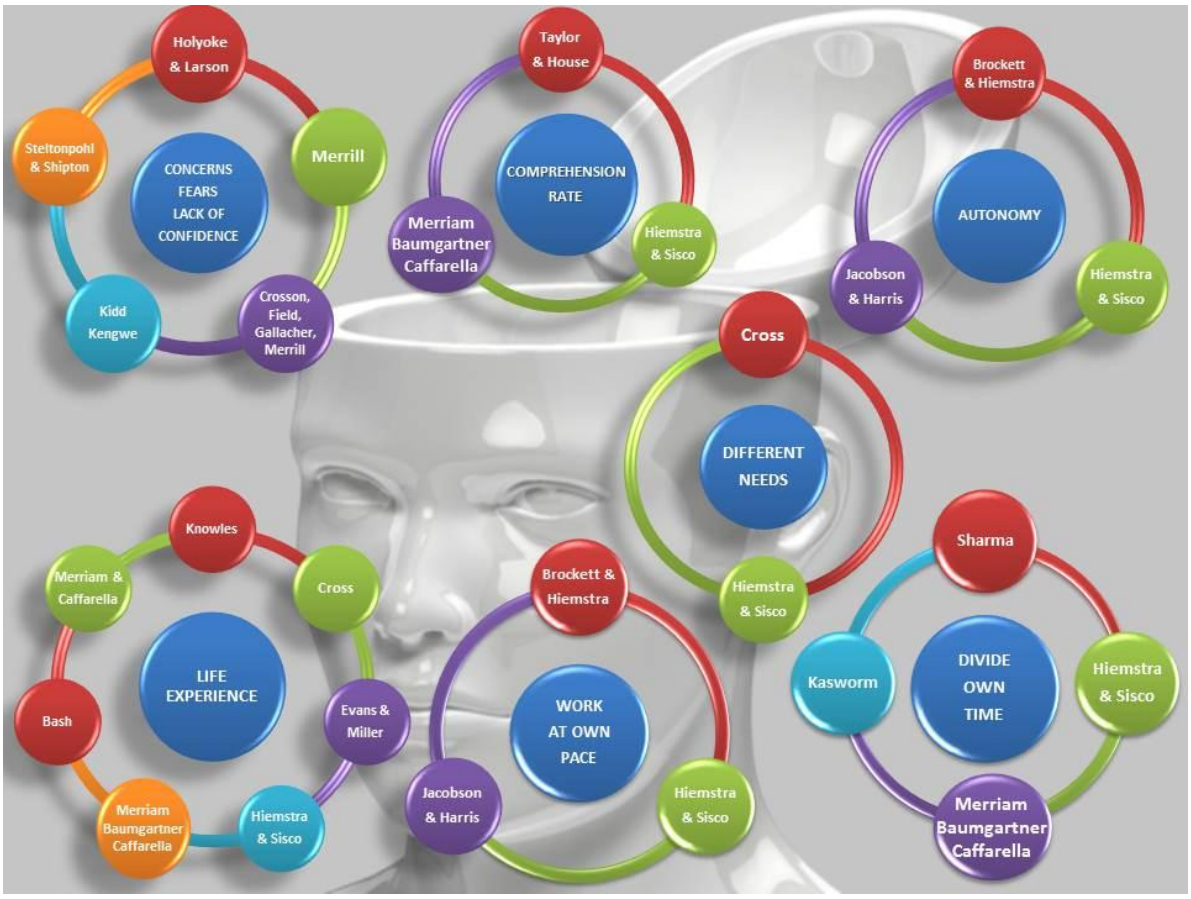

Figure 4. A snap-shot of adult learner characteristics identifying the authors that were included in this study.

Mednick (2002) have suggested, lifelong learning is a prominent goal in higher education globally, yet the needs of adult students remain unmet. Teaching information literacy and self-directed learning skills to adult students may bridge this gap and help meet the needs of adult learners. Adult learners have specific characteristics (Figure 4) differentiating them from traditional aged college students.

Cross (1981), Hiemstra and Sisco (1990), and Merriam, Caffarella, and Baumgartner (2006) suggested that adult students have different needs than traditional aged college students. Adult students return to school with an intense focus on completing required coursework to achieve their determined goal of getting a degree. Adult learners possess decidedly different characteristics from child learners or even traditional-aged college students (Hiemstra & Sisco, 1990; Kasworm, 2003). Knowles (1980) described four

assumptions about the characteristics of adult learners. He stated that as adults mature they become increasingly autonomous and self-directed; life and work experiences act as resources; learning focuses on developmental tasks for life roles; and performance concerns over subject concerns increase (Cyr, 1999). Seven generalizations (Kalama, 1997; Merriam & Caffarella, 1999; Merriam, Caffarella, & Baumgartner, 2006) describing adult learners included: 1) adults can learn throughout their lives; 2) adults address new developmental tasks or challenges and these transitions influence the approach taken toward an instructional program; 3) adults utilize the decision-making process to make informed choices to learn phenomena they deem important, such as a new skill or methods of utilizing new information; 4) adults are time conscious in their learning activities; 5) what adults consider important is variable (Welch & Daniels, 1997, in National Education Administration, n.d.); 6) adults want to be treated like grown-ups; and 7) biological and physical changes affect an individual's learning ability.

Adults bring life experiences and knowledge in diverse areas. Cross (1981), Evans and Miller (1997), Hiemstra and Sisco (1990), Kasworm (2001, 2003), and Knowles (1980), stated that there are unique characteristics adults bring to the educational setting. These common characteristics included: having accumulated life experiences, established opinions and beliefs, intrinsic motivation, and a lack of confidence; and being goal-oriented, autonomous, practical, and tired. Adults preferred practical learning opportunities that integrated lived experiences, and learners tended to relate new facts to past experiences quickly (Kasworm, 2001; Knowles, 1980; Merriam, et al., 2006). Adult learners created their views, opinions, values and beliefs over time and through lived experiences. Bash (1999) and Merriam and Caffarella (1999) noted that the instructor must respect these beliefs and values. A need, interest, and desire to learn motivated adult learners (Bash,

1999; Kalama, 1997; Taylor & House, 2010), and provision and presentation of relevant materials were critical to active engagement during courses (Song & Hill, 2007).

The level of prior education, as well as intellect, personality, and cognitive function dictated non-traditional students learning and comprehension rates (Taylor & House, 2010; Wynne, n.d.). Because of this difference in comprehension rates, teaching must anticipate and accommodate different needs (Hiemstra & Sisco, 1990; Merriam, et al., 2006). Collaborative and participatory learning environments worked best for adult learners because of active involvement in learning objectives and experiences (Merriam, et al., 2006). The characteristic that adult learners were mature and expected to be treated as such coincided with active, participatory engagement in the learning experience (Hiemstra & Sisco, 1990; Kalama, 1997; Okezie, 2003). Adults demanded to know the reason something was taught. They wanted concrete, immediate explanations of the relevancy of material to their learning objective or need and were impatient to receive it (Kalama, 1997; Ozekie, 2003; Welch & Daniels, 1997).

Non-traditional students were self-reliant, autonomous, self-directed learners who preferred to work at their own pace (Brockett & Hiemstra, 1991; Hiemstra & Sisco, 1990; Jacobson & Harris, 2008). As practical problem-solvers adult learners were more impatient than traditional college students in their pursuit of learning, and less tolerant of work lacking an immediate and direct application to their learning needs (Welch & Daniels, 1997). Because adult learners frequently juggled classes with other roles (family, work) (Deggs, 2011; Hiemstra & Sisco, 1990), they felt more exhaustion (Merrill, 2001) during class. Imel (1988) and Wlodkowski (2008) suggested adding liveliness to lessons could increase adult students' engagement.

Adult learners divided their time using logical considerations about family or caregiving, careers, social commitments, time, money, schedules, and transportation (Kasworm, 2001; Merriam, et al., 2006; Sharma, 2006). Non-traditional learners were concerned with being the oldest person in a class and the impact that might have on their ability to participate with younger students (Holyoke & Larson, 2009; Merrill, 2001). Finally, adults may have insufficient confidence in their abilities in an educational setting (Crossan, Field, Gallacher, & Merrill, 2003; Kidd & Kengwe, 2010). Past educational experiences were potentially negative and may lead to feelings of inadequacy or fears about studying and concerns of failure (Steltenpohl & Shipton, 1986; Wynne, n.d.). Adult students may also have a fear of technology (Gaspar, Langevin, Boyer, & Armitage, 2009), both using basic word processing tools as well as searching for information online and in electronic databases (Deggs, 2011).

Self-Directed Learning and Higher Education

Different phrases have been used to describe self-directed learning (SDL), including self-planned learning, self-teaching, autonomous learning, and independent study (Brockett & Hiemstra, 1991); lifelong learning, active learning, and student-centered education (Ainoda, Onishi, & Yasuda, 2005). Each of these terms generated pressure and influence on the concept of SDL and, by extension, contributed to the assorted definitions and use of SDL as a teaching method, an educational goal, and a personal management characteristic (Brockett & Hiemstra, 1991; Brookfield, 1986).

Knowles (1975) defined self-directed learning as a process applied to learning wherein individuals diagnose their needs, formulate goals, identify resources, choose and implement appropriate strategies, and evaluate outcomes. Hiemstra (1976), using the term self-planned learning, described self-directed learning as a learning activity with the

characteristics of being self-initiated and occurring in isolation. Kasworm (1983) defined self-directed learning in three ways: finite behaviors, a belief system evolving from a process, or an ideal state of self-actualization. Brockett (1983) said that self-directed learning meant the learner had primary responsibility for arranging, carrying out, and appraising the endeavor. Brookfield (1986) described two forms of SDL, first, self-education and second, transformation.

Overviews of SDL definitions were provided by prominent adult educators including Brockett and Hiemstra (1991), Brookfield (1993), Candy (1991), Hiemstra (2010), and Long (2010). Brockett and Hiemstra (1991) compared SDL in terms of an instructional method versus a personality characteristic using their Personal Responsibility Orientation (PRO) model. Candy (1991) discussed SDL's existence within four domains including personal autonomy, self-management, independent pursuit of learning, and learner-control. Brookfield (1993) attempted to pull the definitions together, showcasing a consistent element among the definitions – the importance of learner control over decisions in the educational environment, a claim later supported by O'Shea (2003). Hiemstra (2010) recognized Long's four-part concept of SDL, which included the sociological, practical, methodological, and psychological domains. Long's (2010) newest description of SDL included certain information literacy skills, as well as finding and using information resources.

Other authors wrote about the differences in self-direction. Knox (1977) wrote that part of self-directedness involved problem solving and decision-making about change, elements shared with information literacy. He asserted that an emotional component of self-direction helped interpret events. Hiemstra and Brockett (1994) acknowledged there was no single way to think about self-direction. Jarvis (2004) suggested self-directed learning

became an educational technique when used as a teaching method. Merriam, Caffarella, and Baumgartner (2006) discussed the goals of self-directed learning such as enhancing one's ability to be self-directed, fostering transformational learning, and promoting emancipatory learning.

Having discussed different interpretations of self-directedness with administrators, instructors, librarians, and students in higher education, the researcher found that they described all of the above definitions concerning self-direction. Self-direction, when examined in the context of higher education, seemed to be a characteristic expected of students, no matter their level of education or age. The researcher experienced and observed self-direction as self-management, independent initiative, and personal autonomy. Discussions with faculty in the three programs under study yielded support for these three elements of self-direction. Expectations for self-direction increased as the program advanced in educational level. In other words, a lower expectation of students being self-directed existed at the bachelor's level, but a higher expectation level of learner autonomy occurred at the doctoral level.

Despite faculty expectations of student self-direction, the demonstration of self-direction by students is restricted in higher education. The level and application of learners' self-directed behaviors depends on the program and the instructor. Administrators viewed self-direction as a characteristic developed through the educational experiences gained in college (personal communication, C. Norris, August 9, 2011; C. Hess, September 3, 2011; D. Graves, October 5, 2011; J. McCann, October 10, 2011; K. Carter, August 9, 2011), not necessarily a characteristic demonstrated in courses.

Information Literacy and Higher Education

The term information literacy (IL) first appeared in a 1974 report by Zurkowski (Bruce, 1997). According to Zurkowski (1974), IL focused on the use of tools and primary sources. He went beyond usage to include the alteration of a person's concept of reality as well as specific abilities to form questions, understand context, evaluate, and manage information (Cheek & Doskatsch, 1998; Zurkowski, 1974). Although use of the term and interest in IL increased dramatically in the 1980s, not until 1987 did the focus of IL shifted from the K-12 schools into higher education, and the National Forum on Information Literacy was convened (Breivik, 1993; Bruce, 1997).

The American Library Association in its 1989 *Presidential Committee on Information Literacy, Final Report*, developed the most prominent and frequently cited definition (Johnston & Webber, 2003) of the term as a person's ability to recognize a need for information, and to locate, evaluate, and utilize that material. Johnston and Webber (2003) noted a distinction in the ALA definition from former concepts of information searching or finding. The ALA definition focused on the personal skills of recognizing, evaluating, and using information. The Southeastern Association of Colleges and Schools included information literacy as one of its performance indicators in *Best Practices for Electronically Offered Degree and Certificate Programs* (Commission on Colleges, n.d.).

Although the American Library Association (ALA) *Final Report* received criticism because of its limited emphasis on libraries and library resources (Bruce, 1997), the fact that the Association of College & Research Libraries (ACRL) built on their original definition lent credence to its usefulness and influence. The Association of College and Research Libraries (ACRL) *Information Literacy Standards for Higher Education* (2000) document extended IL's reach beyond the historical conceptual influences on information literacy

including information technology literacy, computer literacy, library literacy, information skills, learning to learn, and lifelong learning (Bruce, 1997). Information literacy was the *foundation* for lifelong learning and crossed every discipline, learning environment, and educational level (ACRL, 2000). Further, information literacy enables individuals to become content experts who are self-directed, and able to learn independently.

Likewise, the Australian New Zealand Information Literacy (ANZIL) Framework defined an information literate person as having the ability to recognize and determine the nature and extent of an information need; find information effectively and efficiently; critically evaluate information and the process; manage information; apply information to create new concepts; and use information with understanding; and acknowledge the cultural, ethical, economic, legal and social issues (Bundy, 2004).

Although models of information literacy were developed for K-12 learners (Big6, Super 3), three bodies are primary champions of information literacy in the academic library environment. The ACRL created the *Information Literacy Standards for Higher Education* (2000) in the United States, the Council of Australian University Librarians (CAUL) developed their version of the *Information Literacy Standards* in 2001, and the Standing Conference on National and University Libraries (SCONUL) created the *Seven Pillars of Information Literacy* in 1999. According to Johnston and Webber (2003), the ACRL standards are the most prominent in the library world. However, in Australia, information literacy is approached from a holistic, multi-institution perspective, and in the UK, information literacy is addressed using a model for information literacy that focuses on personal characteristics.

Eisenberg and Berkowitz's (1990) Big6 Initiative, and Kuhlthau's Information Search Process (1983), although developed for K-12 students, have been used in higher

education as well (Bruce, 1997; Eisenberg, 2008; Kuhlthau, 1988; Kuhlthau, Turock, & George, 1990). Information literacy instruction in higher education focuses on developing student's research skills as well as helping them become lifelong learners. According to Jones (1992), a quality education offers opportunities to develop critical thinking and problem solving skills, a global and multi-cultural perspective, scientific literacy, and preparedness for work and good citizenship. Higher education institutions are responsible for this opportunity, and as Breivik (1992, 1998) suggested, a 21st century graduate is an information literate graduate. Universities and colleges have incorporated information literacy into the undergraduate experience by way of stand-alone courses or integrated into subject-specific courses, such as English, History, and Natural Science.

Hepworth (2000) provided a short historical representation of information literacy instruction in higher education. Over the last sixty years information literacy has moved from being known as bibliographic instruction, to user education, to information literacy. Two main approaches are evident in the present conceptualization of the term (Hepworth, 2000): discrete skills and attitudes that can be learned and measured, and individual experiences associated with how people make sense of their world. The institution in this study has shifted, at an institutional level, from having one-time bibliographic instruction sessions, to providing a credit-bearing stand-alone course, to complete integration of information literacy into subject-specific courses at all levels, and finally to online tutorials for course integration.

Assessment of information literacy skills in higher education began in the 1980s and has continued to grow as a result of different social pressures. Meulemans (2002) described three contributors to the early state of information literacy assessment: "the higher education assessment movement, the rise of strategic planning in higher education, and the

development of information literacy" (p. 61). These contributing forces shaped library instruction into information literacy. Increasing pressures from university administrators caused libraries to demonstrate their value and contribution to institutional level goals (Bouber, Poulin, & Vileno, 1995; Smith, 2000). These external pressures shifted the assessment methods used by academic librarians from perception-based surveys, to data-based accountability measures, to formalized assessment instruments built on standards and outcomes for information literacy (Avery, 2003; Meulemans, 2002).

Self-Directed Learning and Information Literacy Overlap

While there is documentation indicating a connection between self-directed learning and information literacy, this researcher found no empirical evidence to support this claim. A relationship between SDL and IL have been suggested by associations such as the Association of College and Research Libraries ([ACRL], 2000) and the International Federation of Library Associations (2011). Several examples of program evaluations and designs were also found in the literature. The Colorado State Department of Education (1997), with its focus on rubrics, was geared towards administrations or the educator perspective, not the learner. Bruce (1995) presented a theoretical framework of information literacy for higher education. Hainer (1998) compared the traditional approach to information literacy taken by Colorado schools with the current approach, outlining the development of the Colorado Model Information Literacy Guidelines. And Rollins, Hutchings, Goldsmith, and Fonseca (2009) chronicled the status of information literacy programs in Louisiana and the role of general education directors in program formation. These program-level studies allude to a relationship between self-directed learning and information literacy, without providing evidence to support the claim.

Articles were found that described the use of self-directed learning methods and information literacy instruction in curriculum development, alluding to the connection between the two concepts. Palmer (1996) discussed several developments and new opportunities for health librarians, including evidence-based information literacy. Utilizing drop-in clinics as the background, Jacklin and Bordonaro (2008) described an approach in information literacy instruction which offered medical students the opportunity to direct how they learned the course content. Considering the information literacy curriculum for medical students, O'Dwyer and Kerns (2011) described curricular modifications which included more focused and interactive clinical information sessions. And using internet usage logs, Judd and Kennedy (2011) investigated how undergraduate medical students used five popular sites to locate and access biomedical resources. These examples documented curriculum development rather than evaluating knowledge and behaviors. Additionally, they did not provide empirical evidence of a relationship between self-directed learning and information literacy.

Finally, Laverty (1997) presented a how-to guide for instruction librarians and their use of the Internet to answer references questions. Rager (2003) evaluated the quality of Internet resources and the use of the Internet for self-directed learning. And Silén and Uhlin (2008) provided an argument to instructors about the importance of SDL. Insinuation of the relationship between self-directed learning and information literacy existed in these resources, however, no empirical evidence of the link was found. Additionally, no articles were found that focused on the learner's perspective; rather the literature containing both SDL and IL were written for teachers or program directors. The current study is designed to address the learner's behaviors, knowledge, and perspective concerning the relationship between self-directed learning and information literacy.

Despite the concerns between implied connections as opposed to empirically-based connections of self-directed learning and information literacy, there is a shared perspective between the two concepts. They can both be described as a process of learning. Processes have discrete, measurable skills that can be learned (Hepworth, 2000; Knowles, 1975), and transformations occur due to individual experiences wherein people make sense of their world (Brookfield, 1984; Hepworth, 2000). Because the SDL and IL frameworks are examined in this study within the context of higher education, the process aspect of each concept was discussed. Figure 5 shows the systematic steps of self-directed learning and information literacy.

To be considered a self-directed learner or an information literate consumer requires knowing and completing the steps in the process (Breivik, 1993, 1998; Brockett & Hiemstra, 1991; Jones, 1992). As a process, each framework includes implied and explicit feedback loops utilizing evaluation, reflection, or critical thinking. As an overall goal, the frameworks for self-directed learning and information literacy include the development of individuals who are or can be self-directed, lifelong learners (Bruce, 1997; Knowles, 1975; Long, 1988).

Stages	Self Directed Learning	Information Literacy
Definition	Diagnose need / learning objectives	Define need
Location	Identify resources	Identify resources
Appraisal	Choose / implement / evaluate strategies	Evaluate information
Usage	Implement / complete project; Knowledge relative and contextual	Use the information to meet the need
Feedback Loop	Evaluate outcomes; Use new information to transform	Understand ethical and legal ramifications

Figure 5. Stages and steps in Self-Directed Learning and Information Literacy expressing the overlapping elements. SDL stages are based on Knowles' (1975) and Brookfield's (1984) work. IL stages are built on ACRL (2000) standards and Bruce's (2004) work.

Step 1 in each process is to define or diagnose a need, whether a learning or information need. Step 2 involves identification and location of resources or collection of evidence. Step 3 appraises the information resources, progress, or strategies. Step 4 is the usage step where an action is performed to address the need. Finally, step 5 engages a feedback loop and evaluation of the entire process or the outcome. This final step also involves integrating what has been learned into an individual's value system or knowledge bank; it is the most reflective part of the process, and leads to transformation of the learner's views or perspectives (Conner, 2011a).

While a suggested 1:1 relationship may be implied between the processes, there are slight discrepancies. Steps 1, 4 and 5 are slightly different from one another with steps 4 and 5 being the most distinct. For example, Knowles' (1975) version of the SDL process included the formulation of goals in Step 1. For the other processes, goals were implied within the creation of a question or description of the information need. Goals were part of the process of describing why information was needed or by designing a researchable question (ACRL, 2000; McKibbon, 1998). Knowles suggested that learners know and can articulate their learning goals at the outset of the SDL process; however, other authors (Cross, 1981; Kuhlthau, 1983, 2004) suggested that goal formation is a more organic process and learners rarely articulate goals at the beginning, rather they create and modify them as they go. Creation and modification of goals throughout the process suggests that evaluation is a constant cycle in the process itself.

Step 4 is identified as the *usage stage*. Knowles did not articulate a clear use for self-directed learning but SDL in his view is an active process, thus an individual is employing a process to learn something on one's own. Utilization of the information or learning materials gathered to satisfy the learning objective(s) is implied. Brookfield (1984,

1985) described knowledge as relative and contextual. Writing from a critical analysis perspective, Brookfield focused on individual transformation. His interpretation of use was to alter an individual internally, to raise their consciousness, and cause a shift in their thinking. IL has a proscribed use for the information gathered; to answer a question or carry out a decision. The act of using leads to the transformative aspect of the SDL framework—step 5.

Step 5 is considered a *feedback loop phase* and it seems to be the most divergent among the frameworks. Evaluation and reflection were implied in each process. Self-directed learning, according to Knowles (1975), required an evaluation of the outcomes. In other words, did the process help the learner achieve the established goals, or did the person learn something from the experience? Brookfield (1984) looked for the use of information to transform psychological worldviews and individual perceptions; however, according to Tennant and Pogson (1995), Brookfield did not translate this into action. For Brookfield it seems that the internal transformation during self-directed learning is sufficient if the individual becomes more perceptive, autonomous, and freethinking. Information literacy's fifth step requires that the learner understands the ethical, legal, and social elements involved in information use. The ACRL (2000) Standards mention performance indicators that focus on copyright, intellectual property, citation styles, and policies. Despite the lack of clearly stated transformation goals, application of the IL steps provides the knowledge for such transformation to occur, especially when compared to Knowles' specifications and according to authors such as Albitz (2007), Hepworth (2000), and Pinto, Cordón, and Díaz (2010). The parallel sequence of steps articulated in both self-directed learning and information literacy could lead to a parallel measurement of the effect of one to the other concept, either SDL – IL or IL – SDL. Below specific instruments that measure both

concepts are discussed in detail with a rationale for the use of the selected instruments for this study.

Self-Directed Learning and Information Literacy Instruments

Three instruments measuring self-directed learning are described in detail below because of their widespread acceptance, discussion, and use. These three instruments were chosen as key illustrations of measurement tools and their impact on the fields of adult education and information science as well as their widespread acceptance by researchers and practitioners.

The study and measurement of self-directed learning was a predominant feature of adult education literature in the 1980s (Conner, Carter, Dieffenderfer, & Brockett, 2009; Donaghy, Robinson, Wallace, Walker, & Brockett, 2002). The dominant instrument measuring self-directed learning, Guglielmino's (1977) Self-Directed Learning Readiness Scale (SDLRS), focuses on readiness. Oddi's Continuing Learning Inventory ([OCLI], 1984) is an instrument that has been used frequently to measure self-directed learning as part of continuing engagement in learning. In 2003, Stockdale developed the Personal Responsibility Orientation of Self-Direction in Learning Scale (PRO-SDLS) to operationalize Brockett and Hiemstra's (1991) Personal Responsibility Orientation (PRO) model.

Beginning in the late 1980s and moving into the early 2000s, the *ALA Presidential Committee on Information Literacy Report* (1989), *ACRL Standards* (2000), *Objectives for Information Literacy* (2001), and *ACRL Best Practices Initiative* (2001), provided formal standards for information literacy that allowed assessment instruments to become more streamlined. With the inclusion of information literacy as an accreditation requirement beginning in 1994 (Middle States Association of Schools and Colleges); academic libraries

became an integral part of the university and information literacy assessment shifted from informal perception-based tools to formal, standardized instruments. There are three dominant IL instruments currently in use, James Madison University's *Information Literacy Test* (ILT), Kent State University's *Standardized Assessment of Information Literacy Skills* (SAILS), and the Educational Testing Service's *iSkills* test. Each of these instruments will be discussed in more detail below.

Self-Directed Learning

Three self-directed learning instruments were chosen to discuss in this study due to their popularity, literature discussions of the pros and cons of each instrument, and operationalization of the Personal Responsibility Orientation model by Brockett and Hiemstra (1991); one conceptual model used in this study. Disagreements exist in the literature on the validity and reliability of the *Self-Directed Learning Readiness Scale* (SDLRS) developed by Guglielmino in 1977 (Brockett & Hiemstra, 1991; Field, 1989; Long, 1988). The *Oddi Continuing Learning Instrument* (1984) was discussed in the research literature and often compared to the SDLRS. The *Personal Responsibility Orientation to Self-Direction in Learning Scale* (PRO-SDLS) is a relatively new instrument developed by Stockdale in 2003. The PRO-SDLS is unique in that it is designed for college students enrolled in a formal educational setting, and focuses on behaviors and personal characteristics rather than readiness. Discussion of the three instruments is arranged in chronological order below.

SDLRS. The *Self-Directed Learning Readiness Scale*, a 58-item five-point Likert scale, was developed in 1977 by Guglielmino, and has dominated the research literature on self-directed learning for 35 years (Guglielmino & Associates, 2011; Long, 1988). The SDLRS measures individual perception about one's own self-directed learning skills and

attitudes that are associated with self-direction in learning (Brockett & Hiemstra, 1991). Used by over 500 companies globally and in more than 100 dissertations (Guglielmino & Associates, 2011), the SDLRS has been translated into 22 languages and is considered the most widely used instrument measuring self-directed readiness. Example topics of correlation studies utilizing the SDLRS include life satisfaction (Brockett, 1982), creativity (Cox, 2002), and resilience (Robinson, 2003). In 1989, Field criticized the SDLRS and set off a string of responses by noted scholars who defended the instrument's validity and reliability in an ongoing series of studies and articles (Guglielmino, 1989; Long, 1989; McCune, 1989). Responses by Guglielmino, Long, and McCune provided evidence to refute Field's criticisms. Brockett and Hiemstra (1991) stated that the SDLRS has value if it is used with the recognition of potential limits. Although the SDLRS is the most popular instrument available, it investigated readiness and was not considered a good fit for this study.

OCLI. Developed in 1984, the *Oddi Continuing Learning Inventory* is a 25-item seven-point Likert scale. The OCLI measures the learner's personality characteristics of initiative and persistence in learning endeavors over time (Oddi, 1984). Three clusters characterized the personality dimensions of self-directed learners, *Proactive Drive versus Reactive Drive; Cognitive Openness versus Defensiveness*; and *Commitment to Learning versus Apathy or Aversion to Learning* (Brockett & Hiemstra, 1991). Blackwood (1988) conducted a study using the OCLI to investigate hemisphericity over the adult life span. Six's (1989) critique of the OCLI questioned the validity of the instrument. This instrument investigates personality characteristics of learners but does not look at the teacher-learner exchange and thus was not considered a good fit for this study.

PRO-SDLS. Stockdale (2003) developed the *Personal Responsibility Orientation to Self-Direction in Learning Scale* using a Delphi technique. The PRO-SDLS's purpose is to operationalize the PRO model, developed by Brockett and Hiemstra in 1991. The 25-item self-rating scale measures the teaching-learning transaction and learner characteristics based on four factors of initiative, self-efficacy, control, and motivation. The PRO-SDLS has been used in studies by Boyer, Langevin, & Gaspar (2008), Fogerson (2005), Gaspar, Langevin, Boyer, & Armitage (2009), Hall (2011), and Holt (2011), predominantly with students in online courses or related to technology. The PRO-SDLS was chosen because it is designed for use in higher education and measures both the teaching-learning interaction and learners' personality characteristics. This scale will be discussed in greater detail in Chapter III.

Information Literacy

There are three commercial instruments currently available that test information literacy skills at the college level. The three tests are *Information Literacy Test* (ILT), created by James Madison University, *iSkills*, advanced by the Education Testing Service, and *SAILS*, developed by Kent State University. Organized chronologically and to provide a sense of the tests in this arena, each assessment tool is described below with details of what it measures. The ILT was chosen because it is a standard test in higher education, the raw data are downloadable, the test is delivered over the web, and the test is reasonably priced for this research.

iSkills. Developed in 2001, *iSkills* measures applied information – computer technology skills using real-world tasks (Educational Testing Service, 2011). Using simulation-based tasks, *iSkills* measures performance on seven tasks that students perform with information, including define, access, evaluate, manage, integrate, create, and communicate. At the university where this study was conducted, the Director of the Quality

Enhancement Plan stated that the university does not use *iSkills* because it focuses on the workplace and is not as appropriate for college students as other tests available (personal communication, P. Smith, November 3, 2011).

ILT. The *Information Literacy Test* (ILT) consists of 60 randomly selected, multiple-choice questions that assess the *Information Literacy Standards for Higher Education*, as detailed by the Association of College and Research Libraries ([ACRL], 2000). The ILT specifically measures student skills based on the ACRL Standards 1, 2, 3, and 5. Standard 4 is not conducive to evaluation using a multiple-choice test, and thus is not covered by the ILT. With a total reliability of 0.88, the ILT will provide student performance rates on research strategy development, search and retrieval knowledge, evaluation, and understanding economic, legal, and social issues of information. The ILT was chosen because of the availability of raw data and is discussed in detail in Chapter III.

SAILS. The *Standardized Assessment of Information Literacy Skills* was developed in 2004 and offers two equivalent versions of the test which measures individual and cohort scores. The 55-item, multiple-choice questionnaire tests information literacy knowledge in different components of IL, including research strategy development, searching, information retrieval, information evaluation, documentation, tool selection and use, the role of academic libraries, and intellectual property issues (Project SAILS, 2000-2011). SAILS is the foremost IL test, however raw data are not available to researchers. Rather, the data are aggregated and a summary is provided to institutions.

Synopsis of Instruments

In conclusion, instruments for self-directed learning focus on readiness and attitudes rather than behaviors. The PRO-SDLS, however, is designed for college students enrolled in a formal educational setting, and focuses on behaviors and personal characteristics. The

scope of this study did not include readiness, but concentrated solely on the degree to which adult learners engage in self-directed learning in a formal educational setting. The number of commercially available information literacy tests is relatively small. Each has been built on the others, but over time modifications have yielded versions for particular groups or in specific settings. The PRO-SDLS investigates the self-directed preferences of learners in the setting being studied, and the ILT measures information literacy skills for all levels of college students. The comparison of preferences to skills is applicable to the purpose of this study because of popular claims that an information literate person is (or becomes) a self-directed lifelong learners (ACRL, 2000; ALA, 1989).

Chapter Summary

The literature review provided supporting evidence of how higher education addressed the SDL and IL frameworks. Few research articles discussed the overlap between self-directed learning and information literacy, but those that did exist were written from the teacher rather than the learner perspective. The reviewed literature further supported the need for this research study and its value to the body of knowledge in both fields because it placed the learner at the center of the process. Investigating where the learner exists in both self-directed learning and information literacy, and combining these two fields, allows researchers and practitioners to design better intervention programs and ensure that their students become self-directed, lifelong learners who can utilize the information they find effectively and efficiently. Studying the relationship of self-directed learning and information literacy compliments the following developments: accrediting bodies (Middle States Commission on Higher Education, Western Association of Schools and Colleges, and Southern Association of Colleges and Schools) designating information literacy as a key outcome of the college experience; library and information science associations (Association

of College & Research Libraries, American Library Association) identifying self-directed and lifelong learning as an outgrowth of information literacy; and colleges and universities expressing the goal of providing graduates with the necessary skills for the 21st century workplace (Durr, Guglielmino, & Guglielmino, 1996; Guglielmino & Murdick, 1997; International Federation of Library Associations, 2011; Oman, 2001; Williams, 1995).

Chapter III provides a description of the method, the population and the setting for this study. Each research question is described along with the analyses used to investigate the questions. Also, readers will find descriptions of the two study instruments, the data collection procedure, and the process of data analysis.

Chapter III

Method

The following chapter outlines the method for this study. This chapter includes information on the population and sample, programs in the study, research questions, instrumentation, procedure, data analysis, and general conclusion outlining the structure for the remaining chapters. Participant demographics, factors of the two instruments, and descriptive statistics and correlations that describe the relationships between self-directed learning and information literacy are discussed.

Population and Sample

The participants were non-traditional, adult college students, aged 25 and over, currently enrolled in a business bachelor's, a master's program, or an education doctoral program. Using convenience sampling, this correlational study took place at a single, private university located in the Appalachian region of the United States. Because respondents provided their age, participants under age 25 were removed from the data to maintain compliance with a commonly agreed upon definition of adult students (Cordes, 2009; National Center for Education Statistics [NCES], 2011).

Given the overall student enrollment of each program, the available population for this study consisted of approximately 303 individuals (N = 61 doctoral program, N = 194 master's, N = 48 bachelor's program); however, 101 of those were withdrawn from the population count because they were online-only or ABD status and thus did not come to campus. The ILT required proctors for the test and could not be sent out via email, the online-only and ABD students it was necessary to conduct the study with on-campus

students only. The remaining accessible population across all three programs was 202. To achieve 95% confidence level, 133 completed surveys were necessary. The final count of completed surveys was 138, yielding a 4.71% margin of error, and a return rate of 68.3%.

The demographic breakdown of the three programs is illustrated in Table 1. Due to the small number of Asian, Hispanic and Native American participants, these three categories were grouped together. Caucasian students, 195 total, (71% bachelors, 65% masters, 57% doctorate) dominated enrollment in all three programs. The next largest demographic group was African American, 54 total, (23% bachelors, 13% masters, 30% doctorate), followed by Asian/Hispanic/Native American, 43 total, (2% bachelors, 3% masters, 7% doctorate). Eleven percent of the students enrolled in all three programs were unclassified. Non-US residents comprised nearly 4 percent of the total sample.

Table 1

Demographics of Students Enrolled in Three Participating Programs

Program	Bachelors	Masters	Doctoral
Ethnicity			
Caucasian	34 (71%)	126 (65%)	35 (57%)
African American	11 (23%)	25 (13%)	18 (30%)
Asian/ Hispanic/ Native Amer	3 (2%)	32 (3%)	8 (7%)
Gender			
Male	30.7%	51.8%	29.4%
Female	69.3%	48.1%	70.5%
Age			
Mean	32.8	32.9	41.0
Median	30.5	30	40
Range	21-59	22-62	26-64

Note: Ethnicity numbers and percentages represent students who self-identified their ethnicity/ race to the University. These numbers do not include unclassified or non-US residents.

Programs in this Study

Investigation of the relationship between self-directed learning and information literacy focused on three programs within a single institution, doctoral, masters, and bachelors level programs, all with an emphasis in leadership. The programs are designed for

working adults and concentrate on career improvement. Each program is made up of non-traditional adult learners ranging in age from 21 – 66. Two of the three programs are organized in cohorts, allowing students to develop cohesive teams and experiences as they collectively progress through their respective program. The master's program has specific requirements and offers class delivery in both a classroom and asynchronous online format. Each of the programs is offered at multiple sites and caters to adult learners by offering classes online, on evenings and weekends, and once per week or month.

Doctoral Program

The education doctoral program is divided into three focus areas, curriculum and instruction, leadership and administration, and executive leadership. Curriculum and instruction is designed for teachers and instructional leaders. Students study topics related to instructional strategies, learning styles, human cognition, and diversity, with a focus on application of research to the field. PreK-12 school leadership is addressed in the concentration in leadership and administration. This program focuses on finance and predictive leadership to address issues that face the educational system. Executive leadership is designed for professionals wishing to secure positions at the executive level in a variety of fields. In this program, students are guided through four dimensions of leadership: the individual, interpersonal, institutional, and investigative. Each concentration focuses on applications of research to a given field and students address their personal leadership and learning styles using various personality and learning styles instruments as well as reflective assignments.

Masters Program

The master's program in business administration is a graduate level curriculum with concentrations in finance, marketing, general business, management, and human resources

management. The part-time program, offered at three campuses, is designed to meet the needs of working adults. Courses are offered both face-to-face and online, in the evening, and meet one night per week. The program objective is to develop critical thinking skills and allow students to apply business principles to the global business environment. Faculty members in the program possess backgrounds in large, multinational firms in addition to their academic expertise. Small class sizes and the use of case studies, group work, presentations, and special projects enable adult students to engage in discussions and real-world projects to apply critical thinking and business knowledge.

Bachelors Program

The degree-completion, bachelors program in business is an undergraduate level curriculum designed for non-traditional, working adults who have already received at least 60 hours of college level credits but did not complete a bachelor's degree. The program requires students to attend two courses every eight weeks, allowing them to focus their studies for truncated periods. The delivery method, beginning spring 2012, is 52% face-to-face, 24% blended, and 24% online only. The curriculum emphasizes the integration of career and workplace experiences within courses allowing students to create a program relevant to their workplace. Students develop an individualized course of study based on the credits they have already earned versus the courses they need to complete the program. According to the program director, along with individualized study plans, students receive career counseling beyond their degree and 18% of the students have continued their education at the graduate level upon completion of the program.

Research Questions

The study investigated three research questions to determine the relationship between variables. The questions were:

1. Is there a significant relationship between self-directed learning preferences and information literacy skills as determined by the two instruments (PRO-SDLS and ILT) used in this sample of adult learners in higher education?
2. Are there significant differences between self-directed learning preferences, information literacy skills and selected demographic variables (Age, College GPA, Educational Attainment, and Ethnicity) in this sample of adult learners in higher education?
3. Are there significant relationships between the factors that comprise self-directed learning (Initiative, Control, Self-efficacy, Motivation) and the sub-scales defining information literacy (ACRL Standards 1, 2, 3, and 5) in this sample of adult learners in higher education?

Instrumentation

This study utilized two instruments, the Personal Responsibility Orientation in Self-Directed Learning Scale (PRO-SDLS, Appendix H), and Information Literacy Test (ILT), plus a demographic survey designed by the researcher. Demographic variables were chosen based on significant findings of the PRO-SDLS and ILT by Fogerson (2005), Hall (2011), and Wise, Cameron, Yang, and Davis (2009). The demographic variables that participants indicated included their age, college GPA, educational degree attainment, and ethnicity. The PRO-SDLS was chosen because it operationalized personal responsibility in self-directedness and was designed specifically for college students. The ILT is a standardized test used for assessing information literacy competency and designed using the ACRL (2000) standards for information literacy in higher education.

PRO-SDLS

The Personal Responsibility Orientation in Self-Directed Learning Scale (PRO-SDLS) is a 25-item, self-rating scale designed for college students. "The PRO-SDLS evaluates the two main factors of self-direction in learning identified by Brockett and Hiemstra (1991): the characteristics of the teacher-learner transaction (TL) and the characteristics of the learner (LC)" (Fogerson, 2005, p. 53). Developing the instrument over three studies, the first two being pilot studies and the third being a measure of overall findings, Stockdale (2003), identified six objectives that guided her study, resulting in an overall coefficient alpha of 0.92, indicating, "that self-direction as measured here can be regarded as a unitary construct" (Stockdale, 2003, p. 141).

Content validity was established by a panel of experts, with 31 of the 35 original items showing strong agreement on the appropriateness of each item related to the TL component or LC component of the PRO-SDLS (Fogerson, 2005; Stockdale & Brockett, 2011). Significant relationships ($\rho < 0.01$) on the PRO-SDLS with age, GPA, course performance, and previously completed semester hours; and a moderately significant relationship ($r = .203$, $\rho < 0.05$) between web access and PRO-SDLS scores for traditional-aged (17-21) students, resulted in Stockdale (2003) asserting "construct validity coefficients established significant relationships between PRO-SDLS scores and related behavioral criteria for self-direction" (p. 126). Fogerson (2005) remarked the PRO-SDLS would demonstrate significant, unique variance to the prediction of self-direction beyond the SDLRS scores.

Congruent validation between the PRO-SDLS and the SDLRS was not met, according to Stockdale, because the Pearson's product moment correlation coefficient was $r < 0.70$. Likewise, convergent validity was not established, as there was no significant

relationship between a professor's ratings of students' self-directedness and outcomes on the PRO-SDLS or SDLRS. Based on Stockdale's (2003) study results, she determined that there was "a link between self-direction, as measured by the PRO-SDLS and successful college outcomes" (p. 143). Stockdale (2003) recommended that the PRO-SDLS be administered to students in different settings or disciplines because the "responses employed to establish reliability were drawn from an extremely homogeneous sample" (p. 151).

Stockdale and Brockett (2011) discussed further validity and reliability testing for the PRO-SDLS. Following the development of the 35-item Personal Responsibility Orientation Self-Directed Learning Scale – Initial (PRO-SDLS-i), a research group familiar with the PRO model examined the items to determine which items were "clearly identifiable as representative of one of the hypothesized four factors" (Stockdale & Brockett, 2011, p. 168). One hundred ninety (190) undergraduate and graduate students completed the PRO-SDLS-i (35-item) with a resulting coefficient alpha of 0.92. The TL items had a coefficient alpha of 0.86, while the LC questions yielded a coefficient alpha of 0.88. The 25-item, PRO-SDLS, had a "coefficient alpha of 0.91. Internal consistency values … for the [four factors] were: initiative (0.81), control (0.78), motivation (0.82), and self-efficacy (0.78)" (Stockdale & Brockett, 2011, p. 170). A confirmatory factor analysis was performed on the final PRO-SDLS, consisting of 25 items. Students were asked to complete the established SDLRS (Guglielmino, 1977) and the 25-item PRO-SDLS. Reliability was established by comparing scores on the SDLRS and the 25-item PRO-SDLS and using a selected sample of students their professor rated on independent levels of self-direction in learning.

Three dissertations by Fogerson (2005), Hall (2011), and Holt (2011) have utilized the PRO-SDLS to date. Fogerson and Holt's studies focused on online learning environments and Hall's study considered first-generation college students. Other studies

that have utilized the PRO-SDLS include Boyer, Langevin, and Gaspar (2008) and Gaspar, Langevin, Boyer, and Armitage (2009). Boyer, et al. (2008) developed teaching methods for computer programming instruction and investigated the relationship among self-direction, constructivist apprenticeship and programming skills (n = 15). Gaspar, et al. (2009) continued the research by Boyer, et al. (2008) surveying 114 programming students and investigating self-direction in programming instruction.

ILT

The Information Literacy Test (ILT) is a 60-item, multiple-choice test available online that evaluates knowledge across four of the five standards of information literacy, as defined by the Association of College & Research Libraries ([ACRL], 2000). These standards state that an information literate individual can 1) determine the nature and extent of the information needed; 2) access needed information effectively and efficiently; 3) evaluate information and its sources critically and incorporate selected information into his or her knowledge base and value system; 4) use information effectively to accomplish a specific purpose; and 5) understand many of the economic, legal, and social issues surrounding the use of information and access and use information ethically and legally. The ILT tests students on ACRL standards 1, 2, 3, and 5 (Wise, et al., 2009).

The primary focus during ILT test development was on college students, whether graduate or undergraduate, enrolled at either a four-year university or community college (Cameron, Wise, & Lottridge, 2007). Reliability for the total ILT test was calculated based on three separate evaluations of the test (Table 2). The developers suggested using only the total test scores for evaluation of information literacy skills because of lower reliability scores on the separate standards (Wise, et al., 2009). There were three iterations of testing during development of the instrument. In 2004, 524 sophomores were tested yielding a total ILT

Table 2

Means, Standard Deviations, Cronbach's α for the ILT across Three Studies

Scale	# Items	*M*	*SD*	*α*
Total Test	60	41.61[a] 36.12[b] 35.77[c]	8.45[a] 7.71[b] 7.92[c]	.88[a] .84[b] .84[c]
Standard 1: defines and articulates the nature and extent of information needed.	12	9.70[a] 8.47[b] 8.47[c]	2.03[a] 2.00[b] 2.54[c]	.65[a] .54[b] .53[c]
Standard 2: accesses needed information effectively and efficiently.	19	11.16[a] 8.67[b] 12.14[c]	2.91[a] 2.53[b] 3.14[c]	.64[a] .54[b] .70[c]
Standard 3: evaluates information and its sources critically and incorporates selected information into his or her knowledge base and value system.	19	13.52[a] 12.15[b] 12.14[c]	3.31[a] 3.04[b] 3.14[c]	.76[a] .69[b] .70[c]
Standard 5: understands many of the ethical, legal, and socio-economic issues surrounding information and information technology.	10	7.18[a] 6.44[b] 6.45[c]	1.84[a] 1.90[b] 1.89[c]	.48[a] .53[b] .50[c]

Note: [a] *N*= 524, [b] *N*=683, [c] *N*=839

coefficient alpha of 0.88, giving it a high reliability mark. In 2008, 683 freshmen from four four-year universities, and in 2009, 839 freshmen at five two-year colleges, were assessed, with a reliability of 0.84 for both groups. The total test reliability measures (0.88, 0.84, 0.84) on the three samples indicate high score reliability (DeVellis, 1991, 2003, 2011; Gall, Gall, and Borg, 2003; Wells & Wollack, 2003). According to Wise, et al. (2009), the moderate reliability marks on the subscales is indicative of the low number of questions per subscale.

Validity, or the degree to which inferences can be made from scores, was gained in two ways: "expert ratings of the items (content validity) and … the degree to which ILT scores statistically behave as we would expect a measure of information literacy to behave (construct validity)" (Wise, et al., 2009, p. 8). Content validity was obtained utilizing three reference librarians who studied the individual ILT items with the standard the items were supposed to measure. The three expert ratings were that 70% matched their intended

standard, with two raters expressing 93% agreement. Seventy percent of the items received rater agreement, while two raters agreed upon 98% of the items. According to Cameron, et al. (2007), this level of agreement indicated that the ILT items show content validity by aligning with the ACRL standards they were meant to measure. Construct validity for the ILT was obtained using four studies, three taking place in 2004, and one in 2008 – 2009. The results are detailed in Table 3 below.

Table 3

Construct Validity of Information Literacy Test

	Comparison	*n*	r_{or} *t*	ρ	*Effect*
Test 1 (2004)	ISST[a]	296	$r(295) = .45$	$\rho < .001$	$r^2 = 0.203$
Test 2 (2004)	GPA	121	$t(119) = .20$	$\rho = .041$	$d = 0.39$[d]
Test 3 (2004)	Students[b]	944	$t(944) = 8.43$	$\rho < .001$	$d = 0.53$[d]
Test 4 (2008)	Freshmen[c]	1105	$t(1103) = 2.11$	$\rho = .0035$	$d = .013$[d]

Note: construct validity data from four testing iterations of the Information Literacy Test by Wise, et al.
[a] Information Seeking Skills Test, [b] psychology students, [c] incoming freshmen at four, 4-year compared to James Madison University students, [d] the strength of the relationship between two variables.

"The first study used the data from the initial administration of the ILT to university sophomores in spring 2004" (Wise et al., 2009, p. 8) and compared it to scores from the Information Seeking Skills Test (ISST), obtained by Miller in 2004. A positive, statistically significant correlation was found between scores on the two tests. Results of the second study, given to 121 freshmen and sophomores, "showed that the sophomores scored significantly higher on the ILT than the freshmen … and ILT scores were significantly correlated with cumulative GPA…" (Wise et al., 2009, p. 8). The third study showed significant differences between ILT scores of incoming freshmen and mid-year sophomores. "Sophomores, unlike freshmen, had been exposed to instructional modules in information literacy and had demonstrated competency on the ISST. The $d = 0.53$ indicated an effect size of more than one half standard deviation" (Wise, et al., 2009, p. 9). The follow-up

study, 2008-2009, results showed only a small effect size, despite observed statistical significance. This result suggested "entering first-year students from different institutions were not dramatically different from JMU entering students" (Wise, et al., 2009, p. 9).

Procedure

The researcher secured permission to use both the PRO-SDLS and the ILT test (Appendix B, C). The ILT test requires a secure testing environment with a proctor present. In addition, cell phones and PDAs are prohibited; also picture IDs must be checked at the testing site by the proctor (Wise, et al., 2009). Testing took place in one sitting to accommodate the regulatory constraints for the ILT test. The researcher, acting as the proctor, scheduled designated sessions to address the participants, explain the study, and inform them that participation was voluntary.

Participants were directed to a URL to locate the informed consent forms (Appendix D), study information sheet (Appendix E), and the demographic survey (Appendix F). Participants entered a randomized identification (ID) number on the demographic survey, release form, and each instrument. To ensure confidentiality the researcher generated randomized numbers to identify the program in which the individual was enrolled and to match instruments without collecting personal or identifiable information. Only the researcher had access to the instruments, forms, and the raw data from each instrument. Upon completion of the demographic form, participants linked to the PRO-SDLS, and then to the ILT. Study data and consent forms will be kept on a secure server on the principal investigator's computer. The data will be removed after three years.

Participants were provided their scores for the PRO-SDLS and ILT as part of their participation in the research. Due to constraints from the university where the study took place, no compensation was offered. Participants benefit by learning about their own level

of self-direction in college courses and will be able to utilize this information in their educational pursuits.

Data Collection Procedure

Providing all students an equal opportunity to participate in this study was necessary. Some students attended classes online only or had completed campus-based coursework. To avoid possible identification of these students they were extracted from the population counts. The resulting population was 202 students, yielding a target sample size of 133 to achieve a confidence level of 95% with a 5% margin of error. The researcher arranged contact times with directors of the three programs under study. The directors contacted their faculty and each faculty member willing to allow access to their students contacted the researcher. A date and time were agreed upon and the researcher travelled to the appropriate campus to collect data from volunteer participants. The education department leadership restricted access to the students during class time, therefore participants contributed before and after classes in the computer lab at their respective campus. The business department leadership, overseeing both the masters and bachelor's programs, offered class time to assess their students.

All instruments were completed online. Prior to beginning the assessments, the researcher set up a generic username and password combination with the home page of each browser set to the first page of the study. After logging on to the computer using a random username and password, participants completed the demographic survey, the PRO-SDLS (Appendix G), and the ILT.

The demographic survey and PRO-SDLS were made available using SPSS and results were directly collected in that software. The ILT data were made available in comma-separated values (.csv) format downloaded by the researcher, with a login and

password. Once the data were downloaded and verified for completion, they were loaded into SPSS and analyzed along with the PRO-SDLS data.

Data Analysis Procedure

The data analysis process included the use of descriptive statistics, demographics, frequency distributions, total test scores, and individual subscale scores. Reliability was established for the two instruments and lends evidence to the body of knowledge as recommended by Cameron, et al. (2007), Fogerson (2005), Hall (2011), Stockdale (2003), Stockdale and Brockett (2011), and Wise et al., (2009). *T*-tests, Pearson's product moment correlation coefficient values, Analysis of Variance (ANOVA) and multiple regressions were calculated for appropriate variables. Testing results indicated statistically significant correlations between self-directed learning preferences and information literacy skills. The results of the data analysis are presented in Chapter IV. Recommendations for direct application of these skill sets and activities for building student's skills in these areas will be discussed in Chapter V.

According to Gay, Mills, and Airasian (2006), "correlational research involves collecting data to determine whether, and to what degree, a relationship exists between two or more quantifiable variables" (p. 191). A correlation coefficient (-1.00 to +1.00) indicates both the size and degree of the relationship between the variables investigated. Reliability scores were calculated to determine the usefulness of the selected variables and variance tests determine if any variables were systematic in their variability. Statistical significance at the 95% confidence level was desired. To arrive at the 95% confidence level with a 5% margin of error 133 completed surveys were required (Raosoft®, 2004). The total number of completed surveys was 138, 137 of which were valid and included in the final numbers of analysis.

The PRO-SDLS and the ILT utilize a total score and scores on four factors and four subscales, respectively. The PRO-SDLS's initiative and control, representing the teaching-learning transaction, and self-efficacy and motivation, representing learner characteristics were analyzed with the ILT's subscales of Standards 1, 2, 3, and 5 of the ACRL Information Literacy Standards for Higher Education (2000). Regressions were run to analyze the relationship between the four subscales on the ILT and total scores on the PRO-SDLS.

Research Question Analysis

The three research questions examined in this study were analyzed using appropriate statistical tests as detailed below.

Research question 1. Research question 1 addressed the relationship between self-directed learning and information literacy for the sample of adult learners participating in this study. Data for research question 1 were analyzed using Pearson's product moment correlation and two ANOVAs (Analysis of Variance). Three groups were studied: participants in the bachelor's, master's, and doctoral programs. Pearson's correlation was run for the total scores on both instruments, the PRO-SDLS and the ILT. The data were then analyzed using one-way ANOVAs, first with the three groups and the PRO-SDLS scores, and second with the three groups and the ILT scores. According to Keppel and Zedeck (1989), corrections such as Bonferonni adjustment are unnecessary if there are less than five tests run.

Research question 2. Research question 2 investigated the differences between self-directed learning, information literacy, and selected demographic variables (age, college GPA, educational attainment, and ethnicity) in the sample. These three demographic variables were chosen based on results from previous studies by Guglielmino (1977), Fogerson (2005), and Stockdale (2003). Gender was specifically left out because no studies

were identified that indicated a relationship existed between self-directed learning and gender. To analyze the second research question, a linear regression and an ANOVA were run. The demographic variables for the regression were age + college GPA + educational attainment. To run the ANOVA, ethnicity was represented by three categories (Caucasian, African American, Asian/ Hispanic/ Native American). Two ANOVAs were used with the three participant groups and each instrument used in the study.

Research question 3. Research question 3 addressed the factors and sub-scales of both instruments used. The four factors of the PRO-SDLS are initiative and control representing the teacher-learner transaction, and self-efficacy and motivation, comprising the characteristics of the learner (Stockdale & Brockett, 2011). The ILT uses four of the five ACRL standards for information literacy for higher education students (Cameron, Wise & Lottridge, 2007; Wise, Cameron, Yang, & Davis, 2009). These standards are: 1) determine the nature and extent of the information needed; 2) access needed information effectively and efficiently; 3) evaluate information and its sources critically and incorporate selected information into his or her knowledge base and value system; 4) use information effectively to accomplish a specific purpose; and 5) understand many of the economic, legal, and social issues surrounding the use of information and access and use information ethically and legally.

Multiple regressions were run to determine the relationship between the four subscales of the Information Literacy Test (ILT) and the PRO-SDLS. The literature, research as well as non-research (i.e., websites and marketing literature), expressed a link between information literacy skills attainment and a preference for self-directed learning. For example, the ACRL (2000) stated that information literate individuals possess the skills to become self-directed, lifelong learners. Likewise, Bruce (2004), Hancock (1993), and

Schloman (2001) discussed assurances made by colleges and universities that they provided their graduates with the necessary skills for the 21st century by teaching self-directed learning and information literacy skills. Long and Guglielmino (2004) and Lunyk-Child, et al. (2001) referred to college and university mission statements that focused on graduating self-directed learners who are prepared for the 21st century workplace. Additionally, Thompson (2002) discussed three accrediting bodies focused on information literacy as a key outcome for college students. Statements linking the two concepts led the researcher to investigate the relationship between sub-scales on each instrument used. The goal was to determine which factors showed moderate to high correlations, thus leading to potential conclusions and suggestions for further research and lesson planning.

Conclusion

This study was designed to provide insight into the levels of self-directed preferences and information literacy skills and knowledge of three non-traditional, adult college student samples. The research was conducted using two instruments, the PRO-SDLS and the ILT, plus a demographic questionnaire. Participants were gathered from three programs in the university. All participants were currently enrolled in the degree-completion bachelor's program, master's program, or doctoral program. Data were collected using a short demographic survey to provide characteristics of the participants, the PRO-SDLS to measure self-directed learning behaviors in a college setting, and ILT to evaluate information literacy skills. Data were analyzed using Pearson's product moment correlation, ANOVA, and linear regression models.

Chapter IV will address the data collected and results of the statistical analysis. The discussion of the data includes information on the three groups and addresses the research questions investigated by the researcher.

Chapter IV

Results

Chapter IV explains the results of data analysis for each research question. The chapter begins with a description of the participants, including ethnic categories, age, college GPA, and educational attainment. Scores and comparisons are presented as both total scores and total participants (n = 137), and are further separated by the program in which participants were enrolled (bachelors, masters, doctoral).

Participant Demographics

Of the available population (N = 202), 138 people from three programs (bachelors, masters and doctoral) participated in the study. Only 137 participants fully completed the two instruments (Table 4), yielding a 68% return rate. Nineteen (14%) participants were enrolled in the bachelors program. The master's program was represented by 56 individuals (41%). And 45% (n = 62) of the participants were from the doctoral program.

Table 4

Participants' Demographic Information by Total and Individual Groups

Demographic Category	Total N = 137	Bachelors n = 19	Masters n = 56	Doctoral n = 62
Ethnicity				
Caucasian	102 (74%)	16 (84%)	42 (75%)	43 (69%)
African American	21 (15%)	1 (5%)	6 (11%)	14 (23%)
Asian/ Hispanic/ Native Am	8 (6%)	3 (16%)	6 (11%)	3 (5%)
Other	4 (3%)	0	2 (3%)	2 (3%)
Age				
Mean	36.59	32.11	33.63	39.97
Median	34	29	30	38
Standard Deviation	10.319	8.239	10.126	9.9886
Range	25-64	25-53	25-57	25-64

The majority of participants were Caucasian (*n* = 102, 74%), followed by African American (*n* = 21, 15%). The greatest diversity of participants was from the doctoral program; 31% indicating their ethnic category was African American, Asian, Hispanic, Native American or other. The age range for all participants was 25-64, with an overall mean age of 36, and a median age of 34.

To gain a more specific profile of the participants in this study, the research posed four questions related to self-directedness and information literacy. The preliminary questions addressed participants perspectives about themselves as self-directed learners based on Knowles' (1975) definition; being in charge of how and what they learned in college classes (Brockett & Hiemstra, 1991); feelings at the beginning of a search for information (Kuhlthau, 2004); and resources consulted for information about a topic (ACRL, 2000; ALA, 1989). Inquiring about the participants view of themselves and their own practices provided information that supported findings by Knowles (1975, 1984), and Brockett and Hiemstra (1991). However, the picture that these descriptive questions created was confusing. Some curious claims were that the majority of the participants claimed to be self-directed, yet fewer wanted to have control in the classroom. Likewise, the two information literacy questions, based on Kuhlthau's (1983) ISP model, produced confusing results, perhaps because participants could choose more than one response to these questions.

Self-directed learner. Participants responded to a lead question: *Do you consider yourself to be a self-directed learner defined as "a learner who can diagnose their needs, formulate goals, identify resources, choose and implement appropriate strategies, and evaluate outcomes?*" The definition operationalized in this question was Knowles' (1975) description of a self-directed learner. The majority of participants (*n* = 123, 90%) said yes,

indicating they did consider themselves self-directed learners as defined in the survey. Participants enrolled in the doctoral program were more likely to describe themselves as self-directed learners (*n* = 57, 92%), followed by the bachelor's program students (*n* = 17, 89%) and finally individuals in the master's program (*n* = 49, 88%).

In charge of learning. Fewer respondents answered yes to the question, *Do you prefer to be in charge of what you learn and how you learn it in college classes,* despite the majority (77%, *n* = 105) indicating they preferred to be in charge of their own learning (Figure 6).

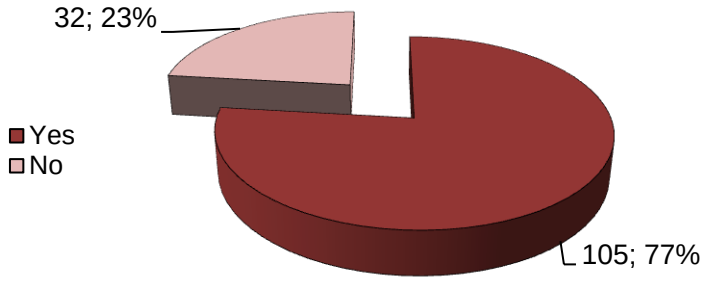

Figure 6. Respondents (77%, *n* = 105) who preferred to take charge of their own learning in a college class.

All of the bachelors program students (*n* = 19, 100%) specified they wanted to be in charge of their own learning in college classes. Only 73% (*n* = 41) of the masters and 74% (*n* = 46) of the doctoral students preferred to be in charge of what and how they learn.

ISP affective categories. Using the Information Search Process (Kuhlthau, 1983, 2004) affect categories, participants indicated how they felt when beginning a search for information for a class assignment. Responses indicated the majority felt confident and optimistic. The researcher assumed that respondent could be experiencing more than one emotion when beginning a search for information. Therefore, more than one choice could be selected, which could have skewed the results. Crosstabs (Appendix I) were run to determine the ISP affective characteristics' by group. The majority of respondents indicated that at the beginning of a search for a new topic they felt confident (52%) and optimistic

(42%). Doubtful (11%) and confused (12%) were chosen least among and between the three groups (Figure 7).

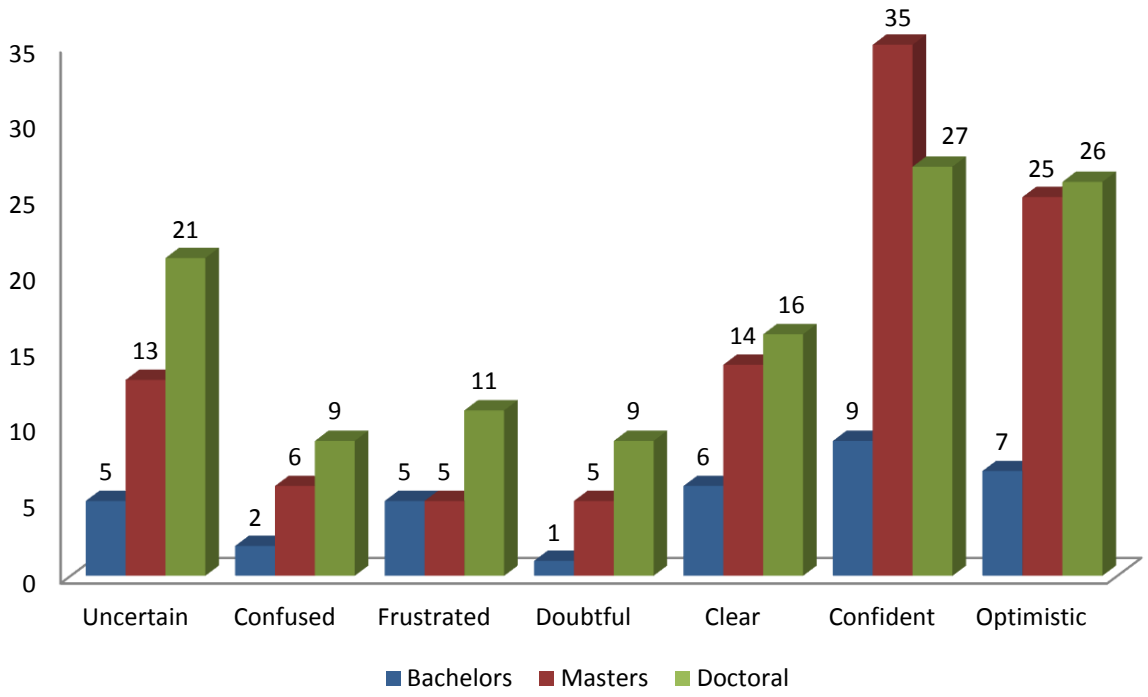

Figure 7. Participants' responses to Kuhlthau's Information Search Process categories of feelings experienced when beginning a search.

Resources consulted. Information literacy skills are frequently taught by instruction librarians in concert with faculty (American Library Association [ALA], 2008). Information literacy teaching tends to focus on how to use library and information resources (Association for College and Research Libraries, 2000, 2003; ALA, 2008; Bruce, 1997). Participants indicated they began searching for information for a research paper using search engines such as Google (78%, *n* = 107), research articles (57%, *n* = 78) and journal databases (55%, *n* = 75), followed by professors (32%, *n* = 44) and books (29%, *n* = 40) (Figure 8).

The categories ranked highest may indicate more about the sample population than the resource itself because participants were enrolled in college. Respondents indicated *all* resources they utilized to find information for an assignment. In this study, results indicated

the use of journal databases and research articles increased with educational attainment, in other words, Bachelors = 37% and 47%; Masters = 54% and 48%; Doctoral = 61% and 68%, respectively (see Appendix I). The types of assignments given and the resources required by professors for assignments in the masters and doctoral programs may explain the change based on educational attainment.

Grouping information resources by access point indicated that library sources – *Librarian, Journal Databases, Research Articles* – were most frequently utilized by participants (121%, *n* = 166), followed by Internet – *Google, Wikipedia* – resources (105%, *n* = 144), and finally personal contacts – *Friends, Professors, Colleagues* – (67%, *n* = 92). Framing the question as a topic for an assignment may also have skewed the results towards article databases and research articles.

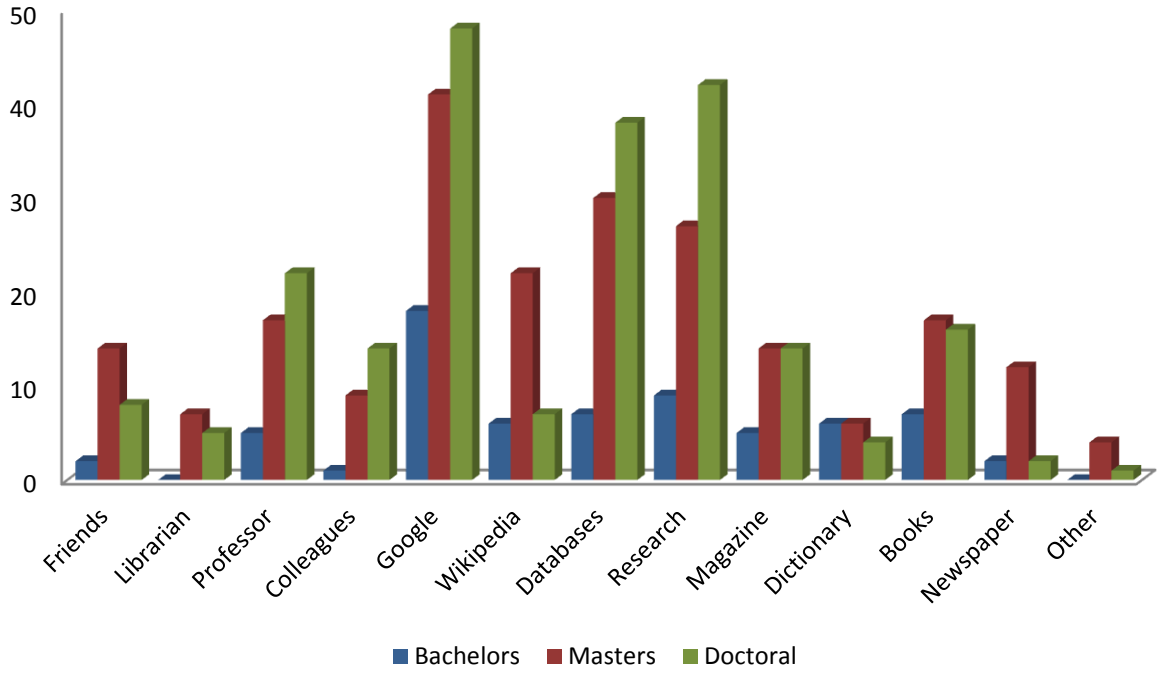

Figure 8. The frequency of resources used when searching for information to complete a research paper assignment in a college course.

Data Analysis

Statistical tests included descriptive data about the test scores and reliability calculations. This section details the descriptive data for the test scores and reliability calculations and provides relevant comparisons to previous studies.

PRO-SDLS and ILT Instrument Scores

Pearson's product moment correlation output showed no significant relationship (r = -.056, ρ = .514) between the composite scores for the two instruments used (Table 5). The mean score for the PRO-SDLS was 74% (92.87 out of a possible 125), and the mean for the ILT was 66% (39.67 out of a possible 60).

Table 5

Means, Standard Deviations, and Percent for PRO-SDLS and ILT Composite scores

Instrument	*n*	*M*	*SD*	*Percent*[a]
PRO-SDLS	137	92.87	13.45	74
ILT	137	39.67	8.55	66

[a] Percent is based on a 100 point scale.

With the exception of Fogerson's 2005 study, total scores on the PRO-SDLS in this study were higher than scores obtained by Boyer, Langevin, and Gaspar (2008), Gaspar, Langevin, Boyer, and Armitage (2009), Hall (2011), Holt (2011), and Stockdale and Brockett (2011). Table 6 provides multiple studies' PRO-SDLS scores.

Table 6

PRO-SDLS Scores from Multiple Studies Arranged by Year

Studies	Year	*n*	*M*	*Percent*	*SD*
Current Study	2012	137	92.87	74	13.45
Hall (pre-test)	2011	110	89.62	72	10.03
Hall (post-test)	2011	110	91.17	73	10.92
Holt	2011	519	89.13	71	11.54
Stockdale and Brockett	2011	195	80.05	64	12.47
Gaspar, Langevin, Boyer, & Armitage	2009	114	90.64	73	12.30
Boyer, Langevin, and Gaspar	2008	15	89.67	72	12.00
Fogerson	2005	217	96.91	78	11.82

ILT scores for the current study (74%, *M* = 39.67, *SD* = 8.55) were among the highest of studies found using the ILT, however the findings were consistent with other studies (Cameron, Wise, & Lottridge, 2004; James Madison University, 2006; Ury, Park, Baudino, & Ury, 2007; Wise, Cameron, Yang, & Davis, 2008, 2009). James Madison University's Center for Assessment and Research Studies (n.d.) provided testing data from multiple institutions concerning ILT test scores. The testing data from multiple institutions demonstrated an overall mean score of 37.74 (62.90% on a 100 point scale), with a standard deviation of 13.48. Cameron, Wise, and Lottridge's study in 2004 (Cameron, et al., 2007) was the only instance where ILT scores were higher than the current study, although Ury, Park, Baudino, and Ury's (2007) study of seniors and sophomores (67%, *M* = 39.56, *SD* = 8.95) most closely resembles the scores found in the current study. Ury, et al.'s (2007) population also more closely resembles that of the current study, potentially indicating similarities in test scores by educational attainment levels. The majority of studies using the ILT had scores that ranged from 60% (*M* = 35.77, *SD* = 7.92) (Wise, et al., 2009) to 69% (*M* = 41.61, *SD* = 8.45) (Cameron, et al., 2007).

ANOVAs were used to compare total scores (Table 7) on the PRO-SDLS and the ILT between the three groups, bachelors (*n* = 19), masters (*n* = 56) and doctoral (*n* = 62). Both the bachelors 72% (*M* = 91.00, *SD* = 13.82) and the doctoral 73% (*M* = 91.32, *SD* = 13.22) groups scored higher on the PRO-SDLS than the masters group 70% (*M* = 87.88, *SD* = 13.58). The distribution of scores by group was within the range of scores found by previous researchers. Mean scores on the ILT increased with each advanced degree, i.e. bachelors 58% (*M*= 34.84, *SD* = 9.44), masters 65% (*M* = 38.96, *SD* = 8.98), and doctoral 70% (*M* = 41.79, *SD* = 7.18). The increase in ILT scores and Educational Attainment, along

with findings from Cameron, et al. (2007) and Ury, et al. (2007) suggests information literacy skills improve with additional educational attainment. Ury, et al.'s (2007) score by class, although a very small increase further supports this claim: Freshmen recorded 64%; Sophomores scored 65%; Juniors achieved 66%; and Seniors logged 67%.

Table 7

Between-Group Means, Standard Deviations, and Percent for PRO-SDLS and ILT

Groups	*N*	*Mean*	*SD*	*Percent*[c]
Bachelors	19	91.00[a] 34.84[b]	13.81[a] 9.44[b]	72[a] 58[b]
Masters	56	87.88[a] 38.96[b]	13.57[a] 8.98[b]	70[a] 65[b]
Doctoral	62	91.32[a] 41.79[b]	13.2173[a] 7.1770[b]	73[a] 70[b]

[a] PRO-SDLS, [b] ILT, [c] Percentage based on 100 point scale.

Reliability

Reliability was established for the PRO-SDLS and the ILT instruments (Table 8) for the three groups (bachelors, masters, doctoral) studied. Total test reliability, based on Cronbach's alpha, for the 25-item PRO-SDLS (α = .90) and ILT (α = .87) indicated that both instruments had high reliability. The PRO-SDLS reliability scores in this study (α = .90) compare favorably to those found by Fogerson (2005) α = .91, Hall (2011) α = .84, .87 (pretest/post-test), Holt (2011) α = .91, and Stockdale (2003) α = .92. Cameron, et al. (2007) and Wise, et al. (2009) calculated test reliability for the ILT across three studies; 2004 (α = .88), 2008 (α = .84), and 2009 (α = .84).

Table 8

Cronbach's α for Composite scores on the PRO-SDLS and ILT

Instrument	Cronbach's α	*N* of Items
PRO-SDLS	.90	25
ILT	.87	60

Note: based on 137 responses

Cronbach's α for the four factors (initiative, control, motivation, self-efficacy) on the PRO-SDLS are listed in Table 9. All four factors on the PRO-SDLS achieved an acceptable reliability level (DeVellis, 1991, 2003, 2011; Gall, Gall, and Borg, 2003; Wells & Wollack, 2003). The reliability coefficients of the four factors on the PRO- SDLS were compared to those obtained by Stockdale (2003), Fogerson (2005), Hall (2011), and Holt (2011). Motivation, in Hall's (2011) study, was the only factor that did not achieve acceptable reliability.

Table 9

Cronbach's α for the Four Factors on the PRO-SDLS

	Cronbach's α[a]					
	Current	Stockdale	Fogerson	Hall[b]	Hall[c]	Holt
N	137	195	217	110	110	519
Initiative	.78	.81	na	.76	.72	.73
Control	.74	.78	na	.78	.83	.72
Self-Efficacy	.76	.78	na	.79	.79	.79
Motivation	.79	.82	na	.41	.67	.79

[a] Acceptable reliability at (α = 0.70). [b] Hall's (2011) pre-test scores,[c] Hall (2011) post-test scores

Cronbach's α for the four sub-scales on the ILT are listed in Table 10. In the current study, two of the four sub-scales achieved an acceptable reliability level (DeVellis, 1991, 2003, 2011; Gall, et al., 2003; Wells & Wollack, 2003). Standard 2 (α = .70) and Standard 3 (α = .72) were the only sub-scales above the acceptable level for reliability. Standard 1 (defining) and Standard 5 - Ethics & Understanding achieved moderate reliability levels (DeVellis, 1991, 2003, 2011; Wells & Wollack, 2003), which supports those reported by Cameron, et al. (2007), and Wise, et al. (2009). According to Wise, et al. (2009), the moderate reliability marks were symbolic of the low number of questions per subscale.

Table 10

Cronbach's α for the Four Sub-scales on the ILT

	Cronbach's α			
	Current	2004[a]	2008[b]	2009[b]
N	137	524	683	839
Standard 1 - define	.56	.65	.54	.53
Standard 2 - access	.70	.64	.54	.70
Standard 3 - evaluate	.72	.76	.69	.70
Standard 5 – ethics, understand	.58	.48	.53	.50

[a] Cameron, Wise, and Lottridge (2007), [b] Wise, Cameron, Yang, and Davis (2009)

Research Questions

The current study investigated three research questions to determine the relationship between self-directed learning and information literacy among adult learners in higher education. Each question is restated below and data analysis results for the questions are provided.

Research question 1. *Is there a significant relationship between self-directed learning preferences and information literacy skills as determined by the two instruments (PRO-SDLS and ILT) used among this sample of adult learners in higher education?*

Data to address Research Question 1 were analyzed using Pearson's product moment correlation for the PRO-SDLS and ILT composite scores and one-way ANOVAs to compare between-group means for self-directed learning preferences and information literacy skills. ANOVA was chosen as the appropriate test because the question asked for a comparison between groups. Between-group comparisons were completed using one-way ANOVAs. There were no significant differences between the group scores on the PRO-SDLS. However, a statistically significant difference ($\rho < .05$) between the groups scores was indicated (Table 11) on the Information Literacy Test.

Table 11

ANOVA Results for Research Question 1

Instrument	*n*	*df*	*F*	Sig.
PRO-SDLS	137	2	1.045	.355
ILT	137	2	5.469	.005*

NOTE: R Squared = .015 (Adjusted R Squared = .001)
*$\rho < .05$

The number of participants by group was unequal; therefore Tukey's HSD (Honestly Significant Difference) test, which explains which means are significantly different from one another (Lowry, 2012), was employed to determine the group showed that showed highest variation on the ILT total score. Tukey's HSD revealed the significant difference was between the bachelors and doctoral groups' (Mean difference = - 6.95 and 6.95, Std. Error = 2.17, $\rho = .005$) scores on the ILT instrument. The error mean square used for Tukey's HSD was 68.53.

In response to Research Question 1, there was no significant relationship between composite scores on the PRO-SDLS and the ILT ($r = -.056$, $\rho = .514$). The mean score for the PRO-SDLS was 92.87, out of a possible 125, and the mean for the ILT was 39.67, out of a possible 60. Despite finding no significant relationship between the composite test scores, there was a significant relationship between-group scores on the ILT.

Research question 2. *Are there significant differences between self-directed learning preferences, information literacy skills, and selected demographic variables (Age, College GPA, Educational Attainment, and Ethnicity) among this sample of adult learners in higher education?*

To analyze the second Research Question, an ANOVA and linear regression were computed. Demographic variables for the regression were grouped into age + college GPA + educational attainment and compared with the total participant group. These three

demographic variables were continuous in nature allowing for comparison of the variables in relation to the two instruments. Pearson's tests (Table 12) showed small correlations (DeVellis, 1991, 2003, 2011) between the PRO-SDLS total scores and the variables age (r = .202), educational attainment (r = .169), and college GPA (r = .119).

Table 12

Correlations of the PRO-SDLS and Predictor Variables (n = 137)

		Age	*EdAttain*	*GPA*
Pearson's Correlation	PRO-SDLS	.202	.169	.119
	Age	1.000	.434	.176
	EdAttain		1.000	.190
	GPA			1.000
Significance (1-tailed)	PRO-SDLS	.009*	.024*	.083
	Age	--	.000*	.020*
	EdAttain		--	.013*
	GPA			--

*$\rho < .05$

There was a significant relationship between scores on the PRO-SDLS and two of the three variables, age (ρ = .009) and educational attainment (ρ = .024), but not college GPA (ρ = .083). Significant relationships ($\rho < .05$) were found between the predictor variables, age and GPA (ρ =.020), age and ed attainment (ρ = .000), and ed attainment and college GPA (ρ = .013).

Table 13 illustrates Pearson's correlations for the ILT total scores and predictor variables. Small correlations were identified between age (r = .153), college GPA (r = .096), and ed attainment (r = .230). Again, two of the three predictor variables were significant ($\rho < .05$) in a one-tailed test age (ρ = .037) and ed attainment (ρ = .003).

Table 13

Correlations of the ILT and Predictor Variables (n = 137)

			Age	*EdAttain*	*GPA*
Pearson's Correlation	ILT		.153	.230	.096
		Age	1.000	.434	.176
		EdAttain	--	1.000	.190
		GPA	--	--	1.000
Significance (1-tailed)	ILT		.037*	.003*	.132
		Age	--	.000*	.020*
		EdAttain		--	.013*
		GPA			--

*$\rho < .05$

Total scores on the two instruments were regressed using age, college GPA, and educational attainment (Table 14). These three predictors accounted for just over half of the variance in the test scores for the PRO-SDLS ($R^2 = 0.59$) and the ILT ($R^2 = 0.54$).

Table 14

Regression Analysis for the PRO-SDLS and ILT with Predictor Variables[a]

Instrument	R	R Square	Adjusted R Square	*df*	Mean Square	*F*	Sig.
ILT	.242	.059	.038	3	194.53	2.77	.044[b*]
PRO-SDLS	.233	.054	.033	3	445.82	2.55	.059[b]

[a](N=137) [b]Predictors: (Constant), College GPA, Age, Educational Attainment
* $\rho < .05$

Regression analysis indicated no statistically significant relationship between the three variables and scores on the PRO-SDLS [$F(3, 133) = 2.55$, $\rho = .059$], but there was a significant relationship between scores on the ILT [$F(3, 133) = 2.77$, $\rho = .044$] and the three variables investigated. Educational attainment ($\beta = .195$, $\rho = .040$) demonstrated a significant effect on scores on the ILT instrument only (Table 15).

Table 15

Coefficients for PRO-SDLS and ILT with Predictor Variables

	Unstandardized Coefficients		Standardized Coefficients		
	β	Std. Error	Beta	*t*	Sig.
PRO-SDLS					
Age	.194	.122	.150	1.589	.114
EdAttain	1.076	1.132	.090	.951	.343
GPA	1.422	1.625	.076	.875	.383
ILT					
Age	.049	.078	.060	.637	.525
EdAttain	1.487	.717	.195	2.073	.040*
GPA	.580	1.030	.049	.563	.574

* $\rho < .05$

The fourth demographic variable investigated in Research Question 2 was ethnicity, represented by six categories (Caucasian, African American, Asian, Hispanic, Native American/Pacific Islander, and other). Categorical data with two or more groups are effectively investigated using ANOVA (Agretsi & Finlay, 2009). The ANOVA was used with the three participant groups (bachelors, masters, doctoral) and each instrument (PRO-SDLS, ILT) used in the study. The mean scores for each ethnic category ranged between 89.15 and 95.83 on the PRO-SDLS and between 37.00 and 41.67 on the ILT.

Scores on the PRO-SDLS were African American (n = 21, M = 91.43, SD = 11.78), Caucasian (n = 102, M = 89.15, SD = 14.03), Asian/ Hispanic/ Native American (n = 11, M = 92.38, SD = 11.39), and Other (n = 3, M = 90.75, SD = 5.74). The ILT scores by ethnic category were African American (n = 21, M = 40.67, SD = 8.38), Caucasian (n = 102, M = 39.49, SD = 8.53); Asian/ Hispanic/ Native American (n = 11, M = 40.78, SD = 9.45), and Other (n = 3, M = 37.00, SD = 12.33). However, the number of participants representing each ethnic category was unequal and heavily weighted toward Caucasian participants.

ANOVA (Table 16) results indicated no statistically significant difference between Ethnicity and total scores on the PRO-SDLS [$F(5, 131) = .370$, $\rho = .868$] or the ILT [$F(5, 131) = .181$, $\rho = .969$].

Table 16

ANOVA Results for Ethnicity

Instrument	*n*	*df*	*F*	Sig.
PRO-SDLS[a]	137	5	.370	.868
ILT[b]	137	5	.181	.969

[a]R Squared = .014 (Adjusted R Squared = -.024), [b] R Squared = .007 (Adjusted R Squared = -.031)

In response to Research Question 2, small, statistically significant correlations on variables of Age and Educational Attainment were found on the PRO-SDLS: age ($r = .202$, $\rho = .009$), ed attainment ($r = .119$, $\rho = .024$), and the ILT: age ($r = .153$, $\rho = .037$), ed attainment ($r = .096$, $\rho = .003$). Significant relationships were identified between the predictor variables, age and college GPA, age and educational attainment, and educational attainment and college GPA. Regression analysis revealed a statistically significant relationship between the three predictor variables and scores on the ILT [$F(3, 133) = 2.77$, $\rho = .044$], however there was no significant relationship on the PRO-SDLS [$F(3, 133) = 2.55$, $\rho = .059$]. No statistically significant relationship was found between ethnicity and either instrument, PRO-SDLS or ILT.

Research question 3. *Are there significant differences between the sub-scales that comprise self-directed learning (Teaching/Learning Interaction and Learner Characteristics) and information literacy (ACRL Standards 1, 2, 3, and 5) among this sample of adult learners in higher education?*

To compare the four factors of the PRO-SDLS and the sub-scales of the ILT Pearson's correlations were used. The four sub-scales of the PRO-SDLS are initiative and

control representing the teacher-learner transaction, and self-efficacy and motivation, comprising the characteristics of the learner (Stockdale & Brockett, 2011). The ILT uses four of the five ACRL standards for information literacy for higher education students (Cameron, Wise, & Lottridge, 2007; Wise, Cameron, Yang, & Davis, 2009). Bivariate correlations between the ILT sub-scales and the PRO-SDLS total score were negative and small, however, Standard 5 - Ethics & Understanding on the ILT was statistically significant when correlated with the total PRO-SDLS score (r = -.182, ρ = .017). Pearson's correlation coefficient (Table 17) indicated Standard 5 - Ethics & Understanding had a small, negative correlation with all factors on the PRO-SDLS, however only one factor and sub-scale, Initiative (PRO-SDLS) and Standard 5 – Ethics & Understanding (ILT) (r = -.184, ρ = .032), showed a statistically significant relationship.

Table 17

Correlations between PRO-SDLS Factors and ILT Sub-scales (n=137)

		ILT Sub-scales			
PRO-SDLS Factors		Standard 1	Standard 2	Standard 3	Standard 5
Initiative	Pearson Correlation	.101	.031	-.030	-.184
	Sig. (2-tailed)	.238	.715	.727	.032*
Control	Pearson Correlation	-.032	.014	-.007	-.109
	Sig. (2-tailed)	.710	.870	.934	.205
Self-Efficacy	Pearson Correlation	-.045	-.055	-.042	-.131
	Sig. (2-tailed)	.601	.522	.629	.126
Motivation	Pearson Correlation	.041	-.003	-.003	-.124
	Sig. (2-tailed)	.633	.972	.972	.147

* $\rho < .05$

Addressing the predictive elements of the literature on information literacy, linear regression was run to determine if the scores on the ILT predicted self-directed learning as indicated by the PRO-SDLS total score. The regression analysis (Table 18) showed no statistically significant relationship between ILT sub-scales and the total scores on the PRO-

SDLS [$F(4, 132) = 1.88$, $\rho = .117$], suggesting scores on the ILT did not predict self-directed learning as measured by the PRO-SDLS. However, investigating the Beta weights for the ILT sub-scales and the PRO-SDLS total scores, Standard 5 - Ethics & Understanding once again showed a significant, negative relationship ($\beta = -2.98$, $\rho = .009$).

Table 18

Regression Analysis for ILT Sub-scales and PRO-SDLS Total Scores

Instrument	R	R Square	Adjusted R Square	Std. Error of the Estimate	*df*	Mean Square	*F*	Sig.
PRO-SDLS	.232[a]	.054	.025	13.23722	4	329.810	1.88	.117

[a] Predictors: (Constant), Standard 1, Standard 2, Standard 3, Standard 5

In response to Research Question 3, only one factor on the PRO-SDLS, Initiative, and one sub-scale on the ILT, Standard 5 – Ethics & Understanding, showed a statistically significant relationship. Regression analysis showed no statistically significant relationship between the total PRO-SDLS score and the four sub-scales on the ILT.

Summary

In summary, reliability for each instrument was obtained at the total score level, however only the PRO-SDLS and two sub-scales on the ILT exceeded acceptable reliability measures. No statistically significant relationship was found between total scores on the PRO-SDLS and total scores on the ILT. A statistically significant difference between participants enrolled in the bachelors and doctoral programs was found on the test scores of both instruments. Four demographic variables were regressed with the two instruments; age, college GPA and educational attainment showed a statistically significant relationship with total scores on the ILT. Ethnicity, however, showed no relationship to total scores on either instrument. Finally, the four factors on the PRO-SDLS and the four sub-scales on the

ILT were compared. Only one sub-scale on the ILT, Standard 5 - Ethics & Understanding, showed a statistically significant correlation with one factor on the PRO-SDLS, Initiative. Finally, regression was run to determine if scores on the ILT predicted scores on the PRO-SDLS. A statistically significant relationship was not found. Chapter V provides a general summary of the study, discussion of the results, implications of the findings, and recommendations for further research and practice.

Chapter V

Conclusion and Discussion

Chapter V begins with a restatement of the purpose of the study, research questions, methods, and major findings. A discussion of the data analysis results will lead to recommendations for further research.

Purpose of the Study

This study investigated the relationship between self-directed learning and information literacy among adult learners in a formal, higher education setting. The intent of this study was to close a gap in the literature concerning the link between self-directed learning preferences and information literacy skills. Exploring the literature claim that a link exists between information literacy and self-directed learning should enhance educators' and administrators' understanding of adult college students. Illuminating behaviors relative to finding and using information, as well as approaches to learning can help to augment universities' support of self-direction in higher education.

The sample consisted of 137 non-traditional, adult college students, aged 25 and over. The participants were enrolled in either a business bachelor's or master's program or an education doctoral program. The participants completed a demographic survey, the PRO-SDLS which measured self-directed learning preferences and behaviors, and the Information Literacy Test (ILT) which measured information literacy skills. Data collected from the participant responses were analyzed using Pearson's correlation, ANOVA and Multiple Regression. The analysis yielded answers to the three research questions.

Research Questions

Three research questions were used to test the relationship between self-directed learning and information literacy. The questions concerned composite scores on the PRO-SDLS and the ILT; composite scores comparisons across the three groups; composite scores compared to demographic variables; and analysis of the four factors on the PRO-SDLS and the four sub-scales on the ILT. Each question is restated below and followed by the major findings for each question along with a discussion of the results.

Research question 1. *Is there a significant relationship between self-directed learning preferences and information literacy skills as determined by the two instruments (PRO-SDLS and ILT) used in this sample of adult learners in higher education?*

Research question 1 addressed the relationship between self-directed learning and information literacy for the sample of adult learners participating in this study. Data were analyzed using Pearson's product moment correlation and ANOVA (Analysis of Variance). Composite scores on the PRO-SDLS and the ILT were compared using Pearson's correlation. Pearson's product moment correlation and ANOVA tests indicated no significant relationship between composite scores on the PRO-SDLS and composite scores on the ILT (r = -.056, ρ = .514).

Finding no statistically significant relationship between composite scores on the PRO-SDLS and composite scores on the ILT (r = -.056, p = .514) indicated that self-directed learning behaviors as measured by the Personal Responsibility Orientation in Self-Directed Learning Scale (PRO-SDLS) are not significantly related to information literacy skills as measured by the Information Literacy Test (ILT). However, the small, negative correlation (r = -.056, ρ = .514) between composite scores on both instruments may suggest an inverse relationship between self-directed learning and information literacy. This inverse

relationship proposes that as skills in information literacy skills increase, behaviors toward self-direction in a college classroom decrease.

To determine differences in composite scores by group (bachelors, masters, doctoral) the data were analyzed using one-way ANOVAs with the three groups and composite scores on the PRO-SDLS and the ILT. Because the groups were unequal, Tukey's HSD was used to investigate significant differences between the three groups. There was no statistically significant difference on group scores on the PRO-SDLS, despite the fact that participants rated themselves highly on self-direction (see Figure 5). This finding suggests that self-directed learning, as measured by the PRO-SDLS, does not change based on educational attainment.

Tukey's HSD did indicate a statistically significant difference at the $\rho = .005$ level on the ILT scores between the bachelors and doctoral groups, suggesting that information literacy skills improve as educational attainment increases. Other reasons for this difference could be that bachelor's students' attention to their goal is stronger than the other group; that the bachelor's degree students have different intentions for education, such as a promotion; these students may also be accustomed to self-directed learning at work thus making this pattern an expectation. The bachelor's degree students left college previously. The reasons they left may influence their self-directed learning behaviors, for example, if they had a poor educational experience before, they may not wish to repeat it and thus adopt self-directed learning as one way to work within the formal system.

Research question 2. *Are there significant differences between self-directed learning preferences, information literacy skills, and selected demographic variables (Age, College GPA, Educational Attainment, and Ethnicity) in this sample of adult learners in higher education?*

Research question 2 investigated the differences between self-directed learning, information literacy, and selected demographic variables (age, college GPA, educational attainment, and ethnicity) in the sample. Demographic variables age + college GPA + educational attainment were examined using regression, and ethnicity was investigated using ANOVA. Weak, statistically significant correlations were identified with the composite scores on the PRO-SDLS with the variables of age (r = .202, ρ = .009) and educational attainment (r = .119, ρ = .024). R^2 = 0.046 explained 4.6% of the variance between scores on the PRO-SDLS and the age and educational attainment variables. Also, small, statistically significant correlations between the ILT scores and the variables age (r = .153, ρ = .037) and ed attainment (r = .096, ρ = .003) were identified. R^2 = 0.036 explained 3.6% of the variance between scores on the PRO-SDLS and the age and ed attainmenmt variables.

The weak, statistically significant correlation ($\rho < .05$) between the demographic variables, age and ed attainment, and composite scores on the PRO-SDLS and the ILT may indicate that as age and educational attainment increase, so do self-directed learning preferences and information literacy skills. Although the results are mixed, literature on self-directed learning suggests that self-directedness increases with age (Fogerson, 2005; Guglielmino, 1977; Knowles, 2004; Long, 2010). The results in this study support previous research that found statistically significant relationships between self-direction and age as well as self-direction and college GPA (Fogerson, 2005; Stockdale, 2003).

The predictor variables indicated statistically significant ($\rho < .05$) relationships between each other. Statistically significant relationships were found between age and college GPA (r = .176, ρ = .020), age and educational attainment (r = .434, ρ = .000), and educational attainment and college GPA (r = .190, ρ = .013). These relationships, being positive and statistically, significant, suggests that as a person's age increases, so does.

educational attainment and college GPA. The relationship between age and educational attainment seems logical because it takes time to complete coursework and the progression route is fixed, meaning educational attainment moves from bachelors, to masters, to the optional specialist (for education), and finally to the doctoral level. However, the relationship between educational attainment and college GPA may be affected by GPA scores clustering around a small range. Graduate programs require students to maintain a 3.0 (B) average or they will be dismissed from the program. The GPA range in this study was small, 121 (94%) responses were in the range from 3.2 - 4.0, with the majority (n = 86; 67%) of the total responses fell in the 3.8 - 4.0 range.

Regression analysis revealed a positive, statistically significant relationship between the three predictor variables (Age, College GPA, Educational Attainment) and composite scores on the ILT [$F(3, 133)$ = 2.77, ρ = .044] indicating that an increase in age, college GPA, and educational attainment were related to an increase in the overall scores on the Information Literacy Test. Utilizing the ILT as an indicator of information literacy skills, the argument could thus be made that information literacy increases with experience.

There was no significant relationship between the composite scores of the PRO-SDLS and the three predictor variables [$F(3, 133)$ = 2.55, ρ = .059]. The regression results suggest that age, college GPA and educational attainment are not related to self-directedness in college. Additionally, ethnicity, the fourth demographic variable examined, showed no significant relationship with composite scores on either test, indicating ethnicity has no influence on either self-directed learning preferences or information literacy skills. Ethnicity was included as a variables because 50% of the total student enrollment across the three programs is non-Caucasian, making this research setting idyllic for investigating any differences by ethnic background.

Research question 3. *Are there significant relationships between the factors that comprise self-directed learning (Initiative, Control, Self-efficacy, Motivation) and the sub-scales defining information literacy (ACRL Standards 1, 2, 3, and 5) in this sample of adult learners in higher education?*

Research question 3 addressed the factors and sub-scales of both instruments used. Regression was first used to determine any relationship that existed between the factors and sub-scales of the PRO-SDLS and the ILT. Two factors on the PRO-SDLS, initiative and control, represent the teaching-learning transaction; the remaining two factors, self-efficacy and motivation, comprise the learner characteristics. Four of the five ACRL standards for information literacy for higher education students make up the ILT sub-scales. The five ACRL standards represent determining a need; accessing; evaluating; using; and understanding information use in the ethical and legal context. Literature by authors such as Bruce (1995), Hainer (1998), Rollins, Hutchings, Goldsmith, and Fonseca (2009), Jacklin and Bordonaro (2008), Judd and Kennedy (2011), Laverty (1997), Palmer (1996), Rager (2003), O'Dwyer and Kerns (2011), and Silén and Uhlin (2008) expressed a link between information literacy skills and self-directed learning behaviors, therefore, multiple regressions examined the relationship between the four factors on the PRO-SDLS and the four subscales on the ILT.

Examination of the four factors of the PRO-SDLS and the four subscales of the ILT revealed that only one factor on the PRO-SDLS, Initiative, and one sub-scale on the ILT, Standard 5 – Ethics & Understanding, showed a negative, statistically significant relationship between one another (r = -.184, ρ = .032). Bivariate correlations between the ILT sub-scales and the PRO-SDLS total score were negative and weak. However, Standard

5 - Ethics & Understanding on the ILT was negatively related to the composite scores on the PRO-SDLS (r = -.182, ρ = .017).

The relationship between the factor, Initiative (PRO-SDLS), and Standard 5 – Ethics & Understanding (ILT) was negative and statistically significant (r = -.184, ρ = .032). This finding suggests that as understanding of the ethical and legal uses of information increases, initiative decreases, and vice versa. Standard 5 – Ethics & Understanding tests respondents' understanding of the ethical, legal, and socio-economic issues surrounding information and information technology. Ten questions are associated with this standard. The ten questions focus on the ethical/legal issues of using and sharing sources (5 questions), source availability and access (2 questions), citations (3 questions). The negative relationship between Initiative and Standard 5 - Ethics & Understanding is puzzling and suggests that future research needed to determine this relationship. If this relationship holds true, then information literacy instruction may need to be modified so as not to decrease individual initiative find and utilize information. Likewise, administrators and faculty may need to consider using better methods, activities, and assignments to help students increase their initiative to be self-directed. If self-direction is negatively affected by information literacy instruction, the reasons for this must be investigated.

Regression was also used to determine if the sub-scales on the ILT predicted composite scores on the PRO-SDLS. Regression analysis showed no statistically significant relationship between the composite scores on the PRO-SDLS score and the four sub-scales on the ILT [$F(4, 132)$ = 1.88, ρ = .117]. However, investigating the Beta weights for the ILT sub-scales and the PRO-SDLS composite scores, Standard 5 - Ethics & Understanding showed a significant, negative relationship (β = -2.98, ρ = .009). This finding suggests that as information literacy skills increase, self-directedness decreases. The regression results do

not support the claim in the literature on information literacy that being information literate leads to self-directedness. Instead, the findings indicate that information literacy skills, as measured by the ILT, do not predict self-directedness in college, as measured by the PRO-SDLS.

Discussion

The purpose of this study was to determine the relationship between self-directed learning and information literacy. Using data from adult learners at a private university, data analysis did not indicate any significant relationship between self-directed learning and information literacy, based on the composite scores of the PRO-SDLS and the ILT. Additionally, the results did not support the claim that information literacy skills leads to self-directedness. In fact, the findings suggest the opposite is true, that as one becomes more information literate, one becomes less self-directed. Possible explanations for these findings are presented below; including how the concepts were conceived and measured, low test reliability scores, participant groups being unequal, some questions being unclear, and the length of time required to complete the instruments.

Concepts conceived and measured. The PRO-SDLS measures behavior but the ILT measures finite skills. Despite the PRO-SDLS being developed for a college setting, self-directedness does not necessarily adhere to finite skills. The potential differences between each instrument are that the PRO-SDLS measures an orientation towards self-directedness while the ILT measures the navigation of information and resources. For example, orientation towards self-directedness could be expressed as the interaction between the teacher and the student. Grow (1991/1996) discussed how a learner's orientation towards self-direction can be seen as a transition from the learner viewing education as being centered around the teacher as the authority figure towards the learner as the authority.

In other words, Grow (1991/1996) suggests that as an individual becomes more self-directed they will shift from being teacher-centered to being learner-centered. Orientation towards self-directedness could also be an individual's pursuit of additional, unassigned information about a topic that was discussed in class, as suggested by Stockdale (2003) and Stockdale and Brockett (2011).

Navigation, on the other hand, begins with a recognition and definition of an information need, or the starting point of a journey. Once the starting point is identified, tools, such as books, databases, or the Internet, are used to locate information. This second piece of the information literacy journey is similar to identifying all possible routes for the journey. Once information has been located (or the routes determined), the individual must evaluate that information to determine if it addresses the stated information need. The individual then uses the information that was found and determined to be useful to address the stated need. Navigation is also expressed as the ability to locate information in a data table. This activity involves finding the information and reading the resources available correctly. Likewise, knowing how to read portions of a reference citation (Kuhlthau, 1983, 1988) correctly allows an individual to locate that information.

The two instruments may be measuring tacit or explicit knowledge. Tacit knowledge is related to practical knowledge, knowledge that is implied or understood rather than expressed or declared. Self-directedness may be considered tacit knowledge because through lived experiences and learning opportunities, individuals may become self-directed learners. In other words, they may become self-directed through the act of learning by doing. Something that is learned by doing becomes second nature, therefore it becomes understood by others that the individual has that knowledge. Although self-directedness is not necessarily taught in college classrooms, Grow (1991/1996) and Hiemstra and Sisco

(1990) developed models that suggest self-directed learning can be taught. If the concept of self-direction is consider tacit knowledge, yet students never learn to take charge of their own learning or pursuit of information, they may not be able to be self-directed in a learning environment. Much like the administrators that were interviewed prior to this study, all claimed that college graduates become self-directed by virtue of the college experience. However, the college experience may be focused on the teacher as the authority figure and students may never have the opportunity to develop their self-directed learning skills. In fact, students' natural inclination towards self-direction may become stifled by rigid assignments that are designed by instructors with no room for students to pursue personal interests. Grow (1991/1996) developed the staged self-directed Learning model to help K-12 students becomes more self-directed by learning how to trust themselves and move from being dependent on their teachers towards being confident in their own abilities to learn on their own. Hiemstra and Sisco (1990) suggested the use of learning contracts to help students become more self-directed and able to take charge in a college classroom.

Explicit, or formal, knowledge can be articulated, codified and stored and is readily transmittable. Information literacy could be considered explicit knowledge because the skills are articulated and codified, as in the ACRL (2000) information literacy standards. The steps in information literacy instruction and models are stored and transmitted to learners, as is the case in the institution under study. One complaint levied against the American Library Association about the Standards was that they were almost entirely library focused. If information literacy is conceived in that manner, then students only learn how to formulate an information need based on assignments. They locate information from the Internet and possibly library catalogs and databases and evaluate what they found to see if it meets the requirements of the assignment. Information literacy instruction reinforces the use

of library resources for locating authoritative information. Focusing on how to use the periodical databases and library catalog to find pre-selected, authoritative information skews an individual's ability to evaluate all information that is located. Representative models (Eisenberg & Berkowitz's, 1990 Big6 Initiative; Cornell University Digital Literacy Resources (2012); Cornell University Undergraduate Information Competency Initiative (n.d.) of the emphasis in information literacy teaching demonstrate that the focus is on assignments and school projects rather than work world tasks or life roles. Paying attention to ways to complete school assignments, and utilizing pre-selected resources does not necessarily create a self-directed learner. Instructors and program developers should conceive information literacy more broadly and build in activities that stretch the instructional models one step further towards encouraging critical thinking on things such as: the benefits of utilizing authoritative information in a work setting, or determining which resources would effectively answer a life role issue (such as being a new parent).

Conceiving of the two concepts, self-directed learning and information literacy, as an orientation versus a navigation, or tacit versus explicit knowledge may play a significant role in the findings in this study. The PRO-SDLS assesses self-directed learning as an orientation, based on Brockett and Hiemstra's (1991) Personal Responsibility Orientation model. The Information Literacy Test, on the other hand assesses skills of navigating resources to locate specific information. Focusing on an individual's orientation towards self-direction in a college classroom implies that the individual has tacit knowledge, that they already know how to be self-directed but they may choose not to be. The PRO-SDLS, by having students rank their preferences supports the idea that self-directedness is tacit knowledge. On the other hand, the ILT measures explicit knowledge. The explicit knowledge is based on five standards of information literacy developed by the American

Library Association (1989) and the Association for College & Research Libraries (2000). The ILT is a multiple-choice test with correct and incorrect answers. The ILT measures skills and explicit knowledge that is codified, for example, reading a data table correctly or understanding that a particular citation is describing a book versus a journal article. Measuring behaviors through a self-report versus skills and knowledge through a graded test suggests that different things are being investigated and, thus, they may be mutually exclusive.

Low test reliability. Previous studies using the ILT indicated that two of the four subscales did not achieve minimum reliability (Cameron, Wise, & Lottridge, 2007; Wise, Cameron, Yang, & Davis, 2009). However, the reliability of the ILT test overall, using the composite scores yielded $\alpha = 0.88$, an acceptable reliability rate that matches the PRO-SDLS (see Table 9). Low reliability scores on two of the sub-scales could explain a lack of significance between the four subscales and the PRO-SDLS scores. Higher reliability scores on the four sub-scales may have supported claims in the literature that information literacy leads to self-directedness. Of the statistically significant relationships found, they were weak relationships.

Length of time. The average length of time to complete the demographic survey and the PRO-SDLS was 5 minutes, while the mean length of time to complete the ILT was 31 minutes (range = 8 to 84 minutes). If time was an issue and participants simply got tired of answering questions, they could have suffered from fatigue and focused on finishing the instrument as opposed to answering the questions accurately. Wise (2006) studied differences in the efforts of test takers in low-stakes testing. Galesic and Bosnjac (2009) found a negative relationship between response rates and length of a survey (Figure 9).

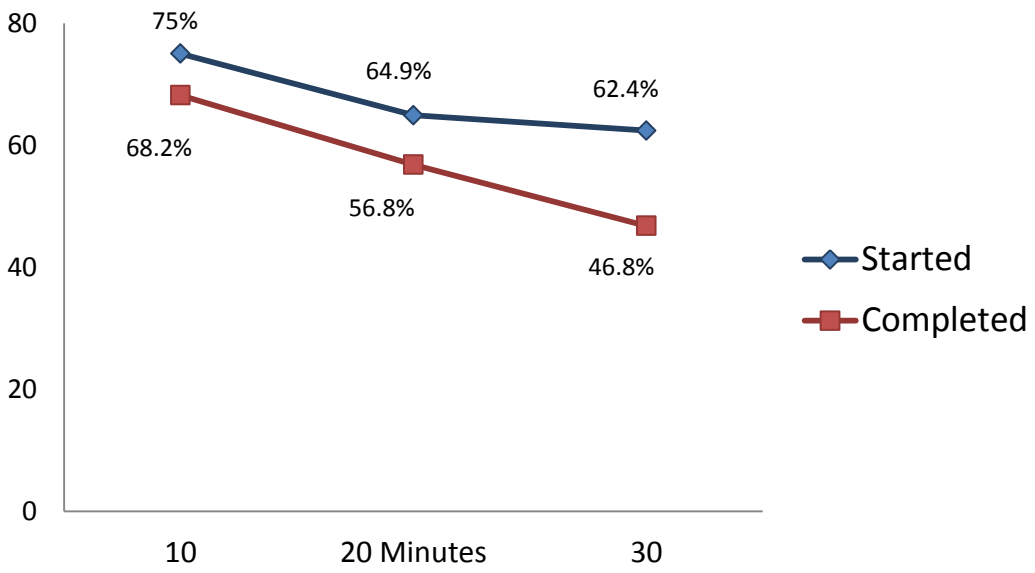

Figure 9. Starting rate and response rate based on survey length in minutes, based on data from Galesic and Bosnjac (2009). The number of respondents who started and completed the survey declined as the survey length increased.

Three possible reasons for the findings included the conception and measurement of self-directed learning and information literacy, low reliability scores on the ILT, and a large amount of time required to complete the process. While using different instruments may have yielded more significant results, the facts concerning alternative instruments made the use of the PRO-SDLS and the ILT the best choices to be made at the time.

Implications for Practice

Assuming the findings from this study are plausible, that information literacy skills do not create self-directed learners, instructional practices may need to be changed if higher education's goal is to graduate self-directed, lifelong learners. Some implications of this research include clearly defining self-directed learning and information literacy, reflecting on teaching practices and their effect on the development of self-directedness, providing more time for information literacy instruction, and increasing collaborations between faculty and librarians. Each of these implications is expanded upon below.

Information literacy needs to be clearly defined at the institutional or program level in order to ensure appropriate assignments and materials are provided to the students. By creating a clear definition, students can understand the specific goals and objectives while faculty can create practical assignments and discussions that increase both skills and preferences. Much like Bruce (1997) found in her research, the term *information literacy* does not clearly articulate how the term is being used. If, as Bruce (1997) found, information literacy is interpreted as focusing on information technology, information sources, information process, information control, knowledge construction, knowledge extension, or wisdom. Defining information literacy within a given setting will help students and faculty members understand how the term is being used in that setting. The institution where this research was conducted focuses information literacy within the concept of information technology communicates this on the syllabus template, while the librarians, who are instructors of information literacy, focus on information sources and process predominantly. There is disconnection between the institutional definition, the students' perception, and the librarians focus of instruction which creates a confusing situation. Conceivably the concept of information literacy, on the part of the institution as well as the librarians, needs to be broadened in order to help students become self-directed.

If the goal of teaching information literacy in college is to help develop self-directed learners, then instructors need to ask if they are teaching the right ideas or the right concepts. Are the materials, exercises, literature, and examples helping students become self-directed? Are the methods of evaluation appropriate for increasing critical thinking skills and direct application of the information literacy that is taught? Instructors focus on content and tend to leave the technology and resource instruction up to either the students to learn, or in the case of the institution in this study, the librarians to teach. While some faculty members

actively engage the librarians, the amount of class time allowed for information literacy instruction continues to decrease. In order for students to utilize information literacy skills to become self-directed, lifelong learners, the faculty and librarian-instructors need to reflect on the assignments students are given and how they interact with the resources available to them. Not only do the exercises and assignments need to be considered, but so too do the methods of evaluation and application towards practical use. The three programs in this study, bachelor's, master's, and doctoral are professional programs focused on the needs of adult learners. The programs were chosen because of their integration of life and work experiences as part of the curriculum and assignments. However, the findings did not indicate that information literacy skills had an impact on self-directed behaviors in the classroom. Because the findings did not support the claim that information literacy yields self-directed learners, the instructors in these three programs may need to consider how students are interacting with the assignments and what their programmatic goals are with relation to developing self-directed, lifelong learners.

Literature on information literacy (citations) states that librarians typically use the ACRL (2000) Standards for Information Literacy in a certain way; they focus on the broad areas but do not always include the subtleties in their instructional sessions, predominantly because they are not given sufficient time in the classroom. These subtleties include practice evaluating resources to determine the basis/evidence for a given argument, identifying bias, or understanding the implications of giving credit to authors or research that they use. Instead, students are exposed to statements such as only use library resources, be sure to use scholarly resources, or cite your information. The instruction session is a short rundown of how to use the library website, where to find the catalog and databases, a quick demonstration of searching a database and limiting results to scholarly articles, and a

sprint through how to cite information in APA or MLA style. To integrate these subtleties, librarian-instructors must have more time with students. One-shot demonstrations are effective for a small audience who needs a basic introduction to the library. Most of the one-shot sessions include providing handouts on the materials covered and contact information for the librarian. By demonstrating the use of information literacy skills and discussing how to apply evaluation methods, for example, students would be able to apply what they learned to their own lives. This application of skills and knowledge would help shape self-directed lifelong learners.

Faculty members and librarians need to increase collaboration on information literacy instruction and materials to include specific goals and definitions of the terms in relation to the institutional goals or the programmatic emphasis areas. For example, information literacy for education may be quite different than information literacy for business programs. For example, locating information on teaching methods from research articles may satisfy the needs of an education doctoral student, but business students may need to know how to evaluate web information and determine what information is valid for business decisions. If a definition at the institutional level were agreed upon and appropriate actions taken at freshman and sophomore levels, then programmatic definitions could be injected into the major curriculum at the junior and senior levels. The institution where this research took place created a university – wide plan to integrate information literacy throughout the curriculum at all levels, from undergraduate to graduate. While the plan integrates information literacy instruction at all levels, one suggestion is to modify the focus of information literacy, in the graduate professional programs, towards direct application in the work environment. Likewise, information literacy instruction at the undergraduate level should move from being dependent on assigned resources to being able to effectively

evaluate resources and to apply the information literacy skills to practical problems outside of the school environment. By providing a staged approach to information literacy, much like Grow's (1991/1996) work on self-directed learning, institutions could graduate self-directed, lifelong learners effectively.

Recommendations for Further Research

Upon review of the findings, several recommendations for further research were considered. These recommendations include: new instruments; qualitative research; different population characteristics and sizes; include work experience questions; clearer definitions; equivalent group sizes; factor and sub-scale analysis; and time analysis. The recommendations are discussed in detail below.

Instrument development. Because the PRO-SDLS measures behaviors and preferences while the ILT measure skills, different tests could be used to investigate the relationship between self-directed learning and information literacy. Three tests that measured each concept were discussed in Chapter II. The Self-Directed Learning Readiness Scale (Guglielmino, 1977) measures readiness, while the Oddi Continuing Learning Inventory (1984) evaluates continuing learning outside of a formal educational setting. The PRO-SDLS was chosen because of its focus on college students and practices within the college setting. Likewise, instruments evaluating information literacy skills did not fit the parameters of this study because the iSkills (ETS, 2011) test measures applied information – computer technology skills. SAILS (Project SAILS, 2000-2011) measures different components of IL and would have been an appropriate test to use, but raw data was not available to the researcher making comparisons impossible. Therefore, the Information Literacy Test, which focuses on college students, was utilized. Given the results and possible reasons for finding no statistically significant relationship between self-directed

learning and information literacy, further research could include developing a new instrument that integrated information literacy skills and self-directed learning. Both concepts could be clearly defined and related to one another. Using a panel of experts as well as pilot-tests, the instrument could measure how information literacy skills were directly applied to assignments, learning situations, and work problems. The basis for instrument development would be to tease out ways information literacy skills directly, or indirectly, affects self-directed learning behaviors and preferences. Perhaps

Qualitative studies. This study utilized quantitative methods to evaluate relationships between self-directed learning and information literacy among adult learners. While the quantitative data yields information about relationships, this method does not answer the questions of why there is no significant relationship, or how participants viewed information literacy, or what they mean by self-directed learning. Conducting qualitative research studies may provide greater insight into the views of self-direction and information literacy through the lens of the participants. Interviews and focus groups provide opportunities to have participants' voices integrated into the findings. Investigating Kuhlthau's Information Search Process (1983), using a phenomenological method would also yield useful descriptive information for faculty and librarians about the patterns and problems students face when trying to locate information. Expanding the ISP further, research could investigate the phenomenon of learners' information literacy skills and self-directedness in other settings and compare their actions in non-college settings to those in college settings.

Varying sizes, locations and programs. Future research should consider studies at other colleges and universities of varying sizes. Investigating the differences between small and large colleges as well as rural and metropolitan campuses would broaden the base of

information about adjustments based on the college setting and size. In addition, comparisons could be made between professional programs and liberal arts programs offered at various schools. Research questions could focus on investigating differences between students enrolled in terminal degree programs and liberal arts programs. Additionally, teaching methods that provide instruction and practice in being a self-directed learner, as well as possible incentives for students to take charge in a college course could be evaluated. Perspectives from both faculty and students could highlight problems or confusion on both sides as well as provide rich data for improvements institution-wide.

Work experience. Individuals' work experience and role at work may yield information about self-directedness and information literacy skills. Some jobs may require self-direction as a matter of getting the job done, while other jobs require more critical thinking, accessing, and using information. An interesting study would be to determine if skills used at work translate into skills used in college, whether at the perceptual or actual level. Considering work experience and work role may indicate the effects a college setting make a difference in practice. Additionally, preconceived notions of the student role versus the teacher role could be compared to role expectations at work. Information literacy skills used at work may not be the same as those needed for researching and writing a college paper, thus investigating work roles and experiences could provide insight into ways that information literacy could be taught during college so that the skills carry through at work.

Define demographic categories. Finally, if this research is to be repeated, defining specific demographic category parameters for participants is critical. For example, several students asked which GPA was requested; undergraduate, graduate, or cumulative. The research assumed students would put their current GPA. This assumption most likely created the heavily weighted GPA range and thus limited the findings for the demographic

variable, educational attainment. In future research, the exact definition of certain demographic variables, such as GPA, should be made explicit and as much information as possible should be gathered from institutional data.

Equal group sizes. Other recommendations for improvement of the research include increasing the number of participants, especially creating equal groups. The number of participants in the bachelor's group was smaller than the numbers in either the masters or doctoral groups. Increasing the number of participants from the smaller group may contribute to a statistically significant correlation. Future studies could also use the data from this research to integrate as a comparison group to achieve more equal group sizes.

Factor and sub-scale analysis. Explore the relationship between initiative on the PRO-SDLS and Standard 5 - Ethics & Understanding on the ILT. This negative, statistically significant relationship is puzzling and should be studied further to determine why a negative relationship was found in this sample. One possible explanation is that as a person's knowledge of ethical, legal, and social responsibilities for using information increase, their desire to start new projects decreases because of the weight of the steps that may need to be taken to secure permission to use information. For example, a documentary filmmaker may be ecstatic about starting a new project on a popular person or company. While engaging in the project, the individual learns about the rules and regulations required for permission, as well as cost of applicable fees, to utilize images or resources, that individual may be far less enthusiastic about the next project. Nonetheless, the negative relationship seems counter to the desires of administrators and instruction librarians.

Time and response effect. Utilizing instruments that do not take as long to complete, especially the ILT, may be needed. Considering the possibility that participants simply clicked answers on the ILT questions in order to finish the test may indicate that the

ILT is not useful for research of this type. An analysis of the click-through times on each ILT question could yield an answer to the possible effect of time on the results. If, for example, the response times are lower on the later questions, the argument could be made that there was a negative response effect due to the length of time.

Closing

The fields of information science – architect of information literacy, and adult education – progenitor of self-directed learning have a long, overlapping history and I was exhilarated to research the link between these two concepts. As a librarian and adjunct professor the results of this study are important to my practice. Working with programs at the graduate level, especially for professional degrees, focused my concern of encouraging self-direction by helping students become more information literate. The results of this study were not expected and the findings are curious. As Patricia Breivik (2000) stated, "Within today's information society, the most important learning outcome for all students is … being able to function as independent lifelong learners. The essential enabler to reaching that goal is information literacy" (para. 1). While this study did not find significant relationships between self-directed learning preferences and information literacy skills, the topic is worthy of further study to uncover ways in which information literacy instruction and skill development can lead to self-directed, lifelong learners.

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Appendices

Appendix A. Table of Search Results and Details for Evaluative Restrictions

Total Number of Items Chosen by Database Vendor

Vendor	SDL + HE[a]	SPL/ ST/ A/I/+HE[b]	AL + HE[c]	IL + HE[d]	PRO-SDLS[e]	PRO Model[f]	ILT + HE[g]	SDL + IL[h]
EBSCO	84	27	52	63	2	1	5	12
T-R	4	0	1	11	0	0	2	1
ProQuest	5	1	0	2	0	4	1	1

Note: Short-hand codes in this table represent seach strategies. [a]: SDL + HE represents ((“self-directed” and (“higher education” or college)). [b]: SDL/ SPL/ ST/ A/ I/ +HE represents (("self-planned learning" or "self-teaching" or "autonomous learning" or "independent study") and (“higher education” or college)). [c]: AL + HE represents ((“adult learner” or “non-traditional student”) and (“higher education” or college)). [d]: IL + HE represents ((“information literacy” and (“higher education” or college)). [e]: PRO-SDLS represents (PRO-SDLS or "personal responsibility orientation of self-direction in learning scale"). [f]: PRO Model represents (“personal responsibility orientation”). [g]: ILT + HE represents (("ILT" or “Information Literacy Test”) and ("higher education" or college)). [h]: SDL + IL represents (“self-directed learning” and “information literacy”)

The evaluative restrictions used to determine a final number of items for review included higher education setting, operationalized definitions, focus on learners rather than programs, and information literacy.

Higher education setting: exclusion of continuing education, self-service centers for community learning, high school students, and any informal learning environment.

Self-directed learning: the operationalized definition employed articulates that a student/learner has some control over choosing and designing some of their learning experience. The abstracts of items described as autonomous, self-managed, self-monitoring, self-reflective, and self-regulated learning, were evaluated to determine if the authors were conceptualizing the idea in a similar manner.

Learners not programs: Items focused on learners rather than programs or institutional level items, and included resources discussing the characteristics of adult learners, barriers to learning, specific experiences in different degree programs, and learner

engagement and experiences. Information such as marketing strategies, literacy planning, adult basic education, institutional improvement and policy, home study, continuing professional education, and programmatic evaluation, were excluded.

Information literacy: Most resources on information literacy focused on descriptions of specific programs, or attempts and successes at integration, the shift from a 60-minute bibliographic instruction session to information literacy teaching, technology tools, and elementary and secondary students.

Appendix B. Permission to Use PRO-SDLS

Tiffani,

I give you permission to use the PRO-SDLS. Have fun.

Susan Stockdale, Ph.D.
Chair of the Secondary and Middle Grades Department
Associate Professor of Educational Psychology and Middle Grades Education
Kennesaw State University

Appendix C. Permission to Use ILT

Hi Tiffani-
Congratulations on your doctoral work! Thank you for your interest in the Information Literacy Test (ILT). The James Madison University (JMU)/Center for Assessment and Research Studies forwarded your email. I am pleased to introduce Madison Assessment to the University of Michigan. Madison Assessment has partnered with JMU and will be distributing and supporting the ILT, Scientific Reasoning (SR), Quantitative Reasoning (QR) and the US Society and Politics (USSP) assessment tests (the Test of Oral Communication Skills (TOCS) will be offered in 2012).

Information on the ILT can be found on our website (www.madisonassessment.com). The cost is $8/test and that includes a full data report and a complimentary Student Opinion Survey (10 questions on student motivation plus 3 informational questions). The test is administered online in a proctored environment. Unfortunately we do not allow copies of the test to be distributed - we assure our clients that our test content has not been compromised. We do have PhD candidate's use our test, but they do pay for each test administered.

There are demo questions for you to view on the website. If you wish to take the full test, please 'sign' our electronic Online Ordering Form (https://www.madisonassessment.com/order-now/) and we can provide access to your evaluation team.

Please advise if you have any additional questions.

Best,
Richelle
Have a Nice Test!

Richelle Burnett
Chief Executive Officer
Madison Assessment LLC - ***Assess Your Success!***
202.480.8068 (o)
202.494.0961 (m)
www.madisonassessment.com

Appendix D. Informed Consent Form

The Relationship between Self-Directed Learning and Information Literacy among Adult Learners in Higher Education

INTRODUCTION

Students are invited to participate in a research study. The purpose of this study is to determine if a relationship exists between self-directed learning and information literacy skills and knowledge.

INFORMATION ABOUT PARTICIPANTS' INVOLVEMENT IN THE STUDY

Participants will complete a demographic survey, the PRO-SDLS self-rating scale, and the ILT test during a designated class period.

The demographic survey will collect basic descriptive information about participants. The Personal Responsibility Orientation in Self-directed Learning Scale (PRO-SDLS) is a self-rating scale measuring self-directed learning behaviors. The Information Literacy Test (ILT) is a 60-item, multiple-choice instrument investigating an individual's competency levels on information literacy skills.

All instruments will be completed online and should take approximately 75-minutes.

RISKS

Risk is minimal in that the anticipated risk of harm that is no greater, considering probability and magnitude, than risks ordinarily encountered in daily life or during the performance of routine physical or psychological examinations or tests.

BENEFITS

This research will contribute to the body of knowledge about non-traditional, adult college students and the development of self-directed learning and information literacy skills. Participants will learn about their own self-directedness in the college classroom as well as their level of information literacy competency. This knowledge will help participants identify areas of competency and inform them about areas of improvement.

CONFIDENTIALITY

All information in the study records will be kept confidential. Data will be stored securely and will be made available only to persons conducting the study unless participants specifically give permission in writing to do otherwise. No reference will be made in oral or written reports which could link participants to the study.

COMPENSATION

There is no compensation for participating in this study.

CONTACT INFORMATION

If you have questions at any time about the study or the procedures, (or you experience adverse effects as a result of participating in this study,) you may contact the researcher, Tiffani R. Conner, at 421 Park 40 North Blvd, Knoxville, TN 37923, and (865) 531-4119. If you have questions about your rights as a participant, contact the Office of Research Compliance Officer at (865) 974-3466.

PARTICIPATION

Your participation in this study is voluntary; you may decline to participate without penalty. If you decide to participate, you may withdraw from the study at any time without penalty and without loss of benefits to which you are otherwise entitled. If you withdraw from the study before data collection is completed your data will be returned to you or destroyed.

CONSENT

I have read the above information. I have received a copy of this form. I agree to participate in this study.

Participant's signature _____ Date _____

Investigator's signature _____ Date _____

Appendix E. Study Information Sheet

The Relationship between Self-Directed Learning and Information Literacy in the Development of Adults Learners in Higher Education

INTRODUCTION

Students are invited to participate in a research study. The purpose of this study is to determine if a relationship exists between self-directed learning and information literacy skills and knowledge.

INFORMATION ABOUT PARTICIPANTS' INVOLVEMENT IN THE STUDY

Participants will complete a demographic survey, the PRO-SDLS self-rating scale, and the ILT test during a designated class period.

The demographic survey will collect basic descriptive information about participants. The Personal Responsibility Orientation in Self-directed Learning Scale (PRO-SDLS) is a self-rating scale measuring self-directed learning behaviors. The Information Literacy Test (ILT) is a 60-item, multiple-choice instrument investigating an individual's competency levels on information literacy skills.

All instruments will be completed online and should take approximately 75-minutes.

RISKS

Risk is minimal in that the anticipated risk of harm that is no greater, considering probability and magnitude, than risks ordinarily encountered in daily life or during the performance of routine physical or psychological examinations or tests.

BENEFITS

This research will contribute to the body of knowledge about non-traditional, adult college students and the development of self-directed learning and information literacy skills. Participants will learn about their own self-directedness in the college classroom as well as their level of information literacy competency. This knowledge will help participants identify areas of competency and inform them about areas of improvement.

CONFIDENTIALITY

All information in the study records will be kept confidential. Data will be stored securely and will be made available only to persons conducting the study unless participants specifically give permission in writing to do otherwise. No reference will be made in oral or written reports which could link participants to the study.

COMPENSATION

There is no compensation for participating in this study.

CONTACT

If you have questions at any time about the study or the procedures, (or you experience adverse effects as a result of participating in this study,) you may contact the researcher, Tiffani R. Conner, at 421 Park 40 North Blvd, Knoxville, TN 37923, and (865) 531-4119. If you have questions about your rights as a participant, contact the Office of Research Compliance Officer at (865) 974-3466.

PARTICIPATION

Your participation in this study is voluntary; you may decline to participate without penalty. If you decide to participate, you may withdraw from the study at any time without penalty and without loss of benefits to which you are otherwise entitled. If you withdraw from the study before data collection is completed your data will be returned to you or destroyed.

Appendix F. Demographic Survey

1. ID number (provided at site)
2. Age Range (18-24, 25-34, 35-44, 45-54, 55-64, 65+)
3. Work Experience (Years worked in paid employment, full or part time)
4. Work Role (Employee, Supervisor, Manager, Administrator)
5. College GPA (self-report)
6. Educational Attainment (HS, AS, AAS, BA/BS, MA/MS, EdS or post-graduate degree, Doctoral degree)
7. Ethnicity (Black, White, Asian, Hispanic, Other, Mixed Heritage)
8. Do you consider yourself to be a self-directed learner defined as: a learner who can diagnose their needs, formulate goals, identify resources, choose and implement appropriate strategies, and evaluate outcomes?

- Yes
- No

9. Do you prefer to be in charge of what you learn and how you learn it in college classes?

- Yes
- No

10. When you begin searching for information for a class assignment do you feel: (check all)

Uncertain	Clear
Confused	Confident
Frustrated	Optimistic
Doubtful	

11. When assigned a research paper, how do you familiarize yourself with a new topic? (check all)

Friends	Work colleagues
Google	Journal databases
Wikipedia	Research articles
Dictionary	Magazine articles
Librarian	Books
Professor	Newspapers

Appendix G. PRO-SDLS

Please indicate one answer for each statement below. Reflect on your recent learning experiences in college – not just those experiences from this class. There are no "right" answers to these statements.

ITEM	Strongly Disagree	Disagree	Sometimes	Agree	Strongly Agree
1. I am confident in my ability to consistently motivate myself.					
2. I frequently do extra work in a course just because I am interested.					
3. I don't see any connection between the work I do for my courses and my personal goals and interests.					
4. If I'm not doing as well as I would like in a course, I always independently make the changes necessary for improvement.					
5. I always effectively take responsibility for my own learning.					
6. I often have a problem motivating myself to learn.					
7. I am very confident in my ability to independently prioritize my learning goals.					
8. I complete most of my college activities because I WANT to, not because I HAVE to.					
9. I would rather take the initiative to learn new things in a course rather than wait for the instructor to foster new learning.					
10. I often use materials I've found on my own to help me in a course.					
11. For most of my classes I really don't know why I complete the work I do.					
12. I am very convinced I have the ability to take personal control of my learning.					
13. I usually struggle in classes if the professor allows me to set my own timetable for work completion.					
14. Most of the work I do for my college is personally enjoyable or seems relevant to my reasons for attending college.					
15. Even after a course is over, I continue spending time learning about the topic.					

16. The primary reason I complete course requirements is to obtain the grade that is expected of me.					
17. I often collect additional information about interesting topics even after the course has ended.					
18. The main reason I do the course activities I do is to avoid feeling guilty or getting a bad grade.					
19. I am very successful at prioritizing my learning goals.					
20. Most of the activities I complete for my college classes are NOT really personally useful or interesting.					
21. I am really uncertain about my capacity to take primary responsibility for my learning.					
22. I am unsure about my ability to independently find needed outside materials for my courses.					
23. I always effectively organize my study time.					
24. I don't have much confidence in my ability to independently carry out my study plans.					
25. I always rely on the instructor to tell me what I need to do in a course to succeed.					

Each question is scored as:
1 point for Strongly Disagree
2 points for Disagree
3 points for Sometimes
4 points for Agree
5 points for Strongly Agree

The shaded items are *reverse scored*.

Appendix H. Crosstabs

Crosstabs for ISP Affect Categories, First Starting Search for Class Assignment

	Bachelor's (n=19)		Masters (n=56)		Doctoral (n=62)	
	N Resp	Percent	N Resp	Percent	N Resp	Percent
Uncertain	5	26%	13	23%	21	34%
Confused	2	11%	6	11%	9	15%
Frustrated	5	26%	5	9%	11	18%
Doubtful	1	5%	5	9%	9	15%
Clear	6	32%	14	25%	16	26%
Confident	9	47%	35	63%	27	44%
Optimistic	7	37%	25	47%	26	42%

NOTE: Totals are over 100%, multiple choices were allowed.

Crosstabs of Initial Resources Used for Assigned Paper

	Bachelor's (n=19)		Masters (n=56)		Doctoral (n=62)	
	N Resp	Percent	N Resp	Percent	N Resp	Percent
Friends	2	11%	14	25%	8	13%
Librarian	0	0%	7	13%	5	8%
Professor	5	26%	17	30%	22	35%
Work colleagues	1	5%	9	16%	14	23%
Google	18	95%	41	73%	48	77%
Wikipedia	6	32%	22	39%	7	11%
Journal databases	7	37%	30	54%	38	61%
Research articles	9	47%	27	48%	42	68%
Magazine articles	5	26%	14	25%	14	23%
Dictionary	6	32%	6	11%	4	6%
Books	7	37%	17	30%	16	26%
Newspaper	2	11%	12	21%	2	3%
Other	0	0%	4	7%	1	2%

NOTE: Totals are over 100%, multiple choices were allowed.

Vita

Tiffani Conner completed her Bachelor of Arts degree in Sociology with a concentration in Environmental Sociology, a Master of Science degree in Educational Psychology with a concentration in Adult Education, and a Master of Science degree in Information Science, at The University of Tennessee. Ms. Conner has worked as an academic librarian at The University of Tennessee, The University of Connecticut, and Lincoln Memorial University; she is also an adjunct professor at Lincoln Memorial University. Ms. Conner completed her Doctor of Philosophy degree in Educational Psychology and Research, with a concentration in Adult Learning, in December, 2012.