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THE RELATIONSHIP BETWEEN SELF-DIRECTED LEARNING READINESS AND LEARNING STYLE PREFERENCES ON EMPLOYEE LEARNING IN A PUBLIC LIBRARY SYSTEM

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THE RELATIONSHIP BETWEEN SELF-DIRECTED LEARNING READINESS AND LEARNING STYLE PREFERENCES ON EMPLOYEE LEARNING IN A PUBLIC LIBRARY SYSTEM

A DISSERTATION APPROVED FOR THE
DEPARTMENT OF EDUCATIONAL LEADERSHIP AND POLICY STUDIES

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Dedication

This work is dedicated to:

My late Grandmother, Orvilla Irene Madsen Scott

for encouraging me to go to college.
You always knew I had so much potential.
I wish you were here to witness my accomplishments.

and

My wife, Melody L. Tunender-Schrank

for believing in me and supporting my wish to
move our family to Oklahoma to pursue this goal.

and

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my educational journey – I hope I have inspired you!

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Abstract

This quantitative correlational study investigated to what degree a relationship exists between self-directed learning readiness and learning style preferences on employee learning by sampling 169 employees employed in a large public library system located in a metropolitan city in a Southwestern state. General demographic information on the sample was also gathered and analyzed. The instruments used in this study included the Self-Directed Learning Readiness Scale (SDLRS), Kolb's Learning Style Inventory (LSI), and a researcher designed pre-test / post-test measure where the resulting scores were used to calculate the employees' learning gain. An online self-directed learning program was employed to increase employees' understanding of various web-based applications currently being utilized by the public library system.

The majority of the public library system employees scored in the above average category of readiness for self-directed learning, indicating that they perceived themselves as ready to engage in self-directed learning. The sample was fairly evenly distributed among the four learning preferences of the LSI with the learning preference known as concrete experience being the most preferred.

No significant correlations were found to exist between SDLRS scores and learning gain, or between the learning styles and learning gain. While no significant relationships were found, public library system

employees had a strong preference for the learning preference of concrete experience with 80% of the participants scoring in the 61-100 percentiles.

Self-directed learning readiness did have significant correlations to the employees' perceived understanding of the digital applications contained in the self-directed learning program both before and after completing the online self-directed learning program. There were also significant positive relationships between employees who had higher levels of understanding of the digital applications and the learning preferences of concrete experience and reflective observation both prior to and after participating in a self-directed learning program. A significant negative correlation was seen between concrete experience and post-participation perceived understanding of the digital applications.

Further details about the results of this study are included as well as a discussion of the findings and implications for future research.

Chapter One

In a world that is constantly changing, there is no one subject or set of subjects that will serve you for the foreseeable future, let alone for the rest of your life. The most important skill to acquire now is learning how to learn.

--John Naisbitt

Introduction

Employee training and development is an essential component of workplace progress. Figures in the American Society of Training and Development's (ASTD) *State of the Industry, 2011* report estimated U.S. organizations averaged more than $1,200.00 per employee on learning in 2010, an increase of 13.6 percent from 2009 (ASTD, 2011). When the direct expenditure of training and development is calculated as a percentage of payrolls, ASTD's (2011) results showed a percentage of 2.26 among the consolidated responses. However, in the most recent published figures by the American Library Association related to spending on employee development and training in libraries showed "academic and public libraries spent an average of 1.26 percent of total payroll on staff development and training" (Lynch, 2001, para. 1). The results also indicated large public libraries, those serving populations over 100,000 patrons, actually spent the least at .98 percent (Lynch, 2001, para. 1).

These figures suggest employee learning and development is happening in a variety of organizations, including public libraries, and

substantial budgetary dollars are being spent each year on employee learning. Employees of any organization must engage in continual learning to enhance their current abilities, skills, and knowledge, to continue to meet organizational and customers' expectations.

Human beings are unique and are shaped by what they learn. With recognition of this uniqueness comes the belief that individuals naturally prefer certain styles of learning to meet their educational needs (Kolb, 1984). Kolb's four learning styles are defined by "a person's relative emphasis on the four modes of the learning process" including concrete experience (CE), reflective observation (RO), abstract conceptualization (AC), and active experimentation (AE). The four modes exist on two intersecting continuums CE – AC and RO – AE and define a learner's preference for abstractness over concreteness and experience over observation respectively. The quadrants established by the intersection of the two continuums identify the four basic preferred learning styles: Diverger (CE – RO), Assimilator (RO – AC), Converger (AC – AE), and Accommodator (CE – AE).

In addition to identifying an employee's preferred learning style, understanding a person's self-directed learning readiness can help shed light on how individuals learn. Built on Knowles' andragogical assumption that learners become increasingly self-directed as they mature, self-directed learning is seen as a major thrust of adult education research (Merriam &

Caffarella, 1999). Confessore (1992) defined self-directed learning in the workplace as “the situation where an employee perceives a need for information, identifies the appropriate learning resource, and undertakes an activity that allows the learning (or training) to take place” (p. 8). This interaction could be as simple as one employee asking another for specific information about how to accomplish some task. Guglielmino and Roberts (1992) stated, “As the lines between work and learning increasingly blur on the job, the ability to learn on one’s own, in a self-directed way, becomes more valuable in the workplace” (p. 261).

Not unlike many other organizations, public libraries are faced with the challenge of keeping their employees continuously updated on the latest information, trends, and technologies to ensure a capable workforce and overall organizational effectiveness. With public libraries being the go-to location for access to free public Internet, social networking, information sharing, government forms, and e-government resources, library employees are being challenged to build their digital skills and knowledge to meet customer needs in physical and virtual library spaces. Today’s public libraries are dynamic environments providing a plethora of resources in traditional and digital formats that are continually changing to keep pace with the latest technology and trends.

As these changes take place, employees need to keep abreast and adapt their development accordingly. Traditionally, employee development

in public libraries was restricted to educational sessions taught by an instructor in a classroom setting. With the time and expense of sending employees to these formal training opportunities, organizations were limited on the number of classes offered and the frequency of employees attending these sessions. However, with the development of technology, new forms of online and self-directed learning are now available to help facilitate employee development. The rapidly changing work environment drives the need for individuals to be more self-directed in their learning. What is not understood is the readiness level of employees to participate in these new methods of learning and whether or not these methods of learning would be preferred or effective.

While online and self-directed learning methods may not be a preferred method for all learners, identifying an employee's preferred learning style and his or her readiness for self-directed learning could help to determine if these types of learning activities could be implemented as a part of a public library's employee development offerings to help their employees learn skills and knowledge to meet the ongoing needs of their job. This information could be beneficial to library administrators and training professionals as they consider employee development opportunities for employees in their organizations.

With the vast amount of information now available in both digital and traditional methods, employees are continually challenged to apply relevant

information to their own work situations. Senge (1990) in his book, *The Fifth Discipline,* referred to today's organizations as learning organizations that require employees to adapt to change and transformation through motivated self-directed learning and critical thinking. Yet, research on work-related self-directed learning is still in its infancy.

With the rapid development and expansion of technology and information available in public libraries, current strategies for training and disseminating this information may no longer be effective. Within the field of adult education the study of self-directed learning readiness and learning styles is often undertaken, but little attention is given to the relationship between these two variables – especially in work-related settings existing outside an academic environment.

Purpose

The purpose of this quantitative correlational study was to investigate to what degree a relationship exists between readiness for self-directed learning and learning style preferences on employee learning in a public library system.

Adenuga (1989) conducted a similar study on the relationship between self-directed learning readiness, learning styles, and selected demographic factors with a population of part-time and full-time graduate students from a single academic campus. What was missing from this study was an attempt to understand the relationship of these factors on the

students' learning. This study attempted to understand the relationship between self-directed learning readiness and learning style preferences on employee learning (learning gain) in a population outside an academic environment. This study sought to answer the following research questions:

1. What are the self-directed learning readiness levels of employees in a public library system?
2. Is there a relationship between the public library system employees' readiness for self-directed learning and their learning gain following the completion of a self-directed learning program at work?
3. Where do public library system employees score on the transformational continuum of Kolb's Learning Style Inventory (LSI)?
4. Is there a relationship between a public library system employees' transformational continuum score and their learning gain following the completion of a self-directed program at work?
5. Is there a relationship between public library system employees with a greater preference for Active Experimentation (AE) on the transformational continuum (LSI score) and greater self-directed learning readiness (SDLRS score)?

Significance

This study focused on understanding the relationships between self-directed learning readiness and learning style preferences on employee learning. While the constructs of self-directed learning readiness and learning styles have been extensively studied, research on these two constructs as they relate to employees in a public library system is virtually nonexistent. The goal of this study was to add to the research base and literature on these two theories especially as it relates to employee learning in public library systems.

Identifying if relationships existed may provide library leadership with a more in-depth understanding of the individual characteristics that influence employee learning. The results of this study could also contribute to the learning strategies in other fields such as library and information science, human resource development, and organizational development.

Assumptions

A few assumptions were made in order to conduct this study. They include:

1. Guglielimo's (1977) Self-directed Learning Readiness Scale is a valid and effective instrument for estimating the participants' readiness for self-direction in their learning.

2. Kolb's (1985) Learning Style Inventory is a valid and effective instrument for assessing participants' preferences for leaning abilities and learning styles.
3. The pre/post test measure is a valid and effective instrument for measuring the participants' knowledge of various web-based applications currently being utilized by the public library system.
4. Participants will respond honestly to the questions contained in the various questionnaires/instruments utilized in this study.
5. Participants are able to effectively evaluate and report their perceptions about the questions being asked.

Limitations

The main study limitations are summarized as follows: First, the study sample was comprised of adult employees working in one public library system; thus the results are not generalizable beyond the sample. Secondly, the SDLRS, the LSI, pre-test, and post-test are all self-report measures with the usual limits associated with this type of instrumentation.

Definitions

Accommodator – One of Kolb's (1984) learning style types and emphasizes concrete experience and active experimentation. "The greatest strength of this orientation lies in doing things, carrying out plans and tasks and getting involved in new experiences" (p.78).

Adulthood – Defined as psychologically arriving at a "self-concept of being responsible for our own lives, of being self-directing" (Knowles, 1990, p. 57).

Assimilator – Another of the learning styles identified by Kolb's (1984) Learning Style Inventory. This style emphasizes abstract conceptualization and reflective observation and is "less focused on people and more concerned with ideas and abstract concepts" (p. 78).

Converger – One of Kolb's (1984) four learning styles in which the learner "prefers to deal with technical tasks and problems and not about social and interpersonal issues" (p.78). This style has abilities of abstract conceptualism and active experimentation.

Diverger – Another of Kolb's learning style types. With this style the learner combines learning by concrete experience and reflective observation. Kolb noted, "The greatest strength of this orientation lies in imaginative ability and awareness of meaning and value" (p. 78).

Kolb Learning Style Inventory (LSI) – Survey instrument designed to measure four distinct learning styles or preferences on two intersecting continuums (Kolb, 1984).

Learning – "The process of creating knowledge" (Kolb & Kolb, 2006, p. 47).

Learning Gain – Determined by calculating how much the employee gained out of the total possible that he or she could have gained from pre to post-test (Williams, 2013).

Learning Preference Assessment (LPA) - The preferred name of the Self-Directed Learning Readiness Scale when it is administered to respondents (Guglielmino & Associates, 2012).

Learning Project – "A highly deliberate effort to gain and retain certain definite knowledge and skill" (Tough, 1979, p.250).

Learning style orientation – Four primary scores on the LSI used to identify an individual's preferred method of receiving and processing information designated as concrete experience (CE), reflective observation (RO), abstract conceptualization (AC), and active experimentation (AE) (Kolb, 1984).

Prehension Continuum – One of two intersecting continuums on Kolb's Learning Style model. An individual's score (from high to low) on this continuum is his or her preference for abstractness over concreteness (AC-CE).

Self-directed learning – "A process in which individuals take the initiative, with or without help from others, in diagnosing their learning needs, formulating goals, identifying human and material resources, choosing and implementing earning strategies and evaluating learning outcomes" (Knowles, 1975, p. 18).

Self-directed learning readiness – An individuals' preference for participating in learning activities, which are more self-directed as opposed to instructor-directed.

Self-Directed Learning Readiness Scale (SDLRS) – Survey instrument designed to measure the complex of attitudes, skills, and characteristics that comprise an individual's current level of readiness to manage his/her own learning (Guglielmino, 1977).

Transformation continuum – One of two intersecting continuums on Kolb's Learning Style model. An individual's score (from high to low) on this continuum is his or her preference for action over reflection (AE-RO).

Chapter Two

All human beings, by nature, desire to know.

-- Aristotle

Introduction to the Literature

As the workplace reacts to new technologies and the seamlessly unending amounts of information, employees need to be able to adapt to these new surroundings with limited barriers. Beebe, Mottet, and Roach (2004) state, “Employees have limited time and energy on the job, and they resent attending training programs they perceive to be of little relevance to their lives and work” (p. 29).

With the technological advancements, the ability to participate in training activities can happen at any time the employee wishes via online formats and using newly designed computer software. What is not known, however, is the employees’ readiness for these more self-directed learning methods and if this style of learning is preferred to more traditional methods. Understanding how employees learn is a key component in helping administrative and training professionals design training opportunities to effectively meet the learning needs of their employees.

This literature review begins with a theoretical background of adult learning, including the aspects of self-directed learning, self-directed learning readiness, experiential learning, learning style orientations, and employee learning. Additionally, an examination of previous studies that

may suggest a relationship between self-directed learning and learning styles on employee learning were also included.

Adult Learning

Throughout the years, numerous researchers and scholars have sought to better understand the various aspects related to adults and their learning practices. A major contributor to the field of adult learning is Lindeman (1926). In his book, *The Meaning of Adult Education,* he stated:

> Adult education is an attempt to discover a new method and create a new incentive for learning; its implications are qualitative, not quantitative. Adult learners are precisely those whose intellectual aspirations are least likely to be aroused by the rigid, uncompromising requirements of authoritative, conventional institutions of learning (p. 19).

Adult learning is often associated with the learning strategy known as andragogy. “Andragogy is defined as the art and science of helping adults (or even better, maturing human beings) learn” (Knowles, 1975, p.19). Early learning theory did not differentiate the learning strategies utilized by children from those used by adults. However, the revolutionary work established by Lindeman (1926) was the start of the push towards adult education needing to be more student-centered rather than the teacher-centered or subject-centered format utilized in the education of children. It was Lindeman’s formative work that later influenced Knowles’ andragogical work.

Knowles (1990) indicated studies completed by Thorndike in 1935 and Sorenson in 1938 provided “scientific evidence that adults could learn

and that they possessed interests and abilities that were different from those of children" (pp. 28-29). In 1967, Knowles began referring to adult learning as andragogy. Knowles (1980) attributed the difference in learning between children (Pedagogy) and adults to an adult's "growing reservoir of experience that becomes an increasingly rich resource for learning" (p. 44). The andragogical model proposed by Knowles (1990) contains several assumptions that differ from those of the pedagogical model including:

1. Adults need to know why they need to learn something before they take on the task of learning.
2. Adults have the self-concept of being responsible for their own decisions, for their own lives.
3. Adults bring a broad range of experiences to their learning activities.
4. Adults become ready to learn things that they need to know to be able to function in real-life situations.
5. Adults have a life-centered (or problem-centered) orientation to learning.
6. Motivation – both external and internal. (pp. 57-63)

When this model was first presented in the book *The Modern Practice of Adult Education: Andragogy Versus Pedagogy* in 1970, Knowles began receiving feedback from elementary and secondary school teachers who were experimenting with various aspects of the andragogical model in their

classrooms and those students were experiencing learning successes (Knowles, 1990). As a result, his 1980 revision the title of the book contained the subtitle *From Pedagogy to Andragogy* to reflect how both models have applications that apply to a broad spectrum of individuals and learning situations.

While Knowles' presentation of andragogy and its relationship to adult learning is highly regarded (many individuals refer to Knowles as the father of adult learning) there are those who question whether or not it is actually a theory of adult learning. Merriam and Caffarella (1999) stated, andragogy is "the best known 'theory' of adult learning," but that "it has also caused more controversy, philosophical debate, and critical analysis than any other concept/theory/model proposed thus far" (pp. 249-250). Davenport and Davenport (1985) highlighted the chronology and analysis of the andragogy debate up to that point in the *Adult Education Quarterly*. Based their analysis, the authors concluded, "An analysis of the andragogy debate suggests that this issue will continue to liven adult education discussions for some time" (p. 157).

Others, too, have established criticism of andragogy as a theory of adult learning. For example, Hartree (1984) in her critique of Knowles' theory of andragogy outlined three areas of confusion about the proposed theory. These concerns included "whether he is presenting a theory of teaching or one of learning"; "relationship he sees between adult and child

learning"; and "as to whether he is dealing with theory or practice" (p. 204). Brookfield (1986) questioned the assumptions and to what extent a "set of well grounded principles of good practice" will result. Cross (1981) stated, "Whether andragogy can serve as a unifying theory of adult education remains to be seen" (p. 227).

While individuals have challenged Knowles' theory of andragogy, Merriam and Caffarella (1999) stated, andragogy is an "enduring model for understanding certain aspects of adult education" and serves as an integral piece in the study of adult learning (p.278). Based on Knowles assumptions, to experience learning success in the andragogical model, self-directedness is a priority for the adult learner.

Self-Directed Learning

Self-directed learning (SDL) is an integral part of adult learning and has been a part of adult learning for decades. In fact, Bouchard (1996) pointed out that SDL occurs in every stratum of society and in populations with extremely diverse educational backgrounds (p.13). Lamdin (1997) referred to SDL as "personal learning" and pointed out that it is most commonly triggered by some event in one's life. He goes on to declare that each adult learner needs to "own" his or her learning project by being in control of what is learned, when the learning starts, where it goes and when it is complete (p. 118).

Beginning in the 1950's, Houle undertook a series of research to focus on understanding the process of adult learning while serving as a visiting professor at the newly formed University of Wisconsin – Milwaukee campus. Houle's studies were designed to discover why adults engage in continuing education but also contained indications of how they learn (Knowles, 1990). Analysis of the participant interview data resulted in Houle identifying three categories of adult learners – goal-orientated, activity-orientated, and learning-orientated. These categories of adult learners served as the foundation of his research and resulted in his seminal work, *The Inquiring Mind,* where the term self-directed learning was introduced (Houle, 1961). His research findings suggested that adults are motivated to participate in learning activities because such involvement will help them: accomplish specific learning goals; seek knowledge that is personally gratifying; and participate in activities they find to be socially gratifying (Ponton, Derrick & Carr, 2005).

Researchers Johnstone and Rivera (1965) expanded on Houle's position of adults as self-directed learners by identifying that as many as nine million American adults conduct one or more self-instruction projects each year. Tough (1979) expanded on Johnstone and Rivera's (1965) findings with his research indicating 90 percent of the population was involved in one self-directed learning project a year, with the average adult being involved in five to seven SDL projects. He continued, "About 70% of

all learning projects are planned by the learner [himself], who seeks help and subject matter from a variety of acquaintances, experts, and printed resources" (Tough, 1979, p.1). Confessore (1992) called self-directed learning a "natural" process and insists that individuals who work with human behavior must recognize "…the very first step must be to recognize that self-direction in learning is natural and productive" (xi).

Tough (1968) believed that adults were more motivated to participate in independent learning activities over more formal learning because of such variables as the pacing, their personal learning style, lack of classes, flexibility, immediacy, and cost. Later, Tough (1979) referred to these learning activities as "projects" and defined them as "a highly deliberate effort to gain and retain certain definite knowledge and skill" (p.250). According to Tough (1979), an activity had to meet an arbitrary minimum to be considered a learning project. The parameters he established included a minimum of seven hours of time need to be spent on the project and this time needed to take place within a six month time period. He also set two days as the minimum length of time for retention in order to qualify as a learning project (Tough, 1968, 1979). Using these parameters as a foundation, major studies have found adult participation in self-directed learning projects range from 70% (Tough, 1979) to more than 90% (Livingstone, 1999). Tough (1979) commented:

> Perhaps the next 20 years will produce several important additions to what we try to learn. In 1990, when people look back to our

> conception of what adults can learn, will they be amused by how narrow it is? (pp. 43-44).

Self-directed learning is also becoming more commonplace in workplace training. Companies such as Motorola, Disney, and American Airlines have integrated self-directed learning strategies into their corporate training departments (Guglielmino & Murdick, 1997). In 1992, Guglielmino and Roberts conducted a comparative study of self-directed learning readiness and implications for job performance with employees at telecommunication companies in the United States and Hong Kong. Their study findings indicated “a clear positive relationship” between the employee’s level of self-directed learning and his or her reported job performance rating – the higher the level of readiness the higher the level of job performance (p. 270). The researchers noted, “the implications of this study could be important for organizations that are involved in businesses that are rapidly changing or require a higher degree of problem-solving ability and creativity” (p. 270).

Self-directed learning is also starting to be a focus in the field of library and information studies. Varlejs (1996) explored the relationship between self-directed learning projects and professional achievement of librarians who were members of the American Library Association and working in a library in the United States. She found a high level (77%) of participation by the respondents in self-directed learning projects (p.64). However, the results of her study indicated a lack of a relationship with the

data suggesting “learners are not necessarily achievers, or at least are not the same individuals who hold more senior positions, earn higher salaries, publish, and get elected to office” (p. 98). In an article for *Library Journal*, Varlejs (1999) recommended future study focus on “how the electronic environment affects continuing professional learning” (p. 194). Li (2001), a student of Varlejs, took this advice in her qualitative study of librarians’ learning in two university libraries in Taiwan. Findings indicated librarians use many different strategies for their learning with learning from people as a “major route” (p. 135). Self-directed learning was also a preferred method. Even technologies, such as the Internet and email, were identified as tools librarians used to learn in the workplace. Li (2001) also indicated the learning these librarians utilized was experiential and “echoes Kolb’s assertion that learning is a continuous process grounded in experience” (p. 137). What is missing in the research is a better understanding of how library employees working in public libraries learn and to what extent does self-directed learning readiness and learning style preference impact the employee’s learning.

While self-directed learning of employees is being studied in a variety of organizations, this research study focused on understanding if employees are ready for this type of learning. Conn (2000) in her study of self-directed learning in the workplace highlighted the need for methods to identify individuals as self-directed learners and then potentially target them for self-

directed learning opportunities at work. One such method for measuring this readiness is the Self-Directed Learning Readiness Scale (SDLRS).

Self-Directed Learning Readiness Scale

As one of Knowles' six assumptions of the andragogical model, learning readiness relates to adults being ready to "learn those things they need to know and be able to do in order to cope effectively with their real-life situations" (1990, p.60). In an effort to measure the readiness levels of individuals to participate in self-directed learning, a variety of scales have been created and tested, however, Brockett and Hiemstra (1991) ascertained the readiness scale developed by Guglielmino (1977) was the most widely used instrument to measure self-directed learning readiness.

Guglielmino (1977) developed the Self-Directed Learning Readiness Scale (SDLRS) to specifically measure an individual's personality characteristics, attitudes, and abilities related to managing his or her own learning. The adult version of the instrument is a self-report, 58-item questionnaire where respondents are asked to read a statement and then rank the degree to which that statement describes their own attitudes, actions, beliefs, and skills (Guglielmino, 1977). The instrument contains 41 items that are positively phrased and 17 items negatively phrased. The five responses for each item include: 1) Almost never true of me; I hardly ever feel this way; 2) Not often true of me; I feel this way less than half the time; 3) Sometimes true of me; I feel this way about half the time; 4) Usually true

of me; I feel this way more than half the time; 5) Almost always true of me; there are very few times when I don't feel this way (Guglielmino, 1977).

Items on the scale tend to cluster around eight different constructs: love of learning; self-concept as an effective independent learner; ability to tolerate risk, ambiguity, and complexity in learning; creativity; view of learning as a lifelong beneficial process; initiative; self-understanding; and acceptance of responsibility for one's own learning (Durr, Guglielmino, & Guglielmino, 1996).

To establish readiness of their employees to participate in self-directed learning activities, various occupational categories and major corporations have utilized the SDLRS. For example, readiness for self-directed learning has been studied in the fields of engineering (Litzinger, Wise, Lee & Bjorklund, 2003), Nursing (Fisher, King, & Tague, 2001), Manufacturing (Durr, et al,, 1996), telecommunications (Guglielmino & Roberts, 1992), and the hospitality industry (Lema, 2006). In the corporate world, Motorola used the measure to determine the readiness of their employees and based on the results, the company began to offer self-directed learning for those employees who were ready (Guglielmino & Murdick, 1997).

The SDLRS has an internal reliability of .87 (Cronbach alpha) and published studies on populations over the age of twenty report similar reliability figures that fall within a range of .72 - .92 (Guglielmino &

Associates, n.d.). Finestone (1984) and Wiley (1981) found test-retest reliability values of .82 and .79 respectively. As for the validity of the SDLRS, Finestone (1984) found a strong congruence between Guglielmino's original Delphi results and a review of the current literature on self-directed learning. Construct validity (convergent and divergent) of the instrument was found in a study conducted by McCune, Guglielmino, and Garcia (1990).

While the SDLRS is the "most often used quantitative measure in studies of self-directed learning" there has been some who have criticized the SDLRS (Merriam & Cafferella, 1999, p. 307). Researchers Brockett (1987), Field (1989), and Straka and Hinz (1996) are just a few who have challenged the reliability and validity of the SDLRS. Field (1989) sought to examine the structure, validity, and reliability of the instrument and concluded Guglielmino's original study was "marred by both conceptual and methodological problems" (p. 125). However, in a 2000 comprehensive review of 250 psychological tests, Delahaye and Choy concluded, "the LPA can be used with acceptable confidence to provide an accurate measurement of readiness for self-directed learning" (2000, p. 859). Although professionally known as the Self-Directed Learning Readiness Scale, this instrument is also referenced as The Learning Preference Assessment (LPA) – particularly when administered to study participants to aid in reducing response bias.

Experiential Learning

In order to make appropriate decisions on how to teach, it is important to understand how a learner learns. Kolb (1984) drew on the work of many contemporary scholars (John Dewey, Kurt Lewin, Jean Piaget, William James, Carl Jung, Paulo Freire, and Carl Rogers) to develop his theory of experiential learning called the Experiential Learning Model (ELM). These scholars gave experience a central role in their theories of human learning and development and were instrumental in Kolb's development of "a holistic model of the experiential learning process and a multi-linear model of adult development" (Kolb & Kolb, 2005, p. 2). "To be alive is to be potentially vulnerable or accessible to life experiences which abound in the individual's life-space or psycho-social environment" (Adenuga, 1989, p. 36). Adenuga (1989) cited the definition of experiential learning by Keeton and Tate (1978) that makes distinctions between two classifications: "collegiate" versus "non-collegiate" and "sponsored" versus "non-sponsored." Based on these classifications, "the majority of experiential learning is in the non-collegiate category" and "take place mainly in nonacademic institutions and include self-directed learning" (Adenuga, 1989, p. 38).

Kolb's (1984) theory is based on six propositions:

1. Learning is best conceived as a process, not in terms of outcomes.
2. All learning is relearning.

3. Learning requires the resolution of conflicts between dialectically opposed modes of adaption to the world.
4. Learning is a holistic process of adaption to the world.
5. Learning results from synergetic transactions between the person and the environment.
6. Learning is a process of creating knowledge (Kolb & Kolb, 2005, p.2).

The belief is that every person has experiences from which he or she uses to guide his or her learning – which may even include relearning. With this understanding, adults begin a learning experience with some ideas or experiences about the topic being undertaken. In other words, the learner does not start at zero, but begins at some point above based on prior experience. In this school of thought, learners gain information through cognitive processes or as Sims and Sims (1995) stated, “Cognitive learning is knowledge learning” (p. 6).

The theory “rests on a different philosophical and epistemological base from behaviorists theories of learning and idealist educational approaches” (Kolb, 1979, p. 26). Koob and Funk (2002) described Kolb’s description of learning as “a development process that proceeds in a clockwise and cyclical fashion from concrete experience (CE), to reflective observation (RO), to abstract conceptualization (AC), to active experimentation (AE), and back to the beginning (CE) where the process

continues to cycle (p. 295). Figure 2.1 demonstrates Kolb's (1984) cyclical learning process. Kolb (1984) believed as a person learns he or she moves through these various abilities and over time some of these abilities may become more preferred and may eventually define the learner's preferred method of learning. As Kolb (1984) defined, "Learning is the process whereby knowledge is created through the transformation of experience" (p. 38).

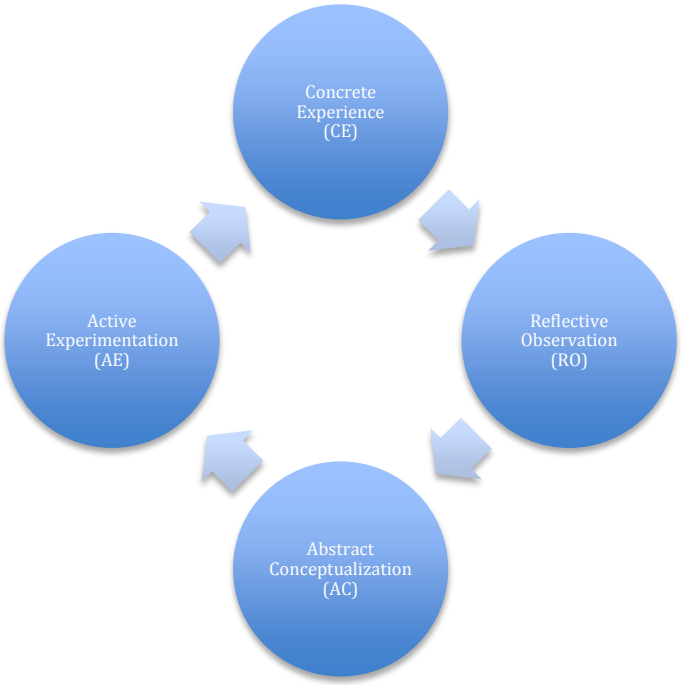


Figure 2.1. Kolb's four-stage cycle of learning. Adapted from Kolb's learning styles, 1984.

As a part of the model, Kolb (1984) also defined two bipolar continuums of learning that intersect to create four distinct learning styles (see Figure 2.2). The continuums range from concreteness (CE) to

abstractness (AC) on the prehension continuum and activeness (AE) to reflectiveness (RO) on the transformational continuum. An individual's identified points on these two continuums suggests which quadrant of learning style the learner prefers. These quadrants, or as Kolb calls them "basic forms of knowing," are defined as: accommodating, diverging, converging, and assimilating (Kolb, 1984, p. 77).

While there are four different preferences, Sharp (2006) encouraged instructors to use these styles to "reach them and teach them" (p. 111). She stated, Kolb's model "provides an effective framework for instructors to develop easily and creatively a variety of strategies to enhance learning" (p. 111).

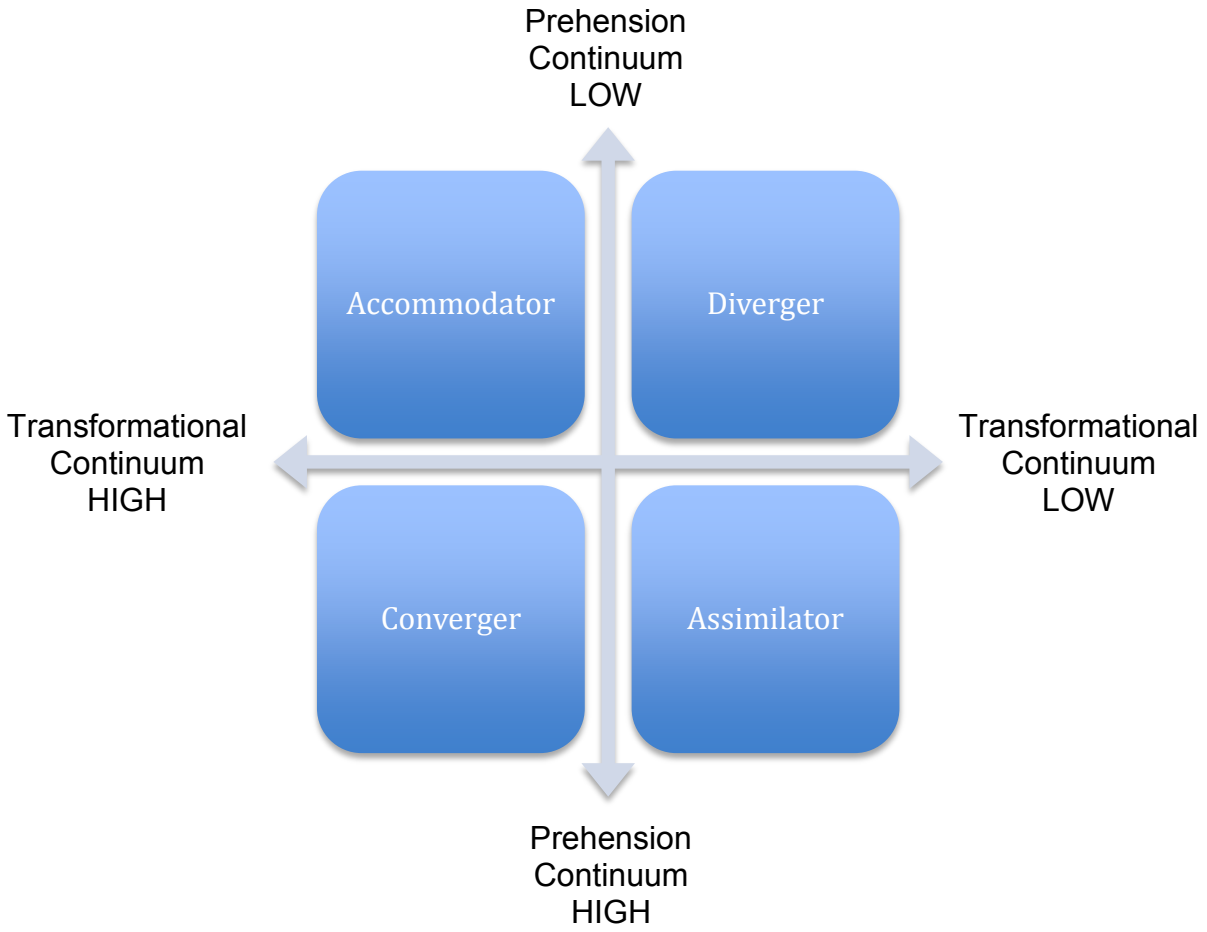


Figure 2.2. Continuums and quadrants of Kolb's learning styles. Adapted from Kolb's learning styles, 1984.

Kolb (1984) described the general characteristics of learners in each of the four quadrants of the LSI. Learners identified as a Converger (AC/AE) have dominant characteristics of active experimentation and abstract conceptualization. They also tended to enjoy problem solving, decision-making, and the practical application of ideas. The opposite of a Converger is a Diverger. These individuals have dominant characteristics of concrete experience and reflective observation (CE/RO). In this quadrant, learners enjoyed learning situations where ideas are generated and where people are the focus and often enjoy working in groups and "tend to specialize in the arts" (Kolb & Kolb, 2005, p. 5). Assimilators (AC/RO), like Convergers, focus less on people. Learners in this quadrant enjoyed inductive learning and creation of theoretical models representative of their preference for abstract conceptualization and reflective observation. Accommodator (CE/AE) learners possessed strengths in contrast to the Assimilator style. Instead of watching and reflecting, Accommodators actually did things. Accommodators focused on setting goals and completing tasks and enjoyed participating in new experiences (Kolb, 1984).

Learning Style Inventory

The Learning Style Inventory (LSI) was developed in an attempt to determine which learning style a learner prefers. Originally designed in 1969 as a part of a curriculum development project at MIT, the first version of the LSI was developed by Kolb (1971, 1979). Various fields of study, including

education, management, psychology, computer science, medicine and nursing, utilized this 9-item instrument in more than 350 published studies from 1971 until 1985 when the instrument was revised (Kolb & Kolb, 2005).

Prior to 1985, several researchers identified weaknesses in the LSI including low “internal consistency reliability and test-retest reliability” (Kolb & Kolb, 2005, p.9). As a result, a revised LSI was created which added six new items to each scale (bringing the total to 12 items on each scale). The revised LSI was well used, generating more than 630 studies, but the test-retest reliability remained a weakness for the instrument. A study by Veres, Sims, and Locklear in 1991 showed that an increase in the test-retest reliability was increased with only a small reduction in the internal reliability by using a randomized scoring process on the instrument (Kolb & Kolb, 2005). The third version of the LSI was introduced in 1999 featuring a booklet format with color-coded scoring sheets designed to assist with the scoring of the instrument. Initially, the LSI used the normative reference group established after the previous revision until a separate reference group based on the randomized format of the latest revision could be established.

In 2005 the LSI was launched with a representative sample of 6977 LSI users (college students and working adults in a variety of fields) who were more diverse than the samples of the previous versions (Kolb & Kolb, 2005). The latest version remained identical in format to the previous 12-

item LSI including the simplified scoring method. Kayes (2005) completed an internal validity and reliability study with the revised LSI using 221 undergraduate and graduate business students. The results of this study concluded “this study shows exploratory information for the internal validity and reliability for the LSI-3 and help clarify previous research” (p. 256). His findings also suggested usage of a two-factor structure over a three-factor when using the revised LSI. Kayes (2005) stated, the LSI “remains one of the most influential and widely distributed instruments to measure individual learning preference” but also indicates the need for future studies to focus on more diverse populations (p. 249).

Employee Learning in Public Libraries

Today there are more than 16,600 public libraries across the U.S. and two-thirds of Americans have a library card (OCLC Online Computer Library Centers, Inc., 2011). Since OCLC published *Perceptions of Libraries and Information Resources* in 2005 there have been many changes in technology and services – many of which have impacted the public library. For example, some of the popular social Internet sites were just being launched (Facebook in February of 2004) or didn’t even exist until years later (Twitter in March 2006). There were also lots of technological developments, including the explosion of smart phones, wireless Internet service, and e-book readers. OCLC (2011) reported substantial growth from 2005 to 2012 in American’s connectivity to the online world. Estimates

showed a twelve percent growth in connectivity to a total of 239 million people and Facebook's unique monthly visitors saw a 1,300 percent growth to 152 million (p. 11). Whittaker (2012) highlighted one example of this growth when he reported Facebook hit a milestone when its creator Mark Zuckerberg announced the site had reached "one billion people who are 'actively' using the social network every month" (par. 1).

While books are the first things many Americans think of when they hear the word library, many libraries are expanding their available resources to include and embrace these technological changes. In many communities, the public library is the only free source of computer and Internet access (OCLC, 2011). Even when an individual has his or her own mobile computer or Internet ready device, he or she can visit more than 80 percent of the public libraries in our country and take advantage of free wireless Internet service (OCLC, 2011).

Of interest to this study was the data associated with the use of online information resources among different generations of public library users. As the focus of this study was on adult learners, data from the following generations was highlighted: Generation Y (age 18-24), Generation X (age 25-45), Boomers (age 46-64), and Traditionalists (age 65+). Among these generations, e-mail had the highest percentage of usage at 94 percent followed by usage of online search engines at 91 percent

(OCLC, 2011). In regard to the use of social networking and social media sites, these percentages were 65 and 63 respectively (OCLC, 2011).

With employees in public libraries composed of the same four generational groups, it was likely these employees also have some knowledge of these online information resources and their benefits. What was not known was the level of readiness of these employees to participate in learning activities to achieve a level of familiarity with these resources to successfully assist others in using these functions. Previous research on employees' self-directed learning in libraries has been extremely limited. Of the few studies previously conducted, the focus was specifically on librarians working in an academic library setting (Li, 2001; Varlejs, 1996) or who were personal members of the American Library Association (Varlejs, 1999). While these studies provide an insight into employee learning in a library setting, the purpose of an academic, school, or special library is different from that of a public library. Therefore, employees working in these types of libraries are likely to be different than employees who work in public libraries.

Public libraries have the purpose to "further democracy, equality, and social justice, increase access to information, disseminate culture and knowledge, contribute to a meaningful and informative leisure time, and act as a communal institution and a social meeting place" (Aabo, 2005, p. 210). With ever-growing technological advancements, public libraries are

changing rapidly and keeping employees up-to-date is a major focus. Smith (2003) stated, “In the context of such rapid transformation, and in order to be able to respond to and cope with such change, it is critical that library and information professionals maintain and upgrade their skills, knowledge and abilities” (p. 443).

Self-Directed Learning and Learning Styles

As organizations focus on the continual development of their employees, understanding the relationship between self-directed learning and preferred learning style can be beneficial. While both concepts have been extensively studied individually, the relationship between them on adult learning is still developing. Canipe (2001) suggested a “call for future research into the relationship between self-directed learning and learning styles” (p. 12).

In an effort to seek previous studies that have examined these two constructs multiple searches were conducted within Dissertation Abstracts (Proquest), PsycINFO, and the University of Oklahoma Libraries catalog using the following search terms: self-directed learning, self-directed learning readiness, learning style, SDLRS, LSI, experiential learning, employee learning, workplace learning, learning preference, and public libraries. While no previous research had been conducted specifically on understanding the relationship among self-directed learning readiness, learning style, and learning gain after completing a self-directed learning

program by employees in a public library, the following research studies most closely matched, and provided justification for, the proposed research study.

Adenuga's (1989) dissertation investigated the relationship between self-directed learning and learning style with graduate students participating in academic programs on a specific college campus. The study results indicated a "significant positive, linear and predictive relationship" between the two continuums (AC-CE & AE-RO) of the LSI and the degree of readiness for self-directed learning indicated by scores on the SDLRS (p. 129). Adenuga's results also indicated a strong dominance for Active Experimentation (AE) on the transformational continuum of the LSI by the participants. These results are important to the proposed study in that it supported the belief that adult learners with a strong dominance for the Active Experimentation preference would also report higher levels of readiness for self-directed learning. The researcher goes on to state, "the findings of the study further suggest that self-reporting diagnostic tools such as the LSI and SDLRS can provide predictive indices to supplement or complement situational specifics for a more effective facilitation of adult learning" (Adenuga, 1989, p. 145).

Barrett's 1991 study of learning styles on gaining competency in learning computers highlighted the lack of research studies on adult learning, computers and learning styles. She stated, "the only dissertation

found to address adult learning about computers and learning style using the Kolb LSI was conducted by Mary Cone Barrie (1984) through the University of Toronto" (p. 70). Barrie's study included adults enrolled in two computer language courses. The results of the LSI indicated a high proportion of individuals enrolled in these courses with a tendency for the Converger learning style - indicative of high scores in the AE and AC stages of the LSI. While this particular study did not include readiness for self-directed learning, the study does indicate that adults who wish to learn about computers tend to have higher scores on the transformational continuum of the LSI, representative of the AC stage, as hypothesized in the proposed study. Barrett (1991) expanded on Barrie's (1984) study with professionals and educators from the nation and Alaska. Her study also utilized Kolb's LSI, but included two additional instruments - the SDLRS and the Berch/Barrett Personal Computer Competency Inventory (PCCI) designed to "assess a comparative level of computer skills of the subjects" (p. 89). Barrett's (1991) study revealed higher mean scores of all participants (M = 244.48, SD = 23.01) than Guglielmino's stated average mean scores (M = 214, SD = 25.59), but no significant difference was found between the self-directed learning readiness scores and the four learning styles of the LSI. However, the scores on the LSI do show a greater number of respondents with preferences for the Accommodator and Converger learning styles –

both of which are defined by higher scores on the transformational continuum of the LSI.

Canipe (2001) studied graduate students at a specific university; however the participants were limited to graduate students in the department of Education and Behavioral Sciences. Here again, the scores of the SDLRS for 240 respondents in this study ranged from 172 to 284, resulting in a higher mean score (M = 230.92, SD = 22.85) than from the previously stated research by Guglielmino (M = 214, SD = 25.59) and did not indicate any significant relationship with each of the four stages of learning (CE, RO, AC, and AE) on the LSI. The researcher did, however, conclude that individuals who score high on the RO stage would score lower on their readiness for self-directed learning. This conclusion supports the hypothesis that higher readiness for self-directed learning scores will be associated with the AE stage as it is on the opposing end of the RO stage on the transformational continuum of Kolb's Learning Styles. Canipe (2001) also suggested that future research exploring the relationship between learning style and readiness for self-directed learning needs to be undertaken with populations other than graduate students. Through replication with adults outside an academic institution, one can help determine the generalizability of these results. "As evidence accumulates about situations where the findings generalize and where they do not, it may

be possible to develop a theory to explain the pattern" (Gall, Gall & Borg, 2003, p. 43).

Amey (2008) explored the relationship between self-directed learning readiness and experiential learning by studying undergraduate and graduate social work students from a specific university who participated in a one-semester field education course. The study results indicated a statistically significant difference between pre-test scores and readiness scores and post-test scores and readiness scores, but only for the undergraduate students. As the researcher noted, this may be due in part to graduate participants spending less time participating in the field education course. "The master's level students spent from 200 to 300 hours (16-20 hours/week for 15 weeks) in one semester along with several courses in the program including the seminar course; half the time of the BSW students" (p. 116). The lack of consistency between the time spent participating in the field education course (the experiential component) by the bachelor and master's level students likely impacted the anticipated results. By maintaining consistency in the length of the self-directed experiential learning program in the proposed study, this effect will be less likely to impact the anticipated research outcomes.

The purpose of this literature review was to highlight and present the relevant conceptual and empirical relationships between self-directed

learning readiness, learning style preferences, and learning gain by adult employees working in a public library system.

Through an exploration of these relationships, a better understanding of these concepts can be garnered and then applied to employee learning in public libraries as well as other workplace settings.

Chapter Three

Introduction to the Design

Training professionals continually struggle with balancing course delivery methods and productivity, as well as keeping employees engaged in their job (Confessore, 1992). Exploring self-directed learning methods may be another way for employees to continually learn where they are, and reduce the need for travel to face-to-face sites for webinars and classes, while keeping the employee fully engaged in his or her work. Historically, employee training in a public library setting has been conducted utilizing traditional face-to-face training methods that often require employees to travel away from their assigned work location to participate. However, with the ever-increasing need for employees to keep up with rapidly changing technology and trends, self-directed learning activities may provide the method needed to keep library employees abreast of changes and trends without the need to travel away from their work location.

The purpose of this quantitative correlational study was to investigate to what degree a relationship exists between self-directed learning readiness and learning style preferences on employee learning in a public library system. Specifically, this study intended to: first, identify the library employees' readiness to participate in self-directed learning at work; second, to identify library employees' preference for the learning style orientation known as active experimentation; and third, determine the relationship these

factors have on employees' learning gain after completing a self-directed learning program at work.

Research Questions and Hypotheses

Based on the before-mentioned study intentions, the following research questions guided this study:

1. What are the self-directed learning readiness levels of employees in a public library system?
2. Is there a relationship between the public library system employees' readiness for self-directed learning and their learning gain following the completion of a self-directed learning program at work?
3. Where do public library system employees score on the transformational continuum of Kolb's Learning Style Inventory (LSI)?
4. Is there a relationship between a public library system employees' transformational continuum score and their learning gain following the completion of a self-directed learning program at work?
5. Is there a relationship between public library system employees with a greater preference for Active Experimentation (AE) on the transformational continuum (LSI score) and greater self-directed learning readiness (SDLRS score)?

The following research hypotheses were employed to address the stated research questions:

H1: Higher self-directed learning readiness (SDLRS score) will be positively correlated to greater learning gain (pre-test/post-test scores) after completing a self-directed learning program at work for a group of public library system employees.

H2: Greater preference for Active Experimentation (AE) on the transformational continuum (LSI score) will be positively correlated to greater learning gain (pre-test/post-test scores) after completing a self-directed learning program at work for a group of public library system employees.

H3: Greater preference for Active Experimentation (AE) on the transformational continuum (LSI score) will be positively correlated with higher levels of self-directed learning readiness (SDLRS score) for a group of public library system employees.

Research Design

This study utilized a quantitative correlational design using web-based questionnaires and instruments to collect the data. The dependent variable of the study was learning gain, as measured by calculating how much learning the employee gained out of the total possible he or she could have gained from the pre-test to the post-test. The independent variables included readiness for self-directed learning as measured by Guglielmino's

(1977) Self-Directed Learning Readiness Scale (SDLRS) and learning style preference as measured by Kolb's (1984) Learning Style Inventory (LSI).

Permission to use the SDLRS was granted by its author, Dr. Lucy Guglielmino. Permission to use the LSI was granted via acceptance of a research application by the HayGroup.

Instrumentation

Data collection for this study was compiled through the use of three instruments – the Self-Directed Learning Readiness Scale (SDLRS), the Learning Style Inventory (LSI), and a researcher designed pre-test / post-test measure.

The Self-Directed Learning Readiness Scale (SDLR) was developed by Guglielmino (1977) to measure an individual's readiness to participate in self-directed learning. The SDLRS is commonly referred to as the Learning Preference Assessment (LPA) when administered in an attempt to reduce response bias (Guglielmino & Associates, 2012). The self-report questionnaire was designed to measure the complexity of attitudes, skills, and characteristics that comprise a person's current perceived level of readiness to manage his or her own learning. The SDLRS is based on eight factors:

1. Attitude toward and joy of learning.
2. Self-confidence in abilities and skills for learning.
3. Complexity, adventure, and independence in learning.

4. Attraction to new and unusual situations.
5. Openness to learning situations.
6. Internal control.
7. Self-understanding.
8. Responsibility for own learning (Adenuga, 1989; Canipe, 2001, and Guglielmino, 1977).

The scale contains 58 questions answered on a five point, Likert-type scale with question responses ranging from: 1) “Almost never true of me; I hardly ever feel this way”; 2) “Not often true of me; I feel this way less than half the time’; 3) Sometimes true of me; I feel this way about half the time”; 4) “Usually true of me; I feel this way more than half the time”; 5) “Almost always true of me; there are very few times when I don’t feel this way.” Upon completion of the questionnaire, a readiness score is generated. Scores fall into one of three categories: 58-201 - Below average; 202-226 – average; and 227-290 - above average. The average score for all adults completing the SDLRS is 214 with a standard deviation of 25.59 (Guglielmino & Associates, n.d.).

The SDLRS has an internal reliability of .87 (Cronbach’s alpha) and published studies on populations over the age of twenty report similar reliability figures that fall within a range of .72 - .92 (Guglielmino & Associates, n.d.). Finestone (1984) and Wiley (1981) found test-retest reliability values of .82 and .79 respectively. As for the validity of the SDLRS,

Finestone (1984) found a strong congruence between Guglielmino's original Delphi results and a review of the current literature on self-directed learning. Construct validity (convergent and divergent) of the instrument was found in a study conducted by McCune, Guglielmino, and Garcia (1990).

The SDLRS automatically includes five general demographic questions: gender, age, country, highest level of education, and occupation however these questions were not utilized as a broader list of demographic questions were added to the beginning of the pre-test measure (see Appendix A) to ensure library system specific demographic information was collected.

Learning Style Orientation was measured using an inventory developed by Kolb (1984) based on the Experiential Learning Model. The inventory measures two major differences in the way people learn: how they perceive or grasp experience and information (concrete vs. abstract; sensing/feeling vs. thinking) and how people process or transform experience and information (active vs. reflective; doing vs. watching). The LSI is designed to measure learning styles as a predictor of behavior consistent with experiential learning theory.

Revised in 2005, the LSI (Version 3.1) is a short 12 item questionnaire that asks the respondent to rank four sentence endings that correspond to the four learning modes or preferences – concrete experience (CE), reflective observation (RO), abstract conceptualization (AC), and

active experimentation (AE). This revised version includes new norms that are based on a larger, more diverse, and more representative sample of 6977 LSI users (college students and working adults in a variety of fields) who were more diverse than the samples of the previous versions (Kolb & Kolb, 2005). The inventory was designed for use with teens and adults.

Kayes (2005) completed an internal validity and reliability study with the revised LSI using 221 undergraduate and graduate business students. The results of this study concluded "this study shows exploratory information for the internal validity and reliability for the LSI-3 and help clarify previous research" (p. 256). His findings also suggested usage of a two-factor structure over a three-factor when using the revised LSI. The LSI "remains one of the most influential and widely distributed instruments to measure individual learning preference" (Kayes, 2005, p. 249).

To measure the participant's learning gain, a researcher designed pre-test / post-test instrument was developed (see Appendix B). The measure contains twenty (20) multiple-choice questions related to the key components contained in the self-directed learning program. Learning gain, the dependent variable, was determined by using a learning gain score calculator (see Appendix J) created by Williams (2013). The formula calculates how much the respondent gained out of the total possible he or she could have gained from the pre-test to the post-test. This gain represents the increase in learning by the employee.

Learning Program

A researcher designed self-directed learning program was utilized as the experimental component of this study. The self-directed learning program focused on a variety of web-based applications currently utilized by the library system to: 1) share information; 2) communicate with library users, employees, and the library community; and 3) participate in social networking functions. The program was entitled “Understanding Digital Applications” and contained five different modules of web-based digital applications. The modules included: social networking, photo sharing, video sharing, tagging and social bookmarking, and electronic media. Employees participated in the program at their own pace and during assigned work shifts over a five-week period.

Location

The study took place in a large, metropolitan public library system located in a Southwestern state. The library system served the residents of an entire county with a population of more than 700,000 (U.S. Census Bureau, 2012). The library system consisted of 14 full-service libraries (located in major cities within the county) and 5 extension libraries (locations providing limited library services in rural towns across the county.)

Participants

The population for this study consisted of the 523 employees currently employed by the library system at the time of the study. Permission to conduct research (see Appendix C) was granted by the executive director of the library system. All 523 employees were recruited via their organizational email program to form a non-probability convenience sample for this study. No special arrangements were made to contact potential participants who were hired by the organization after the study began. Participants did not receive any additional compensation from the investigator or their employer for participation in this study. All employees employed by the organization at the time of the study had an equal chance of participating. Participants were allowed to decline or withdraw from participation at any point without penalty from the researcher or their employer. Participants who terminated employment with the library system during the course of the study were automatically removed.

Procedure

Several procedures were utilized to ensure participant rights were protected during participation in this study. The study was submitted to the Institutional Review Board (IRB) of the University of Oklahoma – Norman Campus for review and approval. The IRB application included a permission letter from the executive director of the public library system granting access to the participants (see Appendix C). Each study participant was assigned a

five-digit unique identification number using a table of random numbers to protect confidentiality. A master identification file was created to document the identification numbers to participant names. The master file was kept securely locked in a file cabinet in the researcher's office and was destroyed upon completion of the study. The file was only used to determine incomplete components or to add clarification as needed during the study. All data collection materials contained only the participant's assigned identification number to ensure his or her confidentiality throughout the study.

Participants were contacted via their organizational e-mail system to solicit participation in the study. The initial e-mail announcement contained a brief description of the study as well as any associated risks and/or benefits of participating in the study and the instructions for notifying the researcher of intent to participate (see Appendix D).

In phase one of the study, participants agreeing to participate were emailed an introductory message containing his or her five digit unique participant code along with the web links to the online informed consent form (see Appendix E), pre-test questionnaire, learning style inventory, and the learning preference assessment. The message also contained specific identification numbers / usernames and passwords associated with the questionnaires. Participants were also given the deadline for the completion of these assessments. Only those participants who completed all

components of phase one were allowed to continue into phase two of the study.

Following the end of phase one, participants who had completed all the components where then emailed the web address for the Understanding Digital Applications learning program along with general instructions (see Appendix G). Participants had five weeks (35 days) to access the program before it became inactive. At that time, a follow-up email was sent to the participants via the library's e-mail system containing the web link to the post-test assessment containing five follow-up questions (see Appendix I). The post-test measure was the same as the pre-test measure administered at phase one of the study (see Appendix B), however it contained the five follow-up questions aimed at understanding the participants' participation in the self-directed learning program (see Appendix I). These questions had the participant indicate estimated time spent on the learning program, the usefulness of the various components of the program, other means the participant used to enhance learning, and a self-reported understanding of the applications both before and after their participation in the self-directed learning program. Participants were given seven (7) days to complete the post-test assessment.

Data Analysis

This study utilized several statistical procedures to test the research questions posited in this study. The research questions were tested as follows:

Question 1: *What are the self-directed learning readiness levels of employees in a public library?* This question was answered through analysis of the 58-items on the SDLRS that generated a SDLRS score (independent variable), sample mean, standard deviation, variance, range, standard error, kurtosis, minimum and maximum score, skewness, number of valid observations, and missing observations (Guglielmino & Associates, 2012).

Question 2: *Is there a relationship between the public library system employees' readiness for self-directed learning and their learning gain following the completion of a self-directed learning program at work?* This question was answered using the Pearson's r that tested the correlation between self-directed learning readiness (independent variable) and employee learning (dependent variable).

Question 3: *Where do public library employees score on the transformational continuum of Kolb's Learning Style Inventory (LSI)?* This question was answered by the analysis of the 12-items on the LSI. Respondents' scores (independent variable) were determined by adding the column totals of the twelve items on the instrument as instructed by Kolb (1985). These scores identified the learning orientation scores for the

prehension (AC-CE) and transformational (AE-RO) continuums of the model. The respondent's score associated with concrete experience (CE) was subtracted from his or her abstract conceptualization (AC) score to establish the participant's prehension continuum score. To determine the transformational continuum score, the participant's reflective observation (RO) score was subtracted from his or her active experimentation (AE) score.

Question 4: *Is there a relationship between a public library system employees' transformational continuum score and their learning gain following the completion of a self-directed program at work?* This question was answered by conducting a Pearson's *r* that examined the correlation between the score on the LSI (independent variable) and employee learning (dependent variable).

Question 5: *Is there a relationship between public library system employees with a greater preference for Active Experimentation (AE) on the transformational continuum (LSI score) and greater self-directed learning readiness (SDLRS score)?* This question was answered by conducting a Pearson's *r* that examined the correlation between employees with greater preference for AE (independent variable) and their SDLR scores (dependent variable).

Study data was entered into the computerized software, Statistical Package for the Social Sciences (SPSS), for statistical analysis. The level of

statistical significance used in all procedures will be $p < .05$ as this is the level of significance traditionally accepted in social science research. The basic demographic information gathered along with the pre-test instrument was scored and measured using measures of central tendency.

Chapter Four

Introduction

This chapter presents the study's findings. The purpose of this quantitative correlation study was to investigate to what degree a relationship exists between self-directed learning readiness and learning style preferences on employee learning in a public library system. To achieve this purpose, the study tested three research hypotheses. Bivariate correlational procedures described in the previous chapter were applied to each of hypotheses and the results are described in tabular, graphic and narrative form in this chapter. The first part of the chapter describes the characteristics of the 169 participants in the study followed by the principal findings of the research project associated with this study.

Descriptive Statistics

The Self-Directed Learning Readiness Scale (SDLRS), Learning Style Inventory (LSI), and pre-test questionnaire containing general demographic questions were administered at the beginning of the study (phase one) to the 186 employees who volunteered to participate. Of those who agreed to participate, 175 participants completed phase one and proceeded to participate in the self-directed learning program (phase two). At the end of the five-week self-directed learning program, 173 participants proceeded onto phase three where a post-test measure containing five post-study questions was administered. In the end, 169 (91%) of the participants

completed all three phases of the study and represented all offices/departments and library locations contained in the public library system. The following demographic results represent the data collected from the demographic questions contained as a part of the pre-test measure completed during phase one of the study.

Gender

The participant sample (*n* = 169) included 135 females (80%) and 34 males (20%). Figure 4.3 illustrates the data related to gender. Based on the data, the majority of the study participants were female. These gender participation numbers closely represented the total public library system population where 382 (72%) employees are female and 150 (28%) are male.

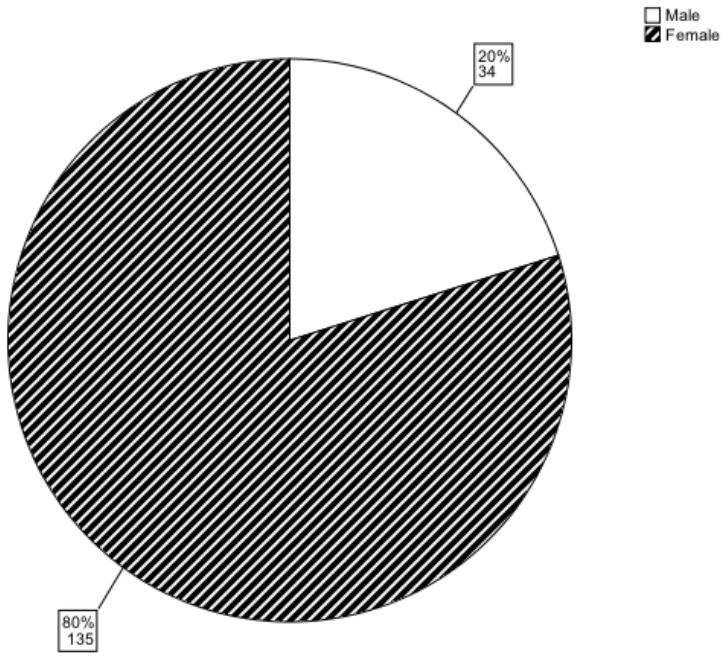


Figure 4.3. Gender breakdown of the public library system sample.

Age

Participants were asked to identify themselves as part of one of six age subgroups in this study: 16-24; 25-34; 35-44; 45-54; 55-64; and 65 and over. Twenty-three percent (*n* = 40) reported as 25-34, 23% (*n* = 39) reported as 45-54, 22% (*n* = 38) reported as 55-64, 20% (*n* = 33) reported as 35-44, 7% (*n* = 11) reported as 16-24, and 5% (*n* = 8) reported as 65 and over. Figure 4.4 illustrates the age category data related to the study group. All age categories were represented in the sample.

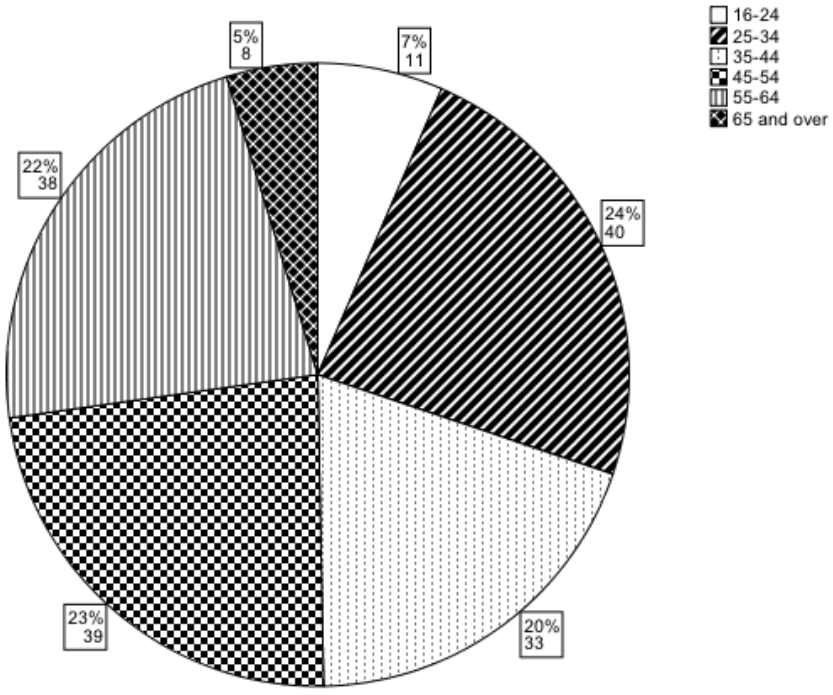


Figure 4.4. Age categories of the public library system sample.

Highest Level of Education

Participants were asked to identify their highest level of education as part of one of eight subgroups for this study: less than high school, high school/GED, some college, 2-year college degree, 4-year college degree, master's degree, doctorate degree, and professional degree. Forty percent (*n* = 67) reported as having a masters degree; 33% (*n* = 56) reported having a 4-year degree; 13.5% (*n* = 23) reported having some college; 6% (*n* = 10) reported having a high school/GED education; 6% (*n* = 10) reported having a 2-year degree; 1% (*n* = 2) reported less than high school; .5% (*n* = 1) reported having a professional degree; and 0% (*n* = 0) reported a doctorate degree. Figure 4.5 illustrates the data related to the education levels of the participant group. These figures identified the public library system employees as having a high educational attainment with the majority of them holding a 4-year college degree of higher.

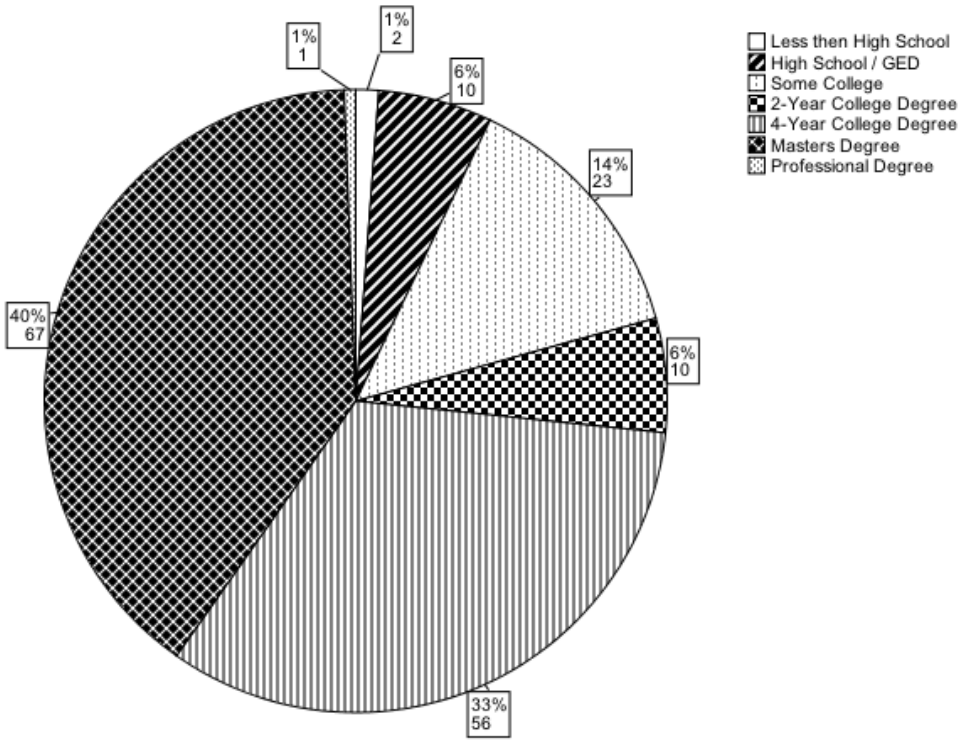


Figure 4.5. Educational attainment levels of the public library system sample.

Years of Service

Participants were asked to identify their years of service as part of one of eight subgroups for this study: less than 1 year, 1-5 years, 6-10 years, 11-15 years, 16-20 years, 21-25 years, 26-30 years, and 31 or more years. Thirty-six percent (*n* = 60) reported as having 1-5 years; 21% (*n* = 36) reported having 6-10 years; 14% (*n* = 24) reported less than 1 year; 14% (*n* = 23) reported 11-15 years; 5% (*n* = 9) reported 16-20 years; 5% (*n* = 9) reported having 31 or more years; 3% (*n* = 5) reported 26-30 years; and 2% (*n* = 3) reported 21-25 years. Figure 4.6 illustrates the data related to the

years of service of the participant group. The results indicated a highly loyal employee base with more than half (57%) of the participants having worked for the library system from one to ten years and 29% of them having been with the library system for 11 to 31 or more years.

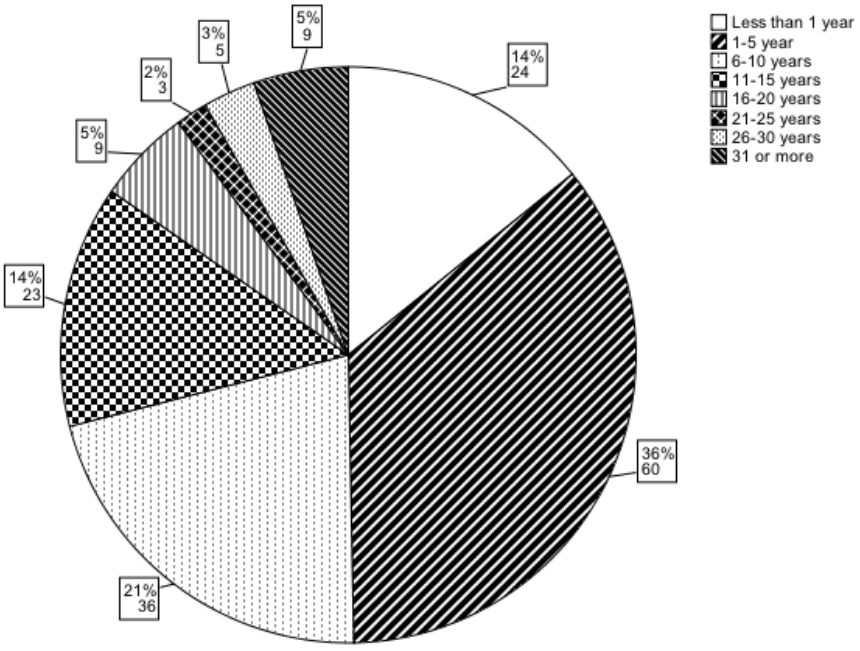


Figure 4.6. Years of service for the public library system sample.

Work Location

Participants were asked to indicate their work location as either a library location or an office/department. Of the 169 participants, 75% (*n* = 127) of them indicated working in a library location and 25% (*n* = 42) of them indicated working in an office/department within the public library system. Figure 4.7 illustrates the data related to work location. Based on the data,

the majority of the participants worked in a library location within the public library system. These figures were similar to the total population of the library system where 72% of the employees worked at a library location and 28% of them worked in an office/department.

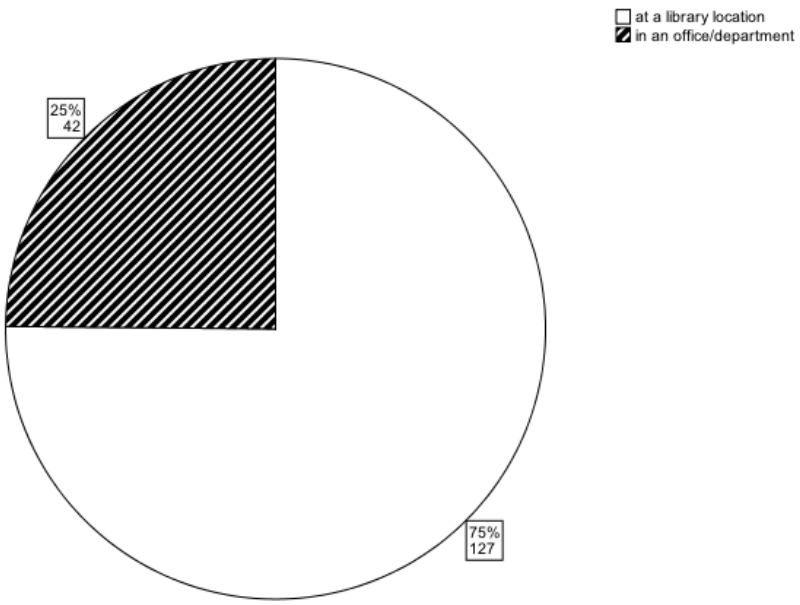


Figure 4.7. Work locations for the public library system sample.

Category of Employment

Participants were also asked to identify their category of employment as one of three subgroups used in this study: support professional, professional, and leadership. The employment position titles identified as a support professional within the library system included: administrative professional, clerk, driver, library aide, public computer specialist, processor, receptionist, and technician. Professional employment positions included the

titles of: accountant, analyst, assistant, assistant manager, associate librarian, cataloger, coordinator, editor, librarian, officer, operator, selector, specialist, supervisor, and webmaster. Leadership employment positions titles included: assistant director, deputy executive director, director, executive director, and manager. Forty-seven percent (*n* = 79) identified their employment position as support professional; 42% (*n* = 71) identified as professional; and 11% (*n* = 19) identified as leadership. Figure 4.8 illustrates the data related to employment position of the participants in the study. The overwhelming majority of the participants in this study were employees serving as professionals and support professionals within the public library system. The smallest percentage of the participants in this study was employees serving in leadership roles.

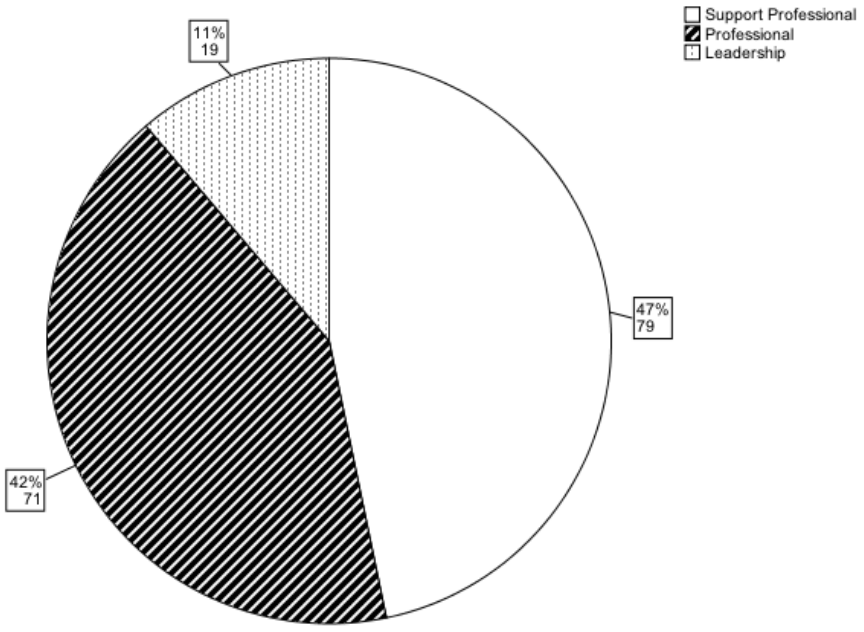


Figure 4.8. Employment categories of the library system sample.

Self-Directed Learning Readiness Scale

As was mentioned in the earlier chapters, one of the objectives of this study was to identify the readiness levels for self-directed learning of the employees in a public library system, as measured by Guglielmino's Self-Directed Learning Readiness Scale (SDLRS). The SDLRS, referred to as the Learning Preference Assessment (LPA) in this study to avoid response bias, is a 58-item self-report questionnaire designed to measure the complex attitudes, skills, and characteristics that comprise a person's current level of readiness to manage his or her own learning. The SDLRS was found to be highly reliable (α = .94). The questionnaire was administered at phase one of the study along with the Learning Style Inventory (LSI) and a pre-test measure containing general demographic

questions. The resulting scores from the Self-Directed Learning Readiness Scale are contained in Table 4.1.

Table 4.1: *Self-Directed Learning Readiness Scores*

n	*M*	Median	Mode	*SD*
169	235.42	238	235	21.96

A comparison was made between this researcher's findings and previous research studies conducted on self-directed learning by adults, including the scores from Guglielmino's (1977) initial study on self-directed learning readiness, are shown in Table 4.2. Currently, there are no known studies where self-directed learning readiness scores are available for employees working in a public library system. The mean score for the study sample (M = 235.42, SD = 21.96) is slightly higher than Canipe's (2001) study involving graduate student and slightly lower than Barrett's (1991) study utilizing professionals and educators. However, the scores in this study are considerably higher than Guglielmino and Associates (n.d.) stated average score for all adults who have completed the questionnaire (M = 214, SD = 25.59).

Table 4.2: *Comparison of Self-Directed Learning Readiness Scale Mean Scores for Current and Previous Studies*

Author (DATE)	Subjects	*n*	*M*	*SD*
Schrank (2013)	Library Employees	169	235.42	21.96
Canipe (2001)	Graduate Students	240	230.90	22.80
Barrett (1991)	Professionals & Educators	194	244.48	23.01
Hassan (1981)	General Adult Population	77	227.97	23.87
Guglielmino (1977)	Graduate Students	91	257.50	20.00

Using Guglielmino's three levels of identified readiness, the frequency distribution for the SDLRS scores from the participants in this study are indicated in Table 4.3. Participant scores of 58-201 suggested below average readiness for self-directed learning; 202-226 for average readiness; and 227-290 suggested above average readiness for self-directed learning. Seventy percent (*n* = 119) of the public library system employees in this study scored in the above average category with the highest score being a 280 out of a possible 290. Twenty-four percent (*n* = 41) of the participants scored in the average readiness category and 5% (*n* = 9) scored in the below average category with the lowest score being a 134 out of a possible 290.

Table 4.3: *Self-Directed Learning Readiness Levels of the Public Library System Sample*

Level	Scores	*n*	(%)
Below Average	58 – 201	9	5.0
Average	202 – 226	41	25.0
Above Average	227 – 290	119	70.0

Note: *n* = 169

The results suggested that employee working in a public library system have self-directed learning readiness scores ranging from below average to above average with the majority of the employees scoring in the above average level of self-directed learning readiness. Table 4.4, on the following page, summarizes the participants' readiness scores by the various demographic variables collected.

Table 4.4: *Self-Directed Learning Readiness Mean Scores by Selected Demographic Variables of the Public Library System Sample*

Demographic Variable	*n*	*M*	*SD*
Gender			
Female	135	237.01	21.28
Male	34	229.09	24.11
Age			
16-24	11	211.09	38.35
25-34	40	240.45	18.87
35-44	33	238.94	21.24
45-54	39	235.26	19.59
55-64	38	233.05	19.07
65 and over	8	241.25	14.75
Education			
Less than High School	2	194.50	67.17
High School	10	224.60	38.65
Some College	23	236.35	18.95
2 year Degree	10	233.20	25.31
4 year Degree	56	233.29	20.98
Master's Degree	67	240.12	16.90
Professional Degree	1	231.00	-
Years of Service			
Less than 1 year	24	239.29	24.72
1-5 years	60	234.60	23.51
6-10 years	36	237.72	20.01
11-15 years	23	228.39	22.52
16-20 years	9	248.56	18.30
21-25 years	3	233.00	9.16
26-30 years	5	241.20	20.54
31 or more years	9	243.78	7.61
Employment Category			
Support Staff	79	230.94	24.90
Professional Staff	71	239.08	16.96
Leadership	19	240.37	23.00
Work Location			
Library	127	235.65	22.02
Office/Department	42	234.71	22.02
All Subjects	169	235.42	21.96

The Kolb Learning Style Inventory

In Table 4.5, the overall results for the individual components of the Kolb Learning Style Inventory (LSI) are presented, as well as the overall results of preference for the four defined learning styles.

The LSI is a twelve question self-report questionnaire designed to measure two differences in the way people learn: how they perceive or grasp experience and information (concrete vs. abstract; sensing/feeling vs. thinking) and how people process or transform experience and information (active vs. reflective; doing vs. watching). Of specific interest for this study was the scores related to active experimentation (AE) and reflective observation (RO) as these two styles represented the transformational continuum on Kolb's learning style model. More specifically, the AE style, as the associated traits most closely match the traits of a highly self-directed learner. The participant's transformational continuum score was calculated by subtracting the participant's RO score from his or her AE score. The Learning Style Inventory consisted of six subscales for each of the 12 items, CE (α = .77), RO (α = .81), AC (α = .84), AE (α = .80), AC-CE (α = .82), and AE-RO (α = .82).

The sample in this study had a preference towards the CE (*M* = 28.15, *SD* = 2.84) style with 80% (*n* = 136) of the participants falling into the 61 to 100 percentile. Reflective observation (RO) (*M* = 28.17, *SD* = 3.84) was the next highest preference with 36% (*n* = 60) falling into the same 61

to 100 percentile followed by AC (*M* = 32.30, *SD* = 2.79) at 33% (*n* = 55). The preference with the lowest number of participants falling into the highest percentiles was AE (*M* = 31.44, *SD* = 3.42) at 11% (*n* = 18). The high percentile scores on the CE and RO preferences indicate the lower ends of each of the continuums associated with the inventory. These results indicated the participants had a preference for feeling on the prehension continuum and watching instead of doing in their transformation of learning experiences. The overall scores on the learning style inventory included: CE scores ranged from 21 to 37; RO scores from 19 to 42; AC scores from 22 to 40; and the AE scores ranged from 24 to 41.

Additionally, the scores on the abstract conceptualization – concrete experience (AC-CE) or prehension continuum of the model ranged from -12 to 15 (*M* = 4.15, *SD* = 4.38) and the active experimentation – reflective observation (AE–RO) or transformational continuum scores ranged from -15 to 19 (*M* = 3.27, *SD* = 6.28). The multiple mode scores of 2 and 3 on the prehension continuum (AC-CE) suggested that the participants in this study most frequently prefer the concrete experience mode of prehension to the abstract conceptualization mode. The mode score of 2, on the transformational continuum (AE-RO), indicated the participants in this study most frequently preferred reflective observation to the active experimentation mode of transforming learning experiences.

Table 4.5: *Facets of the Learning Style Inventory Mean Scores for the Public Library System Sample*

	n	*M*	Median	Mode	*SD*
CE	169	28.15	28.00	27	2.84
RO	169	28.17	28.00	25	3.84
AC	169	32.30	32.00	32	2.79
AE	169	31.44	31.00	31	3.42
AC – CE	169	4.15	4.00	2[a]	4.38
AE – RO	169	3.27	3.00	2	6.28

Note: a. Multiple modes exist. The smallest value is shown.

The LSI scores of the sample in this study are similar to the normative sample scores of the LSI compiled by Kolb (2005). In the normative sample, the highest mean scores were in the AE preference (*M* = 34.14, *SD* = 6.68), followed by AC (*M* = 32.22, *SD* = 7.29), then RO (*M* = 28.19, *SD* = 7.07), and finally CE (*M* = 25.39, *SD* = 6.43). The continuum scores in the normative sample, in turn, are similar to the continuum scores in this study sample. The mean AC-CE continuum score in the normative sample was 6.83 (*SD* = 11.69) and the AE-RO continuum mean score was 5.96 (*SD* = 11.63). Table 4.6 illustrates the normative sample scores from the total population of the normative sample.

The normative sample scores indicate the overall individual preference for the learning modes of AC and AE, which in turn signified an

overall learning style preference for the Converger style. The sample scores of employees working in a public library setting indicate an overall individual preference for the learning modes of AC and RO, which in turn signified an overall preference for the Assimilator style.

Table 4.6: *Facets of the Learning Style Inventory Mean Scores for the Normative Sample*

	n	*M*	*SD*
CE	6977	25.39	6.43
RO	6977	28.19	7.07
AC	6977	32.22	7.29
AE	6977	34.14	6.68
AC – CE	6977	6.83	11.69
AE – RO	6977	5.96	11.63

Based on the data collected on all facets of the LSI, five significant negative relationships existed between the four learning preferences. These relationships included CE and RO, $r(167) = -.236$, $p = .002$; CE and AC, $r(167) = -.204$, $p = .008$; CE and AE, $r(167) = -.407$, $p < .001$; AC and RO, $r(167) = -.518$, $p < .001$; and AE and RO, $r(167) = -.495$, $p < .001$. The sample results also supported significant positive relationships between the two intersecting continuum of the LSI model (AC-CE and AE-RO), $r(167) = .229$, $p = .003$. The AC-CE continuum has significant positive relationships

with AC, $r(167) = .771$, $p < .000$, and AE, $r(167) = .221$, $p = .004$, and significant negative relationships with CE, $r(167) = -.781$, $p < .000$, and RO, $r(167) = -.177$, $p = .021$. The AE-RO continuum has significant positive relationships with AC, $r(167) = .279$, $p < .000$, and AE, $r(167) = .847$, $p < .000$, and a significant negative relationship with RO, $r(167) = -.881$, $p < .000$. Table 4.7 illustrates the correlations between all facets of the LSI and self-directed learning readiness, which will be discussed in the following paragraphs.

Table 4.7: *Correlations Among the Facets of the Learning Style Inventory and Self-Directed Learning Readiness*

	SDLRS	CE	RO	AC	AE	AC-CE	AE-RO
SDLRS	---	-.082	.078	.050	-.056	.085	-.078
CE	-.082	---	-.236**	-.204**	-.407**	-.781**	-.077
RO	.078	-.236**	---	-.518**	-.495**	-.177*	-.881**
AC	.050	-.204**	-.518**	---	-.069	.771**	.279**
AE	-.056	-.407**	-.495**	-.069	---	.221**	.847**
AC-CE	.085	-.781**	-.177*	.771**	.221**	---	.229**
AE-RO	-.078	-.077	-.881**	.279**	.847**	.229**	---

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

A bivariate correlational analysis was conducted to explore the existence of a relationship between the facets of the LSI and self-directed learning readiness levels. The results indicated no significant relationships existed.

Self-Directed Learning Program

To establish learning gain, employees were asked to participate in an online self-directed learning program while at work. The five-week program, entitled “Understanding Digital Applications,” was conducted on a private website hosted by an online web service provider funded by the researcher.

The website contained a home page with an overview of the program and separate sub-web pages for each of the five different concentration areas in the learning program: Electronic Media, Photo Sharing, Social Media, Video Sharing, and Tagging. Each of the concentration areas also contained additional sub-web pages highlighting the various digital applications associated with that particular concentration area. For example, in the concentration area of electronic media there was an overview webpage containing web links to the sub-web pages for the web applications of eBooks and eAudiobooks, eMagazines, and AMP's (Audio Media Players). Table 4.8, on the following page, illustrates the various web pages and sub-pages associated with the various components included in the "Understanding Digital Applications" learning program.

Table 4.8: *Listing of Webpages and Sub-Webpages for the Understanding Digital Applications Learning Program*

Main Webpages	Sub-Webpages
Home	Overview
Electronic Media	Overview Audio Media Players (AMPs) eBook & eAudiobooks eMagazines Freegal Music
Photo Sharing	Overview Flickr Instagram
Social Networking	Overview Facebook Google+ LinkedIn Pinterest Twitter Other Special Interest Social Networking Sites
Tagging	Overview
Video Sharing	Overview Vimeo YouTube

At the beginning of the five-week learning program, 175 employees who had completed the Learning Preference Assessment (SDLRS), Learning Style Inventory, and the pre-test assessment were provided the web address to access the self-directed learning program entitled "Understanding Digital Applications." Google Analytics was employed on the website to track usage statistics during the program period. The usage categories included: visitor type (new and returning), unique visitors, total number of site visits, average pages per visit, and average visit duration on the web-based site. Statistics collected on visitor type and unique visitors were reviewed and subsequently removed from further analysis after learning the public library system used the same IP address for the majority of employee computers and the visitor type and unique visitors could not be validated as an accurate representation of new, returning, or unique visitors in this study. Since the remaining data collection categories are not tied to a specific participant, but rather the participation sample, the results are discussed in the following paragraphs.

During the five-week self-directed learning program there were a total of 744 visits to the program website resulting in a total of 3,507 pageviews. Week one of the learning program had the most pageviews at 24% (*n* = 848) followed by week two at 22% (*n* = 776). Week four was next at 20% (*n* = 682) followed by week five at 18% (*n* = 647). Week three saw the smallest percentage of pageviews at 16% (*n* = 554). Table 4.9 illustrates the weekly

pageviews on the “Understanding Digital Applications” website. These figures likely represent the common student behavior of being anxious to learn at the beginning, becoming somewhat less motivated in the middle, and then re-gaining momentum towards the end of a learning opportunity.

Table 4.9: *Weekly Pageviews During Five Week Self-Directed Learning Program*

Week	Pageviews	%
1	848	24
2	776	22
3	554	16
4	682	20
5	647	18
Totals	3507	100

The analytics also captured a participant’s visit duration on the website with the resulting average being 00:09:36. Duration times for each visit was recorded in seconds and were broken up into five time categories: 0-60 seconds, 61-180 seconds, 181-600 seconds, 601-1800 seconds, and 1801 or more seconds. Forty-one percent (*n* = 304) of the website visits were 60 seconds or less and resulted in 16% (*n* = 580) of the total number of pageviews. Twenty percent (*n* = 150) of the visits were 601-1800 seconds in length and resulted in 29% (*n* =1013) of the total pageviews. Eighteen percent (*n* = 134) of the visits were 181-600 seconds and accounted for 29%

(*n* = 1013) of the total pageviews. Twelve percent (*n* = 89) of the visits were 61-180 seconds in length and accounted for 10% (*n* = 339) of the total pageviews. The lowest percentage of visits, 9% (*n* = 67), were the longest in duration at 1801 or more seconds and accounted for 25% (*n* = 889) of the total pageviews. Illustration of this data is contained in Table 4.10. These figures indicated that over 40% of the visits to the program website lasted one minute or less and were likely the result of testing the weblink or webaddress or were a short visit to the site where the participant may have realized he or she would need additional time to devote to the program and decided to come back at a later time. Seventy-four percent of the pageviews or 351 visits ranged in duration from three to 30+ minutes, likely indicating the participant visited, or returned to the site, when he or she had more time to participate in the learning program.

Table 4.10: *Self-Directed Learning Program Durations, Visits, and Pageviews*

Seconds Spent	# of Visits	%	# of Pageviews	%
0 – 60	304	41	580	16
61 – 180	89	12	339	10
181 – 600	134	18	686	20
601 – 1800	150	20	1013	29
1801 +	67	9	889	25
Totals	744	100	3507	100

As a part of the post-study questionnaire, participants were asked to identify estimations on how much time he or she spent working on the learning program along with identifying his or her level of understanding of these digital applications prior to and after participating in the learning program. In estimating time spent, each participant indicated on a sliding scale from zero to 600 the estimated number of minutes he or she spent participating in the learning program. The results indicated the majority (61%) of the participants estimated spending two hours or less during the five-week program while16% of the participants spent between four and ten hours working on the learning program. Table 4.11 illustrates participants' estimations of time spent on the learning program in this study. For the majority of employees, the estimation of spending two hours or less (or approximately 24 minutes per week) on the learning program may indicate

an online self-directed learning program may not be a preferred method for learning about the digital applications being used by the public library system.

Table 4.11: *Mean Estimations of Minutes Spent on Self-Directed Learning Program*

n	*M*	Median	Mode	*SD*
169	124.64	93.00	60	110.24

Additionally, participants were asked to self-rate their level of understanding of the digital applications using a sliding scale from 1 = little understanding of the applications to 7 = total understanding of the applications. On the survey, participants were first asked to rate his or her understanding of the applications after the completion of the learning program. Next, the participant was asked to rate his or her understanding of the applications prior to participating in the program. A paired-samples t-test was conducted to compare the participants' perceived level understanding of digital applications in pre-study and post-study conditions. There was a statistically significant difference between the mean levels at pre-study ($M = 3.52$, $SD = 1.37$) and post-study ($M = 4.94$, $SD = 1.23$) measures; $t(166) = -18.86$, $p < .000$. These results suggest that participants perceived a higher level of understanding of digital applications post-study than they did pre-study. Table 4.12 illustrates the participants' perceived understanding of digital applications prior to and after completing the self-directed learning

program.

Table 4.12: *Mean Scores of Perceived Pre-Participation and Post-Participation Understanding of Digital Applications*

	n	*M*	Median	Mode	*SD*
Pre Understanding	167	3.52	3.60	4	1.37
Post Understanding	167	4.94	5.00	5	1.23

Bivariate correlational analysis was conducted to identify whether statistically significant relationships existed among the variables of SDLRS, LSI, and pre-participation and post-participation perceived understanding. Statistically significant positive correlations existed between SDLRS and both pre-participation perceived understanding, $r(166) = .215$, $p = .005$, and post-participation perceived understanding, $r(166) = .192$, $p = .013$, and between pre-participation and post-participation perceived understanding, $r(165) = .728$, $p < .001$. These results indicate the higher the SDLRS score the higher the perceived understanding at both prior to and after participating in the self-directed learning phase of the study. The analysis also indicated significant positive relationship between the learning preference of reflective observation and pre-participation, $r(166) = .188$, $p = .015$, and post-participation, $r(166) = .165$, $p = .032$, perceived understanding. There was also a significant negative relationship between the learning preference of concrete experience and post-participation

perceived understanding, $r(166) = -.158$, $p = .041$. Table 4.13 illustrates the correlation levels for the variables of SDLRS, LSI, and pre and post-participation perceived understanding related to various digital applications being utilized in the library system.

Table 4.13: *Correlations Among Pre and Post-Participation Perceived Understanding of Digital Application, Self-Directed Learning Readiness, and Learning Style Inventory Facets by the Public Library System Sample*

	Pre-Understanding	Post-Understanding	SDLRS	CE	RO	AC	AE
Pre-Understanding	---	.728**	.215**	-.088	.188*	-.143	-.012
Post-Understanding	.728**	---	.192*	-.158*	.165*	-.086	.035
SDLRS	.215**	.192*	---	-.082	.078	.050	-.056
CE	-.088	-.158*	-.082	---	-.236**	-.204**	-.407**
RO	.188*	.165*	.078	-.236**	---	-.518**	-.495**
AC	-.143	-.086	.050	-.204**	-.518**	---	-.069
AE	-.012	.035	-.056	-.407**	-.495**	-.069	---

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

Pre-Test / Post-Test

To establish a level of knowledge from which to calculate the participants' learning gain, a researcher designed pre-test and post-test assessment were utilized in this study. The pre-test assessment was administered in phase one of the study and the post-test assessment in phase three. Each measure contained the same 20 multiple-choice questions about the various web-based applications contained in the "Understanding Digital Applications" self-directed learning program utilized in this study. The only difference between the two tests was a randomization of the question order in the post-test assessment. A paired-samples t-test was conducted to compare the scores of the pre-test and post-test conditions. There was a statistically significant difference between the mean scores on the pre-test ($M = 11.75$, $SD = 2.90$) and post-test ($M = 12.77$, $SD = 2.94$) measures; $t(168) = -6.23$, $p < .001$. These results suggested that participants scored higher on a post-test measure than they did on a pre-test measure containing the same questions and answers.

Pre-test and post-test scores indicated the number of questions the participant answered correctly. The participants' pre-test and post-test scores were then inserted into a mathematical formula (see Appendix J) to calculate each participant's learning gain. Table 4.14 illustrates the pre and post-test scores and the learning gain of the participants in this study. The learning gain scores ranged from low of -2.00 to a maximum of .75. It is

noteworthy that the mode for the learning gain was .00 indicating that the participants' most frequently did not see a gain in their learning from the pre-test to the post-test.

Table 4.14: *Pre-test, Post-test, and Leaning Gain Mean Scores*

	n	*M*	Median	Mode	*SD*
Pre Test	169	11.75	12.00	12	2.90
Post Test	169	12.77	13.00	14	2.94
Learning Gain	169	.09	.13	.00	.29

Additionally, Table 4.15 illustrates the participants' learning gain scores by the different demographic variables collected in this study. Most notably is that female employees had an average gain of 11%, whereas the male employees averaged zero gain. A chi-square test was performed and no relationship was found between gender and learning gain, X^2 (43, N = 169) = 46.88, p = .316.

Other segments of the population where a larger increase in learning gain was detected included: employees aged 16-24 (18%) and those aged 65 and older (26%), employees with less than a high school degree (40%), and the one employee with a professional degree saw a 33% gain between the pre-test and post-test measures.

Table 4.15: *Learning Gain Mean Scores by Selected Demographic Variables*

Demographic Variable	*n*	*M*	*SD*
Gender			
Female	135	.11	.24
Male	34	.00	.44
Age			
16-24	11	.18	.21
25-34	40	.09	.29
35-44	33	.05	.27
45-54	39	.09	.41
55-64	38	.04	.20
65 and over	8	.26	.13
Education			
Less than High School	2	.40	.00
High School	10	.04	.28
Some College	23	.13	.23
2 year Degree	10	.07	.32
4 year Degree	56	.08	.26
Master's Degree	67	.07	.34
Professional Degree	1	.33	-
Years of Service			
Less than 1 year	24	.20	.19
1-5 years	60	.13	.23
6-10 years	36	.04	.32
11-15 years	23	-.02	.48
16-20 years	9	.01	.27
21-25 years	3	-.00	.37
26-30 years	5	.07	.07
31 or more years	9	.11	.17
Employment Category			
Support Staff	79	.08	.26
Professional Staff	71	.09	.35
Leadership	19	.10	.18
Work Location			
Library	127	.09	.30
Office/Department	42	.07	.28
All Subjects	169	.09	.29

Additional bivariate correlational analyses were conducted to explore the relationships between the participants' pre-test and post-test scores and the SDLRS and LSI facets. There were statistically significant positive relationships between pre-test and post-test scores, $r(167) = .736$, $p < .001$, and with SDLRS scores and post-test scores, $r(167) = .171$, $p = .02$. There was also a significant negative relationship between pre-test scores and CE scores, $r(167) = -.175$, $p = .02$. Table 4.16 illustrates the correlations between the SDLRS, LSI, and pre-test and post-test scores along with the correlations associated with the other variables discussed in the coming paragraphs of this chapter.

Table 4.16: *Correlations Among Pre-Test/Post-Test Scores, Self-Directed Learning Readiness, Learning Style Inventory Facets, Learning Gain, and Pre/Post Participation Understanding of the Public Library System Sample*

	Pre-Test	Post-Test	SDLRS	CE	RO	AC	AE	Gain	Pre-Under.	Post-Under.
Pre-Test	---	.763**	.110	-.175*	.070	.006	.069	-.318**	.544**	.554**
Post-Test	.763**	---	.171*	-.145	-.006	.058	.094	.293**	.528**	.660**
SDLRS	.110	.171*	---	-.082	.078	.050	-.056	.064	.215**	.192*
CE	-.175*	-.145	-.082	---	-.236**	-.204**	-.407**	.090	-.088	-.158*
RO	.070	-.006	.078	-.236**	---	-.518**	-.495**	-.042	.188*	.165*
AC	.006	.058	.050	-.204**	-.518**	---	-.069	.014	-.143	-.086
AE	.069	.094	-.056	-.407**	-.495**	-.069	---	-.025	-.012	.035
Gain	-.318**	.293**	.064	.090	-.042	.014	-.025	---	-.072	.073
Pre-Under.	.544**	.528**	.215**	-.088	.188*	-.143	-.012	-.072	---	.728**
Post-Under.	.554**	.660**	.192*	-.158*	.165*	-.086	.035	.073	.728**	---

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

Analysis of Hypotheses Testing

This study posed three hypotheses to investigate the relationships between self-directed learning readiness and learning style preferences on learning gain and between each other.

H1: Higher self-directed learning readiness (SDLRS score) will be positively correlated to greater learning gain (pre-test/post-test scores) after completing a self-directed learning program at work for a group of public library system employees.

This hypothesis was tested by a bivariate analysis of the variables using Pearson correlation coefficient. This test measured the strength and direction of the relationship between the predictor variable, self-directed learning readiness, and the criterion variable, learning gain. The resulting correlational coefficient, $r(167) = .06$, $p = .41$, indicates no statistically significant relationship between self-directed learning readiness and learning gain among the sample in this study (see Table 4.16). A visual representation of the relationship is displayed in scatterplot graph form in Figure 4.9.

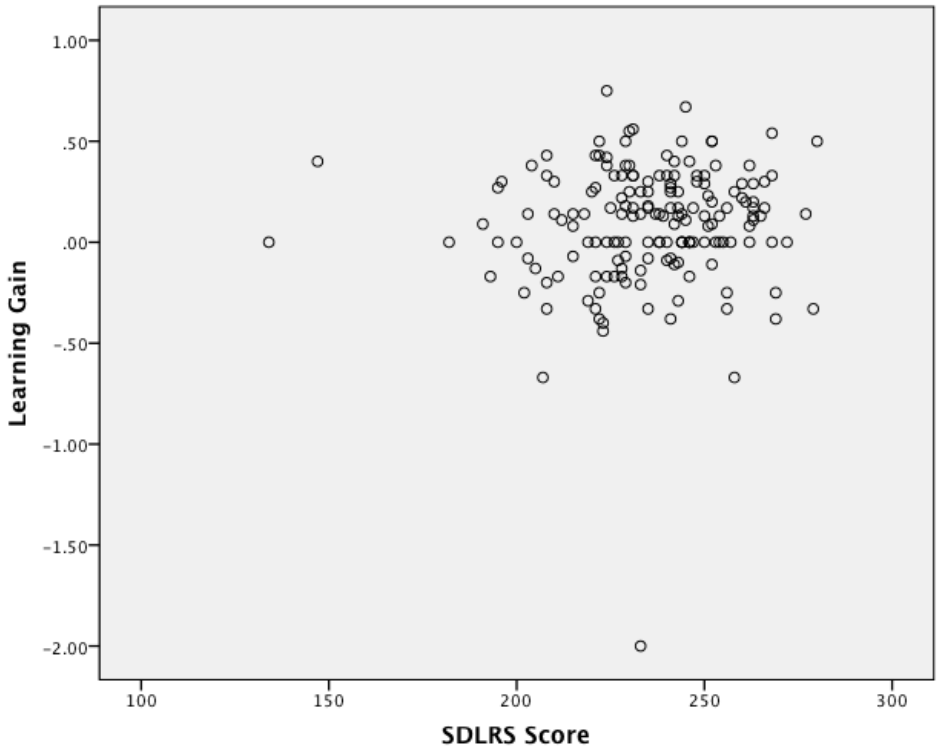


Figure 4.9. Relationship between SDLRS score and employees' learning gain

While not specifically attributed to a participant's learning gain, garnering a participant's perceived understanding of the digital applications can help shed light on employee learning. Therefore, a bivariate analysis using Pearson correlation coefficient was conducted to investigate the relationship between higher SDLRS scores and the participants' self-reported pre-participation and post-participation understanding of the various digital applications contained in the study's self-directed learning program. The results indicated statistically significant positive relationships between SDLRS scores and pre-participation, $r(166) = .215$, $p < .001$ and post-participation, $r(166) = .192$, $p = .013$, perceived understanding. There

was also a significant positive relationship between the pre and post study perceived understanding, $r(165) = .728$, $p < .001$. Table 4.16 also illustrates these relationships. The results indicated that participants with higher self-directed learning readiness have higher perceived understanding of the digital applications both before participating and after completing the online self-directed learning program and, as mentioned earlier, they also have higher post-test scores indicating the likelihood of increased knowledge through learning.

Hypothesis Two Results

> H2: Greater preference for Active Experimentation (AE) on the transformational continuum (LSI score) will be positively correlated to greater learning gain (pre-test/post-test scores) after completing a self-directed learning program at work for a group of public library system employees.

This hypothesis was tested using a bivariate analysis of the variables using the Pearson correlation coefficient. The resulting correlational coefficient, $r(167) = -.025$, $p = .743$, indicates no statistically significant relationship between preference for Active Experimentation (AE) and learning gain. A scatterplot graph summarizes these results in visual form in Figure 4.10.

Additional testing was conducted to explore the relationships of the three remaining learning styles of the Learning Style Inventory with

employees' learning gain. The resulting correlational coefficients: CE, $r(167) = .090$, $p = .245$; RO, $r(167) = -.042$, $p = .584$; and AC, $r(167) = .014$, $p = .857$, indicated no statistically significant relationship existing between the other learning style preferences and learning gain. The relationships between the four learning preferences and learning gain are also represented in Table 4.16.

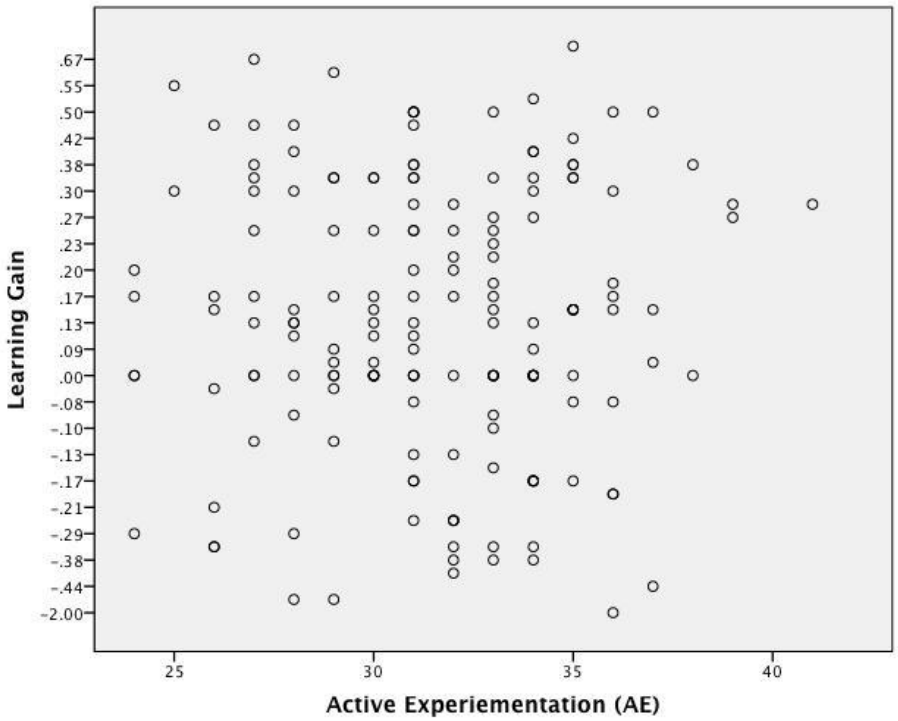


Figure 4.10. Relationship between preference for Active Experimentation on the LSI and learning gain

Here again, although not directly related to a participant's learning gain, an exploration of the relationship between the participants' pre and post participation perceived understanding and their preference for AE on the transformational continuum was also conducted. The results of a Pearson correlational coefficient indicated no significant correlations between pre-participation, $r(166) = -.072$, $p = .353$, or post-participation, $r(166) = .073$, $p = .346$, perceived understanding of the applications and the learning preference of active experimentation (AE). The correlations are also highlighted in Table 4.16.

Hypothesis Three Results

H3: Greater preference for Active Experimentation (AE) on the transformational continuum (LSI score) will be positively correlated with higher levels of self-directed learning readiness (SDLRS score) for a group of public library system employees.

This hypothesis was also tested using a bivariate analysis of the variables using the Pearson correlation coefficient technique. The resulting correlational coefficient, $r(167) = -.056$, $p = .470$, indicates no statistically significant relationship exists between self-directed learning readiness and the learning preference of Active Experimentation (AE). Figure 4.11 is a scatterplot graph providing a visual representation of the results while tabular results can be seen in Table 4.16.

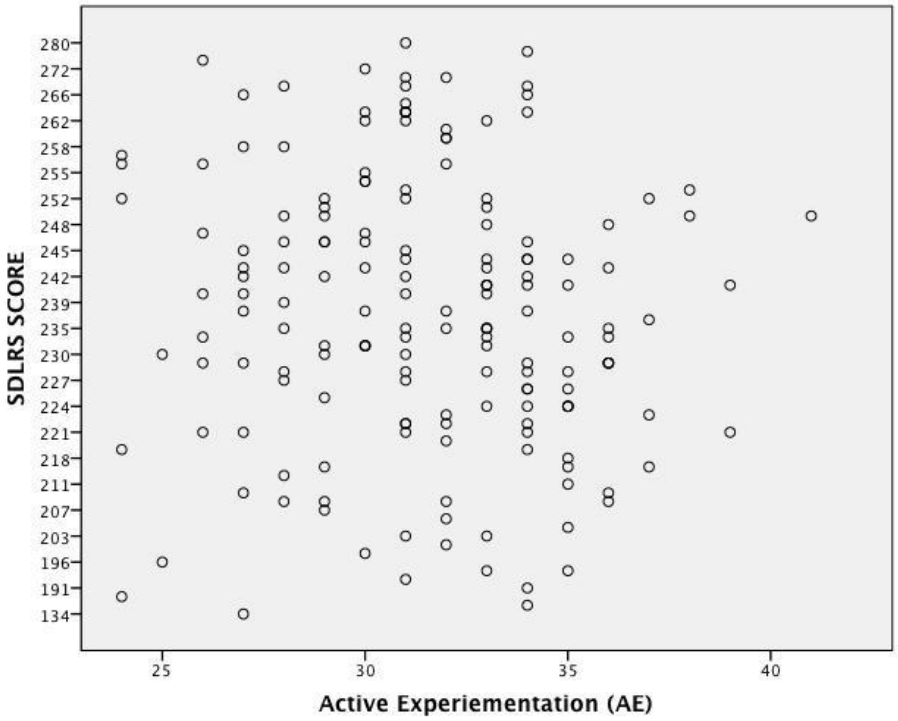


Figure 4.11. Relationship between SDLRS score and AE preference

Once again, additional analysis was conducted to explore the relationship between self-directed learning readiness (SDLRS score) and the remaining three facets of the LSI. The resulting correlational coefficients for CE, $r(167) = -.082$, $p = .288$, RO, $r(167) = .078$, $p = .311$, and AC, $r(167) = .050$, $p = .517$, indicated no significant relationships among these factors. Table 4.16, previously mentioned, illustrates the correlational findings between self-directed learning readiness and the facets of the Learning Style Inventory.

Summary

There were 169 employees in the population for the study who are employed at a large public library system in a large metropolitan city in a

Southwestern state. All 523 employees currently employed at the beginning of the study were given the opportunity to volunteer to participate. A sample of 186 employees agreed to participate and was provided the web links and instructions for completing phase one of the study.

Phase one included completion of the SDLRS, LSI, and the pre-test measure, which also contained the general demographic questions. However, nine of these participants failed to complete all of the initial instruments and two participants resigned from the library system during this phase and were removed from the sample, this bringing the number of participants to 175. The remaining participants then proceeded into phase two of the study which consisted of participation in a five-week self-directed online learning program focused on understanding various web-based applications currently being utilized by the library system. Following the end of the five-weeks, the participants were emailed a post-test measure, which contained five additional post-study related questions. Six participants failed to complete the post-test measure and were removed from the sample leaving a sample of 169 employees who completed all three phases of the study.

The scores on the SDLRS ranged from 134 to 280 with a mean score of 235.42. The results of the LSI indicated a fairly evenly distributed sample among the four learning styles of Converger ($n = 22$), Assimilator ($n = 29$), and Accommodator ($n = 33$) with the highest number of the sample

preferring the Diverger ($n = 85$) style. Learning gain for the sample ranged from minimum gain of -2.00 to a maximum gain of .75 with a mean gain score of .09.

A series of Pearson correlational coefficient tests were conducted to measure the strength and direction of the relationships between the different variables in this study. The first relationship examined was between self-directed learning readiness and learning gain. There was no significant correlation found between self-directed learning readiness and learning gain, $r(167) = .06$, $p = .412$, for the sample in this study. The next variables to be examined were the employees' preference for active experimentation on the Learning Style Inventory and their learning gain. Here again, no significant correlation was found to exist between these two variables, $r(167) = -.025$, $p = .743$, for this study population. Further correlational analysis was conducted on all four preferences of the LSI. Analysis on the remaining preferences, concrete experience, $r(167) = -.090$, $p = .245$, reflective observation, $r(167) = -.042$, $p = .584$, and active experimentation, $r(167) = .014$, $p = .857$, also indicated no significant correlation with employees' learning gain.

The final Pearson Correlational Coefficient analysis was conducted between the two independent variables of preference for the active experimentation on the LSI and self-directed learning readiness from the SDLRS. There was no significant correlation between preference for active

experimentation and self-directed learning readiness, $r(167) = -.056$, $p = .470$, was found to exist. Further correlational analysis was conducted to explore the relationship between the remaining learning preferences and self-directed learning readiness. The results for concrete experience, $r(167) = -.082$, $p = .288$, reflective observation, $r(167) = .078$, $p = .311$, and abstract conceptualization, $r(167) = .050$, $p = .517$, also indicated no significant correlation to exist. These results indicated that public library system employees in this study were highly self-directed, but their readiness had no significant relationship with the employees' ideal learning preferences.

Although not directly linked to employee learning gain scores, employees' perceived understanding levels of the digital applications both prior to and after participation in the self-directed learning program were analyzed to determine whether relationships existed between the employees' perceived understanding and their level of self-directed learning readiness. Pearson correlation coefficients indicated a significant positive correlation between self-directed learning readiness and both pre-participation, $r(166) = .215$, $p = .005$, and post-participation understanding, $r(167) = .192$, $p = .013$.

When perceived understanding was correlated with AE on the transformational continuum of the LSI, the Pearson correlation coefficient indicated no significant relationship between the preference for AE and pre-

study understanding, $r(166) = -.012$, $p = .881$, or post-study understanding, $r(166) = .035$, $p = .651$, of the digital applications in the self-directed learning program.

The demographic questions included the following areas: gender, age, education, years of service, work location, and employment category. Eighty percent of the sample was female ($n = 138$) and 74% ($n = 125$) hold a bachelor's degree or higher in their educational level. Also, 75% ($n = 127$) of the participants work in a library location as opposed to an office or department within the library system.

The follow-up questions contained as a part of the post-test assessment indicated the sample spent between zero minutes and 10 hours, with a mean time of 124.64 minutes, working on the five-week self-directed learning program associated with this study. When asked to rate their understanding of the applications prior to the start of the learning program on a scale from 1 = little understanding to 7 = total understanding, the sample had a mean score of 3.51. When asked the same question in regards understanding the applications following the completion of the learning program, the mean score was 4.94. These figures indicated the participants had a higher understanding of the digital applications following the learning program than they had prior to participation.

This chapter presented the results from the analyses used to test the hypotheses defined in this study. The next chapter contains the conclusions, interpretations, and implications suggested by the results of this study.

Chapter Five

This study was designed to examine the relationships between self-directed learning readiness, learning style preferences and learning gain among employees working in a public library system. Chapter one of this dissertation provided the purpose and an introduction to this study. Chapter two contained an examination of the literature related to self-directed learning, learning style, and workplace learning. Chapter three outlined the procedures for the study and chapter four presented the results from the data collected.

This final chapter, chapter five, highlights the conclusions drawn from the major findings presented in the previous chapter. Additionally, the implications for the practice of self-directed learning and workplace learning, and recommendations for future research related to these fields are also presented.

Purpose and Overview

The purpose of this quantitative correlational study was to investigate to what degree a relationship exists between self-directed learning readiness and learning style preferences on employee learning in a public library system. The sample for this study was drawn from the employees currently employed in a large public library system located in a metropolitan city in a Southwestern state. All 523 employees, employed at the time of this study, were provided the opportunity to volunteer to participate. This

resulted in a non-probability convenience sample of 186 employees with 169 (91%) of them completing all three phases of the study.

The participants in this study were highly educated (more than 70% have earned a bachelor's or master's degree), have longevity with the public library system (50% of the participants had been employed from six to more than 31 years), a majority (80%) were women, and represented all library locations/departments and employment positions in the public library system.

At phase one of the study, the participants completed a series of online questionnaires comprised of the SDLRS, LSI, and a researcher designed pre-test measure that also contained general demographic questions regarding gender, age, education, years of service, work location, and employment category within the library system. The 20-item multiple-choice pre-test instrument was designed to measure the participant's knowledge of various web-based applications utilized by the public library system prior to participating in a self-directed learning program focused on these applications. The online learning program was implemented in phase two of the study. Pre-test scores were utilized, along with the post-test scores, generated in phase three of the study, to determine each participant's learning gain.

The Self-Directed Learning Readiness Scale (SDLRS) is a 58-item, Likert-type scale designed by Lucy Guglielmino in 1977 as a part of her

doctoral work. The scale is designed to measure self-directed learning readiness by having a respondent answer statements regarding learning and attitudes associated with learning according to the degree in which the respondent believes is most applicable to himself or herself. Scores for the sample on SDLRS ranged from 134 to 280 with a mean score of 235.42 and a standard deviation of 21.96. These scores identified the sample as having a higher level of readiness for self-directed learning than the mean score of (*M* = 214) Guglielmino & Associates (n.d.) reports based on all adults who have completed the instrument.

The Learning Style Inventory (LSI) is a 12-item measure designed to identify individual learning style preference for adults. Based on the respondent's answers to each of these items, the results are plotted on a grid formed by two intersecting continuums – a transformation continuum and a prehension continuum. Each end of the continuums defines one of the four learning modes or preferences identified as concrete experience, reflective observation, abstract conceptualization, and active experimentation. The four quadrants formed by these intersecting continuums identify the four learning styles defined as a Diverger, Assimilator, Converger, or Accommodator.

Based on the data collected in this study, the preferred learning styles were fairly evenly distributed with 50% (*n = 85*) of library system employees

identifying as Divergers, 20% ($n = 33$) as Accommodators, 17% ($n = 29$) as Assimilators, and 13% ($n = 22$) as Convergers.

As a part of the study, participants were asked to participate in an online self-directed online learning program aimed at providing an understanding of a variety of web-based applications currently being utilized by the public library system. Google Analytics was collected throughout the five-week duration of the program to track the online activities associated with the learning program. Data collected was collective, as the analytics could not determine individual participation based on the inability to determine unique users. The website was limited to study participants as each was given the unique webaddress to access the program and the site was not available publicly. Data collected via Google Analytics included number of visits, pageviews, and duration of visits. Seventy-four percent of the visits to the website ranged in duration from three to 30+ minutes in length. At the end of the study, participants were asked to self-report the amount of time they spent on the learning program on a sliding scale from zero minutes to a maximum of 600 minutes (10 hours) during the five-week program. The average time spent was just over two hours ($M = 124.64$ minutes). When compared, the participants' estimated time spent is much greater than what was captured in the Google Analytics. The larger self-reported estimations may include time spent by the participants on the web-

applications outside of the learning program and therefore were not captured in the duration numbers.

Additionally, participants were also asked to provide their perceived pre and post-participation understanding of these applications using a scale from 1 = little understanding to 7 = total understanding, the participants indicated greater understanding following the learning program represented by mean rating of 5.0 – up from a mean rating of 3.5 on their pre-participation understanding rating. The perceived post-participation understanding level was significantly correlated with readiness for self-directed learning for this sample indicating employees with high levels of self-directed learning readiness had greater understanding after completing the self-directed learning program in this study. Here again, these perception numbers reflect a different picture than that of the scores on the pre-test and post-test measures designed to produce scores to be utilized in the measurement of learning gain. While the learning gain scores indicate a slight increase in learning gain from pre-test to post-test, the perceived understanding scores indicate a greater increase. The difference in learning gain may be effected by using a pre-test/post-test measure containing multiple-choice questions where participants have the opportunity to guess the answer, if not known, on the pre-test and then answering the questions more carefully on the post-test.

Conclusions

This study examined three hypotheses in an attempt to determine possible relationships between self-directed learning readiness, learning style preferences, and learning gain. The conclusions from these tests are presented below.

H1: Higher self-directed learning readiness (SDLRS score) will be positively correlated to greater learning gain (pre-test/post-test scores) after completing a self-directed learning program at work for a group of public library system employees.

No significant relationship was found to exist at an alpha level of .05 between employees' readiness for self-directed learning readiness and greater learning gain following the completion of a self-directed learning program at work. However, an examination of self-directed learning readiness and perceived understanding of the digital applications did result in statistically significant relationships at both pre-participation and post-participation periods. There was also a significant positive relationship between participants' pre-participation and post-participation perceived understanding.

H2: Greater preference for Active Experimentation (AE) on the transformational continuum (LSI score) will be positively correlated to greater learning gain (pre-test/post-test scores) after completing a self-

directed learning program at work for a group of public library system employees.

No significant relationship was found to exist at an alpha level of .05 between employees' with a greater preference for active experimentation on the transformation continuum of the Learning Style Inventory and greater learning gain following the completion of a self-directed learning program at work. While no significant relationship was found for the active experimentation preference, additional correlational analysis was conducted to determine if a significant relationship existed between greater learning gain and the remaining three learning preferences identified by the LSI. No significant relationship at an alpha level of .05 existed with the other facets of the LSI.

Additional correlational analysis was conducted between pre and post-participation perceived understanding of the digital applications and the preference for AE on the transformational continuum on the LSI. Here again, no significant relationship at the alpha level of .05 existed. However, there was a significant positive correlation between pre-participation perceived understanding and the preference for reflective observation. There was also a significant positive relationship between the preference for reflective observation and a significant negative relationship between concrete experience and post-participation perceived understanding. Reflective

observation is at the opposite end of the transformational continuum from active experimentation on the LSI.

H3: Greater preference for Active Experimentation (AE) on the transformational continuum (LSI score) will be positively correlated with higher levels of self-directed learning readiness (SDLRS score) for a group of public library system employees.

No significant relationship was found at an alpha level of .05 between employees with a greater preference for active experimentation on the transformational continuum and higher levels of self-directed learning readiness. Once again, additional correlational analysis was conducted to determine if a significant relationship existed with higher levels of self-directed learning readiness and the remaining three learning preferences identified by the LSI. No significant relationships at the alpha level .05 were found to exist.

Importance of this Study

The findings from this study have importance to the fields of adult learning, learning styles, self-directed learning, library and information studies and workplace learning. The following will highlight the major findings from this study as they pertain to each of these fields of study.

Self-Directed Learning Findings

1. The average self-directed learning score for employees working in a public library system was 235.42, the minimum score was 134, and the maximum score was 280.
2. The majority (70%) of public library system employees have an above average level of readiness for self-directed learning based on their scores on the self-directed learning readiness scale. Only 5% of the employees scored in the below average level of readiness.
3. Public library system employees are virtually unstudied in regards to their self-directed learning readiness.

Learning Style Findings

1. Fifty percent (*n* = 85) of the participants working in the public library system had a preference for the Diverger learning style. This style is a combination of the concrete experience (CE) and reflective observation (RO) learning preferences.
2. Twenty percent (*n* = 33) of the participants working in the public library system had a preference for the Accommodator learning style. This style is a combination of concrete experience (CE) and active experimentation (AE) learning preferences.
3. Seventeen percent (*n* = 29) of the participants working in the public library system had a preference for the Assimilator learning

style. This style is a combination of abstract conceptualization (AC) and reflective observation (RO).

4. Thirteen percent (*n* = 22) of the participants working in the public library system had a preference for the Converger learning style. This style is a combination of abstract conceptualization (AC) and active experimentation (AE).
5. Preference scores on the transformational continuum of AE (*n* = 18) – RO (*n* = 60) indicated participants in the public library system preferred watching and reflecting to getting things done in their learning activities.
6. Preference scores on the prehension continuum of AC (*n* = 55) – CE (*n* = 136) indicated participants in the public library system preferred feeling and experiencing to logical analysis of ideas in their learning activities.

Employee Learning in Public Library Systems

1. Public library system employees have high levels of self-directed learning readiness and are likely to participate in self-directed learning activities as they become available.
2. Low learning gain scores (*M* = .09) indicated web-based self-directed learning programs may not be a preferred method of learning for public library system employees.

3. Self-directed online learning may not be an effective means for understanding web-based digital applications currently being utilized by the library system.
4. Learning style preferences for public library system employees are similar in distribution among the four learning styles and indicated a need for a variety of employee learning activities and offerings as apposed to focusing on a single method of learning for all learners.

Implications for Practice

The goal of adult learning is to help individuals continue to develop and learn by participating in learning activities they desire and/or need to further themselves personally or professionally in their lives or careers. Adults see themselves as capable of self-direction in their own learning and the research findings have confirmed this fact. What adults learners need is to have a understanding of his or her own learning preferences and then be given the opportunity to participate in a wider range of educational experiences that will foster these learning preferences.

For adult learners, having an understanding of their own learning preferences and styles and an indication to what extent they are ready to participate in self-directed learning activities could be beneficial in the search for and selection to participate in learning opportunities. While the instruments utilized in this study have a fee associated with their usage and

may not be selected for usage by the general population, similar instruments have been adapted and developed based on the research and are readily available to the general public. Usage of such measures can begin to make individuals aware of their learning preferences and styles and may help in the guidance of their learning processes.

Adult educators who are tasked with developing learning opportunities should be mindful of the diversity of learners and learning styles preferences when planning and developing learning opportunities. By offering multiple methods for learning, the learners have the option to choose the method best suited for them to be successful. For adult educators in a workplace setting, offering training and other professional development opportunities in a variety of methods, such as online, face-to-face, or independently, can assist learners in selecting a delivery method that closely matches their preferred method of learning. It is likely that when learners participate in learning activities in their own preferred learning style the learning outcomes are likely to be greater and the experience more gratifying.

This research study suggested that adult learners in the public library system are highly self-directed, however, the use of an online self-directed learning program may not be a preferred method for increasing understanding of web-based applications being used by the public library system. With limited time and resources, online learning is becoming a

popular method for satisfying employees' training needs. What is not fully known is to what extent employees have a preference for this style of learning. While online learning may be convenient and readily available, this method of learning may not be conducive to increasing understanding of the information or processes.

Future Research

The population for this study was limited to a specific group of adult learners employed in a large public library system in a Southwestern state and therefore has limited generalizability. Nonetheless, the following recommendations are offered for future research.

1. The model tested in this study should be replicate with a more representative sample of public library system employees from across the nation with more diverse populations in regards to age, educational levels, and organizational work experience and utilizing other types of self-directed learning programs.
2. A different approach to investigating this topic, such as the use of qualitative research techniques, may be beneficial. Conducting interviews with public library system employees could determine characteristics of self-directed learning readiness and learning style preferences not identified in this study.

3. The model tested in this study should be replicated utilizing a control or comparison group can help to minimize the effects and increase the reliability of the results.
4. Additional measures, other than pre-test/post-test methods, need to be developed to better understand learning gain in a variety of learning situations.
5. Additional research needs to be conducted using the SDLRS and the LSI instruments with large samples to establish the ongoing validity and usefulness in measuring self-directed learning readiness and learning style preferences.
6. Research is needed to establish additional constructs for the understanding of self-directedness and learning style preferences. These alternative views could help in the development of new instrumentation for the measurement of these concepts.
7. Research is needed to study the relationships between self-directed learning readiness and learning styles in populations other than college and graduate students.
8. Longitudinal research is needed to identify characteristics of self-directed learners and learning style preferences.
9. Longitudinal research is needed to further identify the characteristics of self-directed learners and learning style preferences for individuals in the workplace.

Summary

The findings in this study support the fact that self-directed learning and learning style preferences are both an integral part of the life-long learning process and have an impact on an individual's learning. In this study, the author hypothesized adult employees in a public library system with higher self-directed learning readiness scores and a greater preference for the learning style of active experimentation would be positively correlated with higher learning gain following the completion of a self-directed learning program at work.

However, the data collected and explained in earlier chapters, does not support these expectations. The data does, however, indicate public library system employees in this sample possessed above average levels of readiness for self-directed learning, but this readiness had no significant relationship with learning gain. Additionally, no significant relationship existed between the learning preference of active experimentation and learning gain. The lack of relationships between any of the four learning preferences on the Learning Style Inventory may suggest that public library system employees possessed all styles and can utilize their preferred style in various learning situations to increase their learning gain. There is an indication that future research exploring the relationships between all four learning style preferences and self-directed learning readiness may be beneficial.

An analysis of the employees' perceived understanding levels of the digital applications contained in the self-directed learning program after completion of the program indicated that greater readiness for self-directed learning does have a significant positive relationship with higher levels of perceived understanding and further research is needed to explore these factors in more detail.

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Appendix A: Demographic Questions

Gender

- ❍ Male
- ❍ Female

What is your age?

- ❍ 16 to 24 years
- ❍ 25 to 34 years
- ❍ 35 to 44 years
- ❍ 45 to 54 years
- ❍ 55 to 64 years
- ❍ 65 or over

What is the highest level of education you have completed?

- ❍ Less than High School
- ❍ High School / GED
- ❍ Some College
- ❍ 2-year College Degree
- ❍ 4-year College Degree
- ❍ Masters Degree
- ❍ Doctoral Degree
- ❍ Professional Degree (JD, MD)

How many years have you worked at the Metropolitan Library System?

- ❍ less than 1 year
- ❍ 1-5 years
- ❍ 6-10 years
- ❍ 11-15 years
- ❍ 16-20 years
- ❍ 21-25 years
- ❍ 26-30 years
- ❍ 31 or more years

I work:

- ❍ at a Library Location (e.g. BI, ED, VI, etc.)
- ❍ in an Office/Department (e.g. BUS, MSL, ILL, etc.)

Which category closely matches your position in the library system?

- ❍ Support Professional (e.g. Administrative Specialist, Clerk, Driver, Library Aide, Public Computer Specialist, Processor, Receptionist, Technician)
- ❍ Leadership (e.g. Assistant Director, Deputy Executive Director, Director, Executive Director, Manager)
- ❍ Professional (e.g. Accountant, Analyst, Assistant, Assistant Manager, Associate Librarian, Cataloger, Coordinator, Editor, Librarian, Officer, Operator, Selector, Specialist, Supervisor, Webmaster)

Appendix B: Understanding Digital Applications Pre-Test / Post-Test

Please enter your 5-digit participant code:

This survey is designed to gather data on your knowledge of various web-based applications currently being utilized by the Metropolitan Library System. Please read each question carefully and select the correct answer. Each question will only have one correct answer. Please answer the questions by yourself without the help of your co-workers or other available resources. There is no time limit for the survey. Try not to spend too much time on any one question.

Social Media is a category of web applications that includes all of the following except:

- ❍ LinkedIn
- ❍ Twitter
- ❍ Facebook
- ❍ Wikipedia
- ❍ Google+

What file type(s) are available for downloading electronic media from the library system to a playback device?

- ❍ .mp3
- ❍ .epub
- ❍ .wma
- ❍ .azw
- ❍ Only .epub & .wma
- ❍ All of them

What application is a visual collection of social bookmarks?

- ❍ Vimeo
- ❍ YouTube
- ❍ Pinterest
- ❍ Dropbox
- ❍ Instagram

Free, easy to use copyright licenses for sharing your creative work are available through:

- ❍ Copyright Office
- ❍ Intellectual Property Protection
- ❍ Online Web Applications
- ❍ Creative Commons
- ❍ None of these

Facebook was first used by:

- ❍ High School Students
- ❍ Everyone
- ❍ College Students
- ❍ Computer Programmers
- ❍ Employees

LinkedIn is the world's largest network of what kind of individuals?

- ❍ College Students
- ❍ Executives
- ❍ Employers
- ❍ Professionals
- ❍ Job Seekers

All individuals on Twitter are referred to as:

- ❍ Fans
- ❍ Twits
- ❍ Followers
- ❍ Leaders
- ❍ Twitterers

Flickr is a web-based program for sharing:

- ❍ Videos
- ❍ PowerPoint Presentations
- ❍ Photos
- ❍ Photos & Videos
- ❍ None of these

Reporting inappropriate content posted on a web-based application is referred to as:

- ❍ Blocking
- ❍ Banning
- ❍ Flagging
- ❍ Spamming
- ❍ Both Banning & Spamming

People you know on LinkedIn are referred to as:

- ❍ Friends
- ❍ Contacts
- ❍ Connections
- ❍ Acquaintances
- ❍ Subscribers

A YouTube channel is designed to showcase all of the following except:

- ❍ Favorite Videos
- ❍ Subscriptions
- ❍ Uploaded Videos
- ❍ Playlists
- ❍ Subscribers

Flickr was acquired by what company is 2005?

- ❍ Facebook
- ❍ Google
- ❍ Twitter
- ❍ Yahoo!
- ❍ Dropbox

Instagram is another photo-sharing site but includes what feature to give photos a different look?

- ❍ High Definition
- ❍ Filters
- ❍ Faster Upload Speeds
- ❍ Slideshow
- ❍ Both High Definition & Faster Upload Speeds

Which of the following electronic media formats is considered an AMP?

- ❍ eBooks
- ❍ Playaways
- ❍ eAudiobooks
- ❍ Streaming Videos

A free Flickr account limits a user's photo display to how many pictures?

- ❍ 150
- ❍ 500
- ❍ 250
- ❍ 200
- ❍ Unlimited

Google Accounts is a unified sign-in system that also provides access to which application?

- ❍ Twitter
- ❍ LinkedIn
- ❍ Vimeo
- ❍ YouTube
- ❍ Facebook

How is a Vimeo Channel different from a Vimeo Profile?

- ❍ Channel only contains videos
- ❍ Profile only contains videos
- ❍ Channel tells about the creator
- ❍ Profile contains shout boxes
- ❍ No difference - they are the same

Hashtags are used in the following web applications:

- ❍ Twitter & YouTube
- ❍ Pinterest
- ❍ Instagram
- ❍ Google+
- ❍ All of the above

What resource provides an index to more than 1 million free eBooks for personal use?

- ❍ Achive.org
- ❍ Many Books
- ❍ Baen Library
- ❍ Project Gutenberg
- ❍ University of Pennsylvania eBook Collection

The process of assigning a term or keyword to a piece of information is called:

- ❍ Labeling
- ❍ Re-tweeting
- ❍ Tagging
- ❍ Social Bookmarking
- ❍ Cloud Computing

Appendix C: Permission to Conduct Research

February 15, 2012

Donna Morris, Executive Director
Metropolitan Library System
300 Park Ave.
Oklahoma City, OK 73102

Ms. Morris,

I am requesting permission to conduct research with employees of the Metropolitan Library System as part of my doctoral study at the University of Oklahoma.

The purpose of the study is to investigate the relationship between an employee's preferred learning style orientation and his/her readiness for self-directed learning and the relationship of these characteristics on employee learning. The need for this study is important as more learning is moving away from traditional face-to-face classroom settings to more online, webinar-based formats which require a higher level of self-directedness and may not fall within the individual's preferred learning style orientation.

The study will utilize a quasi-experimental design. Initially, a request for employee involvement will be sent via e-mail to all employees in the library system. Those who wish to participate will be required to sign an Informed Consent form as required by the Institutional Review Board (IRB) of the University of Oklahoma. All participants will also be asked to complete a 58-item Learning Preference Assessment (LPA) and a 12-item Learning Style Inventory (LSI), a pre-test and post-test learning assessment, and participate in a five-week self-paced learning project.

Once this study is completed, all employees of the Metropolitan Library System will have the opportunity to participate in the learning project.

The estimated maximum time commitment over the 5-week study is 10 hours.

The University of Oklahoma requires that participants of this study be protected in terms of keeping their information confidential. To meet this requirement, all participants will be randomly assigned a number upon receipt of their Informed Consent document. The number key, linking the number with participant names, will be held securely in a locked file cabinet in my office and not shared. The participant's number will be identifiable on

the survey instruments and pre-test and/or post-test assessments assigned during the study. Pre-addressed sealable security envelopes will be provided for returning completed surveys via library's interagency mail procedures. The self-directed learning project will be conducted via the library's Learning Management System to replicate current training practices in our organization.

The Metropolitan Library System will benefit from this study in the following ways: 1) generalized understanding of staff's readiness to participate in self-directed learning; 2) generalized understanding of staff's preference for learning style orientation; and 3) generalized understanding of the impact of learning style and readiness for self-directed learning on employee learning. This understanding can then be used as the organization makes immediate and future decisions regarding staff training and development opportunities.

All work will be conducted in accordance with the University of Oklahoma Internal Review Board Standards and is under the supervision of my committee chair, Dr. Doo Hum Lim. If you have any questions or need further clarification, please feel free to contact me at your convenience at 405.615.5922 or sschrank@ou.edu.

Appreciatively,

Stacy G. Schrank
Employee Development Coordinator
Metropolitan Library System

I understand the proposed research project described above and give my permission for you to conduct it with the employees of the Metropolitan Library System.

_____ _____

Donna Morris, Executive Director Date

Appendix D: Study Announcement to Employee

MLS Staff,

As many of you know, I am currently pursuing a doctorate degree in adult and higher education at the University of Oklahoma. As part of the requirement to obtain this degree, I am conducting a study on learning styles and preferences of employees in a public library system. I would greatly appreciate your participation in this study.

NOTE: Your participation in this study is strictly voluntary. Refusal to participate will involve no penalty. You may withdraw from the study at any time without penalty. Employees who elect to participate in the study will do so on work time and will receive training credit. Participation in this study will take place online at your own pace and will take a maximum of 12 hours over an eight-week period.

Study materials will be accessed via web links. You will be provided a five-digit participant code that will be utilized on each of the surveys and assessments. No personally identifying information will be placed on anything you complete. So that you can be assured of total confidentiality, please do not include your name on anything you complete connected with this study. Data gathered during the study will be stored on a password-protected computer.

If you are interested in participating in the study, simply reply to this e-mail message and include the message "*I wish to participate in the study.*" You will then be enrolled in the study and will begin to receive study materials via your library e-mail account. Please respond by *Sunday, March 17th* if you wish to participate.

If you have any questions, please feel free to contact me at your convenience at SSchrank@metrolibrary.org or 606-3823. You may also contact my faculty sponsor, Dr. Doo Hun Lim at 405-325-7941 or dhlim@ou.edu.

Stacy G. Schrank
Employee Development Coordinator
Metropolitan Library System

The University of Oklahoma is an Equal Opportunity Institution.

Appendix E: Digital Informed Consent

University of Oklahoma
Institutional Review Board
Informed Consent to Participate in a Research Study

Project Title: Employee Learning in a Public Library System
Principal Investigator: Stacy Garnel Schrank
Department: Educational Leadership & Policy Studies

You are being asked to volunteer for this research study. This study is being conducted within the Metropolitan Library System. You were selected as a possible participant because of your current employment with the library system.

Please read this form and ask any questions that you may have before agreeing to take part in this study.

Purpose of the Research Study

The purpose of this study is to explore the relationships between learning preferences and learning styles on employee learning in a public library system.

Number of Participants

All 532 employees of the library system are eligible to participate.

Procedures

If you agree to be in this study, you will be asked to complete two online surveys and a pre-study assessment. You will then be asked to participate in a 5-week self-paced learning program. At the end of the five weeks you will be asked to complete a post-study assessment.

Length of Participation

Participation in this study will take a maximum of 12 hours over a seven-week period. The Investigator, without regard to the participant's consent, will automatically terminate participants who leave the library system or who have their employment terminated during the study period.

Risks of being in the study are

The risks associated with participation in this study are no greater than those the employee would normally encounter by participating in other training offerings conducted by the Metropolitan Library System.

Benefits of being in the study are

The benefits associated with participation in this study are not less than or greater than those the employee would normally attain by participating in other training offerings conducted by the Metropolitan Library System.

Compensation

You will not be reimbursed for your time and participation in this study.

Confidentiality

In published reports, there will be no information included that will make it possible to identify you. Research records will be stored securely and only approved researchers will have access to the records.

There are organizations that may inspect and/or copy your research records for quality assurance and data analysis. These organizations include the Hay Group, Guglielmino & Associates, and the OU Institutional Review Board.

A summary of the research findings will be shared with the employees of the Metropolitan Library System via their Intranet following the completion of the study.

Voluntary Nature of the Study

Participation in this study is voluntary. If you withdraw or decline participation, you will not be penalized or lose benefits or services unrelated to the study. If you decide to participate, you may decline to answer any question and may choose to withdraw at any time.

Contacts and Questions

If you have concerns or complaints about the research, the researcher conducting this study can be contacted at 405-615-5922 or sschrank@ou.edu. You may also contact my faculty sponsor, Dr. Doo Hun Lim at 405-325-7941 or dhlim@ou.edu. Contact the researcher(s) if you have questions, or if you have experienced a research related injury.

If you have any questions about your rights as a research participant, concerns, or complaints about the research and wish to talk to someone other than individuals on the research team or if you cannot reach the research team, you may contact the University of Oklahoma – Norman Campus Institutional Review Board (OU-NC IRB) at 405-325-8110 or irb@ou.edu.

Please print or save a copy of this information for your records.

This study has been approved by the University of Oklahoma, Norman Campus IRB.

IRB Number: 2511 Approval Date: 02/26/2013

Participation

❍ I agree to participate in this study.

❍ I decline.

Appendix F: Phase One Announcement

<Participant Name>,

Thank you for agreeing to participate in this study on employee learning in a public library system. You have been assigned a unique code that you will use on each of the instruments you complete associated with this study. Please save this message so you have access to this code throughout the study.

Your unique participant code is: **?????**

Below is the web link for the initial assessments. These instruments will take a variety of times to complete – please begin each when you have time to complete it in one sitting. Please answer the questions to the best of your ability and without the help of individuals or resources around you. The estimated maximum times for each assessment are identified below:

The *Understanding Digital Applications* is a 20-item questionnaire and should take you no more than 15-20 minutes to complete.

https://oueducation.qualtrics.com/SE/?SID=SV_bslnCd50RRmdQvH

The *Learning Preference Assessment* is a 58-item questionnaire and should take you no more than 15-20 minutes to complete.

www.lpasdlrs.com/login.html

ID: ?????

Password: ?????

The *Learning Style Inventory* is a 15-item questionnaire and should take you no more than 15-20 minutes to complete.

https://surveys.haygroup.com/login.aspx

Username: ????????

Password: ????????

These surveys must be completed no later than **Sunday, March 31st.** Participants who complete all three instruments will be permitted to continue in the study.

If you have questions regarding the requests in this message, please feel free to contact me at your convenience by replying to this message or by calling 606-3823

Stacy G. Schrank
Employee Development Coordinator

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Appendix G: Phase Two Announcement

Dear Participant,

Thank you for completing the first phase of my research study on employee learning in a public library system. I appreciate your help. The next phase is a learning project.

The Metropolitan Library System has begun to utilize a variety of web-based applications to communicate and share information with our internal and external customers. Many of these applications are also being utilized by individuals and other organizations across our country and the world.

During the next five weeks, you will have the opportunity to learn about and explore five different categories of web-applications currently being used in our library system. The training is entitled "***Understanding Digital Applications***."

The training is designed to be self-paced and contains a variety of information and activities. You are not required to complete all the activities listed in the training, but you should do enough activities to have a broad understanding of each of the applications. There is no time limit for how long you should spend on each component, but it should take no more than 2 hours per week over the five week period. Some components may be a review and take less time and others may include new information and activities and may take you more time to complete. Below is the web link to the training.

The training must be completed by **Sunday, May 12, 2013**.

www.understandingdigitalapps.com

Have fun learning and exploring these digital applications!

Stacy G. Schrank
Employee Development Coordinator
Metropolitan Library System

The University of Oklahoma is an Equal Opportunity Institution.

Appendix H: Phase Three Announcement

Dear Participant,

Congratulations, you are one step away from completing your participation in this study on employee learning in a public library system. Below is a web link to the post study assessment where you will be asked to answer 20 questions relevant to your participation in the self-paced program "Understanding Digital Applications" along with five participant questions.

This assessment should take no more than 30 minutes to complete. Once again, please answer the questions to the best of your ability and without the help of individuals or resources around you.

The surveys must be completed by **Sunday, May 19th**.

https://oueducation.qualtrics.com/SE/?SID=SV_aahOeHG1ovUNjpz

Only participants who complete this post assessment will receive participation credit in the Metro U LMS. Once all the data is collected and analyzed, I will be sharing the results with all study participants. If you have co-workers who are interested in participating in the activities contained in this study, the training website will be made available to all library staff in the coming weeks.

Thank you again for your participation!

Stacy G. Schrank
Employee Development Coordinator
Metropolitan Library System

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Appendix I: Post-Test Follow-up Questions

The following five questions are designed to provide additional understanding of the participants in this study. Please answer the questions from your own perspective.

How many minutes (0 to 600) did you spend participating in Phase II of this study (the Understanding Digital Applications training program)?

_____ Minutes spent on training

Of the components in the training program, rank the usefulness of each for you (0 = Not useful to 10 = Very useful) and explain why

_____ Self-paced – Why?
_____ Completed Online - Why?
_____ Variety of Activities - Why?
_____ Participant is given choices on what to do - Why?
_____ Uses Current Technologies - Why?
_____ Other - Why?
_____ Other - Why?

What else did you do to enhance your learning during this training program? (select all that apply)

- ❑ Discussed training content with co-worker(s)
- ❑ Explored the concepts outside of work
- ❑ Created my own personal accounts for some or all of the applications
- ❑ Shared knowledge of applications with my friends
- ❑ Shared knowledge of applications with co-worker(s)
- ❑ Assisted library customer(s) with one or more of the applications
- ❑ Sought out additional training on these applications
- ❑ Purchased an electronic device that supports one or more of the applications
- ❑ Other _____
- ❑ Did not do anything else

How would you rate your understanding of these digital applications after this training? (1 = Little understanding to 7 = Total understanding)

_____ Understanding Rating

How would you have rated your understanding of these digital applications prior to the start of this training? (1 = Little understanding to 7 = Total understanding)

_____ Understanding Rating

Appendix J: Calculating Learning Gain Formula

$$\frac{\text{(Post-Test Score – Pre-Test Score)}}{\text{(100\% - Pre-Test Score)}}$$

Positive Gain
Example Student #1

$$\frac{70 - 45}{100 - 45} = \frac{25}{55} = .45$$

Student #1 demonstrated a gain of 25% out of a potential 55% he/she could have gained. Thus, Student #1 gained .45 (or 45%) of the possible percentage points he/she could have gained from pre to post-test.

Negative Gain
Example Student #2

$$\frac{50 - 75}{100 - 75} = \frac{-25}{25} = -1.00$$

Student #2 demonstrated a negative gain based on possibly gaining up to 25%, but instead lost 25% (or 100% of what the participant could have gained) from pre to post-test.

Adapted from S. T. Williams, 2013, Sample Learning Gain Scores Calculation. Reprinted with permission.