

**Measuring Motivation and Tendencies Towards Self-directedness Within Information
Technology in an Academic Workplace**

by

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A dissertation submitted to the Graduate Faculty of
Auburn University
in partial fulfillment of the
requirements for the Degree of
Doctor of Philosophy

Auburn, Alabama
December 12, 2011

Keywords: self-directed learning, adult education, motivation, workforce

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Abstract

Advances in industry have placed a high demand on the workforce to maintain constant training. Some of the concerns that face administrators and supervisors are the best methods to keep current with new technology, how to implement these new advances in the environment, and how to best train their employees. While traditional methods have been to bring in trainers or to send the employee to an external site, more employers are relying on the employees to engage in self-directed learning.

Research conducted in workforce education has examined formal education, motivation, organizational psychology, and training methods. While there is a growing trend in different fields contributing to self-directed literature, overall there is a lack of research addressing the employee's self-directed learning efforts.

This study examined the relationship of employee attributes, such as position, position type, and education level to self-directed learning. It also examined motivational, developmental, and educational theories and how they contributed to the learner's engagement in self-directed learning. This study found no significance in position or position type in the self-regulated/motivation, cognitive or social domains. This study also found that those with graduate degrees scored higher in the self-regulated and motivational domains than those without a graduate degree.

Acknowledgements

I wish to acknowledge and express my sincere gratitude to my committee members Dr. James Witte, Dr. Maria Martinez Witte, and Dr. David Diramio for their continued support throughout my graduate studies. Dr. Chih-hsuan Wang is recognized for her time, direction, and assistance with analyzing the data collected for this study. Dr. Brian Parr is also recognized for his contribution as the outside reader.

Finally, I would like to thank my grandmother Ella Mae Cullins for believing in me and my education, my wife Sara for her patience, my children Addy, Bella, Emery and Oliver for the joy they inspire, and my friends and fellow colleagues for their support and encouragement.

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Chapter 1

Introduction

Knowles (1975) defined self-directed learning in adults as having three individual components: the instructor, learner and evaluator. Knowles (1975) proposed three reasons for self-directed learning: students who take control of the process learn more than traditional students, self-directed learning is natural to our psychological development, and education places greater responsibility on the learner. There have been many studies conducted on motivation and self-directed learning in the classroom (Deyo, Huynh, Rochester, Sturpe, & Kiser, 2010; Dynan, Cate, & Rhee, 2008; Stewart, 2007). However, there is scant research conducted examining self-directed learning in the workplace.

Traditionally workforce training has held two major schemas: training in the workforce, such as on-the-job training, master and apprentice programs; and traditional education such as four-year, two-year, and specialized schools. The task of keeping adults current in the skills and knowledge to successfully perform their jobs has become more complicated (Cross, 1981; Kubric, 2008; Sheldon, 2007). Not only have industry's requirements for employment changed, but the rate of change in knowledge for each sector has a faster turn-around. Burns and Heimstra (1997) stated:

An aspect of our lives undergoing perhaps the most change today is the workplace. We may never again see the day when a person started working for an organization and then had an opportunity of working there for 30 or more years. Today, most change jobs and

even careers several times in their lifetime. This means that we often are in transition and there are various learning implications. (para. 3)

In addition to the knowledge and skill-set cycle changes, the workforce has started to see different methods of training in which they postulate that businesses and industry are starting to rely more on the employee in independent learning than formal education (Bachler, 1997; Heimstra & Brockett, 1994; Tobin, 2000). Moncarz (2002) wrote “[t]echnology changes at such a rapid pace that retraining and updating information technology skills is essential, even for workers already in their jobs. The emphasis on nondegree programs, such as employer training and self-study, also will rise in importance” (p. 45). Alexander and Goldberg (2011) discussed the importance of the

lifetime of learning through three types of strategies: training and education programs to help downsized and displaced workers transition to other jobs, within the existing company or elsewhere, depending on the needs of the individual and the opportunities in the marketplace; ongoing skill/knowledge development opportunities for personal growth and career enhancement; and meeting worker and workplace needs through a dual training focus. (p. 6)

Statement of the Problem

Self-directed studies have primarily been focused on the classroom environment (Deyo, Huynh, Rochester, Sturpe, & Kiser, 2010; Dynan, Cate, & Rhee, 2008; Stewart, 2007). There is a lack of research on self-directed learning in the workplace. Research about self-directed learning has typically analyzed age, gender, race, and education in regards to the learner’s self-directed learning readiness (Chu & Tsai, 2009; Kell, 2006; Oddi, 1984; O’Shea, 2003). This study addressed the employees’ motivations and tendencies toward self-directed learning by examining

the correlation in education levels, position and position type within higher education's information technology sector.

Purpose of the Study

The purpose of this study was to investigate motivations and tendencies towards self-directed learning within the information technology workforce in higher education institutions. Employee attributes such as position, position type, and education level were examined in relation to the outcome of the Survey of Adult Learning Traits (S.A.L.T.) instrument. Hogg's (2008) research was conducted in a manufacturing and engineering firm using S.A.L.T. and examined education level and position. It was recommended that this survey be used in other sectors other than manufacturing.

Research Questions

The following research questions were addressed:

1. What is the relationship between the level of education, position, position type and employees' motivation to learn job related information?
2. What is the relationship between the level of education, position, position type and employees' perception of their ability to learn?
3. What is the relationship between the level of education, position, position type and employees' perception of their social and environmental factors associated with self-directed learning?

Significance of Study

The significance of this study included identifying employees' motivation and readiness for self-directed study. Most studies (Chu & Tsai, 2009; Kell, 2006; Oddi, 1984; O'Shea, 2003) have examined variables such as age, race, gender and educational level. This study examines the employee attributes, specifically position and position type, similar to Hogg's (2008) study.

The information from this study can be used by managers, directors and other key personnel to best facilitate future training. For example, if they have a workforce that contains a particular attribute found by this study, such as education level, position or position type, then they may arrange for employee's to engage in self-directed study over traditional or teacher-directed study. Employee tendencies in self-directed learning may also be used in the hiring process or employee evaluation process. This study may also impact the information technology employees' opinion of self-directed study. The job market has become more competitive and applicants are always seeking advantages over their competition, such as current specific knowledge or skills, ability to learn, and an understanding of general business practices (Alexander & Goldberg, 2011; O'Daniell, 1999). This study also added to adult learning, self-directed learning, and workforce development literature.

Limitations of the Study

1. The participants in this study were employees of universities and colleges, primarily in the southeast region of the United States, with a strong emphasis within the state of Alabama.
2. This study's results may be specific to the academic sector as opposed to the private sector and other types of industry.

Assumptions

1. Academic information support, also referred to as information technology, employees may hold multiple positions. For example a person's duties may include a programmer and administrator.
2. Academic information support employees may also span faculty and professional staff positions. The majority of the participant's job responsibilities are within information technology support.
3. Information technology categories can also be specialized. The United States Labor Statistics categorized information technology into twelve groups based on the Standard Occupational Classification System (SOC): computer and information systems managers; "computer programmers; computer and information scientists; computer systems analysts; computer hardware engineers; computer software engineers, applications; computer software engineers, systems software; computer support specialists; database administrators; network and computer systems; administrators; network systems and data communications analysts; and all other computer specialists, a residual category of workers" (Moncarz, 2002, p. 3). For the purpose of this study, the categories were generic: manager, programmer / analyst, or systems administrator / operator.
4. This study assumes that the participant answered honestly and to evaluate themselves to the best of their knowledge. There can be some error due to the individual's value of their perceived level and their actual level.

Definition of Terms

1. Assessment Instrument - The document consisting of questions and a rating scale used in this study for ranking tendencies in individuals towards self-directed learning activity.
For this study, the Survey of Adult Learning Traits (SALT) was the assessment instrument used.
2. Educational Technology Support Staff – employees who are skilled in information technology and who support the needs of the faculty, staff, students, and administration at a higher education institution (Burnham, 2001).
3. Extrinsic Motivation - Extrinsic motivation in learning is manifested as “..a desire to acquire skill, knowledge, or expertise within a domain of knowledge for the purpose of obtaining some form of reward” (Grolnick, Gurland, Jacob, & Decourcey, 2001, p. 150).
4. Information Technology - the branch of engineering that deals with the use of computers and telecommunications to retrieve and store and transmit information (Princeton, 2010).
5. Intrinsic Motivation – When an individual engages in an activity with no apparent reward except for the activity itself (Deci & Ryan, 1985). Intrinsic motivation, from the perspective of the learner, is an attribute of the individual who believes in their ability to learn and master a skill or domain of knowledge and expertise and who has the drive to achieve that learning.
6. Job Classification – Describes the primary job function. Based upon the U.S. Bureau of Labor Statistics (2008) categories in information technology, this was simplified to: management, programmer / analyst, operator, and system administrator. Job classification may also be referred to as position type.

7. Learning Organization – “Organizations where people continually expand their capacity to create the results they truly desire, where new and expansive patterns of thinking are nurtured, where collective aspiration is set free, and where people are continually learning to see the whole together” (Senge, 1990, p. 3).
8. Position type – Describes the participant’s job functionally. The categories (operator, systems administrator, programmer/analyst and manager) were based on the United States Labor Statistics categorized information technology into twelve groups based on the Standard Occupational Classification System (SOC) (Moncarz, 2002).
9. Survey of Adult Learning Traits (SALT) – Instrument developed by Hogg that measured the reason an employee engaged in self-directed learning (Hogg, 2008).
10. Self-Directed Learning (SDL) - " ... describes a process in which individuals take the initiative, with or without the help of others, in diagnosing their learning needs, formulating their learning goals, identifying human and material resources for learning, choosing and implementing appropriate learning strategies, and evaluating learning outcomes" (Knowles, 1975, p. 18).
11. Self-Regulation - Self-regulation is when the individual assumes control of their actions during the acquisition of skills, knowledge, and understanding in a learning endeavor. Students are self-regulated to the degree they are active metacognitively, motivationally, and behaviorally active participants in their own learning process (Zimmerman, 1986).
12. Training – the process of equipping the person with the required skills and knowledge in order to perform a single or series of tasks.
13. Workforce – the workers engaged in a specific activity or enterprise (Merriam-Webster, 2010).

14. Workforce Education – Gray and Herr (1997) define workforce education as:

“that form of pedagogy that is provided at the prebaccalaureate level by educational institutions, by private business and industry, or by government-sponsored, community-based organizations where the objective is to increase individual opportunity in the labor market or to solve human performance problems in the workplace” (p. 4).

Organization of the Study

This study was conducted to examine the motivations and tendencies in self-directed learning within the higher education information technology sector. Chapter 1 introduces the study, presents the problem, purpose, research questions, limitations, and definition of terms. Chapter 2 includes a review of the literature involving self-directed study, motivation, trends in training the workplace and the information technology in higher education. Chapter 3 outlines the procedures used in this study, including how the population and sample were defined; instrumentation – Survey of Adult Learning Traits; the data collection process and the data analysis. Chapter 4 presented the findings of the survey and analysis of these data. Chapter 5 summarizes the study, conclusions, and future recommendations for further research.

Chapter 2

Literature Review

Chapter 1 addresses the statement of the problem, the purpose of the study, the significance of the study, the research questions, the limitations and the assumptions of the study, and the definition of terms. Chapter 2 reviews the literature which considered the adult learner, self-directed learning models, developmental theories, motivation, the learning organization, self-regulation and self-efficacy.

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3. What is the relationship between the level of education, position, position type and employees' perception of their social and environmental factors associated with self-directed learning?

Adult Learning

According to Henschke (2011), “[a]ndragogy [is] the art and science of helping adults learn” (p. 34). Malcolm Knowles popularized the term andragogy, introduced by German educator Alexander Knapp in 1833, to delineate the differences between adult learning and the education of children (Smith, 2002). Andragogy’s definition has been redefined over the last few decades and research is still being conducted. In his review of over 330 published articles, Henschke (2011) “...identified six sections or themes depicting andragogy: (a) evolution of the term andragogy; (b) historical antecedents shaping the concept of andragogy; (c) comparison of the American and European understandings of andragogy; (d) popularizing and sustaining the American and worldwide concept of andragogy; (e) practical applications of andragogy; and (f) theory, research, and definition of andragogy” (p. 35). Knowles’ (1980) foundation on andragogy had five assumptions: the adult learner has an independent self-concept, which allows them to direct their own learning; adults have the advantage of a reservoir of life experiences, which provides a resource for the learning process; adult learning needs are closely related to their changing social roles; adult's interest in learning is generally problem centered, with immediate

application of knowledge to life situations; and adults are generally motivated to learn by internal or intrinsic factors, rather than external factors.

Prior to Tough's research, most adult educators believed that participation in learning was centered on credit and non-credit courses (Interview Schedule, 2007). Tough (1967) conducted research involving adult participants engaged in projects that did not have formal teachers or classroom setting. The adults in this study held the roles of instructor, evaluator, moderator and learner. He also noted that roughly 90% of adults engage in self-learning projects (Tough, 1979). The sample in Tough's research were engaged in personal projects that furthered the individual personally but not necessarily professionally. His work on learning projects contributed to constructivist theory and adult education, specifically involving self-directed learning.

Workforce Training

The workforce is changing drastically and the employee has to keep up to date with new methods, processes, and technology at an increasing rate. Taylor (2006) stated:

If we are to create a vision of the future in which imaginary boundaries will be disimagined, we first have to get from socialized to self-authorized ways of knowing.

This, then, is a call for adult educators to explore SDL as it emerges at the intersection of adult learning and adult development. (p. 216)

Gray and Herr (1997) chronicled workforce education in the United States from the colonial times involving apprenticeship, to the industrial revolution involving migration to cities, and finally to modern times and the two independent educational systems: public and private sectors. Preskill and Torres (1999) delineated the transition of the workplace and business practices from the Industrial era to the Knowledge Era (see Figure 1).

<i>Transitioning From the Industrial Era to the Knowledge Era</i>	
Industrial Era	Knowledge Era
Hierarchical chain of command	Self-governing teams and networks
Competitive advantage	Collaborative advantage
Control	Commitment
Managers control, maintain stability	Managers coach and lead
Few performance Information systems	Proliferation of performance information systems
Multiple levels of management	Fewer layers of management
Bureaucratic rules and policies	Fewer rules and policies
Power over others	Sharing power with others
Information held by a few	Information disseminated and available to all
Emphasis on repetition	Emphasis on problem solving
Risk averse	Risk tolerant
Interest in short-term gains	Interest in continuous improvement and long-term gains

Figure 1. Transitioning from the Industrial Era to the Knowledge Era

In the modern era, industry trained its workforce in traditional methods: hired external consultants for instruction, sent their employees to training seminars, or had internal departments for training. However, this established paradigm is shifting in both the private and public sector. Bachler (1997) investigated the role of corporate trainers and how it has changed due to outsourcing. He also noted that management had poor or missing measurement of outcomes of their employee training in relation to their job performance. Tobin (2000) found the same reasons as Bachler about the shifting training practices and expanded them by adding unsatisfactory return on investment of training programs, cost of leave, cost of logistics, and failure of training implementation. Tobin (2000) also reported that classroom-based training was still the preferred method, accounting for two-thirds of corporate training. He proposed that

independent self-directed learning in the workplace would increase over the next decade to fifty percent. Guglielmino and Guglielmino (1994) stated that:

there appears to be three major factors contributing to the increased interest in self-directed learning: unprecedented rates of technological and societal change that require increased flexibility and continuous learning, trends toward self-directed teams in the workplace, and research findings that consistently demonstrate a positive relationship between readiness for self-directed learning and performance. (p. 39)

Schachter (2007) commented that “organizations have a lot to lose by not investing in employee development” (p. 45). She also stresses the importance of the organization’s priority to continuing education and training. Schachter (2007) mentioned that “info pros” or information professionals “seem to be some of the most supportive of continuing education and learning opportunities” (p. 44). Schachter (2007) further cites Wentland’s business practice that “employee development and empowerment is a recommendation that advocates, somewhat surprisingly, against the ‘customer first’ business trend of recent years” (p. 45). When training responsibilities shift from a central administrative group to an individual, it stresses the reliance on the employee’s diagnosis of their needs, determining their goals, and developing a successful course of study for the optimum outcome.

Self-Directed Learning

Tough’s (1979) study on learning projects found that 68% were self-planned and that an additional 9% were partially self-planned. Tough (1979) provided the following reasons for the popularity of self-planning learning:

1. The learner may believe that he would actually lose time in the long run by turning the responsibility for planning over to someone else.

2. He may be confident that planning the learning episodes for the particular knowledge and skill he desires will be easy, and that the content will be readily available.
3. The learner may not be able to see past the next two or three learning episodes. He may not be sure how much longer he will continue the learning project, and may think that the direction or subject matter will change soon. Consequently, he does not want to commit himself for a long period of time to a particular object, person or group. He does not want to give up the possibility of shifting the subject matter significantly or frequently.
4. Using oneself as a planner avoids any difficulty in locating, selecting, and using the planner. The learner knows that he himself is available, whereas the other three types of planners may not be available in his community at the time he wants to begin the learning project. The learner may not want to bother investigating and choosing some other planner. He may be shy or reluctant to approach other people or an institution. The learner himself as a planner is always available at any time of the day or night, without an appointment or schedule, and without cost.
5. The learner may be reluctant to let others direct his learning project in case their procedures produce in him some inappropriate beliefs, attitudes, habits or techniques.
6. The learner may be highly skilled at locating printed materials, and at quickly selecting and grasping their relevant ideas. Consequently he feels no need for another person or group to present the subject matter to him. He may also want to be free to read and reread any portion of a book, for example, in any order he wishes. Consequently he feels he would be frustrated by the relatively inflexible sequence imposed by other sorts of nonhuman resources.

7. The learner often has greater insight than anyone else into his own capabilities, preferred methods, goals, needs, pace and emotional blocks to learning.
8. The learner may expect to discover, invent, or synthesize the knowledge and skill because no one else has yet done so. The desired knowledge and skill may be unique: no one else is trying to obtain it. This is true of certain political decisions, research questions, and personal problems, for example.
9. In order to deal with a certain problem, the learner may want to gather a variety of possible solutions from several sources before selecting the best solution.
10. The learner may be especially likely to choose self-planning if he is self-reliant, independent, and autonomous.
11. He may expect to feel especially proud or pleased if he successfully plans his own learning, or he may hope to impress others. (p. 93)

Tough's research on adults learning independently led Knowles to investigate it as well. Knowles (1975) combined his work on andragogy with Tough's findings and defined self-directed learning as:

the process in which individuals take the initiative, with or without the help of others, in diagnosing their learning needs, formulating their learning goals, identifying human and material resources for learning, choosing and implementing appropriate learning strategies, and evaluating learning outcomes. (p. 18)

Since Knowles' formal definition, others have expanded and redefined it based on their research (Brockett & Hiemstra, 1991; Merriam, 2001; Pilling-Cormick, 1996). These formal models of self-directed learning have also been pivotal in developing instruments to measure self-directed learning (Guglielmino, 1977; Hogg, 2008; Pilling-Cormick, 1996).

Merriam's Model

Merriam's (2001) model is based heavily on andragogy, Knowles model and Tough's learning projects. According to Merriam, self-directed learning has three categories: the goal, the process, and the learner.

Merriam's first category of self-directedness, the goal is divided into three parts: humanistic goals, transformational learning, and social change. Humanistic goals are the result of changes that better the learner either personally or professionally. Transformational learning was described by Mezirow (1985) and Brookfield (1986) as the critical reflection by the learner to the process. Finally the goal is a change in society or person based on the knowledge (Merriam, 2001).

Merriam's second category of self-directed learning, the process, has evolved since its first proposal. Malcolm and Tough first described the process as a linear method that moved "...from assessing learning needs, to deciding what one was doing to learn, and then to locating resources, choosing strategies, and carrying out and evaluating the learning activity" (Larisey, 1994, p. 9). Over the next two decades the definition tended to have a slightly more involved and interactive system (Merriam, 2001). The system also changed from a teacher centered unilateral direction to a tridirectional scheme between teacher, student and the learning environment.

Merriam's third category of self-directed learning, the learner, is categorized as the individual and factors for their learning (Merriam, 2001). Some of these components and factors may include demographics, type of learner and their loss of opportunity by pursuing the knowledge or skill (Kazanas & Rothwell, 2004). Demographics can include sex, race, age, income, (demographics, 2010) and can even include disabilities, mobility, educational

attainment, home ownership, employment status, and location. Merriam (2001) added factors in their learning may also be "...personal characteristic and associated with other variables such as educational level, creativity, learning style, and so on" (p. 10).

Merriam's first category, comprising of humanistic goals, transformational learning and social change, is found throughout adult education literature. Humanistic goals also overlap Houle's motivational typology for the adult learner which consists of goal-oriented, activity-oriented goals, and learning-oriented goals (Houle, 1961). While the typology may vary in its goal domains, all center on the learner. Brookfield (1995) mentioned that transformational learning is "... an engagement in critical conversation" (p. 27). While Brookfield's scope was focused on the classroom setting, it shows that the learner had to evaluate the process and the outcomes in a meaningful and constructive way. Pilling-Cormick (1997) shared the importance of reflection: "[i]f reflection is fostered in the self-directed process, then it can open up new possibilities for transformation of assumptions, beliefs, and perspectives about learning itself" (p. 77). Finally, the goal, change to society, can be found in Schroeder's four types of agencies and how they related to the adult education field (Schroeder, 1970). Type III agencies, which included churches, libraries, historical societies and others, regarded adult education as an allied function and are typically community based (Schroeder, 1970). Issac (Isaac & Savage, 2004) indicated that most pastors believed that "... secular education (i.e., literacy, parenting, job training) is an important mission of the church" (p. 287). Religious institutions also tend to be community based, which also adds the social aspect of the learner to this type of agency. These organizations believe that by empowering the individual, the individual can change the community. Merriam (2001) wrote "Just as andragogy has been critiqued for ignoring the context of learning, so too some writers would like to see self-directed learning positioned more

for social and political action than individual learning” (p. 9). This goal is also found in early educational theory in colonial America, where the goal was to produce a responsible, functional citizen (Carpenter, 2004). Carpenter (2004) wrote that Thomas Jefferson “...expected that through education, all citizens would understand their duties to the country and their neighbors and would discharge those functions with competence“ (p. 143). Freire’s literature stressed that the only way the citizen would not be oppressed was to be educated (Cavalier, 2002). English and Stengel (2010) stated that for Freire “facing fear relies on the social strategy of critical reflection rooted in intellectual discipline” (p. 536). This implies that in order to overcome oppression and injustices, education plays an important part. Cavalier (2002) points out that Freire’s earlier work emphasis was mainly education and his later work found education to be a part of the solution.

Additional support on Merriam’s third category, the learner and factors of learning, can consider the attributes of the person as well as their motivations. The age of the adult is an important component when considering the facilities and environment setting in the curriculum design. If the program is tailored toward senior citizens, it may be beneficial to target a facility with easy access parking and advanced age considerations. It is also important to consider where the learner fits into Houle’s (1961) motivational typology for adult learners: goal-oriented, activity-oriented, and learning-oriented. While the goals of each of the students may vary, for example some may attend for activity-oriented reasons and others for social, the overall goal of the class will determine the program’s design. If the overall goal of the class is the social aspect, meaning they place a priority to connect with others equal to or higher than the knowledge or skill, then group work and discussion would be appropriate. If the class is studying for a particular certificate or degree, then the content may be tailored toward a specific assessment.

It is also important to consider the learner's prior knowledge skills and attitude (Kazanas & Rothwell, 2004; Knowles, 1975). Knowles (1975) differentiated that one of the main differences between pedagogy (childhood learning) and andragogy (adult learning) was adults had prior experience. While adults may be more successful in self-directed learning, Merriam (2001) cautioned that a learner's success in self-direction in one area does not mean they will succeed everytime, suggesting that each learning experience is unique and should be treated as such.

Pilling-Cormick Self-Directed Learning Perception Model.

Pilling-Cormick (1996) describes her model as "... basically three components: a) the interaction between the educator and student; b) the encompassing role of control and c) dimensions which influence the interaction" (p. 28).

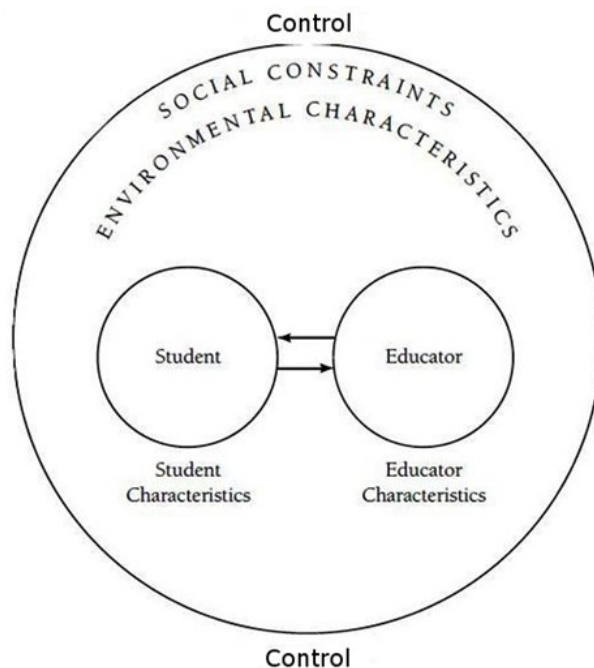


Figure 2. The Self-Directed Learning Process Model

Pilling-Cormick (1996, 1997) describes the interaction between the educator and the student in a bi-directional process. Each group oscillates between learning and facilitating within themselves as well as their interaction with the other, thus the relationship between each is symbiotic. The role of control is defined as "...the extent to which students can direct their learning" (Pilling-Cormick, 1996, p. 29). The role of control is stressed and encompasses the entire model. Dimensions can be broken into four categories: social constraints, environmental characteristics, student characteristics, and educator characteristics (Pilling-Cormick, 1996, 1997).

Brockett and Hiemstra's PRO Model

Brockett and Hiemstra's (1991) Personal Responsibility Orientation (PRO) Model shows the different domains with the root of the hierarchy being placed in personal responsibility.

Beard (2010) also points out that:

By personal responsibility [Brockett and Heimstra] mean that individuals assume ownership for their own thoughts and actions. Personal responsibility does not necessarily mean control over personal life circumstances or environment. However, it does mean that a person has control over how to respond to a situation. (para. 3)

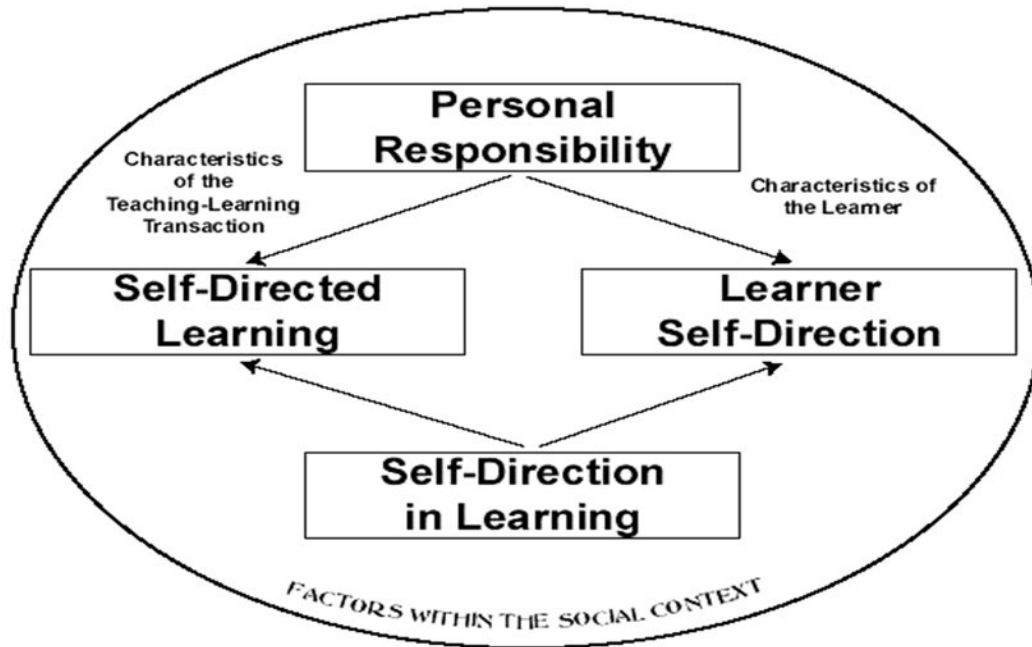


Figure 3. Personal Responsibility Orientation (PRO) Model

The model's structure stresses the importance of the personal responsibility of learning residing with the learner. The characteristics of the learner bridge the personal responsibilities and the learner's self-direction. This is important because the individual needs to possess the drive and motivation found in self-direction. If the learner does not have the needed characteristics such as maturity or independence, they may not engage in self-directed learning successfully (Ausburn, 2002; Chu & Tsai, 2009; Kell, 2006). The characteristics of the teaching-learning transaction place the emphasis that the learner needs to be responsible to engage in their best practices to attain the knowledge. This means that the learner is responsible for learning in each step of their learning activity. At the bottom of the figure, self-direction in learning shows the equal balance of self-direction methods as well as learner characteristics and drive are essential for success. Brockett and Hiemstra (1991) placed the social context outside of these

main points. In this model, social context is important and permeates throughout the model, but does not stand alone like the learner or the learner's process.

Brockett, Beard and Hiemstra PPC Model

Brockett, Beard and Hiemstra are developing a model entitled the Person-Process-Context (PPC) (Beard, 2010). The figure below, reprinted with permission by Brockett (R. Brockett, personal communication, January 5, 2011), shows the new schema and how they relate.

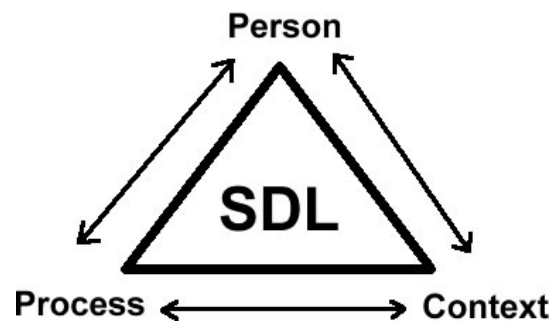


Figure 4. Person Process Context (PPC) Model

Brockett and Hiemstra indicated that the PPC model does not replace the PRO model, rather it extends it (J. Beard, personal communication, January 15, 2011). The reason they created this new model was due to the fact that they believed context plays a larger role than the previous model stated and that the PRO model needed revisions after twenty years. The person vertex comprises characteristics of the individual, the process vertex includes the teaching-learning transaction and the context vertex includes the environmental, sociopolitical and other cultural factors (J. Beard, personal communication, January 15, 2011).

Self-Directed Learning in the Workplace

Self-directed learning is critical to due to rapid changes in technology, knowledge and skills (Field, 2006). While the method most used by industry and academe was formal internal or external training, personnel are starting to engage in self-directed learning in order to satisfy their

needs both personally and professionally (Tobin, 2000). Employees partake in self-directed learning for a myriad of reasons, some of which include expanding their skill set, general interest in an area, control and satisfaction in their own development (Merriam, 2001; Tobin, 2000; Tough, 1979).

While the majority of literature on self-directed learning involves the individual engaged in an academic or personal pursuit, studies involving in the workforce are starting to emerge in many disciplines. Stewart (2007) wrote that when engineering students enter the workforce, they will have to engage in self-directed learning from the first day. The implementation of self-directed learning was also coupled with problem based learning as a center of their graduate curriculum. Stewart also noted that students from traditional education initially had setbacks when learning on self-directed projects and problem based learning.

O'Shea's (2003) review of nursing education also shows that a majority of nurses engage in hundreds of hours per year in self-directed learning. O'Shea suggested that new or younger students tended to prefer teacher-centered instruction while older or experienced students preferred learner-centered which was based on self-directed learning.

Ausburn's (2002) study of self-directed learning and the students within a career technical center also showed the same issues with student learning maturity as O'Shea's study. Ausburn's sample consisted of 63 participants, 78% were younger students earning high school credit and 22% were older adults. The students' instructors were also given a survey to see the impact of self-directed learning in their classroom. Twenty-eight of the 46 instructors reported that self-directed learning and learning activity packages (LAPs) may not be appropriate for those who were not adult learners. In fact, Ausburn (2002) cited that the instructors found most high school students are "...not sufficiently mature and motivated for LAPs, and that younger

students need constant supervision and guidance and often take time away from more mature students who can benefit more from a self-directed environment” (p. 229). The employee, in regards to their profession, needs to have the requisite maturity and skills in order to engage in self-directed learning.

Armstrong (2010) proposed that a high degree of self-directed learning was needed in athletic training education and stated that it “helped students to become autonomous practitioners who incorporate higher-order cognitive skills, such as reflection and critical thinking, when making decisions about patient care” (p. 20). Armstrong’s article outlines what the educators must do to facilitate self-directed learning in classroom teaching and clinical education. Armstrong divides self-directed learning into four parts: planning self-directed learning, monitoring self-directed learning, reflection in self-directed learning, and assessing self-directed learning. Armstrong suggested that the classroom setting planning self-directed learning should include evidence based problems to gain insight on a particular area. Armstrong (2010) suggested that monitoring self-directed learning should define the instructor as “a facilitator, not a lecturer” (p. 20). Reflection in self-directed study should include the student’s feedback which not only includes the experience, but it fosters the connection with clinical education. Assessing self-directed learning should include both “formative and summative assessments” (Armstrong, 2010, p. 20), not only quizzing the students but incorporating their reflections. In regards to clinical education, Armstrong believed that the planning stage should establish learning goals from both the student and the instructor. The instructor monitors self-directed learning by making sure the student connects the theory of the classroom to the practice in clinical practicum. Reflection in self-directed learning places emphasis on the student to evaluate their “clinical practice, which should lead to better clinical decision making” (Armstrong, 2010, p.

21). Finally, assessing self-directed learning should mirror the classroom implementation recommendation by both formal assessment as well as student feedback.

Self-directed learning is not only being used for functional job training. Friedman (2005) asserted that the world has flattened extensively due to technology use and business practices involving other countries. Since the job market has shifted to the global economy, employees and employers have to learn about new areas of growth. This growth may be a new target demographic, a new venture or business location or a potential threat if another company engages in the resource first. Because the global market is dynamic, employers and employees will need to stay informed quickly and sufficiently. Formal training tends to be dependent on static content and not as adaptive to changes whereas self-directed learning allows the learner flexibility (Bolhuis 2003). Tobin (2000) attributes the movement towards self-directed learning in the corporate world due to:

1. Corporate downsizing and consolidation of corporate functions generate pressure to reduce corporate training budgets, including travel time and expense and the opportunity cost of time away from work for training
2. Corporate training directors are unable to show a positive return on the company's investments in training and development programs
3. Well-planned efforts take advantage of proliferating technology to create technology-based training and knowledge-management systems. (p 2)

Tobin (2000) also notes that companies are also starting to allow their employees to be in charge of their own training, which can be viewed as empowerment to the employee.

Self-Directed Learning Instruments

Self-directed learning readiness scale.

Instruments have been developed to measure self-directed learning or learning tendencies. One of the best known is the self-directed learning readiness scale (SDLRS) created by Guglielmino (1977). As Brockett (1985) points out, “the instrument is a measure of perceived readiness, not of self-directed learning behavior” (p. 17). Brockett (1985) states that the instrument “has followed three major branches: . . . Tough’s learning projects, a greater understanding of the way self-directed learning, and quantitative studies involving the self-directed learning readiness scale” (p. 16).

Guglielmino constructed the instrument by a three-round Delphi survey involving self-directed learning authorities, including Knowles, Houle, Chickering, and Tough (SDLRS/LPA, n.d.),

Using the results from this panel, Guglielmino defined a highly self-directed learner: A highly self-directed learner, based on the survey results, is one who exhibits initiative, independence, and persistence in learning; one who accepts responsibility for his or her own learning and views problems as challenges, not obstacles; one who is capable of self-discipline and has a high degree of curiosity; one who has a strong desire to learn or change and is self-confident; one who is able to use basic study skills, organize his or her time and set an appropriate pace for learning, and to develop a plan for completing work; one who enjoys learning and has a tendency to be goal-oriented. (SDLRS/LPA., n.d., para. 17)

The SDLRS has been used in both academic settings and corporate settings in many countries (Brockett, 1985; SDLRS/LPA, n.d.). There are three types of the SDLRS: SDLRS-A, which is for the general adult population comprising of 58 items; SDLRS-ABE for adults with

low reading levels or non-native English speakers containing of 34 items; and the SDLRS-E for elementary children which consists of 58 items (SDLRS/LPA, n.d.).

Some criticize (Bonham, 1991; Field, 1991; Taylor, 2006) that the self-directed learning readiness scale does not measure if a learner is ready for self-directed learning or if it happens to be a tool to show predisposition. As Hoban, Lawson et. al (2005) wrote:

we acknowledge Guglielmino's efforts to develop a practical instrument for measuring self-directed learning readiness. Her carefully constructed approach to generating the instrument appears appropriate; yet, the SDLRS apparently falls short of measuring characteristics that Guglielmino determined were associated with self-directed learning.
(p. 376)

Brockett and Hiemstra (1991) had similar concerns: "...the evidence is rather convincing that early concerns raised about certain items of the scale are warranted." (p. 73). Despite the criticisms, the instrument has been used in corporate and educational settings and "provides insight" (Taylor, 2006, p. 199). Self-Directed Learning Readiness Scale is the most used instrument in practice, testing more than 75,000 participants, as well as research, cited and used in most articles on self-directed learning and used in over 90 doctoral dissertations (McCune, 1988; Merriam, Caffarella, & Baumgartner 2007; SDLRS/LPA, n.d.).

Oddi continuing learning inventory.

Oddi (1986) developed the Oddi Continuing Learning Inventory (OCLI). The goal of the instrument was to find a way to measure "personality characteristics of self-directed continuing

learners and develop an instrument to identify such learners” (Oddi, 1986, p. 1998). The instrument contains 24 likert scale items and spans three domains. These domains are:

- (a) proactive versus reactive learning drive - corresponding to internal learner characteristics such as motivation, persistence, confidence, autonomy, and self-efficacy;
- (b) cognitive openness versus defensiveness—centered on learner adaptability, curiosity, flexibility, receptivity to change, and willingness to take risks; and (c) commitment to learning versus apathy or aversion to learning—indicative of an individual's level of engagement in and enjoyment, love, and active pursuit of learning. (Harvey, Rothman, & Frecker, 2006, p. 189)

Oddi (1984) cited that “it was not clear if age and sex had any impact on performance on the OCLI” (p. 105). Oddi cited other studies (Boshier, 1977; Johnstone & Rivera, 1965; Kay, 1981) that indicated women may have a higher learning interest, but also reported that others had not found a difference (Oddi, 1984). In regards to age, Oddi found that studies (Boshier, 1977; Coolican, 1973; Johnstone & Rivera, 1965; Kay, 1981) did not have a consensus. Some studies found that younger adults engaged more than older adults (Johnstone & Rivera, 1965; Kay, 1981) and other found that older adults engaged for life-long learning more than younger adults (Boshier, 1977).

Brockett and Hiemstra (1991a) stated that “... it has not yet been subjected to the same degree of scrutiny as the SDLRS” (p. 79) and other studies (Oddi, 1986; Six, 1989; Straka, 1996) have examined the instrument. Harvey, Rothman, and Frecker’s (2006) study on 250 undergraduate medical students suggested that the domains Oddi established be extended from three to four: “learning with others, learner motivation/self-efficacy/autonomy, ability to be self-

regulating, and reading avidity” (p. 197). Kungu, Kinyanjui, and Machtmes (2011) used the OCLI to test if self-directed learning was culturally dependent. The instrument was administered to 371 students at a Kenyan university and evaluated the following variables: age, gender, marital status, employment status, ethnicity, year enrolled and type of high school they had graduated. While the instrument found the students possessed a high readiness for self-directed learning, there were no significant findings among the demographic variables. Kungu, Kinyanjui, and Machtmes (2011) also noted that:

Some issues raised in previous studies about the instrument such as low inter-factor correlation, low variance explained by extracted factors (less than 50%), low item-to-total correlations also seemed to plague the results of this study. (p. 5)

Brockett and Hiemstra (1991a) concluded that:

[t]he findings of the Six ... and Landers studies raise formidable questions about the appropriateness of the OCLI as a measure of self-direction. Yet, as with the SDLRS, we are unwilling to dismiss the instrument. Oddi has made an important contribution to the knowledge base by attempting to further clarify the meaning of self-direction and to develop an instrument reflecting that perspective. The concerns with the scale seem real and legitimate; however, only through further research will it be possible to confirm, refute, or modify the legitimacy of these concerns. (p. 80)

Personal responsibility orientation self-directed learning scale.

Stockdale and Brockett (2010) developed the personal responsibility orientation self-directed learning scale (PRO-SDLS) based upon Brockett and Hiemstra’s (1991) personal responsibility orientation model to self-directed learning. Stockdale and Brockett’s (2010)

intended audience for this instrument was "...limited to a particular segment of learners: those who are participating in a higher education course" (p. 15). The instrument consists of 25 items and was tested on a sample of 196 college undergraduate students. Stockdale and Brockett (2010) defined the domains as initiative, control, and self-efficacy autonomous motivation. The domains were represented in the instrument as follows: "[a] total of six items each were chosen as clearly representative of initiative, control, and self-efficacy. Seven items were selected as clearly representative of autonomous motivation" (Stockdale & Brockett, 2010, p. 10). Stockdale and Brockett tested GPA, professor ratings, course performance, age, and gender. There were not significance findings in gender, professor ratings, or age. There were significant findings in GPA and course performance. As Stockdale and Brockett (2010) wrote "[a]n increase in a student's PRO-SDLS score is generally linked to an increase in his or her academic performance. Logically, fostering self-direction based on an operationalization of Brockett and Hiemstra's (1991) model facilitates adult learning and successful college achievement" (p. 14).

Fogerson's (2005) study used the PRO-SDLS to measure self-directed learning in students enrolled in an online class. There was significance found in age and self-directed learning. Those who were older engaged in self-directed learning more than the younger students. Fogerson also found that those with higher self-directed learning had greater satisfaction with the online class.

Self-directed learning perception scale.

Pilling-Cormick (1996) developed the Self-Directed Learning Perception Scale (SDLPS) for three goals: "...describe theoretical foundations for the construct of the self-directed process

(SDL); develop an instrument to provide a description of what helps students with the SDL process; and to conduct an investigation to validate the instrument” (p. ii).

According to Pilling-Cormick (1997) “...[t]he Self-Directed Learning Perception Scale is a fifty-seven-item inventory designed to assess students’ perceptions of the environmental characteristics that help or inhibit their ability to be self-directed” (p. 71). The pilot study had 47 respondents with the students giving feedback about the instrument. The instrument was modified if student feedback was “reinforced by the comment of an expert” (Pilling-Cormick, 1997, p. 95). The field test was conducted over four university classes totaling 110 students. Additional student feedback coupled with expert verification refined the instrument further.

Pilling-Cormick (1994) found that there was resistance to measure self-directed learning in the classroom and gave two reasons: “misconceptions about the term self-directed learning and discrepancies between educators' beliefs and practices” (p. 64). In order to overcome these resistance instructors, students, and staff needed some education self-directed learning and the merits of being able to measure it.

Constructivist internet-based learning environment scale.

Chu and Tsai (2009) created a Constructivist Internet-based learning environment scale, or CILES, based upon Guglielmino, Chang, Tsai and Tsai. This instrument also contained the Internet Self-Efficacy Scale, or ISES, which is a seven item likert scale tool. CILES has five aspects: “technical, content, cognitive, metacognitive, and epistemological” (Chu & Tsai, 2009, p. 492). In their study, they measured the self-directed readiness, internet self-efficacy and preferences of older adults. One of their predictor variables, gender, did not have an impact. Their finding about gender is consistent with literature involving self-directed learning. Kell’s

(2006) study of admission profiles did find a difference in gender in relation to SLDR and academic satisfaction, but noted that "...[t]he significant difference ... are not supported in the literature and may perhaps be a feature of this specific group of female students" (p. e20). Chu and Tsai also found that the higher age group did not do as well with ease of use (EU). Critical Judgement (CJ) also scored low and the researchers pointed out that this was probably due to the sample's environment, which was a community college and being in the Eastern culture in Taiwan (Chu & Tsai, 2009). Chu and Tsai also stressed that "...[a]dult practitioners and educators also need to realize the importance of identifying adult learners' development of self-directedness" (p. 498) and cite Merriam's finding that SDL skills do not always increase with age (Chu & Tsai, 2009, p. 498). Chu and Tsai (2009) concluded their study stating:

Further studies may pay more attention to the personal qualities of the learners, such as adults' attitude towards the Internet, motivation to participate in continuous learning, social presence and the key to develop SDL, and thus, provide an Internet-based learning environment that meets adult students' needs. (p. 498)

Survey of adult learning traits.

The Survey Adult Learning Traits (SALT) was designed for measuring self-directed learning in the workforce. Hogg (2008) stated "...[t]his instrument is not focused specifically on formal education as an object of self-directed learning, but rather on learning related to employment" (p. 53). The survey was developed by establishing a theoretical framework from literature. After a foundation was established, an expert panel was convened consisting of adult education faculty as well as human resource employees from the private sector. After the researcher developed the questions, the confirmation panel performed a Q-sort on the items

placing them into four domains and this was repeated until 96% accuracy was observed by all panels. After the Q-sort, a field test was conducted and confirmatory analysis was performed. The initial four domains were reorganized into three domains: Motivation and Self-Regulation, Cognitive Elements, and Social/Environmental factors.

Developmental Theories

Behaviorism

Behaviorism examines learners in terms of their environment, stimulus, and behavior in regards to the stimulus. As Watson (1913), considered the founder of behaviorism, wrote:

Psychology as the behaviorist views it is a purely objective experimental branch of natural science. Its theoretical goal is the prediction and control of behavior. Introspection forms no essential part of its methods, nor is the scientific value of its data dependent upon the readiness with which they lend themselves to interpretation in terms of consciousness. The behaviorist, in his efforts to get a unitary scheme of animal response, recognizes no dividing line between man and brute. The behavior of man, with all of its refinement and complexity, forms only a part of the behaviorist's total scheme of investigation. (p. 158)

During the mid to late 20th century, Skinner (1953) expanded the field by examining the operant model, in which the subject operates in their environment. Skinner's work combined behaviorist psychological theory with Pavlov's work on classical conditioning. Pavlov experiment (Crain, 2005c) investigated training canines to salivate when they heard the sound of a bell. Pavlov identified: the conditioned stimulus (CS), the bell ringing; unconditioned stimulus (US), the presentation of the food; conditioned reflex (CR), the salivating when they heard the bell; and the unconditioned reflex (UR), which was when the canines salivated at seeing food.

Skinner placed importance in the rate of responding to a stimulus as well as the schedule of treatment (Crain, 2005c; Skinner, 1968). Skinner, Watson and other behaviorists considered that it was the individual and the environment that determined learning and dismissed individual mental processes. Crain (2005b) wrote:

[B]ehaviorist argued we should confine ourselves to the measurement of overt behavior and the way it is controlled by the observable stimuli in the external environment. Mental processes, they said, cannot be directly observed and therefore have no place in scientific psychology. (p. 370)

The environment would play great importance to the learner and the individual is only responding to the surroundings. Boghossian (2006) wrote:

Behaviorists believe that knowledge does not depend upon introspection, and they completely reject discussion about internal mental states. Rather, behaviorism's focus is on the external observation of lawful relations between and among outwardly observable stimuli and the responses that follow. (p. 715)

Zemke and Zemke (1996) stressed that a safe and comfortable environment, including lightening, temperature, as well as psychological engagement, is essential for the adult to learn.

McGaghie and Menges (1975) used self-directed study in operant psychology through the use of "self-modification projects" (p. 56). The students would assess their levels of behavior, such as study habits, nail-biting, being impolite to others, score how they did, set a goal and started to make their changes. The student made note of what was happening in their environment during the self-modification project and how it impacted them. This study closely paralleled Tough's (1967) concept of a learning project. The authors of the study found that

students engaged in self-modification projects did well in their project and related to the material better. McGaghie and Menges (1975) further stated that:

Independent, self-directed study is encouraged in educational settings ranging from open classrooms to universities without walls. Teachers encourage students to design individual learning projects, pursue them with autonomy, and evaluate the effectiveness of their learning (p. 59).

Opponents of behaviorism point out that without the schedule and reinforcement, learned behaviors can become extinct (Crain, 2005b; Crain, 2005c). Another argument made was that looking at solely the organism and its environment provides only partial information on how individuals learn. The mental processes, emotions, and social context should be considered as well.

With self-directed learning, the schedule of reinforcement would be in control of the learner and not the environment, which tends to conflict with behaviorism. External motivation in business practices mirrors reinforcement and stimuli behavior model with salary, benefits, and promotions being the reward.

Cognitive

Cognitive theory attempts to explain human behavior by understanding the thought processes. The learner starts to perform self-monitoring, self-regulation and other processes when they are engaged in self-directed learning. The learner at this point is building upon the knowledge base and continuing to process data, methods as well as metacognition. Van Merriënboer and Sluijsmans' (2009) study of cognitive load theory, four-component instructional design, and self-directed learning stated the following:

The lack of flexibility in the educational program makes it difficult for learners to (a) take

full responsibility for performing learning tasks, (b) assess the strengths and weaknesses in their own performance, and (c) select learning tasks that offer the best opportunities to remediate weaknesses and improve performance. (p. 56)

While their study was focused on traditional academic development, their statements hold true in workforce education. There may be certain levels of mastery required in a skill set, either by industry standard, company policy or tradesman code, but the best manner of learning may not be in the one-size fits all training that many companies have relied upon. The employee will need to be able to recognize their strengths and weaknesses and be able to make adjustments through training mirroring self-directed learning (SDL). These are learning needs, implementing strategies, and evaluating outcomes (Knowles, 1975). While the simple tasks may be handled in a traditional way, the more complex learning tasks start to require scaffolding from others (Van Merriënboer & Sluijsmans, 2009). Van Merriënboer and Sluijsmans' study also proposed that while early in the learning process the learner needs to be guided and directed. As they become better acquainted with the knowledge and their own assessment, the guidance and support should gradually reduce and start to let the learner take control of their education and development. Tobin (2000) refers to this as "Helping Employees Learn to Learn" (p. 51). One of the most important parts of self-directed learning is the fact it is autonomous. A learner needs to know how to develop the best strategy to learn a subject in the best fit to them, otherwise the alternative is a short-term achievement in a static skill or knowledge versus becoming a lifelong learner. Business processes, technology and other protocol change frequently, so the learner must have a strong sense of meta-cognition as well as subject related skill strategies.

Vygotskian

Taylor (2006) stated that “ Vygotsky’s ... [major] addition to the constructivist perspective is the emphasis on the significance of the social context and the interdependence of individuals and their cultural surround. People learn and develop within a web of personal and social relationships that affect how one knows” (p. 201). While self-directed learning is viewed as independent, there are still external factors, such as the person’s colleagues, work culture and society, that impact the learner’s process for learning. Bolhuis (2003) wrote that the studies of knowledge or skills are influenced by social and historical factors. According to his study a learner compares themselves to their colleagues in what they must learn and how their predecessors learned the knowledge. Past methods of learning impact present training as well as future education and training. Stanley (2010) wrote about this concept in nursing training:

Understanding each generational group allows leaders and managers an opportunity to grasp what it is that may drive or motivate each of the different groups and if the nursing profession is going to successfully deal with the impending nursing shortage understanding how to attract and retain employees from across the generational spectrum may prove vital. (p. 850)

While the learner acts as the evaluator, teacher, and student in self-directed learning, scaffolding and modeling as well as the zone of proximity can be applied. The outside agent, also known as the more knowledgeable other (MKO), could engage the learner and show them the mastery of a particular skill or study and thus increase their potential in the domain. After showing the individual the skills to bridge the discrepancy between where the learner currently stands and where they would like to be, the MKO would disengage so the learner continue their studies.

Worthen (2004) argues that the workplace needs to be evaluated not only in the areas of productivity, man-hours, and skill gaps but it should also include the social impact of the working environment. Unionization transitions the individual's mentality from the workplace and expands it into a legal and social group. These social groups hold interactions with the employer which are important, as they allow the individuals to shape their work culture.

In Henning and van Rensburg's (2002) study of e-learning courses they stated that the learners "...appeared to be trapped in their educational comfort zones and had narrowed their zones of proximal development, probably because of fixed patterns of educational behaviour, which could include an epistemology that was not receptive to self-directed learning" (p. 297). This study illuminated that when an idea or concept is new or radically different to a group, in this case online education and self-directed learning, it can act as a barrier and the learner may have additional difficulty.

Constructivist

Boghossian (2006) cited that "...[t]here are many different types of constructivism, among the most popular are cognitive, critical, radical, and social" (p. 714). Boghossian (2006) wrote that "[b]ehaviorism dominated the educational landscape 20 years ago, while the foremost learning theory today is constructivism" (p. 713). In fact, Boghossian (2006) wrote that "this manifested itself in the dominant learning theory of the time, behaviorism" (p. 715).

Constructivism combines cognitive learning theory from Piaget, Kelly, and social learning from Vygotsky (Taylor, 2006). According to Forbes, Ross, Salisbury-Glennon and Strom (2006), "constructivist theory is grounded in the research of Piaget, Vygotsky, the Gestalt psychologist, Bartlett, and Bruner as well as the philosophy of John Dewey, to mention a few intellectual roots" (p. 292). According to Asynchronous Learning Networks (1997) constructivism is the

educational philosophy in which learners ultimately construct their own knowledge that then resides within them, so that each person's knowledge is as unique as they are. The Oregon Technology in Education Council (n.d.) extend the definition by noting:

situated or anchored learning, which presumes that most learning is context-dependent, so that cognitive experiences situated in authentic activities such as project-based learning; cognitive apprenticeships, or case-based learning environments result in richer and more meaningful learning experiences; social negotiation of knowledge, a process by which learners form and test their constructs in a dialogue with other individuals and with the larger society; collaboration as a principal focus of learning activities so that negotiation and testing of knowledge can occur. (para. 2)

Constructivist theory strongly parallels andragogy. Constructivist theory relies on the learner to draw on their experiences and concepts to learn. Andragogy's definition talks about experience providing learning foundations for adults (Knowles, 1980). Constructivist theory also recognizes that knowledge in a social context, which also is found in Knowles' (1980) citation that learning needs are related to the social roles. Constructivist theory places an importance in connecting the theory of the knowledge to the implementation of the skill. This concept correlates to adults being more problem centered, with immediate application to real-world situations.

Zemke and Zemke (1996) stated adults tend to engage in job-skill training if the workers "...see if it is relevant to the rest of their lives as well" (p. 43). Zemke and Zemke (1996) also made a distinction between lecturing and facilitation stating that lecturing is most efficient when the learner has "zero grounding" (p. 47) in the subject. Facilitation tends to engage the learners more and thus the knowledge is better retained. Facilitation in the constructivist method means

that the instructor needs to try to integrate the learner's experiences, protect the minority's opinion, and have collaboration in the learner's goals (Zemke & Zemke, 1996).

Identity View

According to Piaget there are four stages of human intelligence development: sensorimotor intelligence, occurring from birth to age 2; preoperational, from age 2 through 7; concrete operations, age 7 to 11; and finally formal operations, occurring from 11 to adulthood (Crain, 2005d). The sensorimotor intelligence stage encompasses physical actions, such as grasping and walking. The preoperational stage denotes when the child starts to think and to associate colors, images, and language to objects and events. The concrete operation stage denotes when the child begins to think systematically and their thinking is limited to their knowledge up to that point and time. As Crain (2005d) wrote, those in the concrete operation stage "lives primarily in the here and now" (p. 134). The last stage, formal operations, occurs when the individual can think both systematically, but can also extend to abstract ideas, objects, and concepts. Crain (2005d) wrote that "many adults do not regularly demonstrate the highest stages of formal operations on Piaget's standard tasks" (p. 143).

If a learner is in the concrete operation stage, then a behavioral style of teaching may be more effective than a constructivist approach. A learner in the formal operation stage may respond better in a cognitive or constructivist approach versus a behavioral setting. Piaget believed that new events and subject matter may cause disequilibrium, which creates a better tendency for long-term learning (Crain, 2005d; Lavatelli, 1973). Piaget also stressed that too little disequilibrium or too much would result in short term memory versus the optimal discomfort with results with the lesson being committed to long term memory.

Crain (2005a) wrote that while Piaget focused on intellectual development, “Erickson’s theory describes a variety of feelings we bring to tasks” (p. 296). Erickson’s stages of life examined the individual not only on their personal development, but also took social context into consideration. Erickson’s stage theory divided an individual’s life into eight stages: trust vs. mistrust, from birth to one year old; autonomy vs. shame, doubt, from one year old to three years old; initiative vs. guilt, three years old to six years old; industry vs. inferiority, six years to eleven years old; identity vs. role confusion, adolescence years; intimacy vs. isolation, during young adulthood; generativity vs. self-absorption, stagnation, during established adulthood; ego integrity vs. despair, in old age (Crain, 2005a). In Erickson’s stages of development, the child’s stages start with the trust of others, progress to purpose and competence, and finally relationships and self-esteem. The progression shows that in each stage the learner is struggling with a central conflict which will have a major impact on their focus (Crain, 2005a). In the later childhood stages, a learner may be more likely to engage in learning involving groups versus the earlier stages which focuses on individual skill.

Young adulthood, middle adulthood, and maturity show three radically different stages in an adult’s life. In the earlier adult stages, the individual typically tries to strengthen their careers and establish their personal life. As they progress to the next stage, they may wish to start ensuring that the next generation is being secured and satisfied. In the last stage, the focus is lifelong reflection and is more individually centered (Crain, 2005a).

Havighurst discussed social roles in regards to the progress of an adult’s development. Havighurst and Orr (1956) and James, Witte, and Galbraith (2006) found that specific social roles provide strong motivation for individuals to perform well. His initial roles were defined as: Parent, Neighbor, Citizen, Spouse, Acquaintance, Friend, Kin, Worker, User of Leisure,

Grandparent, Homemaker, Church Member, Club or Association Member, Child of Aging Parents, Great Grandparent, and Colleague at Work. (James, Witte, & Galbraith, 2006) Later his roles were redefined to include the adult learner and other categories were reorganized: “Neighbor, Acquaintance, Colleague at work, and Great Grandparent were rejected as contemporary adult social roles. Neighbor and Acquaintance were not perceived to be major roles; Colleague at Work was subsumed under the Worker role; and Great Grandparent was subsumed under the Grandparent role” (James, Witte, & Galbraith, 2006, p. 54). Havighurst’s social roles tie motivation and identity to the adult in their development. In regards to self-directed learning, two of Havighurst’s roles play a vital role: the learner and the worker: “the learner role activities relate to the acquisition of knowledge and the development of learning skills, while the worker includes activities related to the job for which one receives pay or still performs although retired.” (James, Witte, & Galbraith, 2006, p. 55) When the adult engages in activities that they want to gain knowledge for their profession, they are satisfying two roles. This parallels Erikson’s young and middle adulthood which ties with the core of the adult’s life development stage.

Donald Super’s life-career rainbow (see Figure 5) combines Havighurst’s roles and Erickson’s model of adult development across a spectrum of life space (Brott, 2005; Okocha , 2001; Super, 1980). Super’s life-career rainbow track six roles, child, student, leisure, citizen, worker, homemaker and divide them among the five categories of growth, exploration, establishment, maintenance, and decline (Gray & Herr, 1997). Super’s model has been used by many career counselors to help determine the best match for a person with a career not only in their skill set, but by also incorporating their own beliefs and expectations. As Brott (2005)

states, “It is more than ‘test them and tell them’ and more than ‘true reasoning’ for finding the fit between person and occupation” (p. 138).

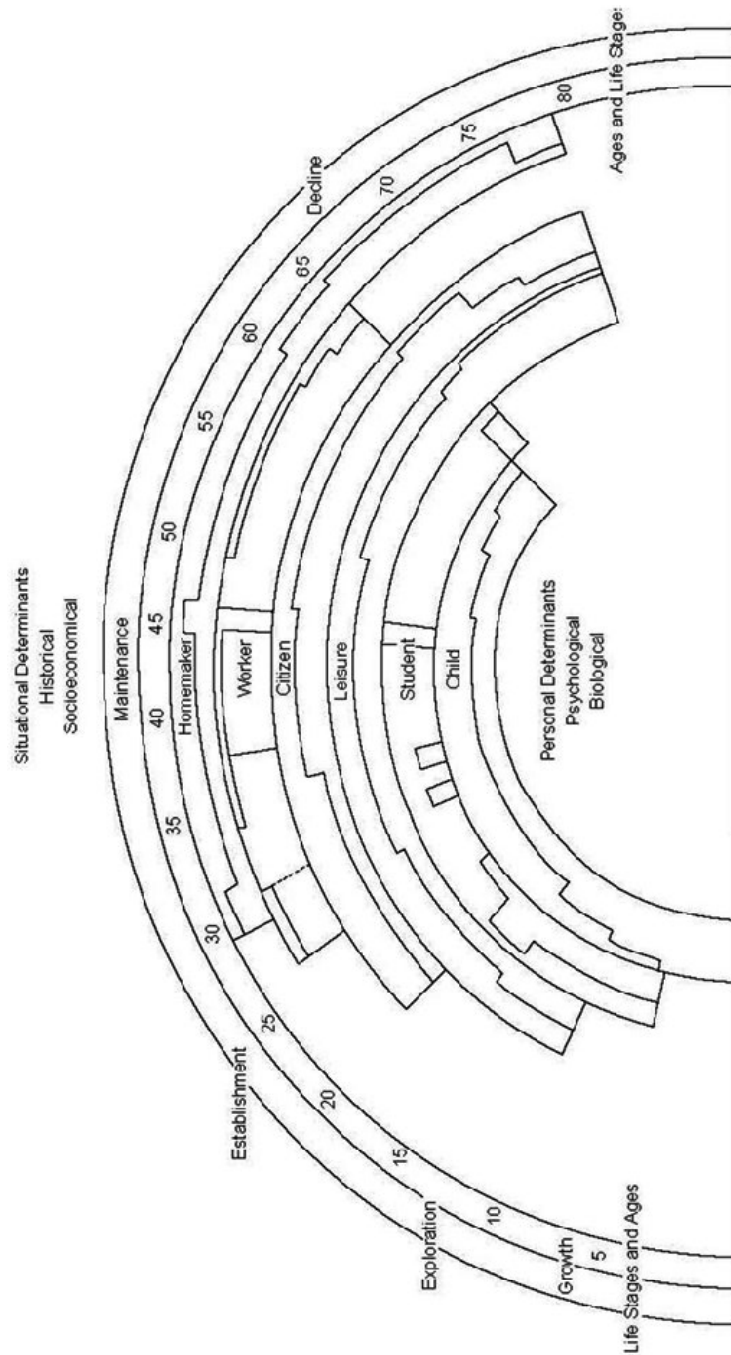


Figure 5. Donald Super's life-career rainbow

Jones and McEwen (2000) discuss multiple identities that a single person possesses. They identified six dimensions and a heuristic on how the individual accept these multiple dimensions. The dimensions were race, class, religion, gender, culture, sexual orientation. The heuristic is divided into four parts: individual accepting one dimension of themselves passively, the individual accepting a single dimension (race, class, religion, gender, culture, sexual orientation), the individual accepts certain dimensions, and finally the individual accepts all dimensions. This concept is important because many individuals try to find their peers and identify within these groups. Astin (1993) noted that one of the most powerful influences on college students was their peer group. This concept carries great weight in student development and student services. Astin showed that there was a link between academic success and student engagement. Therefore, the level of acceptance a learner may have about themselves in regards to their multiple identities may hold important bearing on their academic success. While Erikson's early stages involves a child's identity, it is guided by their guardians and teachers. In contrast Jones and McEwen state the adult is finding their own identity.

Motivation

Intrinsic Motivation

Intrinsic motivation is defined by rewards inherent to a task or activity itself. Deci (1971) stated that "[o]ne is said to be intrinsically motivated when engaging in an activity 'with no apparent reward except for the activity itself'" (p. 105). In the scope of the workforce, intrinsic motivation includes, but are not limited to: further mastery of the domain, development of a new domain, desire of great performance review, and wanting to keep a competitive edge.

Schachter (2007) noted that keeping a learning friendly environment in the workplace is needed for five reasons:

We want to ensure employees are challenged by their work and continue to improve; We want to take opportunity for implementing new processes, technology, etc. to increase efficiency and productivity; We want to develop innovation; We want to increase employee morale by showing that we invest in our employees through ongoing professional development; We want to empower our employees. (p. 44)

While this was written from the perspective of the employee's manager, most of the points are tied to intrinsic motivations: the employees' work challenges, self-worth, and their empowerment. Schachter's (2007) comment on investing in the employee not only shows an internal motivation to the employee, but an internal motivation to the company as well.

Strickler (2006) stated that one of the most important motivators businesses can foster is one of trust. Strickler suggests that business become values driven, create a safe working environment, hold employees accountable and responsible, and encourage them to do their best. In addition, Strickler (2006) noted that Semco CEO Ricardo Semler felt that companies need to change their culture and business practices in a modern style that fosters employees to be as open with the organization as possible.

Cooper's creativity model (2000) asserted that projects need mental diversity. Cooper also defined mental diversity as employees who have different ideas and come from different backgrounds. Each contributing member should be able to contribute in order to solve the problems that arise during each stage in a heuristic, rather than algorithmic, method. He also mentioned that those who see the problem as a puzzle tend to engage the issue with added

enthusiasm and are persistent towards the resolution. Cooper discussed that these types of intrinsic motivations were more powerful than the extrinsic motivations such as money or advancement.

Vankatesh's (1999) study found the importance of learner intrinsic motivation was demonstrated with end-user training by comparing two different methods, specifically traditional versus game-based training. The traditional method consisted of lecture, actual use, and an exam of the system learned. The game-based method started with the use of the system based on a game, lecture, use of the system, and then an exam. Those who had the game-based training did better than the traditional class. The users' intrinsic motivation, facilitated by playing the game, helped retain the information better than the control group's members.

Stacey, Smith, and Barty's study (2004) of the adult learner in the workplace found that the learner had "growth in understanding; clarification of thinking; ability to present ideas to others; capacity to initiate or develop programs; and leadership in professional practice" (p. 115). This showed that the learners' outcomes increased internal attributes: understanding, thinking, ability, capacity, and leadership. These correlate to self-efficacy and self-esteem. Murphy and Roopchand (2003) study found "...a highly significant positive correlation between students' reported self-esteem and their scores for intrinsic motivation towards learning" (p. 252).

Oh and Lewis (2007) conducted a study on effective performance appraisal systems in federal agencies using the U.S. Merit Systems Protection Board. The study was distributed to 23 agencies and had a response rate of 43% for a sample size of 4,346. They found public sector employees were intrinsically motivated. Fifty-seven percent of participants answered that the appraisal system, based heavily on extrinsic motivators such as raises and promotions, had an

impact on their jobs. These employees have a desire to serve the public and to be loyal to the government.

Lord and Farrington's (2006) study on age-related differences in knowledge workers found that older workers did not place as much emphasis on the benefits as the younger workers. In fact, the study found that the older workers most valued importance of project, autonomy, input into their processes and social aspects of their employment. These specific traits are the characteristics found in self-directed learning.

Extrinsic Motivation

Extrinsic motivation is defined by the reward that comes from outside the individual. For example, in the workforce an employee may have the following external motivators: a good job review, a raise, additional fringe benefits, a promotion, status among colleagues, and job security. The manager, company, appraisal system or other authority controls the rewards to the employee as well as the schedule of the reward.

Extrinsic motivation can often discourage those whom are intrinsically motivated (Deci & Ryan, 2000; Frank & Lewis, 2004). Oh and Lewis (2007) investigated the performance appraisal system that was implemented in a few governmental agencies. Only 19 percent of those polled strongly stated that the appraisal system motivated them to do a better job. Of the remaining 81 percent, many of them agreed that they were neutral or less motivated due to this system.

Cooper (2000) found that if a new system is imposed on an individual then there is a great chance that they shall resist the change greater than if they had some buy-in from the beginning. Wynia's (2009) review of reward systems in the healthcare field wrote "...that when an activity is largely driven by internal motivations—such as professionalism or pride in the

quality of work one achieves— adding an external (e.g., financial) motivator can actually backfire, often dramatically” (p. 855). Therefore an employer, in an attempt for the individual to internalize the change, may want to add self-directed learning so the employee would have some control in their learning process.

Ferratt’s study (1988) compared two different groups: a domain specialized department and a general department, which were the information systems and the business office, respectively. Results showed that even though the departments had different job responsibilities and structures, the motivations found in each department were similar. If extrinsic motivations are only available to specific departments, other employees may harbor resentment and experience a reduction in motivation.

Lord and Farrington (2006) conducted a study on engineers, scientists, and information technology workers in regards to age differences. They categorized workers into two groups: younger, those under 55 years of age, and older, those at or over 55 years of age. According to Lord and Fairington (2006), there were key differences between the two groups: older workers were more satisfied with their current jobs than younger workers; younger workers place more importance on advancement, security, and how their supervisor relates to them and older worker places more importance on independence; younger workers found it harder to leave the organization from a personal material loss point of view than did older workers and older workers appeared to feel that the organization deserved their loyalty more so than did the younger workers; younger workers remained in the workforce were different from those of older workers. Additionally, younger workers worked to provide basic necessities and safety nets for themselves and their families. Recognition appeared to be a stronger factor for younger knowledge workers than for older knowledge workers. The primary reason older workers

remained in the workforce is that they enjoy working and take pride in what they do. (Lord & Farrington, 2006)

Additionally, Lord and Farrington (2006) found that a “strong intrinsic motivator for both age groups is the fact that they enjoy and take pride in the job they do” (p. 25). In their conclusion, Lord and Farrington mention that the engineering manager needs to foster the independence of the older worker by allowing them to do and learn different things.

Motivation Theories

Motivation-Hygiene Theory

Herzberg’s motivator-hygiene theory proposes that certain factors in the workplace result in job satisfaction, but if absent lead to dissatisfaction. (Schwenker & Tamosaitis 2002)

Motivators such as challenging work, recognition, responsibility can provide positive satisfaction. Hygiene factors such as status, job security, salary, and fringe benefits do not motivate, but if they are absent it can result in demotivation. Schwenker and Tamosaitis’ (2002) study of employment in a technical work environment among contractor and federal employees listed external motivators such as salary, job security, leave, and benefits as the major reasons in recruitment and retention. Internal motivators cited were the work itself, personal growth, colleague relationships, job responsibility, and career growth. Motivation-Hygiene theory shows that employee’s individual motivations affect their work as well as the organization’s culture. If the working environment has a culture that stifles the motivators or provides de-motivating hygiene factors, then the individual may not engage in bettering themselves within the company. Additionally, the hygiene factors of recognition and status are related to the social context of the workplace such as peer reviews, team dynamics, and mentorship. Social goal setting, a similar

theory, postulates that if a person is not meeting certain social aspects, such as peer recognition, they are not as likely to engage in their learning (Wentzel, 2002).

Self-determination theory

Self-determination is defined as the degree to which individuals experience themselves as autonomous or as having choice in their actions and behaviors, as opposed to being controlled or pressured (Grolnick, Gurland, Jacob, & Decourcey, 2001). According to deCharms (1968), an individual sees themselves as either origins or pawns. Self-determination resonates strongest with the learner when the reasons are intrinsic. Extrinsic motivation could be viewed as outside the control of the individual, which could shift the role of the learner from origin to pawn. However, the individual could view extrinsic motivation in varying degrees of intrinsic and extrinsic. According to self-determination theory, extrinsic motivation can be divided into four categories: external regulation, introjection, identified regulation, and integrated regulation. External regulation is dependent on the reward or punishment from the activity. Introjection is defined as the learner taking the responsibility and self-administering for the reward or punishment. Identified regulation occurs when the individual identifies with the value or worth of the behavior and engages in it accordingly due to values or belief, even if “the activity may not be perceived as fun or enjoyable” (Grolnick, Gurland, Jacob, & Decourcey, 2001, p. 151). Integrated regulation is the closest to intrinsic in the extrinsic spectrum. Grolnick, Gurland, Jacob and Decourcey (2001) stated “...individuals not only engage in the behavior out of a personal valuing or endorsement, but also integrate the behavior into a larger constellation of related behaviors and values” (p. 151). While studies (Deci & Ryan, 2000; Oh & Lewis, 2007) show that extrinsic motivation can extinguish intrinsic motivation, it is still possible to have the benefits of internal motivation while the company implements extrinsic motivational methods.

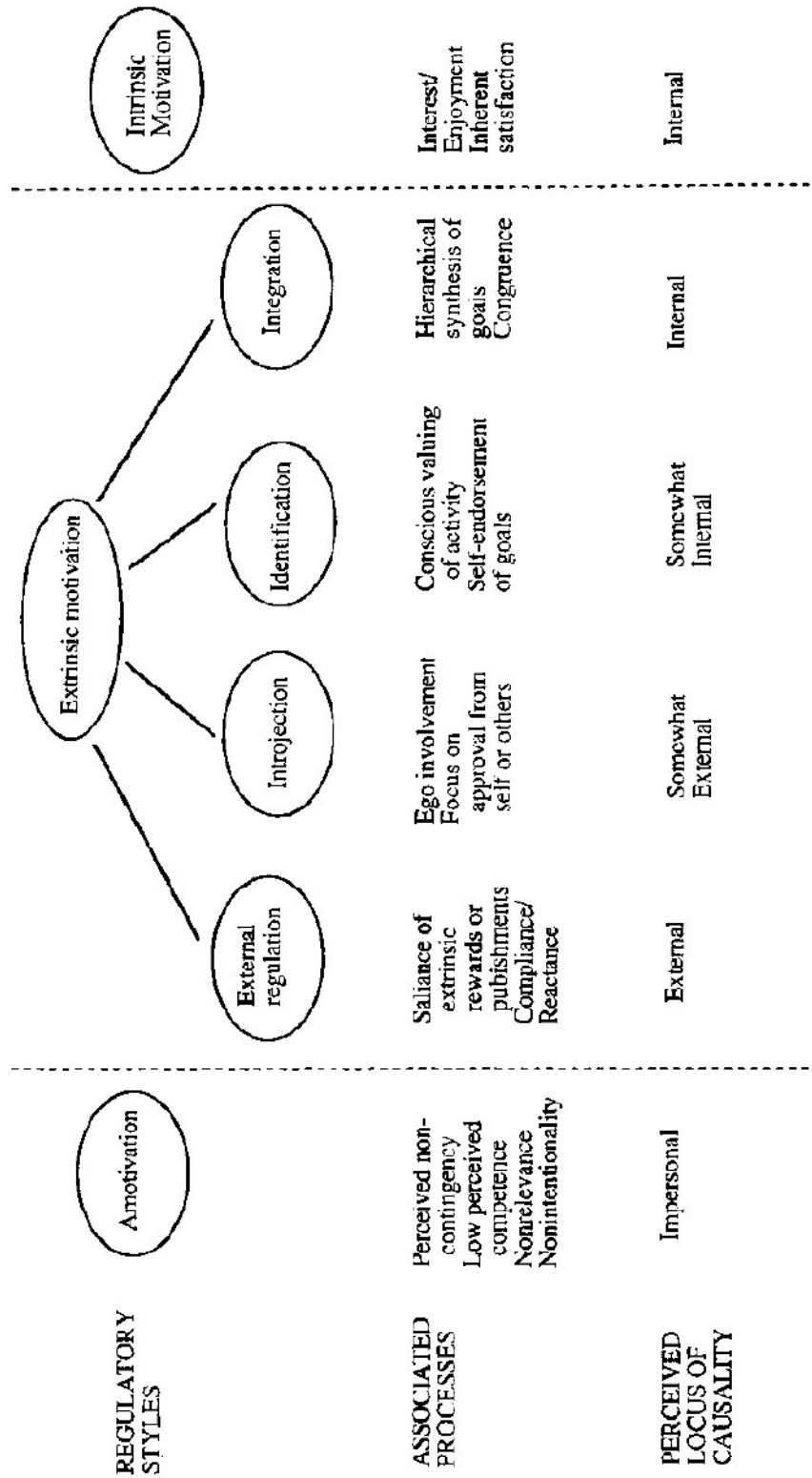


Figure 6. A Taxonomy of Human Motivation

When the learner engages in self-directed learning, they typically are seeking an area in which they hope to attain value, either personally or professionally. In an earlier study, Deci and Ryan (2000) declared that self-determination theory highlights the importance of three fundamental psychological needs to understand optimal functioning: autonomy, competence, and relatedness. Candy (1987) identified three kinds of autonomy in learning: personal autonomy which involves moral, emotional and intellectual independence; student autonomy, which involves people taking responsibility for their own learning; and the acquisition of habits of disciplined which lead to lifelong learning. The learner's autonomy is essential to self-directed learning as well. If a learner cannot function independent of an authority figure, then there is a greater chance they shall not engage in self-directed learning efficiently.

Expectancy-value theory

According to expectancy-value theory, behavior is a function of the expectancies one has and the value of the goal toward which one is working, expressed as a formula $B = f(E \times V)$. In terms of the formula, $B=f(E \times V)$, there is not a consensus in the literature as to the relation between E and V. This theory stresses two important parts: the first is that the person who is about to learn in this new domain has the ability to understand what the expectancies are in terms of goals and achievement of those goals; the second is that the individual shall quantify the engaged knowledge.

The first part of the theory, expectancies in terms of goals and achievement of those goals, is found directly in Knowles (1975) definition of self-directed learning: "formulating their learning goals ...[and] ... implementing appropriate learning strategies and evaluating learning outcomes" (p. 18). The learner sets their own goal, their level of mastery, how to reach that goal and the success of that goal. Expectancies infer the attainment values that an individual places on

the task. Attainment values also stress the importance of the individual doing well on the task, which can be linked to other identity roles (Eccles & Wigfield, 2002).

The second part of the theory, an individual quantifies the engaged knowledge and places emphasis on the value. A task's value can be "...outlined into four components ...: attainment value, intrinsic value, utility value, and cost" (Eccles & Wigfield, 2002, p. 119). Each of these are defined as follows: the attainment value is how the individual performs on the task; the intrinsic value is the enjoyment one gains from doing the task; the utility value task fits into an individual's future plans; and the cost is what the individual has to give up to do the task, similar to the economic term known as the cost of opportunity.

If the learner believes that the information or skill set to be valuable, they may decide to engage in it even if the expectancy value may be low. Stockdale and Brockett (2010) suggested the concept of personal ownership can "also be thought of as the personal values we attach to making decisions, taking control, or accepting responsibility for our beliefs and actions" (p. 3).

McGregor's theory X and theory Y

Caudron et al. (2002) listed McGregor's ideas as one of the most important in workforce people, events and trends in the last 100 years. McGregor's ideas on management behavior revolutionized the way corporations consider and value their employees and challenged the belief at the time that workers were 'inherently lazy' (Caudron et al., 2002, p. 32). They credited McGregor as one of the first to recognize that 'people are assets' (Caudron et al., 2002, p. 32).

McGregor's theory X and theory Y divides management and the workers motivation in two different areas. Theory X employees are lax and try to do as little as possible and management considers that the way to motivate these workers is via extrinsic motivational forces, in particular threat, coercion, and other negative consequences (McGregor, 1960). Senge

(1990) and Argyris (1990) mentioned that in practice most managers find collective inquiry threatening. Theory Y's employees are highly intrinsically motivated and truly enjoy their work. The manager's job is to keep this motivation high with responsibility and diversity in their work. Neulip's (1996) study of unethical messages being sent in both Theory X and Theory Y areas show that the resulting actions may be the same, but theory X's managers would expect this of their employees. This would also suggest that the employee's worth is very little to their managers, so their self-worth to the organization would be compromised.

Self-directed learning could potentially thrive in a Theory Y environment due to the managers acting as facilitators and empowering the employee. In contrast, the strict control of Theory X environment managers could stifle the employees from doing anything other than the prescribed training regimen.

Goal Orientation

Anderman, Austin and Johnson (2002) discuss the various definitions involving goal orientation and define goal orientation as a "...students' reason for engaging in academic tasks" (p. 197). In a more abstract view, goal orientation is the cognitive reasoning for engaging in tasks. Goal orientation literature traditionally defines two dimensions to goal orientation: mastery and performance; appearance and avoidance.

Mastery orientation is when the learner is engaged in bettering their knowledge and skill in a certain domain. They want to increase their knowledge and pursue the task concerned with an in-depth understanding of the domain as the major motivation. Mastery orientation is typically aligned with intrinsic motivation (Eccles & Wigfield, 2002). Performance is the appearance of competency in comparison to others. Performance is typically viewed as extrinsic motivation (Eccles & Wigfield, 2002). The individual does not compare their mastery, rather their outcomes

to others. A classic example that shows the contrast between mastery and performance is the student who wants to learn (mastery) and the student who wants to get better grades than others (performance).

Atkinson (1957) and McClelland (1951) proposed that there were two types of motivations: approach and avoidance. Approach is when the person believes they shall do well in the domain. Avoidance is when the individual does not engage due to potential failure of the particular task. Eccles and Wigfield (2002) cite that this is also known as “ego-involved goals and task-involved goals” (p. 115). Pintrich (2000) integrated each dimension into a 2 by 2 square. The matrix’s cells are: mastery-appearance, mastery-avoidance, performance-appearance, performance-avoidance (See Table 1 below).

Table 1

Two Goal Orientations and Their Approach and Avoidance States

	Approach state	Avoidance state
Mastery orientation	Focus on mastering task, learning, understanding Use of standards of self-improvement, progress, deep understanding of task	Focus on avoiding misunderstanding, avoiding not learning or not mastering task Use of standards of not being wrong, not doing it incorrectly relative to task
Performance orientation	Focus on being superior, besting others, being the smartest, best at task in comparison to others Use of normative standards such as getting best or highest grades, being top or best performer in class	Focus on avoiding inferiority, not looking stupid or dumb in comparison to others Use of normative standards of not getting the worst grades, being lowest performer in class

In mastery-appearance orientation, the learner engages in the domain with the goal of achieving the greatest understanding. They also tend to have a strong disposition for the particular domain. Their performance is not relevant to others, only to themselves, and the

individual pursues mastery of the domain. The mastery student will engage in problems that are challenging for the pursuit of the goal (Eccles & Wigfield, 2002).

Mastery-avoidance orientation typically is when a learner wants to master a domain and their driving motivation is not to do it incorrectly. In contrast to mastery-appearance, they do not want to learn this task for the sake of learning, but rather to not perform it poorly. Pintrich (2000) had difficulty defining mastery-avoidance, but summed it up by stating "... 'not mastering' the task or avoiding 'not learning or not understanding' the task. The standards to be used reflect a concern with not 'being wrong,' but it is not relative to others..." (p. 100).

Performance-appearance orientation is when the individual wants to engage in the task with the motivation to perform better than others. As Eccles and Wigfield (2002) explained the individuals are "...more likely to perform tasks they know they can do" (p. 116). A common example would be the learner who is concerned with their score compared to their classmates than with the retention or understanding of the tested material. Performance-avoidance orientation is when the individual engages in the domain with the goal to not appear inferior to others (Eccles & Wigfield, 2002). The learner may not be concerned with being the valedictorian, but strives to not be at the bottom of the class. In both performance-approach and performance-avoidance, the measured outcomes are the driving motivation. Zemke and Zemke (1996) point out that the facilitator in a group learning session needs to be aware of the learners' confidence. A learner within the avoidance orientation may not be best engaged if they fear looking weaker than their peers. In self-directed learning, "...identifying human resources..." (Knowles, 1975, p. 18) may prove difficult for the learner.

Self-directed learning can encompass each of Pintrich's orientations and it is important to recognize which orientation a learner may be in order to optimize their learning transaction. A

key element of self-directed learning is the learner implementing the most appropriate learning strategies and the motivation matrix may show the rationale and may be a predictor in their methods.

The Learning Organization

Kerka (1995) remarked “there is not... a consensus on the definition of a learning organization” (p. 3). Learning organizations and organizational learning are also used interchangeably in literature. Senge (1990) described learning organizations as

Organizations where people continually expand their capacity to create the results they truly desire, where new and expansive patterns of thinking are nurtured, where collective aspiration is set free, and where people are continually learning to see the whole together.
(p. 3)

According to Langlois (2007), Argyris and Schön first discussed the concept of organization learning and it was fairly theoretical. In their research, they addressed how organizations solved issues and how they learned from the situation. Argyris and Schön’s (1974; 1978) framework was grounded in two concepts: single-loop and double-loop learning. Single-loop learning addressed the situation within the scope of the current system. This meant the correction to the problem involved the known resources, methods and processes of the company defined in a linear fashion. Double-loop learning involved the same process, but with the added function of questioning the processes, methods and actions normally used (Smith, 2001). Argyris and Schön (1978) noted that

an organization is like an organism each of whose cells contains a particular, partial, changing image of itself in relation to the whole. And like such an organism, the organization’s practice stems from those very images. Organization is an artifact of

individual ways of representing organization. Hence, our inquiry into organizational learning must concern itself not with static entities called organizations, but with an active process of organizing which is, at root, a cognitive enterprise. (p. 16)

Their framework was further discussed in two models: one set to encourage double-loop learning (model 2) and the other to discourage it (model 1) (Smith, 2001). Argyris and Schön (1978) urged organizations to move from model 1 to model 2 in order to help both the organization as well as the individual.

Jarvis (1998) states that learning organizations are “the concrete image which enabled academics and practitioners alike to discuss the abstract idea of organizational learning” (p. 4). Senge (1990) defined it as “an organization that is continually expanding its capacity to create its future” (p. 14). Senge (1990), Jarvis (1998) and others (Flood,1999; Garvin, 1993) built the practical framework of learning organizations on Argyris and Schön’s concept of organizational learning. Garvin (1993) wrote that there are five building blocks for a learning organization: systematic problem solving; experimentation; learning from past experience; learning from others; and transferring knowledge.

Preskill and Torres (1999) defined the evaluative inquiry within a learning organization in three major states: focusing the inquiry, carrying out the inquiry, and applying learning (see Figure 7). They also show that when the cycle repeats, as to reevaluate the system to ensure that the inquiries are still relevant as well as the methods and procedures that are governing the solution. Between each major state, Preskill and Torres noted that a different learning group may be affected the most: individuals, teams or the entire organization. Finally, the organization has four major components: communication, culture, leadership, and systems structure. Each of the global components play an important part in moving the evaluative inquiry from one state to the

next. For example, if the culture of a organization is not conducive to change, learning may be inhibited. At the center of their model, Preskill and Torres note the core ideas behind the learning organization: dialog, reflection, asking questions, values, beliefs, identifying, clarifying, assumptions and knowledge. Serge (1990) and Argyris and Schön (1978) stressed the importance of being able to inquire about the system and its parts in order to facilitate the best learning environment. Without the freedom to answer these central ideas, an organization has the potential to cease to be a learning organization.

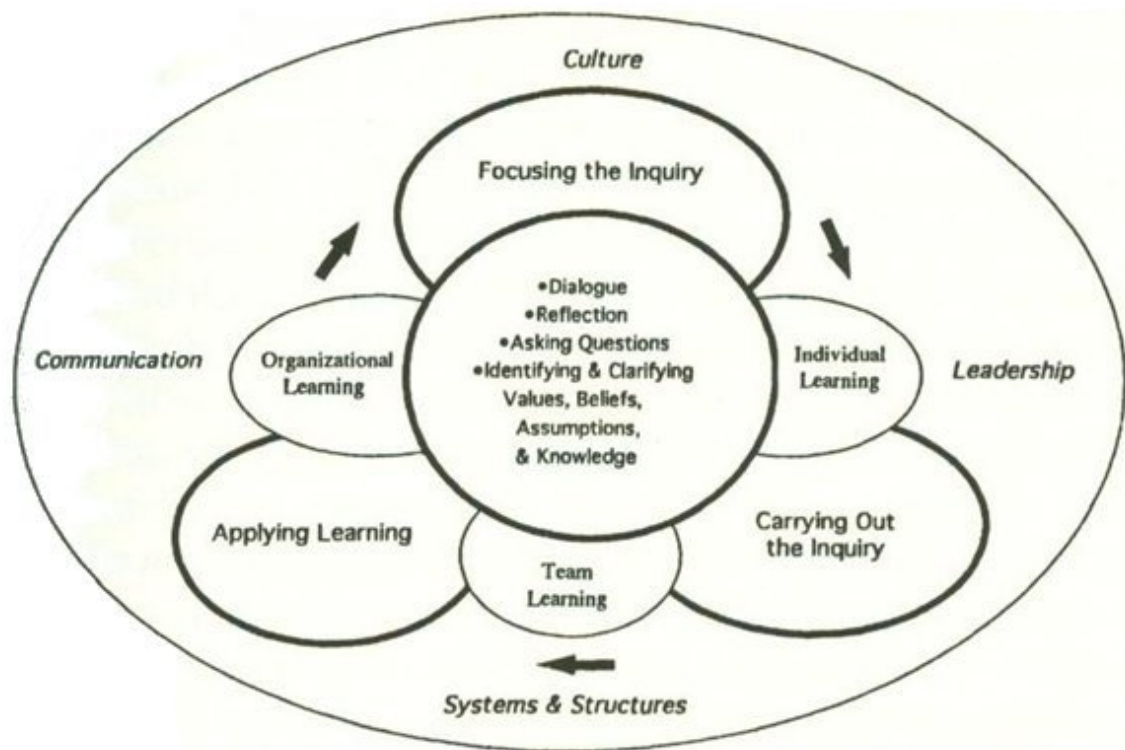


Figure 7. Evaluative Inquiry in a Learning Organization

Senge (1990) established that the difference between a traditional company and a learning organization are the following: personal mastery, mental models, shared vision, team learning, and systems thinking. Flood (1999) compared different theories and discussed Senge's observation that one of the issues with employees making change within the organization is their

systematic thinking. Argyris and Schön (1978) attributed challenges to the status quo will come from someone who is viewed as a radical and wanting to protect the system. They found that the defensive mechanism of an employee, manager or organization can halt progress. Additionally, Senge explained that the employee's limited vision does not allow change and thus leads to inertia for both individuals and the organization. This is the reason that many companies hire new personnel and do not promote entirely from within. Confessore, and Kops (1998) found that:

Managers identified conditions within their organizations that affected their capacity to learn in a self-directed way, including the following: (1) supportive and challenging organizational settings, characterized by open communication, active experimentation, and tolerance of mistakes; (2) clear expectations and outcomes that allow for the alignment of SDL efforts with the goals of an organization; (3) discretionary time for learning and maintenance of resources that support learning; (4) opportunities for making internal and external contacts and building networks with colleagues and associates; and (5) development of employees' ability to engage in SDL (p. 369).

Senge (1990) and others (Argyris & Schön, 1978; Flood, 1999; Preskill & Torres, 1999; Tobin, 2000) examined the importance of the employee as well as the condition of the organization. The culture of the workplace impacts many aspects of their employees and a central key to continual educational and training motivation was a positive learning environment. Tobin (2000) defined a positive learning environment as:

...a company that encourages, even demands, that every employee at every level be in continuous learning mode, constantly searching for new ideas, trying new methods, sharing ideas and learning with others, and learning from others, to find new and better way to achieve individual, group, and organizational business goals. (p. 22)

Tobin (2000) cited his study from Pennsylvania State University on positive learning environments. Tobin (2000) emailed the TRDEV-L listserv which had over 5,000 members. He posted the question “How would you define the characteristics of a positive learning environment” (p. 25). There were more than two dozen responses, most of which were found in Kunlke’s list of themes to know if you worked in a positive environment, for example ideas being openly solicited, cross-functional teamwork, and employees looking forward to meetings (Tobin, 2000).

Preskill and Torres considered that when organizational learning is implemented correctly, individuals, team and the entire organization had a better understanding of each level (see Figure 8). Not only did the individual see where the fit into the system, but they could see the best business practices and conduct in the most efficient way in each level (individual, team and global). In addition, the current schema could be expanded to include new clients / customers, develop new products and services, similar to Senge’s (1990) comment that a learning organization is “continually expanding its capacity to create its future” (p. 14).

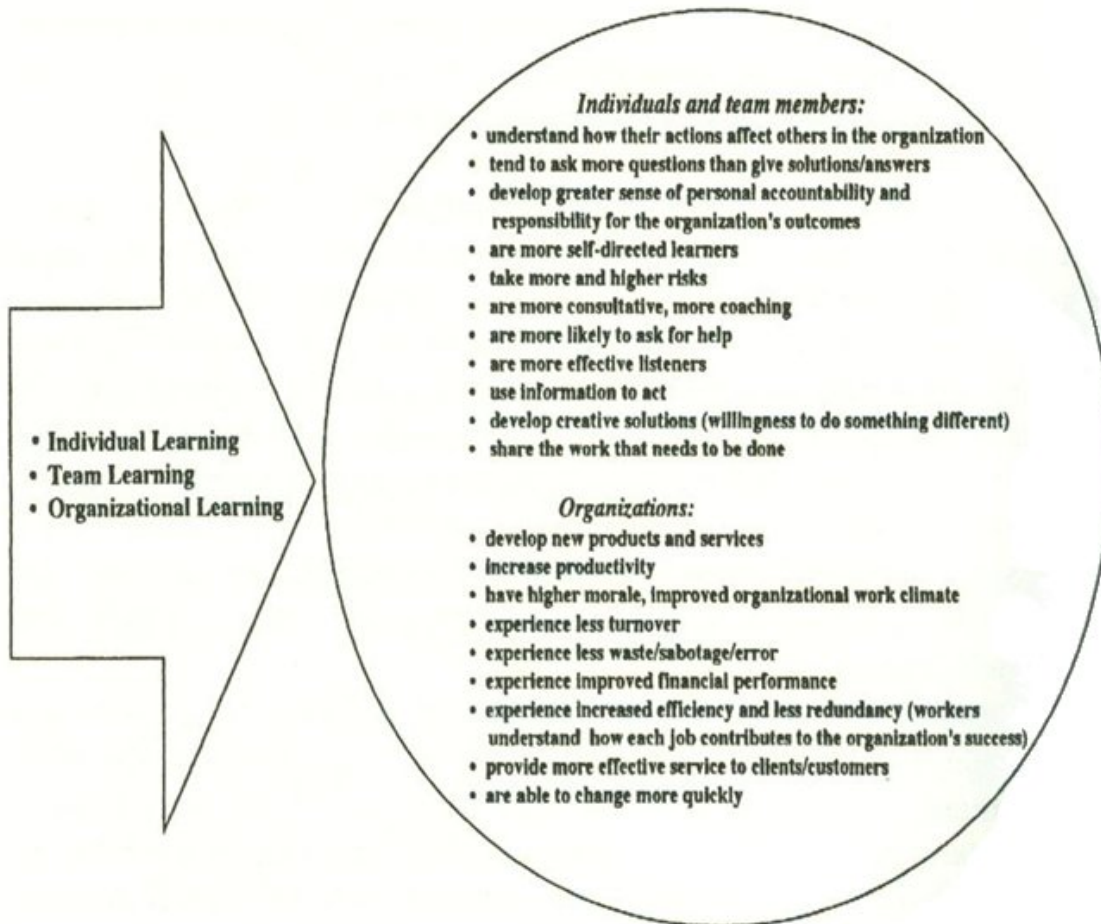


Figure 8. Outcomes Associated with Evaluative Inquiry for Learning

Confessore and Kops (1998) stated some important parallels between self-directed learning (SDL) literature and learning organizations (LO):

First, they affirm the importance of workplace SDL and link the two constructs of SDL and the learning organization from the perspectives of learners and training and development experts. Second, the parallels emphasize the importance of context in learning organizations-specifically, that context is important to fostering SDL. Third, the parallels confirm that rapidly changing conditions in organizations both build a learning organization and promote SDL. (p. 370)

Self-Regulation

Zimmerman (1986; 1990) defined self-regulation as when the individual assumes control of their actions during the acquisition of skills, knowledge, and understanding in a learning endeavor. Students are self-regulated to the degree they are metacognitively, motivationally, and behaviorally active participants in their own learning process.

Pintrich and De Groot (1990) established that there are three motivational components to self-regulated learning: an expectancy component, beliefs about one's ability to perform a task; a value component, beliefs about the value and interest of the task; and an affective component, emotional reactions to the task.

Zimmerman (2002) proposed eight skills which are important to student self-regulated learning. These skills are: setting specific proximal goals for oneself; adopting powerful strategies for attaining these goals; monitoring one's performance; restructuring one's learning environment to make it compatible with one's goals; managing one's time effectively; self-evaluating one's methods; attributing results to causation; and adapting future methods. These eight skills are present during the process of self-directed learning as well. Van Eekelen's et al. (2005) study on self-regulated learning in the workplace construct for adults consisted of three parts: self-directed study; experimental learning; and reflection.

Van Eekelen et al. (2005) declared that self-regulation is not performed in a social vacuum, "Clearly, according to these authors, the self-regulated learning process at the workplace is complex and unpredictable, and unfolds as it goes along" (p. 450).

Karabenick, Pintrich, and Wolters (2003) indicated that there were four phases that made up self-regulated learning: 1) forethought, planning and activation; 2) monitoring; 3) control; and 4) reaction and reflection (see Table 2). The areas for regulation are divided into three styles of

controlling and regulation: cognition, motivation/affect, and behavior. The fourth column, context, refers to the “task environment or general classroom or cultural context where the learning is taking place” (Karabenick, Pintrich, & Wolters, 2003, p. 7). The first three columns deal with the learner and how they continue in self-regulated learning stasis and the fourth column is the impact of outside environment. Karabenick, Pintrich, and Wolters (2003) acknowledged that the “phases are suggested as a heuristic to organize our thinking and research on self-regulated learning” (p. 5). Each cell within the matrix represents an action that the learner engages in during that phase. For example, a learner who is in the monitoring phase and in the behavior regulation area will engage in self-observation of their behavior versus someone who is engaging in metacognitive awareness in the cognition area. At the bottom of the matrix, the relevant scales represent learning strategies that may help learners in a particular phase who have tendencies in one area over another one.

Table 2

Phases and Areas for Self-regulated Learning

Phases	Areas for Regulation		
	Cognition	Motivation/Affect	Behavior
1)Forethought, Planning, and Activation	<ul style="list-style-type: none"> 1)Target goal setting 2)Prior content knowledge activation 3)Metacognitive knowledge activation 	<ul style="list-style-type: none"> 1)Goal orientation adoption 2)Efficacy judgments 3)Perceptions of task difficulty 4)Task value activation 5)Interest activation 	<ul style="list-style-type: none"> 1)Time and effort planning 2)Planning for self-observations of behavior
2)Monitoring	<ul style="list-style-type: none"> 1)Metacognitive awareness and monitoring of cognition 	<ul style="list-style-type: none"> 1)Awareness and monitoring of motivation and affect 	<ul style="list-style-type: none"> 1)Monitoring changing task and context conditions 2)Self-observation of behavior
3)Control	<ul style="list-style-type: none"> 1)Selection and adaptation of cognitive strategies for learning, thinking 	<ul style="list-style-type: none"> 1)Selection and adaptation of strategies for managing motivation and affect 	<ul style="list-style-type: none"> 1)Increase/decrease effort 2)Persist, give up 3)Help-seeking behavior
4)Reaction and Reflection	<ul style="list-style-type: none"> 1)Cognitive judgments 2)Attributions 	<ul style="list-style-type: none"> 1)Affective reactions 2)Attributions 	<ul style="list-style-type: none"> 1)Choice behavior 2)Evaluation of task
Relevant Scales	<ul style="list-style-type: none"> Rehearsal Elaboration Organization Metacognitive Regulation 	<ul style="list-style-type: none"> Mastery Self-talk Extrinsic Self-talk Relative Ability Self-talk Relevance Enhancement Situational Interest Enhancement Self-consequating 	<ul style="list-style-type: none"> Effort Regulation Time/Study Environment Help-seeking

Self-Efficacy

Bandura (1977) defined self-efficacy as an individual's perceived capabilities for a given task. Self-efficacy has been studied in academic motivation and there is a significant positive correlation between high self-efficacy and academic achievement. Zimmerman and Ringle (1981) and Schunk and Hanson (1985) asserted that self-efficacy beliefs are measured by rate of performance and expenditure of energy. According to Cervone, Aristico and Berry (2006) self-efficacy beliefs are important to intentional action for three reasons: first, "self-efficacy perceptions directly contribute to decisions, actions and experiences" (p. 172); second, "self-efficacy perceptions may moderate the impact of other psychological mechanisms on developmental outcomes" (p. 172); and finally "self-efficacy beliefs influence other cognitive and emotional factors that in turn contribute to performance" (p. 172). Those who have higher self-efficacy beliefs tend to set more challenging goals and remain committed to their goals. In turn, the outcomes of the activity become an additional driving motivating factor in their goal setting (Cervone, Aristico & Berry, 2006)

Chu and Tsai (2009) examined self-efficacy in regards to self-directed learning. Their study examined the internet self-efficacy (ISE), which "refers to an individual's ability to self-evaluate their Internet usage and independently accomplish Internet tasks" (Chu & Tsai, 2009, p. 490). They divided internet self-efficacy into two groups: general internet self-efficacy, involving how the individual operated in general online, and communicative internet self-efficacy, involving how they communicated while online. In self-directed learning, adults shall try to choose the most comfortable learning environment. Chu and Tsai (2009) wrote this "suggests that more time spent on Internet practice may increase adult learners' ISE, which may strengthen their preferences for Internet-based learning environments" (p.489).

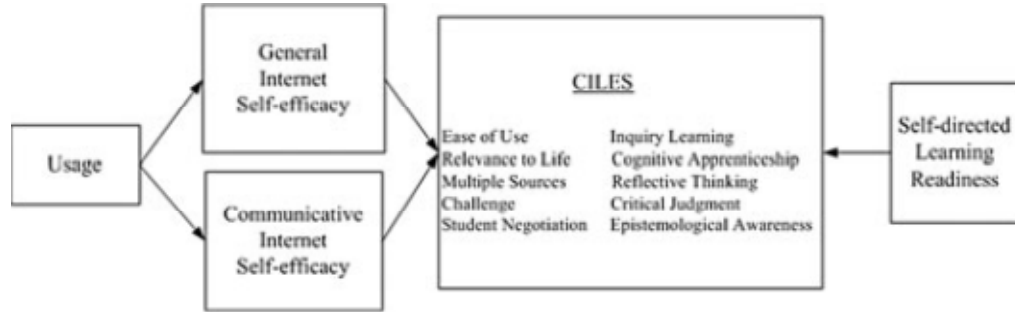


Figure 9. Path model depicting the relationships of Internet usage, Internet self-efficacy, self-directed learning and the constructivist Internet-based learning environment scale (CILES)

Sahu and Sangetta (2004) studied self-efficacy in women in the workplace. They found that there was a positive correlation between workplace experience and self-efficacy beliefs as well as self-efficacy beliefs and sense of well-being.

According to the United Kingdom’s Health Professions Council high education needs to graduate “[a]utonomous professionals are said to need: (a) self-directed learning skills and attributes; (b) a positive academic self-efficacy; (c) an internal academic locus of control and (d) a positive academic self-concept” (Kell, 2006, p. e16). Kell (2006) noted that “Guglielmino (1977) suggested that the confidence of mature students in managing their various non-academic roles is translated, at least on admission, into higher perceived [self-directed learning readiness] (SDLR), self-esteem and self-concept” (p. e20).

Conclusion

Self-directed learning is not limited to the academic sector alone. The implementation of the learner taking charge of their knowledge can lead to a more satisfied individual. While the classical forms of training involved formal lectures, classroom settings, external training, or a hybrid approach, many companies are starting to push the training duties to the employee and

individual study. Self-directed learning allows the individual to assess their level of knowledge, find the optimal level of knowledge, facilitate the process, and finally moderate their success.

Several studies (Ausburn, 2002; Chu & Tsai, 2009; O'Shea, 2003) cited in the literature review reiterated that the learner needs to have a strong sense of self-assessment, self-regulation and maturity in order to engage in full meaningful self-directed learning. If the individual did not have a strong background in self-directed learning from their pedagogical construct, the conversion to the andragogical schema will take some time and potential scaffolding on others.

Employees, whom are the learners, can use self-directed learning for a myriad of reasons. Whether their catalyst is internal or external factors, the responsibility of the new domain being integrated into their skill set has shifted from management to the workers.

Many studies and instruments (Beard, 2010; Brockett & Hiemstra, 1991; Hogg, 2008; Pilling-Cormick, 1996; Pilling-Cormick, 1997; Stockdale & Brockett, 2010) showed that social context presented a major influence as well as the individual view. This can be seen in the development of Hiemstra and Brockett's (1991) personal responsibility orientation (PRO) model into the person-process-content (PPC) model (Beard, 2010) and cited in social context.

Motivational theories suggest that the worker may not be influenced by extrinsic motivations alone (Deci & Ryan, 2000; Oh & Lewis, 2007). Intrinsic motivation can be more powerful than extrinsic and the transition from extrinsic to intrinsic can extinguish intrinsic motivation (Deci & Ryan, 2000; Frank & Lewis, 2004; Wynia, 2009). Even if the rewards are purely extrinsic, self-determination theory can explain that the reasons can shift towards intrinsic tendencies.

There have not been significant findings on age as a predictor of self-directed learning (Ausburn, 2002; Chu & Tsai, 2009; Kungu, Kinyanjui, & Machtmes, 2011; Oddi, 1984; O'Shea,

2003). While there was an outlier study that showed a difference in gender (Kell, 2006), most studies (Chu & Tsai, 2009; Oddi, 1984) did not yield a significant finding. In certain instruments, such as the SDLRS, it showed that workers that scored higher did show a certain propensity toward job requiring a high degree of problem solving abilities, creativity and adaptability to change (SDLRS/LPA, n.d.).

Chapter 3

Methods

Introduction

Chapter 1 addressed the statement of the problem, the purpose of the study, the significance of the study, the research questions, the limitations and the assumptions of the study, and the definition of terms. Chapter 2 reviewed the literature which considered the adult learner, self-directed learning models, developmental theories, motivation, the learning organization, self-regulation and self-efficacy. This chapter discusses the sample and instruments used in the study.

Purpose of the Study

The purpose of this study was to investigate motivations and tendencies towards self-directed learning within the information technology workforce in higher education institutions. Employee attributes such as position, position type, and education level were examined in relation to the outcome of the Survey of Adult Learning Traits (S.A.L.T.) instrument. Hogg's (2008) research was conducted in a manufacturing and engineering firm using S.A.L.T. and examined education level and position. It was recommended that this survey be used in other sectors other than manufacturing.

Research Questions

The following research questions were addressed:

1. What is the relationship between the level of education, position, position type and employees' motivation to learn job related information?
2. What is the relationship between the level of education, position, position type and employees' perception of their ability to learn?
3. What is the relationship between the level of education, position, position type and employees' perception of their social and environmental factors associated with self-directed learning?

Procedure

Permission was granted by Auburn University to conduct this study (Appendix G). Potential participants were compiled from professional associations and higher education institutions (Appendix D). These organizations' head information technology officers were asked permission (Appendix E) to contact and poll their employees or members. If an organization did not respond, it was assumed that they declined to participate. Once permission was granted, the organizations were asked on the best method of contacting their employees.

There were three methods of contacting the organizations' employees: the employees were emailed directly by the principal investigator, the employees were emailed by the organization internally, or the employees received paper copies.

The potential participants were initially notified (Appendix B) about the research project and asked to take the survey. Approximately two to three weeks after the initial contact, the participant list, or in the case of the internal organization notification the main contact, was sent a reminder (Appendix C) to participate in the study. The survey (Appendix F) was administered

anonymously and therefore there was no distinction between who had taken the survey and who had not.

After the data were collected, SPSS was used to analyze the trends and correlations. The data were discussed with the committee by the principal investigator.

Sample

The sample was compiled from the information technology departments of the following organizations: Alabama Cooperative Extension System, Arizona State University, Auburn University, Auburn University Montgomery, Clemson University, Georgia Southern University, Houston Community College System, Miami University, Mississippi State University, Mississippi University, North Carolina State University, Troy University, University of Alabama at Birmingham, University of Alabama at Huntsville, University of Alabama at Tuscaloosa, University of Central Florida, University of Maryland, University of North Alabama, University of North Carolina, University of West Alabama, University of Arkansas at Little Rock, and Virginia Polytechnic Institute and State University.

Of the 447 surveys received, 416 surveys were valid and 31 were invalid due to the participant not completing the survey. There were 155 females (37.3%) and 261 males (62.7%). Age ranged from 19 years to 77 years, with a mean age of 43.4, standard deviation of 10.78 and a variance of 116.16. Experience ranged from 1 year to 55 years, with a mean of 17.74 years, standard deviation of 10 and a variance of 100.006. The position variable was comprised 38 hourly (9.1%), 111 management (26.7%) and 267 salaried (64.2%) employees. The position type variable was comprised of 128 management (30.8%), 36 operators (8.7%), 160 programmer/analysts (38.5%), and 92 system administrators (22.1%). The education variable

comprised of 21 High School or GED (5.0%), 7 Vocational Certification (1.7%), 39 2-year college (9.4%), 180 4-year college (43.3%), and 169 graduate school (40.6%) participants.

Instrument

The instrument used was the Survey for Adult Learning Traits (S.A.L.T.) This survey was developed to measure self-directed learning in the workplace (Hogg, 2008). The instrument consists of 15 Lickert scale questions and examines three domains: motivation/self-regulation, cognition/cognitive strategies, and social/environmental. S.A.L.T.'s reliability was as follows: Motivation & Self-Regulation, .60; Cognitive Elements, .81; Social/Environmental .77. Since each domain's Cronbach's alphas was greater than or equal to .6, it was considered good. (Hair, Black, Babin, Anderson, and Tatham, 2006)

The motivation/self-regulation domain contained four questions:

1. I enjoy learning something related to my work.
2. I can put off doing something I want to do to study work related information.
3. I am ready to participate in training that helps me advance into a better and higher paying job.
4. I can manage my own efforts to learn outside of a classroom.

The cognition/cognitive domain contained five questions:

5. It is usually easy for me to learn something new.
6. I am good at finding helpful resources, such as books or people who can help me learn.
7. I can evaluate my progress towards learning new skills as I go along.
8. I am good at developing strategies for learning new materials or skills.
9. I can change the way I study if what I am doing is not working.

The social/environmental elements contained four questions:

10. I have personal time available that I can set aside for learning.

11. I feel encouraged by friends, family, or the people I work with to spend time learning something new.

12. There is somewhere I can go, which is a good place to study.

13. My workplace is free from distractions that interfere with learning new job skills.

14. I am not too tired after work to spend time learning something new.

The correlation between each domain was examined against the position (hourly/salaried/manager), position type (management, system administrator, programmer / analyst, operator), and education level (high school, GED, vocational training, 2 year, 4 year and Graduate School).

Data Collection

The survey was made available electronically through a third party vendor, surveymonkey.com. Consent to participate was collected by the information letter as part of the website. The potential participants were sent a web link to their email. Once the time allotted for the study elapsed, the data was downloaded from the third party. Any paper copies of the survey were appended to the file by data entry. These data were downloaded into a single file for analysis by SPSS.

Analysis of Data

The data were analyzed with SPSS version 18. Multivariate Analysis of Variance (MANOVA) was selected for two reasons: "First...there are several correlated dependent variables, and the researcher desires a single, overall statistical test on this set of variables instead of performing multiple individual tests. The second, and in some cases, the more important purpose is to explore how independent variables influence some patterning of response

on the dependent variables.” (Carey, 1998, p. 1) A one-way MANOVA was conducted with each independent variable and if significance was found, Fisher's least significant difference (LSD) posthoc test was performed.

Summary

Departments of information technology in higher education organizations and institutions were considered with an emphasis in the southeast United States. Each of the 22 organizations was contacted and once permission was secured, the potential participants were directed to the link by the recommendation of the institution. The three methods were by direct email from the principal investigator, an internal contact email or through paper copy.

Of the 447 surveys, 416 surveys were complete. There were more male (261) participants than female (155). Age ranged from 19 years to 77 years with a mean age of 43.4 years. Experience ranged from 1 year to 55 years with a mean of 17.74 years. Most of the surveys were completed by those with a management position (111), followed by salaried (267) and then hourly (38). Most of the position types were management (128), followed by programmer/analysts (160), system administrators (92) and finally operators (36). Most participants had attended graduate school (169), followed by 4-year college (180), 2-year college (39), High School or GED (21), and vocational certification (7).

Chapter 4

Findings

Introduction

Chapter 1 addressed the statement of the problem, the purpose of the study, the significance of the study, the research questions, the limitations and the assumptions of the study, and the definition of terms. Chapter 2 reviewed the literature which considered the adult learner, self-directed learning models, developmental theories, motivation, the learning organization, self-regulation and self-efficacy. Chapter 3 discussed the sample and instruments used in the study. This chapter reports the results and analysis of the sample.

Purpose of the Study

The purpose of this study was to investigate motivations and tendencies towards self-directed learning within the information technology workforce in higher education institutions. Employee attributes such as position, position type, and education level were examined in relation to the outcome of the Survey of Adult Learning Traits (S.A.L.T.) instrument. Hogg's (2008) research was conducted in a manufacturing and engineering firm using S.A.L.T. and examined education level and position. It was recommended that this survey be used in other sectors other than manufacturing.

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The following research questions were addressed:

1. What is the relationship between the level of education, position, position type and employees' motivation to learn job related information?
2. What is the relationship between the level of education, position, position type and employees' perception of their ability to learn?
3. What is the relationship between the level of education, position, position type and employees' perception of their social and environmental factors associated with self-directed learning?

Demographic Results

Of the entire 447 surveys returned, there were 416 surveys completed. There were 155 females (37.3%) and 261 males (62.7%).

Age and Experience

Ages ranged from 19 years to 77 years, with a mean age of 43.4, standard deviation of 10.78 and a variance of 116.16. Experience ranged from 1 year to 55 years, with a mean of 17.74 years, standard deviation of 10 and a variance of 100.01.

Table 3

Age and Experience

	N	Range	Minimum	Maximum	Mean	Std. Deviation	Variance
Age	416	58	19	77	43.40	10.778	116.159
NormalizedExp	416	54	1	55	17.74	10.000	100.006
Valid N (listwise)	416						

Position

There were three employee positions identified in the study: hourly, salaried and management. There were 38 hourly (9.1%), 111 management (26.7%) and 267 salaried (64.2%) employees.

Table 4

Position Variable

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Hourly	38	9.1	9.1	9.1
	Management	111	26.7	26.7	35.8
	Salaried	267	64.2	64.2	100.0
	Total	416	100.0	100.0	

Position Type

There were four position types identified in this study: operators, system administrators, programmer/analyst, and management. There were 128 management (30.8%), 36 operators (8.7%), 160 programmer/analysts (38.5%), and 92 system administrators (22.1%).

Table 5

Position Type

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Management	128	30.8	30.8	30.8
	Operator	36	8.7	8.7	39.4
	Programmer / Analyst	160	38.5	38.5	77.9
	System Administrator	92	22.1	22.1	100.0
	Total	416	100.0	100.0	

Education

There were five education categories in this study: high school or GED, vocational certification, 2 year college, 4 year college and graduate school. There were 21 High School or GED (9.4%), 7 Vocational Certification (1.7%), 39 2-year college (9.4%), 180 4-year college (43.3%), and 169 graduate school (40.6%).

Table 6

Education Level

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2 year college	39	9.4	9.4	9.4
	4 year college	180	43.3	43.3	52.6
	Graduate School	169	40.6	40.6	93.3
	High School or GED	21	5.0	5.0	98.3
	Vocational Certification	7	1.7	1.7	100.0
	Total	416	100.0	100.0	

Cross tabs were examined to see if the variables were independent. The results (see table 7 and table 8 below) showed that the position, position-type and education were independent and that measuring each was appropriate.

Table 7

*Education Level * Position Type Crosstabulation*

		Position Type				Total
		Management	Operator	Programmer / Analyst	System Administrator	
Educational Level	2 year College	12	6	10	11	39
	4 year college	33	19	85	43	180
	Graduate School	73	8	59	29	169
	High School or GED	9	3	5	4	21
	Vocational Certification	1	0	1	5	7
Total		128	36	160	92	416

Table 8

*Educational Level * Position Crosstabulation*

		Position			Total
		Hourly	Management	Salaried	
Educational Level	2 year College	10	7	22	39
	4 year college	20	32	128	180
	Graduate School	3	62	104	169
	High School or GED	4	8	9	21
	Vocational Certification	1	2	4	7
Total		38	111	267	416

The Educational Level was condensed from five categories to three: High School/GED/Vocational Certification/ 2 year college, 4 year college, and Graduate school. This was due to a small number of participants that had the education level of high school or GED, vocational certification and 2 year college. The four year college and graduate school category remained due to the satisfactory representation of each.

The Position Type was condensed from four types to three: Manager, Programmer/Analyst, System Admin/Operator. This was due to the low number of operators in the entire sample. The system administrator and operator’s jobs held similar characteristics, such as maintaining the systems, alerting personnel when issues arose and therefore it was appropriate to combine these two types into one category.

Analysis of the Data

The three domains in the Survey of Adult Learning Traits were: Motivation / Self-regulation, questions one through four; Cognitive, questions five through nine; Social/Environmental, questions ten through fifteen.

Reliability

Table 9

Reliability

Domain	Cronbach's Alpha	N of Items
Motivation / Self-Regulation	.612	4
Cognitive	.762	5
Social / Environmental	.703	5

a. Listwise deletion based on all variables in the procedure.

According to George and Mallery (2003), any alpha value that is at .6 may be questionable and above .7 is acceptable. While the motivation/self-regulation domain may be questionable (.612), it is acceptable but not as strong as the cognitive domain (.762) and the social/environmental domain (.703).

Overall Domain Perspective

The motivation domain has a possible range from 4 to 20 and the mean was 16.84. The cognitive domain has a possible range from 5 to 25 and the mean was 16.84. The social / environmental domain has a possible range from 5 to 25 and the mean was 16.84.

Table 10 *Domain Descriptive Statistics*

Domain	Mean	Variance	Std. Deviation	N of Items
Motivation / Self-Regulation	16.84	3.9	1.98	4
Cognitive	20.42	5.7	2.38	5
Social / Environmental	16.33	10.1	3.19	5

Position Variable

In the position category, there were a total 416 participants: 38 hourly (9.1%), 111 managers (26.7%), and 267 salaried positions (64.2%).

Table 11

Position Variable Between-Subjects Factors

		N
Position	1.00	38
	2.00	111
	3.00	267

Legend: 1 - Hourly, 2 - Management, 3 - Salaried

Within the motivation/self-regulation domain, the hourly employees scored highest (16.89), salaried (16.85) and managers lowest (16.79). The managers scored highest in the cognitive domain (20.45), followed by hourly (20.42) and finally salaried (20.41). The hourly scored highest in the social / environmental (17.24), followed by salaried (16.33) and management (16.01).

Table 12

Position and Domain Descriptive Statistics

	position_3cate	Mean	Std. Deviation	N
Motivation / Self - Regulation	1.00	16.8947	2.18	38
	2.00	16.7928	1.99	111
	3.00	16.8464	1.96	267
	Total	16.8365	1.98	416
Cognitive	1.00	20.4211	2.50	38
	2.00	20.4505	2.27	111
	3.00	20.4120	2.41	267
	Total	20.4231	2.38	416
Social / Environment	1.00	17.2368	3.06	38
	2.00	16.0090	3.33	111
	3.00	16.3296	3.13	267
	Total	16.3269	3.18	416

Legend: 1 - Hourly, 2 - Management, 3 - Salaried

Since multivariate analysis of variance was used, the homogeneity of variance was tested. The significance was .809, which was greater than the threshold of .05, therefore the

homogeneity of variance was not violated. Wilks' λ was .988 and p-value was .551. The observed power was .330. There was no significance found in the position variable and therefore no post-hoc tests were required.

Position Type Variable

In the position type variable, there were a total 416 participants: 128 Management, 160 Programmer / Analyst and 128 System Administrator and Operators.

Table 13

Position Type Between-Subjects Factors

		N
PositionType	1.00	128
	2.00	160
	3.00	128

Legend: 1 - Management, 2 - Programmer / Analyst, 3 - System Administrator and Operators

The system administrators and operators scored highest (16.98), then the programmer/analyst (16.67) and finally management (16.67) in the motivation / self-regulation domain. The programmer/analyst scored highest (20.53) in the cognitive domain, followed by management (20.47) and finally the system administrators/operators (20.25).

Table 14

Position Type and Domain Descriptive Statistics

	PositionType_3cate	Mean	Std. Deviation	N
Motivation / Self- Regulation	1.00	16.67	2.10	128
	2.00	16.85	1.95	160
	3.00	16.98	1.90	128
	Total	16.84	1.98	416
Cognitive	1.00	20.47	2.30	128
	2.00	20.53	2.50	160
	3.00	20.25	2.31	128
	Total	20.42	2.38	416
Social / Environment	1.00	16.23	3.27	128
	2.00	16.48	3.11	160

3.00	16.23	3.21	128
Total	16.33	3.18	416

Legend: 1 - Management, 2 - Programmer / Analyst, 3 - System Administrator and Operators

Since multivariate analysis of variance was used, the homogeneity of variance was tested. The significance was .898, which was higher than the threshold of .05, therefore homogeneity of variance was not violated. Wilks' λ was .988 and the p-value was .540 and the observed power was .336. Since no significance was found, no further tests were required.

Education Level Variable

In the education level variable, there were a total of 416 participants: 67 high school / GED / Vocational / 2 Year, 180 4 Year College, and 169 Graduate School.

Table 15 *Education Level Variable Between-Subjects Factors*

		N
Education	1.00	67
	2.00	180
	3.00	169

Legend: 1 - HighSchool / GED/ Vocational / 2 Year to 1, 2 - 4 Year, 3 - Graduate School.

Those in the graduate school category scored the highest in the motivation/self-regulated domain (17.21), followed by the four year college (16.68) and finally the high school / GED / vocational / 2 year (16.30). Those who attended graduate school also scored highest in the cognitive domain (20.67) followed by the four year college (20.15) and finally high school / GED / vocational / 2 year (20.15). Participants in the graduate school category also scored highest in the social / environmental domain (16.44), followed by the high school / GED / vocational / 2 year (16.33) and finally the four year college (16.22)

Table 16 *Education Level and Domain Descriptive Statistics*

Education_3cate	Mean	Std. Deviation	N
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Motivation /	1.00	16.30	1.99	67
Self-	2.00	16.68	2.05	180
regulation	3.00	17.21	1.84	169
	Total	16.84	1.98	416
Cognitive	1.00	20.15	2.36	67
	2.00	20.29	2.40	180
	3.00	20.67	2.35	169
	Total	20.42	2.38	416
Social /	1.00	16.33	2.84	67
Environment	2.00	16.22	3.35	180
	3.00	16.44	3.14	169
	Total	16.33	3.18	416

Legend: 1 - HighSchool / GED/ Vocational / 2 Year to 1, 2 - 4 Year, 3 - Graduate School.

Since multivariate analysis of variance was used, the homogeneity of variance was tested. The significance was .185, which is above threshold of .05, therefore homogeneity of variance was not violated. Wilks' λ was .969, *F-distribution* was 2.141, p-value was .047, and partial $\eta^2 = .015$. The effect size was between small (.01) and moderate (.06).

Table 17

Multivariate Tests

Effect	Value	F	Hypothesis			Partial Eta Squared	Noncent. Parameter	Observed Power ^b	
			df	Error df	Sig.				
Intercept	Pillai's Trace	.988	11377.980 ^a	3.000	411.000	.000	.988	34133.939	1.000
	Wilks'	.012	11377.980 ^a	3.000	411.000	.000	.988	34133.939	1.000
	Lambda								
	Hotelling's Trace	83.051	11377.980 ^a	3.000	411.000	.000	.988	34133.939	1.000
	Roy's Largest Root	83.051	11377.980 ^a	3.000	411.000	.000	.988	34133.939	1.000
Education	Pillai's Trace	.031	2.131	6.000	824.000	.048	.015	12.787	.766
	Wilks'	.969	2.141 ^a	6.000	822.000	.047	.015	12.847	.768
	Lambda								
	Hotelling's Trace	.031	2.151	6.000	820.000	.046	.015	12.908	.770

Roy's	.031	4.231 ^c	3.000	412.000	.006	.030	12.692	.858
Largest								
Root								

- a. Exact statistic
- b. Computed using alpha = .05
- c. The statistic is an upper bound on F that yields a lower bound on the significance level.
- d. Design: Intercept + Education

Since the p-value was significant (.047), follow up tests were performed. Each domain was above the threshold of .05 and therefore Test of Equality of Error was not violated.

Table 18

Levene's Test of Equality of Error Variances

	F	df1	df2	Sig.
Motivation / Self-Regulation	1.185	2	413	.307
Cognitive	.111	2	413	.895
Social / Environment	.745	2	413	.475

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

Table 19

Education Level Tests of Between-Subjects Effects

Source	Dependent Variable	Type III		Mean Square	F	Sig.	Partial		Observed Power ^b
		Sum of Squares	df				Eta Squared	Noncent. Parameter	
Corrected Model	Motivation	47.573 ^a	2	23.787	6.213	.002	.029	12.425	.892
	Cognitive	18.193 ^c	2	9.096	1.613	.201	.008	3.226	.341
	Social	4.496 ^d	2	2.248	.221	.802	.001	.442	.084
Intercept	Motivation	95443.419	1	95443.419	24927.498	.000	.984	24927.498	1.000
	Cognitive	141476.826	1	141476.826	25084.267	.000	.984	25084.267	1.000
	Social	90912.025	1	90912.025	8928.963	.000	.956	8928.963	1.000
Education	Motivation	47.573	2	23.787	6.213	.002	.029	12.425	.892

	Cognitive	18.193	2	9.096	1.613	.201	.008	3.226	.341
	Social	4.496	2	2.248	.221	.802	.001	.442	.084
Error	Motivation	1581.311	413	3.829					
	Cognitive	2329.346	413	5.640					
	Social	4205.042	413	10.182					
Total	Motivation	119552.000	416						
	Cognitive	175862.000	416						
	Social	115102.000	416						
Corrected	Motivation	1628.885	415						
Total	Cognitive	2347.538	415						
	Social	4209.538	415						

a. R Squared = .029 (Adjusted R Squared = .025)

b. Computed using alpha = .05

c. R Squared = .008 (Adjusted R Squared = .003)

d. R Squared = .001 (Adjusted R Squared = -.004)

Motivation/Self-Regulation Domain

The motivation/self-regulation domain had a $F(2, 413) = 6.213, p = .002, \eta^2 = .029$. The results were between small (.01) to moderate (.06) effect size and was significant with the given threshold (.05).

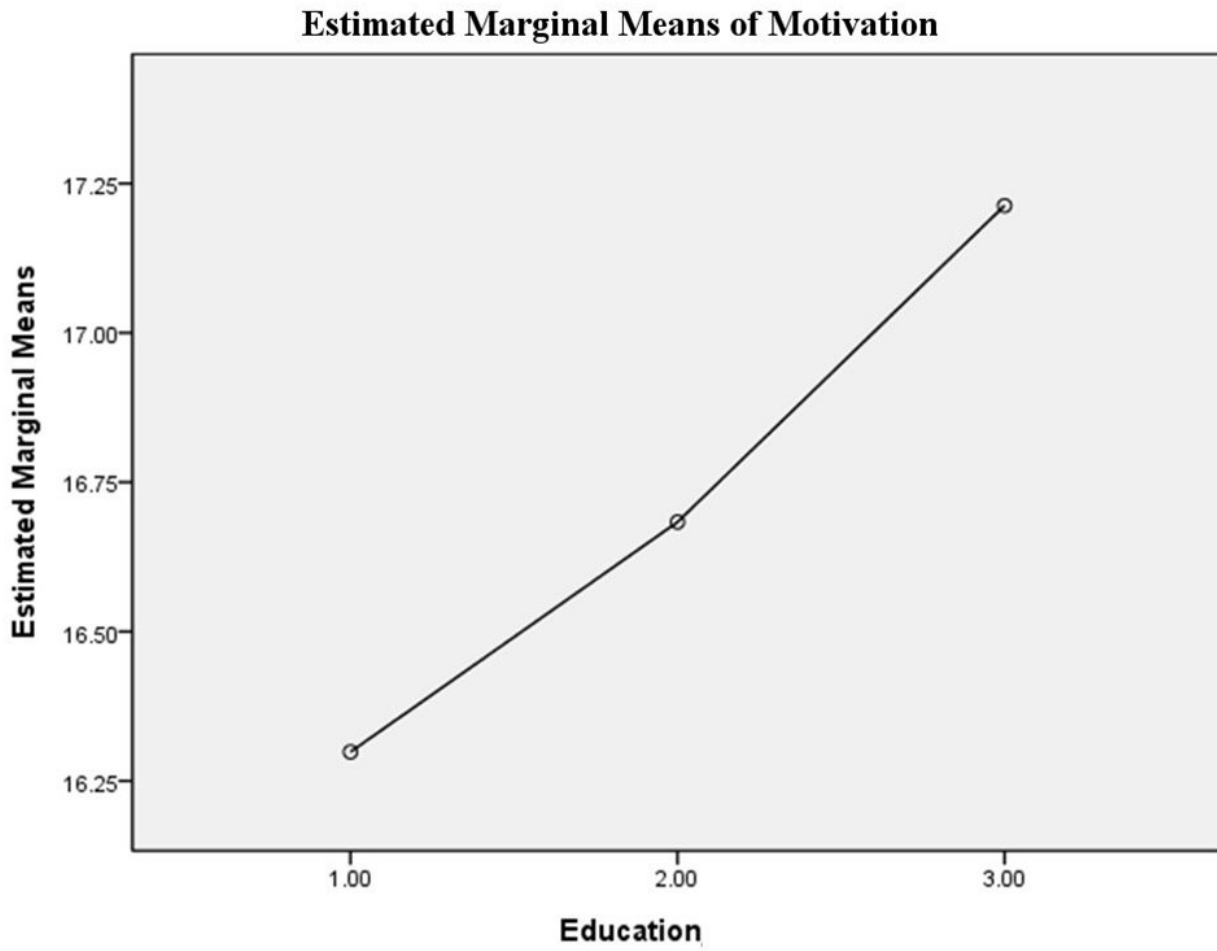


Figure 10. Estimated Marginal Means of Motivation

A follow up Post-hoc least significant difference (LSD) analysis was performed:

Table 20

Education Level in Motivation Domain, LSD Posthoc

Multiple Comparisons							
LSD							
Dependent Variable	(I) Education	(J) Education	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Motivation / Self-regulation	1.00	2.00	-.3848	.28003	.170	-.9353	.1656
	2.00	3.00	-.9145*	.28249	.001	-1.4698	-.3592
		1.00	.3848	.28003	.170	-.1656	.9353
	3.00	3.00	-.5297*	.20959	.012	-.9417	-.1177
1.00		.9145*	.28249	.001	.3592	1.4698	
Cognitive	1.00	2.00	-.1452	.33987	.669	-.8133	.5229
		3.00	-.5194	.34286	.131	-1.1934	.1546
	2.00	1.00	.1452	.33987	.669	-.5229	.8133
		3.00	-.3742	.25438	.142	-.8742	.1258
	3.00	1.00	.5194	.34286	.131	-.1546	1.1934
		2.00	.3742	.25438	.142	-.1258	.8742
Social	1.00	2.00	.1117	.45665	.807	-.7860	1.0093
		3.00	-.1154	.46067	.802	-1.0210	.7901
	2.00	1.00	-.1117	.45665	.807	-1.0093	.7860
		3.00	-.2271	.34178	.507	-.8990	.4447
	3.00	1.00	.1154	.46067	.802	-.7901	1.0210
		2.00	.2271	.34178	.507	-.4447	.8990

Based on observed means.

The error term is Mean Square(Error) = 10.182.

*. The mean difference is significant at the .05 level.

Legend: 1 - HighSchool / GED/ Vocational / 2 Year to 1, 2 - 4 Year, 3 - Graduate School.

Within the motivation and self-regulated domain, there were significant differences between category 1 (High School / GED/ Vocational / 2 Year) and category 3 (Graduate School), ($p = .001$), and category 2 (4 Year College) and category 3 (Graduate School) ($p = .012$), but not Category 1 (High School / GED/ Vocational / 2 Year) and category 2 (4 Year College) ($p = .170$, $p > .05$).

Cognitive Domain

The cognitive domain had a $F(2, 413) = 1.613$, $p = .201$, and an observed power of .341. Therefore, no significance was found within the cognitive domain. No follow-up tests were required.

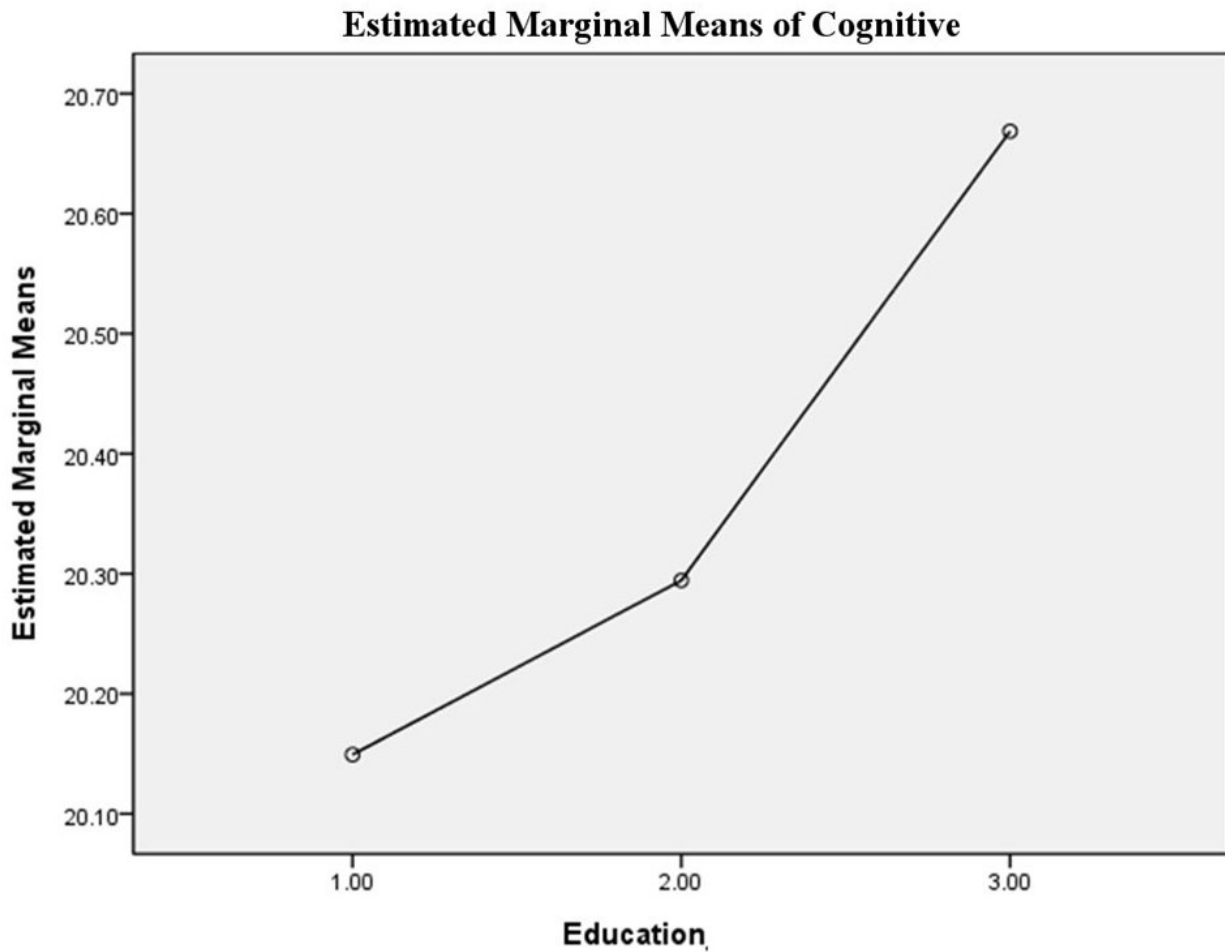


Figure 11. Estimated Marginal Means of Cognitive

Social / Environmental Domain

The social / environmental domain had a $F(2, 413) = .221$, $p = .802$, and an observed power of .084. No significance was found within the social / environmental domain. No follow up tests were required.

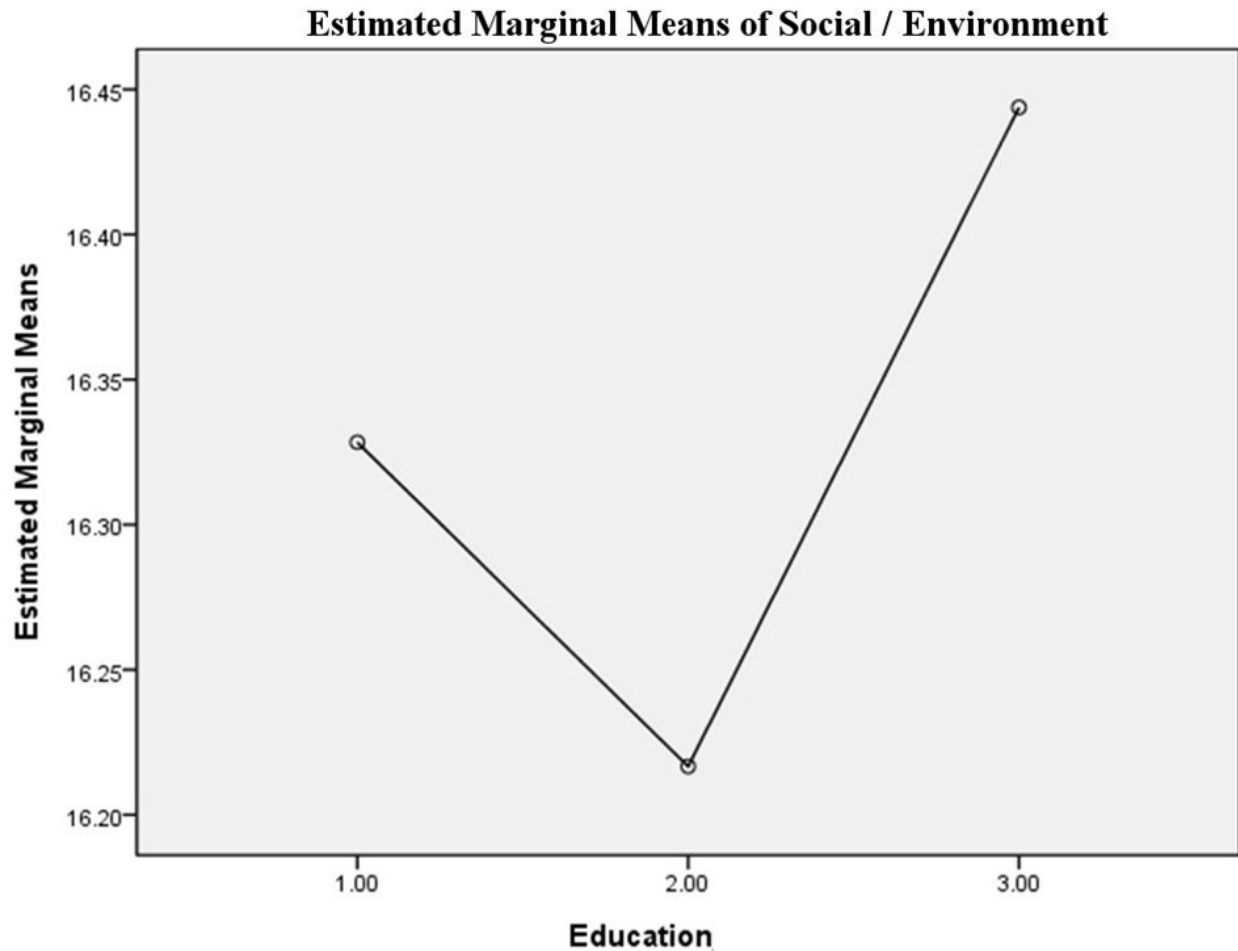


Figure 12. Estimated Marginal Means of Social / Environment

Summary

There were 447 surveys returned from 22 higher education organizations. Of the 447 surveys submitted, 416 surveys were valid and 31 were invalid due to the participant not completing the survey. There were 155 females (37.3%) and 261 males (62.7%). Age ranged from 19 years to 77 years, with a mean age of 43.4, standard deviation of 10.78 and a variance of 116.16. Experience ranged from 1 year to 55 years, with a mean of 17.74 years, standard deviation of 10 and a variance of 100.01. The position had 38 hourly (9.1%), 111 management

(26.7%) and 267 salaried (64.2%) employees. The position type comprised of 128 management (30.8%), 36 operators (8.7%), 160 programmer/analysts (38.5%), and 92 system administrators (22.1%). The education comprised of 21 High School or GED (5.0%), 7 Vocational Certification (1.7%), 39 2-year college (9.4%), 180 4-year college (43.3%), and 169 graduate school (40.6%).

There were no significant differences between the positions or position types found in any domain. There was a significant finding in the education level in the motivation / self-regulation domain. Those who had graduate school scored 17.21, which was higher than those who held High School/GED/Vocational or 2 year College of 16.30. Those who had attended or completed graduate school scored higher (17.21) than those who had completed a four year degree (16.68). No significant differences were found between those who held a high school / GED / vocational / 2 year degree and a four year degree. No significant differences were found in the cognitive domain or the social / environmental domain.

Chapter 5

Summary, Conclusions, Implications and Recommendations

Introduction

Chapter 1 addressed the statement of the problem, the purpose of the study, the significance of the study, the research questions, the limitations and the assumptions of the study, and the definition of terms. Chapter 2 reviewed the literature which considered the adult learner, self-directed learning models, developmental theories, motivation, the learning organization, self-regulation and self-efficacy. Chapter 3 discussed the sample and instruments used in the study. Chapter 4 reported the results and analysis of the sample. This chapter provides the conclusions, discussions, implications and recommendations for future research.

Purpose of the Study

The purpose of this study was to investigate motivations and tendencies towards self-directed learning within the information technology workforce in higher education institutions. Employee attributes such as position, position type, and education level were examined in relation to the outcome of the Survey of Adult Learning Traits (S.A.L.T.) instrument. Hogg's (2008) research was conducted in a manufacturing and engineering firm using S.A.L.T. and examined education level and position. It was recommended that this survey be used in other sectors other than manufacturing.

Research Questions

The following research questions were addressed:

1. What is the relationship between the level of education, position, position type and employees' motivation to learn job related information?
2. What is the relationship between the level of education, position, position type and employees' perception of their ability to learn?
3. What is the relationship between the level of education, position, position type and employees' perception of their social and environmental factors associated with self-directed learning?

Summary

There were 447 surveys returned from 22 higher education organizations. Of the 447 surveys submitted, 416 surveys were valid and 31 were invalid due to the participant not completing the survey. There were 155 females (37.3%) and 261 males (62.7%). Age ranged from 19 years to 77 years, with a mean age of 43.4, standard deviation of 10.78 and a variance of 116.16. Experience ranged from 1 year to 55 years, with a mean of 17.74 years, standard deviation of 10 and a variance of 100.01. The position had 38 hourly (9.1%), 111 management (26.7%) and 267 salaried (64.2%) employees. The position type comprised of 128 management (30.8%), 36 operators (8.7%), 160 programmer/analysts (38.5%), and 92 system administrators (22.1%). The education comprised of 21 High School or GED (5.0%), 7 Vocational Certification (1.7%), 39 2-year college (9.4%), 180 4-year college (43.3%), and 169 graduate school (40.6%).

A one-way multivariate analysis of variance (MANOVA) was performed on each independent variable (position, position type, and education) to determine if there were any differences in the dependent variables (scores in the motivation/self-regulation, cognitive, or

social/environmental domains). One post hoc test was performed due to the results of the interaction between the educational variable and the motivation/self-regulation domain. This study found that level of education was significant, with a small to moderate effect size, in the motivation / self-regulation domain.

Conclusions

This study investigated the relationship between position, position type, and education of information technology employees in higher education and their motivation and tendencies in self-directed learning. This study used the Survey of Adult Learning Traits (Hogg, 2008) which examines three domains: motivation/self-regulation, cognitive, and social/environment.

There were no significant findings in the cognitive or the social/environmental domains in among the position, position types, nor education levels. However, there was significance found between the education levels in the motivation / self-regulated domain. Participants with graduate degrees scored higher than those with only a high school, graduate equivalency diploma, vocational, two year and four year degrees. There was no difference between those with a high school, graduate equivalency diploma, vocational, two year degree and a four year degree.

Implications

Some studies (Ausburn, 2002; Chu & Tsai, 2009; Kell, 2006; Oddi, 1986) on self-directed learning did not find that gender, race, or age factored in the learner engaging in self-directed study. One study showed that those who had not engaged in self-directed study may not be successful at first (Henning & van Rensburg, 2002) but also recommended that it be included in traditional educational and training (Armstrong, 2010; O'Shea, 2003; Stewart, 2007).

This study did find that those with graduate degrees were more likely to engage in self-directed learning than their peers. What are the attributes that are commonly found in those who

completed graduate school and those who are more ready to engage in self-directed learning? Both may have the drive to better themselves, either by their intrinsic or extrinsic motivation. However, the results of this study did not find any significance in the social and environmental domain, which would imply that an employee's motivation is more of an individual drive.

This study also did not find any differences in the cognitive domain among the position, position type nor education levels. The literature review found that while there were no demographic factors that predicted engagement in self-directed learning, it did find that those who had not engaged in it previously had a harder time adapting to it. While the learner may be less likely to engage in self-directed learning, it is not because they lack the cognitive tools nor is it dependent on their job, job type or education level.

This study did not find that the learner engaged in self-directed learning for the social or environmental aspects. While literature showed that the organizational psychology has changed dramatically from the Industrial Era to the Knowledge Era, the worker engages in it for other reasons (Preskill & Torres, 1999). Learning organizations foster a better environment for self-directed learning, but do not necessarily create employee motivations towards it. The argument could be made, however, that if an employee is likely to engage in self-directed learning they may be deterred if the organization is not supportive of their efforts or conducive of learning (Schachter, 2007; Strickler, 2006; Tobin, 2000).

Self-directed learning is starting to be stressed in major academic disciplines such as engineering (Stewart, 2007), nursing (O'Shea, 2003), and athletic training (Armstrong, 2010). As other fields are incorporating self-directed learning into their curriculum, it is vital that information technology's base educational fields, such as computer science, computer engineering, software engineering, information systems, and others instill it in their students.

Tobin (2000) believed that corporations are moving away from the traditional methods of training (classrooms, seminars, internal training departments) towards the employee being responsible for being current in their skills and knowledge.

Those with graduate degrees performed higher in the motivation / self-regulation domain. A possible benefit that employers could use to increase an individual's desire to stay current in skills and knowledge would be to send the employee to graduate school. Many corporations have educational incentives as an employee benefit.

In the higher education institutions surveyed, 93.3% held college degrees (9.4% 2 year college degree, 43.4% 4 year college degree, 40.6% graduate degree). The information technology job in higher education pool is educated, which makes it a competitive employment environment. Being proficient in self-directed learning gives an employee an edge over those who are not.

Recommendations

This study was conducted in the southeast United States, primarily in Alabama. A study outside this geographic area would be recommended.

The Survey for Adult Learning Traits (S.A.L.T.) has been used in manufacturing engineering and information technology in higher education. It is recommended that other work environments be evaluated using this instrument.

This study's focus was on the attributes of the learner and the motivations and developmental reasons for conducting their readiness for self-directed learning. It is recommended that the S.A.L.T. score be used as a predictor towards a particular job-related test score, such as the professional engineering or licensing exams.

Learning organizations are organizations that encourage growth and change through their people. Learning organizations are considered more flexible due to their process of feedback and implementation from the feedback than the traditional organization. Panosh (n.d.) discussed in his literature review that self-directed learning and attributes of learning organizations are “well established” (p. 7). However, Panosh (n.d.) also questioned the correlation between the learning organization (LO) and self-directed learning (SDL): “The answers to these and other issues may change the tentative conclusion that SDL and LO are correlated, thus changing the focus of further research” (p. 7).

Pintrich (2000) developed the motivation matrix: mastery-approach, mastery-avoidance, performance-approach, and performance-avoidance. It may be of interest to determine the correlation between how a learner is identified in this matrix and their readiness for self-directed learning. In addition, it may be of interest to see, among self-directed learners, how their methods and processes are similar or contrasted against others in the matrix.

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Appendix A

Information Letter

[SURVEY PREVIEW MODE] Survey of Adult Learning Traits

http://www.surveymonkey.com/s.aspx?PREVIEW_MODE=DO_NOT_U...

Survey of Adult Learning Traits

[Exit this survey](#)

1. Electronic IRB Letter

(NOTE: DO NOT AGREE TO PARTICIPATE UNLESS IRB APPROVAL INFORMATION WITH CURRENT DATES HAS BEEN ADDED TO THIS DOCUMENT.)

INFORMATION LETTER

for a Research Study entitled

"Measuring Motivation and Tendencies Toward Self Directedness Within Information Technology in an Academic Workplace"

You are invited to participate in a research study to use the S.A.L.T. survey to measure self-directed readiness in higher education information technology employees. The study is being conducted by Robert S. Campbell, under the direction of James E. Witte, associate professor in the Auburn University Department of Education Foundations, Leadership and Technology. You were selected as a possible participant because you are an information technology employee in higher education and are age 19 or older.

What will be involved if you participate? Your participation is completely voluntary. If you decide to participate in this research study, you will be asked to fill out a survey and some demographic information. Your total time commitment will be approximately 15 minutes.

Are there any risks or discomforts? The risks associated with participating in this study are breach of confidentiality. To minimize these risks, we will not track emails, IP addresses and only the principal investigator shall see the data. Will you receive compensation for participating? There is not any monetary compensation for participating.

If you change your mind about participating, you can withdraw at any time by closing your browser window. If you choose to withdraw, your data can be withdrawn as long as it is identifiable. Once you've submitted anonymous data, it cannot be withdrawn since it will be unidentifiable. Your decision about whether or not to participate or to stop participating will not jeopardize your future relations with Auburn University, the Department of Education Foundations, Leadership and Technology.

Any data obtained in connection with this study will remain anonymous. We will protect your privacy and the data you provide by not recording email addresses or IP addresses. Information collected through your participation may be used to fulfill an educational requirement, research publication, and conference presentations.

If you have questions about this study, please contact Robert Campbell at campbr1@auburn.edu or James Witte at witteje@auburn.edu.

If you have questions about your rights as a research participant, you may contact the Auburn University Office of Human Subjects Research or the Institutional Review Board by phone (334) 844-5986 or e-mail at hsubjec@auburn.edu or IRBChair@auburn.edu.

HAVING READ THE INFORMATION ABOVE, YOU MUST DECIDE IF YOU WANT TO PARTICIPATE IN THIS RESEARCH PROJECT. IF YOU DECIDE TO PARTICIPATE, PLEASE CLICK ON THE LINK BELOW. YOU MAY PRINT A COPY OF THIS LETTER TO KEEP.

Robert Campbell
Investigator

James Witte
Co-Investigator

The Auburn University Institutional Review Board has approved this document for use from 1/21/2011 to 1/20/2012.
Protocol #11-344 Ex 1101

Appendix B

Participant Recruitment

E-MAIL INVITATION FOR ON-LINE SURVEY

Subject: E-mail Invitation for Online survey

I am a graduate student in the Department of Education Foundations, Leadership, and Technology at Auburn University. I would like to invite you to participate in my research study to 'Measure Motivation and Tendencies Toward Self Directedness Within Information Technology in an Academic Workplace'. You may participate if you are an information technology employee in higher education.

Participants will be asked to take a survey and fill out demographics, taking no longer than 10 minutes.

We will protect your privacy and the data you provide by not recording email addresses or IP addresses. Information collected through your participation may be used to fulfill an educational requirement, research publication, and conference presentations.

If you would like to know more information about this study, an information letter can be obtained by clicking on this link, <https://www.surveymonkey.com/s/JLLKYSG>, or by sending me an e-mail. If you decide to participate after reading the letter, you can access the survey from a link in the letter.

If you have any questions, please contact me at campbr1@auburn.edu or my advisor, Dr. James Witte, at witteje@auburn.edu.

Thank you for your consideration,

Robert S. Campbell

Appendix C

Reminder to Potential Participants

Subject: Reminder: E-mail Invitation for Online survey

This is a reminder, if you have not done so, to please take the online survey at <https://www.surveymonkey.com/s/JLLKYSG> for my dissertation research.

You may participate if you are an information technology employee in higher education.

Participants will be asked to take a survey and fill out demographics, taking no longer than 10 minutes.

We will protect your privacy and the data you provide by not recording email addresses or IP addresses.

Information collected through your participation may be used to fulfill an educational requirement, research publication, and conference presentations.

If you would like to know more information about this study, an information letter can be obtained by clicking on this link, <https://www.surveymonkey.com/s/JLLKYSG>, or by sending me an e-mail.

If you have any questions, please contact me at campbr1@auburn.edu or my advisor, Dr. James Witte, at witteje@auburn.edu.

Thank you for your consideration,

Robert S. Campbell

Appendix D

Higher Education Organizations

Alabama Cooperative Extension System
Arizona State University
Auburn University
Auburn University Montgomery
Clemson University
Georgia Southern University
Houston Community College System
Miami University
Mississippi State University
Mississippi University
North Carolina State University
Troy University
University of Alabama - Birmingham
University of Alabama - Huntsville
University of Alabama - Tuscaloosa
University of Central Florida
University of Maryland
University of North Alabama - Florence, AL
University of North Carolina
University of West Alabama
University of Arkansas-Little Rock
Virginia Polytechnic Institute and State University

Appendix E

Permission Email

Subject: Permission to contact IT Employees

My name is Robert Campbell and I work at Auburn University. In addition to being a full time employee, I am also working on my doctorate degree in the College of Education. My dissertation is entitled "Measuring motivation and tendencies toward self-directedness within information technology in an academic workplace".

My dissertation's population is information technology employees in higher education. The instrument for the study is a survey of 14 questions, each question rating from 1 (strongly disagree) - 5 (strongly agree). In addition, the survey asks for the persons' age, years of experience, and if they are an hourly or salaried employee. The entire survey is online and should take less than 10 minutes (average is 5 minutes).

With your permission, I would like to email the IT professionals in your area. I plan on a primary email asking for participation, a reminder email if they have not taken the survey, and a final call email. Data shall not be traced via IP, email address or other encoding. The list of employees shall not be shared with anyone.

I can send a sample of the survey, a link to the online survey and/or my official IRB if you wish.

If you have any questions, please feel free to contact me at campbr1@auburn.edu 334 844 3612.

Regards,

Robert Campbell, M. Ed.
Info Spec V, ISS

Appendix F

Survey for Adult Learning Traits

Survey of Adult Learning Traits
Information sheet

Purpose:

This survey is being developed to provide additional insight into how employees learn new information and skills in a workplace setting.

Background Information:

Age			years													
Gender			Male			Female										
Experience			years													
Position					Management				Salaried				Hourly			
Position Type	Operator				System Administrator				Programmer / Analyst				Manager			
Education Level	Some High School			High School or GED			Vocational Certification			2 year college		4 years college		Graduate School		

Instructions:

The statements on the following pages describe opinions on issues related to how you like to learn new skills and information related to work. You are asked to rate whether you agree or disagree with the statement on a scale ranging from 1 (strongly disagree) to 5 (strongly agree). The following example illustrates how to complete the survey:

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
<i>I enjoy learning something new</i>					

Select only one.

After reading each statement on the following pages, please indicate your opinion by circling one number on the scale. Thank you for your participation.

Motivation/Self-regulation

		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	<i>I enjoy learning something related to my work.</i>					
2	<i>I can put off doing something I want to do to study work related information.</i>					
3	<i>I am ready to participate in training that helps me advance into a better and higher paying job.</i>					
4	<i>I can manage my own efforts to learn outside of a classroom.</i>					

Cognition/Cognitive strategies

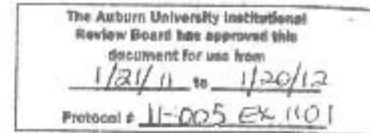
		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
5	<i>It is usually easy for me to learn something new.</i>					
6	<i>I am good at finding helpful resources, such as books or people who can help me learn.</i>					
7	<i>I can evaluate my progress towards learning new skills as I go along.</i>					
8	<i>I am good at developing strategies for learning new materials or skills.</i>					
9	<i>I can change the way I study if what I am doing is not working.</i>					

Social/Environmental Elements

		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
10	<i>I have personal time available that I can set aside for learning.</i>					
11	<i>I feel encouraged by friends, family, or the people I work with to spend time learning something new.</i>					
12	<i>There is somewhere I can go, which is a good place to study.</i>					
13	<i>My workplace is free from distractions that interfere with learning new job skills.</i>					
14	<i>I am not too tired after work to spend time learning something new.</i>					

Appendix G

IRB Approval Letter



EDUCATIONAL FOUNDATIONS, LEADERSHIP AND TECHNOLOGY

(NOTE: DO NOT AGREE TO PARTICIPATE UNLESS IRB APPROVAL INFORMATION WITH CURRENT DATES HAS BEEN ADDED TO THIS DOCUMENT.)

INFORMATION LETTER for a Research Study entitled

"Measuring Motivation and Tendencies Toward Self Directedness In learning Within Information Technology in an Academic Workplace"

You are invited to participate in a research study to use the S.A.L.T. survey to measure self-directed readiness in higher education information technology employees. The study is being conducted by Robert S. Campbell, under the direction of James E. Witte, associate professor in the Auburn University Department of Education Foundations, Leadership and Technology. You were selected as a possible participant because you are an information technology employee in higher education and are age 19 or older.

What will be involved if you participate? Your participation is completely voluntary. If you decide to participate in this research study, you will be asked to fill out a survey and some demographic information. Your total time commitment will be approximately 15 minutes.

Are there any risks or discomforts? The risks associated with participating in this study are breach of confidentiality. To minimize these risks, we will not track emails, IP addresses and only the principal investigator shall see the data.

Will you receive compensation for participating? There is not any monetary compensation for participating.

If you change your mind about participating, you can withdraw at any time by closing your browser window. If you choose to withdraw, your data can be withdrawn as long as it is identifiable. Once you've submitted anonymous data, it cannot be withdrawn since it will be unidentifiable. Your decision about whether or not to participate or to stop participating will not jeopardize your future relations with Auburn University, the Department of Education Foundations, Leadership and Technology.

Any data obtained in connection with this study will remain anonymous. We will protect your privacy and the data you provide by not recording email addresses or IP addresses. Information collected through your participation may be used to fulfill an educational requirement, research publication, and conference presentations.

4858 Haley Center, Auburn, AL 36849-5221; Telephone: 334-844-4460; Fax: 334-844-3072

www.auburn.edu

If you have questions about this study, please contact Robert Campbell at campbr1@auburn.edu or James Witte at witteje@auburn.edu.

If you have questions about your rights as a research participant, you may contact the Auburn University Office of Human Subjects Research or the Institutional Review Board by phone (334) 844-5966 or e-mail at hsubjec@auburn.edu or IRBChair@auburn.edu.

HAVING READ THE INFORMATION ABOVE, YOU MUST DECIDE IF YOU WANT TO PARTICIPATE IN THIS RESEARCH PROJECT. IF YOU DECIDE TO PARTICIPATE, PLEASE CLICK ON THE LINK BELOW. YOU MAY PRINT A COPY OF THIS LETTER TO KEEP.

Investigator Date

Co-Investigator Date

The Auburn University Institutional Review Board has approved this document for use from 1/21/2011 to 1/20/2012. Protocol #11-344 Ex 1101

I agree

The Auburn University Institutional
Review Board has approved this
document for use from
1/21/11 to 1/20/12
Protocol #11-005 Ex 1101