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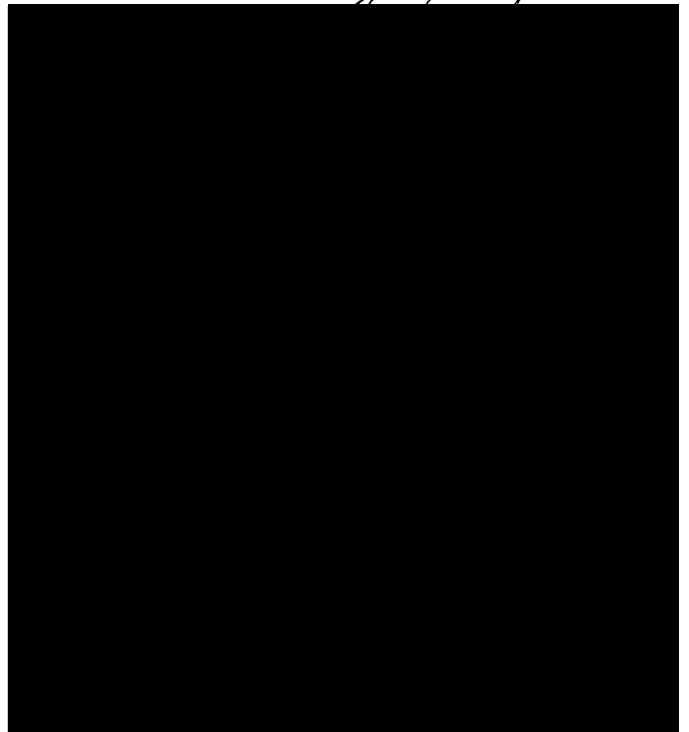
THE RELATIONSHIPS OF LEARNING STYLE BALANCE AND LEARNING
DIMENSIONS TO SELF-DIRECTED LEARNING PROPENSITY AMONG
ADULT LEARNERS

by

Sarah Tullos Hutto

A Dissertation
Submitted to the Graduate School
of The University of Southern Mississippi
in Partial Fulfillment of the Requirements
for the Degree of Doctor of Philosophy

Approved:



December 2009

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ABSTRACT

THE RELATIONSHIPS OF LEARNING STYLE BALANCE AND LEARNING DIMENSIONS TO SELF-DIRECTED LEARNING PROPENSITY AMONG ADULT LEARNERS

by Sarah Tullos Hutto

December 2009

The purpose of this study was to examine the relationships of learning style characteristics to self-directed learning propensity among adult learners. The learning style characteristics investigated were learning style balance as measured by a scoring method developed by Mainemelis, Boyatzis, and Kolb (2002) and learning style dimensions as measured by the Kolb Learning Style Inventory (LSI). The Oddi Continuous Learning Instrument (OCLI) was used to measure self-directed learning propensity. A questionnaire was used to collect descriptive information about the participants for age, gender, years of professional work experience, and graduate degree program in the categories of business, education, health, and other.

The subjects were adult graduate students enrolled in a public, comprehensive university in the southeastern United States. Pearson product moment correlations at the .05 significance level were used to analyze the data.

The findings in this study indicate that learning style balance is not significantly related to self-directed learning propensity. However, self-directed learning propensity was found to be significantly related to the transformation learning dimension (active-reflective) in the direction of the reflective mode. No significant relationship was found between the prehension learning dimension (abstract-concrete) and self-directed learning.

An ancillary finding was that age and gender were significantly related to self-directed learning. Females and respondents in the age category 46-55 scored significantly higher on the OCLI than did males and respondents in three other age groups.

DEDICATION

With gratitude, admiration, love, and respect, this work is dedicated to the memories of my parents, Worth and Sadie Bass Tullos; my sister, Jane Tullos Kloman; and my father-in-law, W. W. “Buck” Hutto.

ACKNOWLEDGEMENTS

I gratefully acknowledge my committee members, Dr. W. Lee Pierce, Dr. John Rachal, Dr. J. T. Johnson, Dr. Andrea Wesley, and Dr. John Koeppel for their expertise and the insightful guidance they have given me in pursuit of this degree.

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Finally, I thank my uncle, W. Cassell Tullos; my mother-in-law, Anne Hutto; my husband, John Hutto; and my children, Beverly “Sheena” and Brett Hutto for their love, support, and understanding throughout this challenging endeavor.

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CHAPTER I

INTRODUCTION

Background of the Study

[Learning] is the only thing that never fails. You may grow old and trembling in your anatomies, you may lie awake at night listening to the disorder of your veins, you may miss your love and lose your moneys to a monster, you may see the world about you devastated by evil lunatics, or know your honour trampled in the sewers of baser minds. There is only one thing for it then—to learn. Learn why the world wags and what wags it. That is the only thing which the poor mind can never exhaust, never alienate, never be tortured by, never fear or distrust, and never dream of regretting. Learning is the thing for you. (White, 1938, as cited in Candy, 1991, p. 398)

Knowing how to learn has always been important. Today, rapidly changing societal and global structures and complex technology coupled with the speed at which information increases have made imperative the ability to be a self-directed learner. Because the ability to adapt and thrive in this time of rapid change requires constant, continuous learning, Davis and Davis (2000) call the current era the Age of Perpetual Learning. They liken life in this Age to “trying to change a tire on a car while the car is still moving” (p. 1). They assert, “The Age of Perpetual Learning requires that we become self-directed learners, aggressive learners, self-confident learners, and optimistic learners” (p. 31).

A self-directed learner is one who thinks critically, adapts easily to changes, and

quickly assimilates and understands the meaning of information. Such a learner has the ability to “take the initiative, with or without the help of others, to gain certain definite knowledge and skills” (Caffarella, 1983, p.7). In addition to the attitudes and skills needed to cope with rapid technological changes, people need flexibility and self-directed learning abilities to adapt to new environments (Kerka, 1994a; Lewis & Williams, 1994). The new “flat” organizational structure with reduced layers of managers has resulted in self-managed teams, which require decision making by front line employees (Hoare, 2006). These innovative work structures necessitate continuous learning and preparation for flexible roles in various positions (Maurer, 2001 as cited in Hoare, 2006).

Much of the information transmitted today will be obsolete in a few years (Davis & Davis, 2000; Knowles, 1980; Taylor, 2006). It is as if we are in a time machine speeding toward the future—with each generation, the machine goes faster and the relevance of new information grows shorter. As Davis and Davis (2000) observe, “The world we grew up in no longer exists” (p. 3). Therefore, “we must define the mission of education as to produce *competent* people—people who are able to apply their knowledge under changing conditions; and we know that the foundational competence all people must have is the competence to engage in lifelong self-directed learning” (Knowles, 1980, pp.18-19).

Self-directed learners, those individuals who take responsibility for their own learning and do not wait passively to be taught, are needed by employers, communities, and society as a whole. In his seminal work, *The Inquiring Mind*, Houle (1961) asked the question: “What kinds of men and women retain alert and inquiring minds throughout the years of their maturity?” (p. x). This question has prompted much research into the

characteristics and activities of these self-directed learners who intentionally seek learning throughout life.

The ability to be a self-directed learner includes several psychological attributes. Oddi (1984, 1986) found initiative, persistence, and self-regulating attributes among the characteristics that indicate self-directed learning propensity. Other researchers have reported self-efficacy (Lema, 2006; Oliveira & Simoes, 2006; Hoban & Sersland, 1999, 2000, 2001 as cited in Hoban & Hoban, 2004); resilience (Robinson, 2003); personal confidence, and conscientiousness (Oliveira & Simoes, 2006) as characteristics of the self-directed learner.

We know from Dweck's (2000, 2006, 2008) research that personality and learning abilities are malleable. Therefore, it seems reasonable to expect that self-directed learning attributes can be developed. But first, we must know more about the qualities that comprise the learning characteristics of the self-directed learner. It may be helpful to think of personality characteristics related to learning and thinking processes as one's "learning personality." An individual's learning personality includes learning styles, beliefs about learning, frames of reference, and self-theories, which are all shaped by experience.

In Kolb's (1984) experiential learning theory, learning is conceptualized as two intersecting dimensions, each with two dialectically opposing learning modes. Kolb's learning style model consists of a prehension dimension described as a way of taking in or grasping experience through a concrete versus an abstract mode and a transformation dimension to process the experience through an active versus a reflective mode. According to Kolb's theory, learning style is the combination of one's preferred way to

take in or grasp experience (either concretely or abstractly) and the preferred way to transform experience (either actively or reflectively). The theory emphasizes integrative development, which is the integration of the concrete, abstract, active, and reflective learning modes. With higher levels of development, the learner moves from a specialized learning approach to one of integrating the four learning modes. This capacity to resolve the tension between the opposing modes on each dimension in an integrative manner represents a flexible approach to learning as well as the ability to engage in dialectical thinking, which is a higher level of adult cognitive development (Basseches, 1984; Merriam, 2004).

On the prehension dimension, the concrete experience (CE) mode represents learning from feeling and sensing, while the abstract conceptualization (AC) mode represents learning from thinking and analyzing. On the transformation dimension, the active experimentation (AE) mode indicates learning by doing, while the reflective observation (RO) mode indicates learning by watching and listening.

Although everyone has preferences toward certain learning approaches, a person who habitually uses a learning mode that is toward the extreme end of a learning dimension may develop a rigid, limited, specialized approach to learning. Such a person may be resistant to developing abilities in the other modes. Thus, over time, a learning style preference may become a learning style specialization that inhibits one's ability to learn a range of diverse topics, limits one's capacity for gaining knowledge, and prevents development of dialectical thinking abilities.

During the 1970s and 1980s, the adult education literature was replete with references to the importance of knowing the learning style of each adult learner in order

to provide learning experiences adapted to each individual's learning style. The adult educator was advised to administer a learning style instrument or ask the learner which instructional method he or she preferred. However, little research has been conducted to determine the validity of this advice. As a practical matter, very few adult educators have the resources to tailor programs to meet the individual learning style of each adult learner (Davidson, 1990).

Now, learning style instruments are more often used for the purpose of developing awareness of and expanding the use of different learning approaches (e.g., Cranton, 2000; Hawk & Shah, 2007; Kolb, 1984; Ouellette, 2000; Tullos, 2000; Vancleave & Schkade, 1987 as cited in Garner, 2000). In her discussion of transformative learning, Cranton (2000) observes that before transformation can take place, one must first be aware of one's psychological characteristics. However, she cautions against interpreting the results of a personality or learning style test as a permanent descriptor of who you are. She concludes that "many approaches to personality and learning and cognitive style become dysfunctional when individuals use their category or label as a justification for not changing. People who say 'I am a converger' or 'I am a thinker' and, therefore, 'I cannot be expected to be imaginative' are doing themselves a great disservice" (p.187). Davis and Davis (2000) and Dweck (2000, 2002, 2006, 2008) express the same concern that people often view their learning aptitudes and abilities as fixed traits.

From his teaching experience, Kolb (1984) explains that the nature of the subject matter affects the teaching method. As an example of using different approaches to teach different subjects, Kolb contrasts developing empathic listening skills to teaching statistics. Similarly, the learner should not use the same learning approach to every

subject. The problem is that some learners are “stuck” in a specialized learning style and try to apply the same learning approach to every subject. By using a variety of teaching techniques and actively promoting a variety of learning approaches, educators encourage integrative development and self-direction.

Rather than having the instructor present material in a manner that matches each learner’s particular learning style, it is now recognized that the best educational approach is to use a variety of techniques that encompass a range of learning styles (Candy, 1991; Felder, 1996; Felder & Brent, 2005; Hawk & Shah, 2007; Loo, 2004; Tullos, 2000). Exposure to learning through all four of the learning modes described in Kolb’s (1984) experiential learning model expands the learner’s repertoire of styles. This “stretching” of one’s learning style allows for an integration of the four learning modes.

Although it is incumbent upon the educator to teach the appropriate content for a particular subject, an inclusion of diverse techniques encourages the use of alternate learning styles and develops the ability to learn regardless of the format of the material presented. In fact, by tailoring programs to an individual student’s preferred style, the adult educator may actually exacerbate an individual’s reliance on a particular learning style, thereby encouraging learning style specialization and reducing the learner’s flexibility to use a learning style that is congruent with the subject matter and the method of instruction (Felder, 1996; Robotham, 1995; Weger, 1990). What is needed is the ability to learn how to learn.

Smith (1982) defines learning how to learn as a broad concept that “involves possessing, or acquiring, the knowledge and skill to learn effectively in whatever learning situation one encounters” (p. 19). He lists learning style as one of three components of

the learning how to learn concept. His definition of learning style is “the individual’s characteristic ways of processing information, feeling, and behaving in learning situations” (p. 24) and “processes of perceiving and thinking” (p. 19).

Is the ability to be flexible with learning style a characteristic of a self-directed learner? Canipe (2001) notes that several adult education researchers have advanced the idea that flexibility and adaptability are essential characteristics of a self-directed learner. The ability to be flexible in learning style is especially important as learners are increasingly required to take responsibility for their own knowledge development through a variety of instructional formats from traditional classroom methods to online courses. This flexibility in learning style allows one to employ the best strategy to learn a particular subject matter, or to adapt to an instructional method that may be in opposition to one’s preferred learning style. As previously stated, a preferred learning style indicates a tendency toward a certain learning style, and although a particular style is preferred, other learning styles can be employed as needed. In contrast, a specialized learning style indicates rigidity and use of a certain learning style to the exclusion of other styles.

Although individuals may have preferences for certain learning styles, learning styles are not fixed traits. They are malleable, and the degree of integration among the styles is a product of the learner’s development that has resulted from reflecting upon experience. Cranton (2000) believes that psychological preferences and learning styles are fluid rather than static.

As previously noted, there is interplay between the concepts of personality characteristics of a self-directed learner and the integrative development aspect (the

ability to resolve dialectical tensions between the modes on each dimension) of experiential learning theory. Therefore, this study will examine selected learning style attributes as measured by the Kolb Learning Style Inventory in relation to self-directed learning propensity as measured by the Oddi Continuing Learning Inventory.

Statement of the Problem

This study will be guided by the following research questions: What is the relationship between learning style flexibility, as measured by learning style balance on each learning dimension, and self-directed learning propensity? What is the relationship between each learning dimension and self-directed learning propensity?

Purposes of the Study

The general purposes of the study are to examine the relationship between learning style balance and self-directed learning propensity and to determine the relationship, if any, between the prehension and transforming learning dimensions and self-directed learning propensity. Knowing more about the relationship between learning style characteristics and self-directed learning propensity will provide insight into the cognitive and developmental processes associated with self-directed learning.

The findings from this study will have implications for adult educational practices such as determining the efficacy of current methods designed to develop self-directed learning attributes and the development of effective methods to encourage self-direction in adult learners. The ultimate goal of the study is to add to the knowledge base about psychological attributes of the self-directed learner and, through this knowledge, provide a basis for improving educational practices.

Research Questions

The following research questions were investigated:

1. Is there a significant relationship between the prehension learning dimension of abstract conceptualization - concrete experience (AC-CE) and self-directed learning propensity for the adult learner?
2. Is there a significant relationship between the transformation learning dimension of active experimentation - reflective observation (AE-RO) and self-directed learning propensity for the adult learner?
3. Is there a significant relationship between learning style balance on the prehension learning dimension of abstract conceptualization - concrete experience (AC-CE) and self-directed learning propensity for the adult learner?
4. Is there a significant relationship between learning style balance on the transformation learning dimension of active experimentation - reflective observation (AE-RO) and self-directed learning propensity for the adult learner?

Definition of Terms

Terms used in this study are defined as follows:

1. Adult student – A university graduate student, 25 years of age or older.
2. Integrative development – A term used by Kolb (1984) to describe the highest level of personal development which is achieved when a person is self-directed and is “highly developed in each of the four learning modes: active, reflective, abstract, and concrete” (p. 203).
3. Learning Style Inventory specific technical nomenclature:
 - A. Learning dimensions – Two representations of the learning process which are

used in combination to grasp and transform experience. The prehension dimension represents the two opposing ways (modes) that learners grasp or take in experience either through concrete experience (CE) or abstract conceptualization (AC). The transformation dimension represents the two opposing ways (modes) that learners process experience either through active experimentation (AE) or reflective observation (RO).

B. Learning modes – The four adaptive ways of learning from experience conceptualized as a four-stage learning cycle whereby the learner alternately grasps and transforms experience. The learning cycle is composed of two opposing ways (modes) to grasp or take in experience and two opposing ways (modes) to transform experience. On the prehension dimension, concrete experience (CE) represents the use of open-minded thinking, sensing, feeling-based judgment, and personal involvement in new situations, while the opposing mode, abstract conceptualization (AC) represents the use of abstract thinking, logic, ideas, and planning when new situations are encountered (Kolb, 1981, 1984, 1985). Active experimentation (AE) and reflective observation (RO) are opposing modes on the transformation dimension. AE represents an action and practical approach to solving problems, while RO represents a reflective and objective approach to problem solving (Kolb, 1981, 1984, 1985). Although the cycle is usually depicted as starting with the CE mode, the cycle can start with any of the modes (Kolb, 1984).

C. Learning styles – The two intersecting learning dimensions produce four quadrants or categories. The categories that result from plotting the combination

mode scores on each of the two learning dimensions are accommodator, diverger, assimilator, and converger.

Accommodator – the accommodator combines the concrete experience mode on the prehension dimension with the active experimentation mode on the transformation dimension. People with this learning style prefer to learn through “hands-on” experience and enjoy carrying out plans. They prefer to solve problems by intuition (“gut” feelings) and to rely on other people for information and analysis.

Assimilator – the assimilator combines the abstract conceptualization mode on the prehension dimension with the reflective observation mode on the transformation dimension. People with this learning style prefer to examine a wide range of information and integrate it into a logical form. They prefer to solve problems by inductive reasoning and are interested in theories, abstract ideas, and concepts.

Converger – the converger combines the abstract conceptualization mode on the prehension dimension with the active experimentation mode on the transformation dimension. People with this learning style prefer to find practical applications for ideas and theories. They prefer to solve problems by deductive reasoning and by focusing on specific problems.

Diverger – the diverger combines the concrete experience mode on the prehension dimension with the reflective observation mode on the transformation dimension. People with this learning style prefer to observe rather than take action. They solve problems through gathering information and generating a wide

range of ideas (Kolb, 1984, 1985).

4. Learning style balance – The degree to which an individual’s learning style is flexible. Learning style balance is indicated by proximity to the midpoint between the two opposing learning modes on each of the learning dimensions contained in the Kolb Learning Style Inventory (LSI).
5. Learning style flexibility – The ability to adapt one’s learning style and use the modes best suited to the present learning environment, subject matter, or instructional format.
6. Self-directed learning propensity – A personality attribute characterized by intentional effort, initiative, and persistence “to learn better ways of doing things, to gain new information and knowledge, to change . . . perception, behavior, or performance” (Tough, 1975, p. 2).

Delimitations

1. The participants in this study will be volunteer graduate students 25 years of age or older at a mid-sized comprehensive public university in the southeastern United States.
2. The variables of this study will be learning dimensions as measured by the Kolb Learning Style Inventory, learning style balance as measured by the Mainemelis, Boyatzis, and Kolb (2002) scoring method on the Kolb Learning Style Inventory, and self-directed learning propensity as measured by the Oddi Continuing Learning Inventory.
3. Subjects and variables not specified above are considered to be beyond the scope of this study.

Assumptions

Results of this study will be interpreted based on the following assumptions:

1. Subjects are not overly familiar with the instruments.
2. Subjects have sufficient self-knowledge to accurately respond to the items on the instruments.
3. Subjects will respond honestly to all items on the instruments.
4. At the age of 25, most subjects will have at least one year of professional work experience and will not be financially dependent on their parents.

Justification of the Study

New technology, constant increases in information, and changing global social and economic structures have created a need for self-directed learners. New technology has created the need to quickly understand concepts and information regardless of the instructional method or medium used. Global social and economic interdependence requires development of integrative learning approaches to understand dialectical ideas and contrasting perspectives. As a predominant area of study in the field of adult education, the concept of self-directed learning needs empirical research to develop a knowledge base from which to test assumptions.

As a result of studying learning processes and learning styles, Kolb (1984) advocates learning as “a skill that can be improved and coached” (p. 202). Research based on Mezirow’s transformation theory reveals that awareness of metacognitive processes through self-reflection can lead to transformative learning. Dweck’s research provides insight into the ways learning approaches are linked to the learner’s theories of learning and personality characteristics. Her findings demonstrate that personality

attributes, which affect learning, are malleable and can be changed.

Tough (1967, 1971 as cited in Knowles, 1980) found that adults usually seek help from others who may or may not be trained as teachers, and that most of the time the trained teachers imposed unnatural pedagogical practices that actually interfered with learning. Tough's findings illustrate the need for adult educators to understand the psychological underpinnings of self-directed learning.

The development of successful learners, as a goal of adult education, requires a better understanding of the characteristics of self-directed learners. Knowledge about the characteristics of the self-directed learner will enable adult educators to guide students toward developing self-directed learning attributes. This study may help determine if the degree of self-directed learning propensity can be measured in relation to balance in learning style, and, if so, provide a basis for improving educational practice regarding ways to foster development of the ability to engage in self-directed learning. Should such a relationship be established, then learning style instruments may be used as diagnostic tools to determine what adjustments in learning style are needed to facilitate the ability to be a self-directed learner. If a balance in learning style is positively correlated with self-directed learning propensity, methods that guide learners toward a balanced style should be further developed and studied.

Learning style flexibility as measured by learning style balance may be used as an objective measure to determine ability or readiness to engage in self-directed learning. A learning style flexibility measurement has the potential to measure the degrees of development of self-directed learning abilities in information processing skills and may provide direction for methods to enhance the learner's development as a self-directed

learner. Thus, educators would be able to measure self-directed learning development by measuring learning style balance.

Individuals who are not inclined to be self-directed learners may have extreme learning styles—that is, learning mode scores that are on the extreme ends of the learning dimensions. By examining the relationship between learning style balance and self-directed learning propensity, it may be possible to identify learning style characteristics that enhance or hinder the abilities of individuals to become self-directed learners. If learning style balance is a characteristic of a self-directed learner, adult educators should include learning style flexibility in their repertoire of learning tools and assist learners to develop learning style flexibility. Of the two dimensions, if one learning dimension is more indicative of self-directed learning propensity than the other dimension, adult educators should understand ways to assist learners to develop strengths in this dimension.

Much research has been conducted to compare learning styles to various variables. Examples of such research include adaptive flexibility (Mainemelis, et al., 2002), personality types (Soucy, 1995), achievement (Hamlin, 2001), and self-directed learning (Adenuga, 1989; Baxter, 1993; Canipe, 2001; Haggerty, 2000; Ware, 2003). However, research relating learning style balance to self-directed learning has not been explored.

A literature search on learning style balance by Mainemelis et al. (2002) yielded only three other investigations into the subject. This researcher found three related studies. Geiger and Pinto (1991) discovered the learning style balance phenomenon as a result of their longitudinal study. A dissertation by Weger (1990) was an intentional

investigation into the effects of learning style balance on achievement and attendance. Another dissertation by Serrapere (1977) focused on a training program designed to assist adults in developing balanced learning styles. However, none of these studies included the variable of self-directed learning propensity. Therefore, from the literature review, it appears that an exploration into the relationship between the variables of learning style balance and self-directed learning is warranted. The literature also indicates that very little attention has been paid to comparing learning dimensions to self-directed learning propensity (Adenuga, 1989). Consequently, the present study will also focus on examining these relationships.

CHAPTER II

REVIEW OF LITERATURE

Human beings are unique among all living organisms in that their primary adaptive specialization lies not in some particular physical form or skill or fits in an ecological niche, but rather in identification with the process of adaptation itself—in the process of learning. We are thus the learning species, and our survival depends on our ability to adapt not only in the reactive sense of fitting into the physical and social worlds, but in the proactive sense of creating and shaping those worlds. (Kolb, 1984, p. 1)

The purpose of this chapter is to provide a review of the literature related to the research questions. The focus of the study is the relationships between learning style balance and learning dimensions to self-directed learning propensity. This chapter will provide the background for understanding these concepts.

Theoretical Framework

Two broad adult learning themes are the basis for this study: learning styles and self-directed learning. Associated with these themes are the concepts of experiential learning, learning transformation, dialectical thinking, and self-directed learner characteristics and development.

Only recently has adult development been linked with adult learning (Hoare, 2006). Hoare details four reasons for this lack of attention to adult development. The first reason is related to Freud and psychologist of his era who saw the adult as a fixed entity with no positive development possibilities. Second, children were once looked upon as miniature adults. And even though this is no longer the view of children, the

notion that adults are merely fixed extensions of their younger selves still influences theories related to human learning and development. The third reason is due to a linear, lockstep view of adult development, whereby development is restricted to set stages and events in adulthood. The final reason is related to a short life expectancy— as recently as the turn of the twentieth century, the average life expectancy was less than 50 years. Therefore, it was not until the mid twentieth century that the mid to late life adult populations reached the density level necessary to attract the attention of researchers. Hoare offers the following definition of adult development: “*Adult development* means systematic, qualitative changes in human abilities and behaviors as a result of interactions between internal and external environments” (p. 8).

Basseches (1984) confirms Hoare’s observations about the neglect of research in adult development: Until the late 1960s, the terms “developmental psychology” and “child psychology” were synonymous to most psychologists. Basseches speculates that the growth of the field of adult development could have been attributed to changing social views precipitated by works such as Gail Sheehy’s book, *Passages: Predictable Crises of Adult Life* and Maslow’s ideas of self-actualization. Whatever the impetus, the realization that significant personality changes can take place in adulthood opened the doors to extensive research in the field of adult development.

In adult education, Cyril Houle was one of the first researchers to recognize a relationship between adult learning and adult development. Houle’s (1961) work, *The Inquiring Mind*, ignited interest in the learning activities of adults. Through in-depth interviews with adult learners, Houle found that there were three types of adult learners: goal-oriented, activity-oriented, and learning-oriented. The goal-oriented learners had a

specific purpose for engaging in learning activities. The activity-oriented learners mostly had a social focus for participating in learning activities. The third group sought learning for its own sake. This last group is what is typically considered to be self-directed learners. However, as noted by Houle, “These are not pure types; the best way to represent them pictorially would be three circles which overlap at their edges” (p. 16).

One of Houle’s students, Allen Tough, further investigated learning projects carried out by adults. Tough (1975) conducted structured interviews to explore the nature of the learning projects and how much time was spent on the projects. He found that of the 66 participants, 98% were involved in learning projects and 68% of the projects were self-planned.

Similar to the past views of adult development are some of the previous ideas about adult learning—adults learn in the same way that children learn; hence, the same teaching methods should be used (Knowles, 1980). Or, worse, adults of a certain age were too old to learn.

Malcolm Knowles, another student of Cyril Houle, recognized that the education methods used for children did not fit with the way adults learn. Knowles (1980) developed a set of assumptions, known as andragogy, which differentiated the learning characteristics of adults from that of the pedagogical educational methods being used to teach children. He explains that as individuals mature:

1. their self-concept moves from one of being a dependent personality toward being a self-directed human being;
2. they accumulate a growing reservoir of experience that becomes an increasingly rich resource for learning;

3. their readiness to learn becomes oriented increasingly to the developmental tasks of their social roles; and
4. their time perspective changes from one of postponed application of knowledge to immediacy of application, and accordingly, their orientation toward learning shifts from one of subject-centeredness to one of performance-centeredness. (pp. 44-45)

The discussions and debates brought about by Knowles' ideas have enriched the study of adult learning and have enlightened adult educators. However, it is now commonly recognized that many of the pedagogical education methods that are inappropriate for adults are unsuitable for children as well. In addition to the psychological differences which differentiate learning in childhood and adulthood, one of the primary differences between learning in children and adults is related to experience. Adults have more experiences; therefore, adults have more preconceived ideas than children have. From experiences, many adults have developed negative learning habits and attitudes that interfere with learning. Because of these experiences, adults often have to unlearn their approach to learning and relearn how to learn.

Kolb's Experiential Learning Theory

Experiential learning theory emphasizes "the central role that experience plays in the learning process" (Kolb, 1984, p. 20). However, without reflection and interpretation, experience alone is not sufficient for learning.

Experiential learning is a holistic approach to learning that integrates experience, perception, cognition, and behavior. Unlike cognitive learning theories that emphasize information acquisition and processing and behavior learning theories that ignore the role

of emotions and consciousness, experiential learning theory presents “a holistic integrative perspective on learning that combines experience, perception, cognition, and behavior” (Kolb, 1984, p. 21). This represents a multilinear or integrative view of development.

Kolb’s (1984) experiential learning theory is grounded in the intellectual works of Dewey, Lewin, and Piaget. These three theories emphasize, “development toward a life of purpose and self-direction” (Kolb, p. 18). A point of difference with Piaget’s theory, however, is that where Piaget’s hierarchy of learning development positions concrete learning experiences at the lower level of development, Kolb’s theory places such experience as equal with abstract thought. Kolb arrived at this conclusion as a result of studying hemispheric brain research. In the past, individuals who suffered from severe epileptic seizures were subjected to surgery to sever the connection between the right and left hemispheres of the brain. Studies done with these patients revealed that these two hemispheres have two separate and distinct ways of understanding the world.

Kolb was also influenced by Paulo Freire’s revolutionary writings on critical consciousness, “the active exploration of the personal, experiential meaning of abstract concepts through dialogue among equals” (Kolb, 1984, p. 16) and his concept of praxis, the resolution of the dialectic nature of reflection and action. Kolb was further influenced by the “therapeutic psychologies” especially Carl Jung’s theory of psychological type, which includes the concept of introversion and extraversion as two separate dialectical dimensions. Experiential learning theory also incorporates the works of Erik Erikson, Carl Rogers, Fritz Perls and Abraham Maslow. From these therapeutic psychologies, Kolb conceived the idea that healthy adaptation requires a person to effectively integrate

cognitive and affective processes and that a person continues to develop socially and emotionally throughout life.

The six main principles of Kolb's experiential learning theory are listed as follows:

1. Learning is a process, not an outcome;
2. All learning is relearning;
3. Learning results from resolving dialectically opposing ways of experiencing and adapting to the world;
4. Learning is a holistic process of adaptation;
5. Learning is a result of synergetic transactions between the person and the environment;
6. Learning is the process of creating knowledge. (Kolb & Kolb, 2005, p. 194)

Kolb (1984) defines learning as “the process whereby knowledge is created through the transformation of experience” (p. 38). He explains his model of learning and development as a dialectical process that integrates concrete experiences with abstract concepts and reflection with action. For Kolb, the integration of the four modes of learning: concrete, abstract, reflective, and active, represents the highest level of development. In his description of the experiential learning theory of development, which illustrates the way that learning shapes development, “dimension” refers to the affective, perceptual, symbolic, and behavioral components of development and “mode” refers to the four ways of learning: concretely, reflectively, abstractly, and actively. He explains:

The four dimensions of growth are depicted in the shape of a cone, the base of

which represents the lower stages of development and the apex of which represents the peak of development—representing the fact that the four dimensions become more highly integrated at higher stages of development. Development on each dimension proceeds from a state of embeddedness, defensiveness, dependence, and reaction to a state of self-actualization, independence, proaction and self-direction. . . . At the highest level of development . . . the adaptive commitment to learning and creativity produces a strong need for integration of the four adaptive modes. (1984, p.140)

It should be noted that the term “dimension” used here has a different connotation from the term used in describing Kolb’s Learning Style Inventory.

Transformation Learning Theory

Like Kolb’s Experiential Learning Theory, Transformative Learning Theory is a constructivist learning theory; both theories draw from the works of Piaget (Bassett, 2006). Both theories emphasize critical reflection, transformation processes, life experiences, and the importance of discourse in creating self-awareness.

Developed by Mezirow in 1978, transformation theory draws from the disciplines of adult education, psychology, psychiatry, sociology, and philosophy. Transformation theory requires critical reflection to change assumptions which restrict individuals’ self-beliefs, perceptions, and understandings of the world. The resulting change of assumptions or “habits of mind” consequently leads to a new integrating perspective for making choices and for interacting with the world. The point of view that results from a habit of mind is a frame of reference. Key concepts in transformation theory are as follows:

1. Meaning perspective: The structure of assumptions that constitutes a frame of reference for interpreting the meaning of an experience.
2. Reflection: Examination of the justification for one's beliefs, primarily to guide action and to reassess the efficacy of the strategies and procedures used in problem solving.
3. Critical reflection: Assessment of the validity of the presuppositions of one's meaning perspectives, and examination of their sources and consequences.
4. Critical self-reflection: Assessment of the way one has posed problems and of one's own meaning perspectives.
5. Transformative learning: The process of learning through critical self-reflection, which results in the reformulation of a meaning perspective to allow a more inclusive, discriminating, and integrative understanding of one's experience. Learning includes acting on these insights.
6. Emancipatory education: An organized effort to precipitate or to facilitate transformative learning in others. (Mezirow, 1990, p. xvi)

In discussing transformative learning, Cranton (1994) states, "Adult learners have assumptions, beliefs, and values that determine the way they interpret the world and their experiences" (p. 730). Defective frames of reference are destructive, repressive barriers to learning and self-fulfillment. An understanding of internal learning processes leads to self-awareness and changes in perspectives that are more accurately aligned with reality. Through transformative learning methods educators are able to guide adults through the process of breaking habits of learning that are detrimental to development. Cranton (2000) explains the role of educators in the transformative learning process, "Helping

learners become fully aware of their preferences assists them in seeing their strengths, their blind spots, [and] their prejudices against others different from themselves” (p. 196).

Kegan (2000) addresses some of the misconceptions about transformation learning by contrasting it with informative learning. Informative learning deals with increasing specific knowledge and skill development of existing ways of knowing. He points out that informative learning is critical in developing expertise in areas such as a pilot with skills in navigating a plane or a physician who has the knowledge to make a correct diagnosis. Informative learning deals with changes in *what* we know, while transformative learning deals with changes in *how* we know.

Experiential learning and learning how to learn encompass both informative learning and transformative learning. Being aware of knowing how to learn increases one’s ability to gain knowledge. It has been noted by Gibbons, Bailey, Comeau, Schmuck, Seymour, and Wallace (1980) and also by Daley (1999) that a large fund of knowledge is a necessary, important factor in what makes an expert an expert. In studying the biographies of experts with low levels of formal education, Gibbons et al. connected the ability to gain high levels of subject knowledge with being self-directed.

Dialectical Thinking

Related to Kolb’s theory of experiential learning and integrative development and Mezirow’s transformative learning is the concept of dialectical thinking. Bassett (2006) explains the integrative learning concept in her discussion of dialectical thinking:

“Dialectical thinking emphasizes the way people arrive at an integration or synthesis of antithetical or disparate aspects of the psyche, or of a situation or an issue that presents itself with incompleteness of knowledge, provisionality of truth or reality, and the need

for judgment or decision in the face of uncertainty” (p. 297).

The development of dialectical thinking leads to insight, which has been linked to increased learning and changes in consciousness, and hence, changes in behavior (Hoare, 2006). Caffarella and Barnett (1994), note that “adults tend to be more reflective and dialectical in their thinking, that is, they appear to be more tolerant of contradictions and ambiguities, and they engage more often in problem finding as well as problem solving” (p. 32). In describing Sternberg’s (1998) opinion about the nature of wisdom, Bassett (2006) explains that wisdom cannot be transferred directly from one person to another—it can only be advanced through experience and development of dialectical thinking.

Occurring after Piaget’s formal operations stage of cognitive development, dialectical thinking allows one to understand competing, opposing perspectives and the integration of multiple perspectives into one’s own thinking. Development in dialectic thinking deals with change, growth, transformation, relationships, and individuation. Adults do not all go through the same lock-step stages of development, and adults are not fixed—through experiences a person can be changed, then as a changed person, he or she will have different experiences. Basseches (1984) describes how dialectical thinking is important in a multicultural society. “This way of thinking leads to eagerness to learn from, and to resolve, differences with people who are very different from ourselves, rather than to a tendency to respond defensively because they threaten our rigid ideas and ways. This way of thinking is dialectical thinking” (p. 337).

Basseches (1984) researched writings about dialectical thinking and organized the common themes into 24 dialectical schemata. To test his hypothesis that dialectical thinking represents a level of adult cognitive development beyond Piaget’s formal

operations, Basseches conducted in-depth interviews with 9 freshmen, 9 seniors, and 9 faculty members from various disciplines at Swarthmore College. Subjects were carefully selected to insure that no one discipline was over represented. Due to the intellectual rigor promoted at Swarthmore, Basseches had surmised that participants affiliated with Swarthmore would demonstrate higher adult cognitive development (i.e., dialectical thinking abilities) should such a level of development exist.

Basseches found that there was a significantly higher relationship between the number of different schemas that the faculty members used in comparison to the number of different schemas that the seniors used. The senior group in turn used a significantly higher number of different schemas than the freshmen group used. Analysis revealed that academic level accounted for the difference in the number of different schemas used. The research findings support the concept of dialectical thinking as a higher level of cognitive abilities that can be developed.

Basseches (1984) views the ability to engage in dialectical thinking as development (growth)—mere change or adaptation is not personal development. He explains, “dialectical thinking recognizes the importance of stability, but also recognizes the process of change as more fundamental than any particular form of stability. Mature, creative thought requires the *integration* of abilities to grasp, create, and promote change with abilities to grasp, create, and promote stability” (p. 221).

Learning Styles

The Concept of Learning Styles

The concept of learning styles is broad and complex. There are more than 30 different learning style inventories representing different theories and measuring different

aspects of approaches to learning (Ouellette, 2000). To add to the confusion, the terms “cognitive styles” and “learning styles” are often used interchangeably. According to Keefe (1988) and MacKeracher (2004), the term learning styles is the overarching term whereas the term cognitive styles is used more frequently in psychology to study mental processes such as memory, problem solving, and linguistics.

Keefe (1988) defines learning styles as “a composite of characteristic cognitive, affective, and physiological factors that serve as relatively stable indicators of how a learner perceives, interacts with, and responds to the learning environment” (p. 3). James and Maher (2004) agree with Keefe’s definition and add emphasis to the affective component as personality and the physiological element as perceptual.

Recently, McAdams and Pals (2006, as cited in Hawk & Shah, 2007) proposed five principles for studying personality: (a) evolutionary design for human nature, (b) dispositional traits, (c) characteristic adaptations, (d) self-defining life narratives, and (e) culture/social contexts. These principles examine personality in the context of traits that are based on evolutionary design and apply to all humans, traits that apply to groups, and traits that are unique to the individual. Hawk and Shah (2007) interpret learning style to be in the categories of dispositional traits and characteristic adaptations “where there are differences across individual humans but there are groupings of humans who have common or similar learning style characteristics” (p. 2).

As previously noted, there are numerous learning style models and instruments to consider. As discussed in Chapter I, learning style instruments should be used in the context of a broader discussion about learning approaches and are not intended for individually prescribed instruction. Cranton (2000) advocates the use of learning style

instruments only as a means to increasing the learner's self-awareness for subsequent reflective discourse.

Kolb's Learning Style Inventory (LSI)

Designed for adults, the Learning Style Inventory (LSI) is used in a variety of educational and work settings for the purposes of career development and development of interpersonal interactions and skills and approaches to problem solving. The LSI measures preferences for the way people take in and process information and experiences and the way they resolve dialectical learning approaches (active as opposed to reflective and concrete as opposed to active).

The instrument consists of 12 sentences with four different endings which are ranked from 1 to 4 in order of preference. The resulting scores correspond to four modes representing active, reflective, concrete, and abstract approaches to learning. These modes correspond to learning dimensions that represent how we perceive and how we process information and experience. The concrete experience (CE) mode is the bi-polar opposite of the abstract conceptualization (AC) mode on the prehension or taking in dimension, while the reflective observation mode (RO) is the bi-polar opposite of the active experimentation (AE) mode on the transformation or processing dimension. After obtaining the initial mode scores from the sentence completion section, combination mode scores are calculated in order to obtain a score for each dimension. On the prehension dimension, represented by a vertical line, the formula is AC-CE, while the formula on the transformation dimension, represented by a horizontal line, is AE-RO. The lines of the two dimensions intersect to form a four-quadrant grid. The score on each dimension is then plotted on the grid. For example, on the prehension dimension, an AC

mode score of 32 and a CE mode score of 28 result in a final mode score of 4, which is plotted on the vertical line. On the transformation dimension, an AE mode score of 36 and a RO mode score of 24 result in a final mode score of 12, which is plotted on the horizontal line. The score placements on the grid determine one's learning style preference: accommodator (concrete/active), diverger (concrete/reflective), assimilator (abstract/reflective) and converger (abstract/active). See Figure 1.

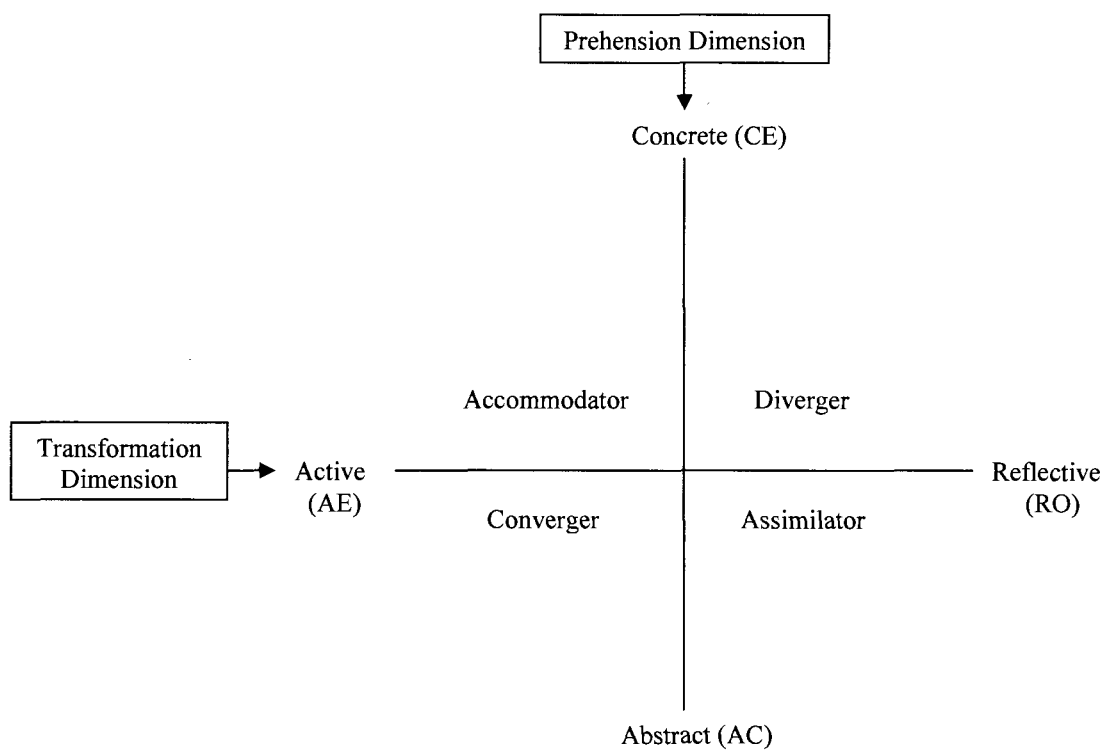


Figure 1. Learning Dimensions and Learning Style Categories (Kolb, 1984)

On the transformation dimension, accommodators and convergers represent active learning styles, while divergers and assimilators represent reflective styles. On the prehension dimension, accommodators and divergers prefer concrete learning experiences in contrast to convergers and assimilators, who prefer abstract thinking experiences.

Learning Style Balance

Developed from Kolb's experiential learning theory, the basis for the LSI lies in Kolb's conception of the learning process as a cycle. Similar to the universal symbols that denote completeness and unity by circular movement around opposing sides, such as the mandala or yin and yang symbols, Kolb conceived of the learning process as a cycle whereby all four of the learning modes (ways of learning) are incorporated into the learning experience (Kolb, 1984). It should be remembered that Kolb refers to learning styles as "specialized ways of learning" because learning styles indicate specialization in just two of the modes rather than an integration of all four modes. At higher levels of development, the learner moves from a specialized, limited learning approach to one of integrating the four learning modes. The goal of optimal adult learning development, according to experiential theory, is for the learner to develop the ability to integrate the four modes so that the learner is flexible and can adapt his or her learning approach to the task to be learned.

According to Kolb's cyclical experiential learning model, learners move through four stages in the learning process. These stages correspond to the four modes. There are components of all the learning modes in learning every topic; however, the modes are used in varying degrees depending on the subject matter. Likewise, some instructional methods suit some learning approaches better than other approaches. For example, learning from lecture requires a different learning approach than does learning through online coursework.

Although the cycle is depicted as a flat circle, it is more accurately characterized as a three-dimensional spiral that undulates—rising and falling, resting briefly or moving

quickly on the modes in response to the learning experience encountered. Recently, a biological basis for Kolb's learning cycle has been established (Kolb & Kolb, 2005; Zull, 2002). Zull has noted that the four learning components of the brain correspond to Kolb's learning cycle. This full involvement of the "whole brain" stimulates the brain and enhances learning.

Mainemelis et al. (2002) devised a learning style balance scoring method to determine one's degree of integration of the opposing modes on the prehension dimension and the opposing modes on the transformation dimension. This scoring method allows researchers to examine the relationship between learning style balance other variables.

Self-Directed Learning

The Concept of Self-Directed Learning

In 1983, Brockett stated that "one of the most significant contributions to emerge from adult education research from the 1970's has been the realization that many adult learning endeavors are self-directed" (p. 16). And although attention to self-directed learning has somewhat diminished since being the primary focus of adult education research during the 1980s and 1990s, it remains one of the main areas of interest among researchers in the field (Brockett, 2002).

Mezirow (1981) noted that self-directed learning is integral to the philosophy of adult education:

It is almost universally recognized, at least in theory, that central to the adult educator's function is a goal and method of self-directed learning. Enhancing the learner's ability for self-direction in learning as a foundation for a distinctive

philosophy of adult education has breadth and power. It represents the mode of learning characteristic of adulthood. (p. 21)

Knowles (1980) considers the development of an attitude toward lifelong learning and the abilities for self-directed learning as one of the primary missions of adult educators. He states,

[I]t is no longer functional to define education as a process of transmitting what is known; it must now be defined as a lifelong process of continuing inquiry. And so the most important learning of all – for both children and adults – is learning how to learn, the skills of self-directed inquiry. (p. 41)

The diversity of terms used to describe the concept of self-directed learning illustrates the breadth of the concept. In her dissertation, Oddi (1984) listed more than a dozen terms used to describe self-directed learning; twelve years later, the number of different descriptive terms and other terms associated with the concept had reached a total of 247 (Hiemstra, 1996). However, not all of these terms described the concept of self-directed learning itself—many of the terms were only related to the concept (e.g., OCLI, Oddi Continuous Learning Inventory; SDLRS, Self-Directed Learning Readiness Scale). Hiemstra's analysis of the literature from the International Symposium on Self-Directed Learning during the years from 1986 to 1994 and a 1992 book by Confessore and Confessore revealed the various descriptors and related terms. The symposium books contained 205 different terms, while the Confessore and Confessore book had an additional 42 items.

Hiemstra's frequency table shows that the most often used descriptor was, of course, "self-directed learning" with a frequency rate of 2,833. The other more

frequently occurring descriptive terms were “self-planned learning,” “self-education,” “self-direction in learning,” “autodidactic learning,” and “autonomous learning.” A follow up analysis of the symposium books from 1995 to 2003 revealed an additional 53 items in the literature (Hiemstra, 2004).

Along with the numerous terms to describe self-directed learning, there are various definitions of the concept. Perhaps the most often quoted definition of self-directed learning is from Knowles (1975):

In its broadest meaning “self-directed learning” describes a process in which individuals take the initiative, with or without the help of others, in diagnosing their learning goals, formulating learning goals, identifying human and material resources for learning, choosing and implementing appropriate learning strategies, and evaluating learning outcomes. (p.18)

Oddi (1984) coined the term “self-directed continuing learning” to distinguish the psychological construct of self-directed learning from the instructional process. She describes the limitation of viewing self-directed learning only as a self-instructional process: “To view self-directed learning only as a set of activities focuses attention on discrete episodes of learning and provides neither a means of interrelating such episodes nor an explanation for why such behavior persists over time in some individuals and not in others” (p. 22). Further, Oddi (1987) advocates studying all aspects of the self-directed learner’s personality, including motivational, cognitive, and affective characteristics. She conceptualizes self-directed learning as a “psychological construct that impels an individual to initiate and persist in learning activities . . . throughout life” (Oddi, 1984, p. 46).

As can be seen from these contrasting views, the literature on self-directed learning reflects two themes associated with the term: (a) self-directed learning as a set of activities in the learning process or an instructional method and (b) self-directed learning as a personal attribute or aptitude (Brockett & Hiemstra, 1991; Cafarella, 1993; Cafarella & O'Donnell, 1987; Candy, 1991; Merriam & Cafarella, 1999; Oddi, 1984, 1986, 1987; Russett, 1998; Wilson, 1992).

Theoretical Perspectives of Self-Directed Learning

Most current perspectives of self-directed learning include both themes of instructional methods *for* learners and psychological attributes *of* learners. In this section, three perspectives containing both orientations are described.

Personal Responsibility Orientation Model (PRO). Brockett and Hiemstra (1991) advocate using “self-direction in learning” as the overarching term to acknowledge both the instructional or external components and the psychological or internal aspects of self-directed learning. They describe their rationale for selecting this term:

[S]elf-direction in learning refers to two distinct but related dimensions. The first of these dimensions is a process in which a learner assumes primary responsibility for planning, implementing, and evaluating the learning process. An education agent or resource often plays a facilitating role in this process. This is the notion of *self-directed learning* as it has generally been used in the professional literature. The second dimension, which we refer to as *learner self-direction*, centers on a learner’s desire or preference for assuming responsibility for learning. This is the personality aspect . . . where the individual assumes primary responsibility for a learning experience. (p. 24)

From this framework, they united the two dimensions in their Personal Responsibility Orientation (PRO) Model. Both dimensions are on a continuum that represents the range of opportunities for self-direction on the external dimension and the range of self-directedness levels on the internal dimension (Brockett & Hiemstra, 1991, p. 30). In this model, the central focus is on personal responsibility, whereby, “individuals assume ownership for their own thoughts and actions” (p. 26). However, Brockett and Hiemstra quickly point out that this responsibility role does not mean that a person necessarily has control of personal life circumstances. Rather, the emphasis is on the control a person can exercise in thought and action as to how one responds to such situations—the choices one makes in different circumstances.

Candy’s self-directed learning model. Candy (1991) delineates the two themes of self-directed learning into two subparts each; this subdivision results in four dimensions. The first theme of self-direction as an outcome of learning includes psychological and philosophical characteristics. The second theme is self-direction as a process of learning; this theme differentiates learning in formal settings from learning in everyday life. The four resulting dimensions are self-direction as

1. A personal attribute (personal autonomy);
2. The willingness and capacity to conduct ones’ own education (self-management);
3. A mode of organizing instruction in formal settings (learner-control);
and
4. The individual, noninstitutional pursuit of learning opportunities in the ‘natural societal setting’ (autodidaxy). (p. 23)

Garrison's self-directed learning model. Garrison (1997) conceives of self-directed learning as having three overlapping dimensions: self-management, self-monitoring, and motivation. The self-management dimension includes the traditional concept of self-directed learning, which involves setting goals and utilizing external resources. The self-monitoring dimension refers to cognitive and metacognitive processes. Self-monitoring or cognitive responsibility “reflects a commitment and obligation to construct meaning through critical reflection and collaborative confirmation” (p. 24). The motivation dimension addresses effort directed toward learning. This dimension has two components: entering motivation and task motivation. Entering motivation focuses on the process of deciding to participate in a learning experience, while task motivation is concerned with persistence and staying on task.

The Self-Directed Learner

In describing the abilities needed for self-directed learning as an instructional process, Caffarella (1983) developed the following list based on the works of Tough (1971) and Knowles (1975):

1. The ability to decide what knowledge and skills to learn;
2. The ability to diagnose learning needs realistically, with help from teachers and peers;
3. The ability to translate learning needs into learning objectives in a form that makes it possible for their accomplishments to be assessed;
4. The ability to relate to teachers as facilitators, helpers, or consultants and to take the initiative in making use of their resources;
5. The ability to relate to peers collaboratively, to see them as resources for

learning;

6. The ability to identify human and material resources appropriate to different kinds of learning objectives;
7. The ability to select effective strategies skillfully and with initiative;
8. The ability to gain knowledge or skill from the resources utilized;
9. The ability to evaluate one's own work and get feedback from others about progress;
10. The ability to detect and cope with personal blocks to learning;
11. The ability to renew motivation for learning when motivation lags. (p. 7)

In developing his framework for andragogy, the art and science of helping adults learn, Knowles (1970) first conceived of self-directed learning as the natural state of learning for adults as opposed to pedagogy, the dependent way children learn. However, after K-12 teachers began contacting him to describe the success of his model with children, Knowles (1980) reconceptualized pedagogy and andragogy as two ends of a continuum for various educational concepts regardless of age. In this new view, the degree of a learner's maturity depends on the situation. He gives an example that both children and adults may be dependent when learning something unfamiliar, but they may both be self-directing when the learning activity is a familiar one.

Candy (1991) and Kerka (1994b) also note the situational aspects of engaging in self-directed instruction. Candy observes that even a learner who has been an autonomous, successful learner in the past may have difficulty with carrying out certain learning activities. He explains that the "type of learning project, the level of learning, and the learner's purposes all interact in complex ways that affect the learning outcome"

(p. 309). Kerka proposes that learners may be more or less able to engage in self-directed learning depending upon factors such as “learning style, exposure to self-direction, familiarity with subject matter, expectations of schooling and learning, motivation, length of time away from formal schooling, [and] social and political context” (n.p.).

The fact that individuals can improve their learning abilities by changing their self-beliefs has been shown by Dweck’s (2000, 2006, 2008) personality research. Her research indicates that personality is not necessarily fixed from birth, or even into adulthood; there are some aspects of personality that are inherent, but, for the most part personality is “a flexible and dynamic thing (Mischel & Shoda, 1995) that changes over the life span and is shaped by experience (Roberts, Walton, & Viechtbauer, 2006)” (Dweck, 2008, p. 391). Dweck’s (2000, 2006, 2008) research indicates that personality characteristics have a significant impact on one’s attitude and approach to learning. Her concept of personality factors associated with fixed and growth mindsets is useful in discussing attributes of a self-directed learner. In fact, Dweck’s (2000) description of “mastery-oriented” qualities in a successful person corresponds to the description of a self-directed learner: “they love learning, they seek challenges, they value effort, and they persist in the face of obstacles” (p. 1).

The fixed mindset is characterized by a belief that intelligence, personality, and abilities are not changeable. This creates a view that fixed qualities are more important to achieving success than effort. People with the growth mindset, on the other hand, enjoy challenges and constantly strive to improve their abilities. Based on Dweck’s research, it can be surmised that self-directed learning personality characteristics are not fixed—they can be developed. Her theory of fixed/growth mindset and personality change

emphasizes that the psychological aspects of successful learning such as effort and flexible mindset can be more important than mental acuity.

According to Guglielmino (2008) and Deci and Ryan (1981, as cited in Oddi, 1984), being a self-directed learner is the natural way to learn. As an example of this inherent disposition found in everyone, Guglielmino (2008) points to the activities of a young child discovering a new object—the child instinctively examines the item and explores its properties through taste, touch, sight, and sound to learn as much as possible about the object. Unfortunately, negative educational learning experiences may create a learning personality marked by dependency, passivity, and rigidity (Merriam, Mott, & Lee, 1996; Oddi, 1984, 1987). Guglielmino (2008) refers to the classroom environment for children as the “manufacturing model of education,” which is “designed to produce uniform results through promotion of conformity, obedience, and memorization of content dictated by others, leading to the transformation of self-directed learners into other-directed learners” (p. 2). Although people are born with a natural drive to learn, for some people, that drive evaporates—learning beyond what is required for daily living is no longer actively sought. Negative learning experiences often have to be overcome by the adult learner—some adult learners must relearn how to learn and redevelop their capacity for being self-directed learners (Smith, 1982). Yet many adults survive the impact of negative learning experiences and preserve their innate self-directed learning characteristics. Therefore, if self-directedness is a quality that can be diminished—it can also be restored and further developed.

The use of self-directed learning techniques in an educational setting may be viewed as an attempt to replicate the natural way that people learn. Most often, however,

as Long (1990) observed, these techniques “generally ignore the psychological process” (p. 332). Relative to this observation, he commented, “This is amazing when learning is basically a psychological event” (p. 332). Understanding the impact of self-beliefs on one’s ability to learn and accurately relate to learning situations is an essential component of the learning process.

There is a difference between learning that takes place because it is required and learning that is self-directed; the former is reactive, while the latter is proactive—this self-directed type of learning requires intent and effort to continuously seek learning beyond what is needed for daily living. Garrison (1992) observes, “an individual can only learn if he or she actively makes that decision, either voluntarily or through coercion. Less active or coercive learning may result in superficially acquired information that may not have a lasting presence or may deter further learning” (pp. 141-142). As Boyatzis (2001) points out “adults learn what they want to learn” (p. 10). People easily forget or discard what they learn unless it is important to them. Boyatzis discusses behavioral change as the outward reflection of an intentional internal change. Related to this view of learning, his definition of self-directed learning is “self-directed change in which you are aware of the change and understand the process of change” (p. 10).

Merriam and Caffarella (1999) explored self-directed learning and noted the contrast in two types of intentional learning. There is intentional learning for leisure interests such as a hobby and there is learning for the purpose of coping with a new situation in life. Both involve self-directed learning, but the first is dealing with the familiar, whereas the latter deals with the unknown. The passive or other-directed learner

stagnates in only learning what is necessary to deal with daily life; if an unexpected event arises, this type of learner becomes helpless; whereas the self-directed learner intentionally engages in active problem solving learning behavior. Alternatively, the unexpected event may be the impetus needed by the passive learner to reactivate the self-directed learning drive.

The Interaction between Learning Styles and Self-Directed Learning

Prominent researchers (e.g., Brockett & Hiemstra, 1991; Candy, 1991; Cranton, 2000; Dweck, 2008; Garrison, 1997; Kolb, 1984; Long, 1990; Mezirow, 2000; Oddi, 1984) have noted that self-directed learning personality characteristics and metacognitive skills mutually develop each other in a cycle: As learners improve their ability to learn how to learn, an opportunity for a transformation in perspective is created; this change in perspective supports the development of self-beliefs that are characteristic of self-directed learners. The new self-beliefs lead to a change in personality toward one of self-directedness, which encourages more learning-seeking behavior. This interactive cycle between personality and learning skills may begin at any point in the cycle.

These researchers have emphasized that successful learning abilities are influenced by an individual's personality and self-beliefs. Dweck (2008) theorizes that self-beliefs comprise one's personality; what she calls the middle layer of an individual's personality. James and Maher (2004) emphasize that learning styles are a component of personality. According to these researchers, successful learning attributes, such as those found in integrative learning processes, can be developed.

Individuals are born with a propensity toward certain personality characteristics with learning styles as part of the repertoire that comprises the individual's personality

(Hawk & Shaw, 2007; James & Maher, 2004). Some personality traits are more malleable than others. Consequently, the ability to consciously change one's perspective and, therefore, one's learning orientation, through awareness, provides a basis for examining learning style characteristics in relation to self-directed learner propensity.

Empirical Studies

Learning Style Balance Research

Studies related to learning style balance include a three-year longitudinal study conducted by Geiger and Pinto (1991). A longitudinal study is more appropriate to test changes in learning styles over time. The researchers had noted that cross-sectional studies which proposed to test changes in learning styles over time were flawed because the only way to appropriately test such changes is to track and test the same group of students each year.

The researchers started the study with a group of 55 sophomore business students. Data were collected on 40 of these students during the three year period. After comparing the first year to the second year, the results indicated there were no significant changes in the students' learning style preferences. These results suggested that learning styles are more stable than previously reported in cross-sectional studies. However, the results from the third year reported that a significant change in learning style preference occurred between the junior and senior year. When the results were analyzed, it was discovered that the changes on the learning dimension scores were minor. This slight movement from one direction of the learning dimension pole to the other direction caused scores to be reclassified into a different learning style category. Geiger and Pinto (1991) attributed the significant change in learning style classification to the fact that most of the

students had a balanced learning style preference, that is, their dimensional scores were close to the axes of the intersecting dimensional poles. From these unexpected results, the researchers recommend examining the dimensional scores in addition to the learning style classification results.

While the learning style balance results were a surprise to Geiger and Pinto, the investigators of the next three studies intentionally investigated the learning style balance phenomenon.

For his dissertation, Serrapere (1977) implemented a ten-week training program based on Kolb's experiential learning model. The purpose of the study was to determine if a more balanced learning style could be developed. Twenty adults agreed to participate in five to twelve 40-minute sessions. At the beginning of the program, each participant was given the Learning Style Inventory and three support instruments. The initial sessions matched the learner to his or her preferred style. In the later sessions, two participants with matching styles were grouped with three other participants with different styles. Each participant also received at least one individual session in addition to the individual pre and post conferences.

The results of the program indicated the divergers (65%) had the highest rate of change toward a balanced learning style compared to the accommodators (25%) who had the lowest rate of change. Serrapere, also a diverger, noted that the learning style match between himself and the diverger participants may have contributed to the high percentage of change in this group. For future research, he suggested a comparison of his program results to the results of a program conducted by a facilitator with a converger, assimilator, or accommodator learning style.

Another dissertation by Weger (1990) explored the effects of balanced and flexible learning styles on achievement and attendance. Two learning style instruments, the Kolb LSI and the Gregorc Style Delineator, were used with a subject sample of 96 undergraduate students in an introductory psychology course. Only the results from the LSI will be reported here. Pre and post tests of each instrument were given at a 6-week interval. A balanced learning style on the LSI was defined as scores at or between the 20th and 80th on the LSI scoring grid, while a flexible learning style was indicated by a change in learning style classification from pre to post test. Pre and post tests for learning style balance on the LSI were 44% pre and 30% post. Pre and post tests on the LSI classifications were 38%/33% Assimilators, 33%/33% Divergers, 17%/17% Accommodators, and 13%/7% Convergents. The research findings indicated no significant relationship between grades or attendance and balance or flexible scores. Weger surmised the results may be attributed to the positive experiential environment of the class or perhaps to the encouraging attitudes of the instructors.

The final study to investigate balanced learning styles is one by Mainemelis et al. (2002). They developed a new method of using the LSI to calculate balance on each learning dimension. With a sample of 198 part-time and full-time MBA students, they examined the relationship between balanced/specialized learning styles and two other instruments, the Adaptive Style Inventory and the Learning Skills Profile. Only the results of the Adaptive Style Inventory (ASI) will be reported here. The ASI measures how well one adapts to four different types of situations: divergent, assimilative, convergent, and accommodative. Balance on the prehension dimension (abstract/concrete) did positively correlate with the ASI, while the transformation

dimension (acting/reflecting) did not. The researchers attributed the lack of a significant relationship for learning style balance and the transformation dimension to the high analytical abilities of the MBA students.

Self-Directed Learning Research

In her dissertation to develop the Oddi Continuing Learning Inventory (OCLI), an instrument to measure self-directed learning, Oddi (1984) researched the personality characteristics of self-directed learners. Oddi focused on “the personality characteristics which impel an individual to continue learning over time through various means” (p. 7). From her review of the literature, three overlapping themes emerged as personality characteristics of self-directed learning propensity: proactive drive, cognitive openness, and commitment to learning.

The first theme, proactive drive versus reactive drive, contained attributes of initiative and persistence in learning and included the qualities of “self-regulating behavior, possession of high self-esteem and self-confidence, and engagement in self-initiated and self-sustained learning activity directed toward higher level goals” (Oddi, 1986, p. 99). Thus, this element reflected “a combination of competence and self-actualization motivation” (Oddi, 1986, p. 99). The characteristics associated with cognitive openness versus defensiveness were “openness to new ideas and activities, ability to adapt to change, and tolerance of ambiguity” (Oddi, 1986, p. 99). The third theme, commitment to learning versus apathy or aversion to learning, was characterized by an overall positive attitude toward learning activities.

After a factor analysis of the pilot instrument was completed, three factors emerged: A General Factor, Ability to be Self-Regulating, and Reading Avidity (Oddi,

1984, 1986). The items associated with these factors were the ability to learn independently and through the involvement with others, ability to be self-regulating, an active interest in learning through reading and discussion, seeking learning through diverse means, and cognitive openness. Twenty years later, using a different research technique to analyze the OCLI, Harvey, Rothman, and Frecker (2006) found four factors: Learning with Others, Learner Motivation/Self-Efficacy/Autonomy, Ability to be Self-Regulating, and Reading Avidity (p. 199). In Harvey et al.'s study, the OCLI General Factor was split into the two factors of Learning with Others and Learner Motivation/Self-Efficacy/Autonomy. The Learning with Others factor included items related to openness/defensiveness and commitment/aversion to learning. The Learner Motivation/Self-Efficacy/Autonomy factor included items related to the proactive/reactive learning drive.

For her dissertation to develop the Self-Directed Learning Readiness Scale (SDLRS), Guglielmino (1977) also conducted a Delphi study, which revealed the description of a self-directed learner as

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. (p. 73)

Factor analysis of the data revealed the following factors: self-concept as an

effective learner, openness to learning opportunities, initiative and independence in learning, acceptance of responsibility for one's own learning, love of learning, creativity, ability to use basic study skills and problem solving skills, and positive orientation to the future (Guglielmino, 1977).

The Self-Directed Learning Readiness Scale has been used in studies to correlate personality type with self-directed learning readiness. Wilson (1992) administered the Myers-Briggs Type Indicator (MBTI) and the Self-Directed Learning Readiness Scale (SDLRS) to 134 junior and senior-level adult college students. Based on Jung's psychological type research, the MBTI is an instrument that classifies individuals on four dichotomous scales: Extraversion-Introversion, Sensing-Intuition, Thinking-Feeling; and Judgment-Perception. Wilson found that the intuition psychological type and the thinking psychological type were significant predictors of self-directed learning readiness. The intuitive types are characterized as imaginative, concept-oriented, and focused on meanings and possibilities (Felder, 1996). The thinking types tend to be skeptical and analytical (Felder, 1996). She notes that the literature suggests abstract thinking abilities are prevalent among intuitive types.

In a similar study, using the same instruments with a study sample of 76 adult college students, Johnson, Sample, and Jones (1988) found that the intuitive and the judging types were significant predictors of self-directed learning readiness. The judging types "set and follow agendas [and] seek closure even with incomplete data" (Felder, 1996, n.p.). The significant relationship between the intuitive type and self-directed learning readiness was a common finding in the Johnson et al. study and in the Wilson (1992) study described above.

An analysis of the biographies of twenty experts who personified self-directed learners was done by Gibbons et al. (1980). These individuals had no formal schooling after high school, yet became experts in their field. Their biographies revealed common characteristics such as initiative, drive, persistence, and energy. The experts included well-known personalities such as Walt Disney, Harry Truman, Pablo Picasso, and Amelia Earhart. The researchers found, for the most part, that formal schooling was viewed by the individuals as insignificant or even detrimental to the development of their expertise. Out of the 154 identified characteristics, the top five were “primary experience in the area, industriousness, perseverance, self-disciplined study, [and] curiosity” (p. 46). It is interesting to note that among the top 30 characteristics, the researchers found “Avid Reading (Specific to Field)” which is similar to Oddi’s Reading Avidity and “An incident that Led to a New Perspective” which relates to transformation theory.

Daley (1999) also investigated the learning processes of experts. Although her study did not specifically target self-directed learning, it has important implications for understanding learning development. Her study compared the difference in learning processes between 10 novice nurses and 10 expert nurses. Like Gibbons et al., she found that experts were self-directed—they sought knowledge on their own from various sources including discussions with peers and other professionals. In contrast, the novices tended to attend formal education programs and review policies and procedures. Further, the novices did not seem to understand their own learning processes.

Based on a review of twenty research articles, Candy (1991) compiled a list of attributes connected with self-directed learner competencies. Common among the reported skills, were the abilities to:

- Be methodical and disciplined
- Be logical and analytical
- Be reflective and self-aware
- Demonstrate curiosity, openness and motivation
- Be flexible
- Be interdependent and interpersonally competent
- Be persistent and responsible
- Be venturesome and creative
- Show confidence and have a positive self-concept
- Be independent and self-sufficient
- Have developed information-seeking and retrieval skills
- Have knowledge about, and skill at, learning generally
- Develop and use defensible criteria for evaluation learning. (p. 130)

The flexibility element was noted in Kolb's (1984) investigation into the relationship between self-direction and adaptive flexibility. Kolb modified the Learning Style Inventory to develop the Adaptive Style Inventory (ASI), which is a measure of how well one adapts to four different types of situations: divergent, assimilative, convergent, and accommodative. He defined self-direction as the ability to direct one's own life. To determine self-directedness, he used data from adults which indicated the degree that their life situations controlled their behavior compared to adults who controlled their own person. He found there was a significantly positive relationship between self-directedness and adaptive flexibility.

In his influential research to gain an understanding of adult learning through the

use of learning projects, defined as “highly deliberate learning efforts,” Tough (1975) contrasted “high learners” with “low learners.” The high learners were described as having confidence, clear learning objectives, and a general enjoyment and satisfaction with life. The low learners were characterized by negativity toward new situations and a fear of failure.

Learning Style Research Related to Self-Directed Learning

One of the first studies to connect learning styles with self-directed learning was one done by Theil (1984). Theil used the Adaptive Style Inventory (ASI), which is a modified version of the LSI, to measure learning style. Rather than using a self-directed learning instrument such as the OCLI or SDLRS to determine self-directedness, Theil used Brookfield’s (1981, as cited in Theil) criterion of successful self-directed learners who had no more than sixteen years of formal education. He used this criterion because he wanted to insure that the learning processes of the subjects were not influenced by formal education. The remaining criteria for selecting the subjects were (a) being involved in the same learning project for at least four years, (b) spending less than three months in formal learning activities related to the learning project, (c) having expertise in an area recognized by other experts, and (d) having expertise that is not related to job skills.

There were 11 women and 19 men from French-speaking associations who met all the criteria of a successful self-directed learner. A French translated version of the ASI was used. Approximately three-fourths of the subjects had 13 or less years of formal education, while the remaining fourth had 14 to 16 years of formal education. Eleven of the subjects were in the 18 to 35 year age group. The remaining subjects were 36 years

of age and older—no information about the upper age was provided for this age group. Theil reported that slightly more than half of the subjects were accommodators (active/concrete) and slightly more than a fourth were assimilators (reflective/abstract). The converger style (active/abstract) represented 13.3% and the diverger style (reflective/concrete) represented 6.7% of the subject population.

A surprising finding was that 7 out of the 8 subjects with 14 to 16 years of formal education were accommodators and not assimilators. It was expected that subjects with more years of formal education would rely on their academic backgrounds and prefer more reflective and abstract approaches to learning. Theil speculated that “a given self-directed learning setting could lead the subjects to put aside their habitual way of learning” (p. 241) and adapt their learning style as needed to fit the learning environment.

The first dissertation on the topic of self-directed learning and learning styles was done by Adenuga (1989). Using the SDLRS to measure self-directed learning readiness and the LSI to measure learning style characteristics, Adenuga compared the prehension and transformation learning dimensions to self-directed learning readiness. The subject population in this study was 178 graduate students mostly in the disciplines of social sciences (46.4%) and physical science (51.4%). Adenuga found a significant relationship between self-directed learning readiness and both of the learning dimensions: abstract-concrete (AC-CE) in the direction of the abstract mode and active-reflective (AE-RO) in the direction of the active mode. Adenuga concluded that these results support Kolb’s (1984) theory that both learning dimensions are equally important.

Baxter (1993) used the SDLRS and the LSI to compare learning styles to self-directed learning readiness and determine if either variable had an effect on self-paced

instruction success. Success was indicated by the level of confidence in applying skills learned in a self-paced training program to the job. Confidence level was measured by the Confidence Assessment by Participant (CAP), a modified version of an instrument to assess training effectiveness. The CAP was developed by the corporation where the study took place. Her subject population consisted of 125 adult employees enrolled in self-paced courses at the corporation. The subject sample included both clerical workers and executives and drew from a variety of professional groups such as sales, finance, and legal.

She reported that convergers (active/abstract) are significantly more ready for self-directed learning than are the accommodators (active/concrete) and assimilators (reflective/abstract). There was no significant difference for the diverger learning style group. She attributed the converger group's high level of self-directed learning readiness to the higher education level of this group. Post hoc analysis revealed a significant relationship between readiness scores and formal education levels. There was no significant difference between learning style and self-paced training success confidence levels. However, she found that readiness for self-directed learning had a positive significant relationship with confidence for self-paced training success.

Haggerty (2000) investigated the impact of exposure to self-directed learning instruction techniques and skill development on learning styles. Her population sample was 36 community college students, ages 18-36, enrolled in a freshman biology course. The subjects were given the Inventory of Learning Styles for Higher Education by Jan Vermunt (1996, as cited in Haggerty, 2000) at the beginning and at the end of the semester. Of the variety of learning style instruments, the Inventory of Learning Styles

for Higher Education is one of the more recently developed. This instrument identifies deep processing, self-regulating, personally interested, and knowledge construction preferences (Haggerty, 2000). The self-regulating score was used to assess change in self-directedness.

The results of Haggerty's study indicated there was no statistically significant relationship between using self-directed learning techniques and self-directed learning style. However, there was an increase from 6% to 33% in the number of students who preferred self-directed learning. Through analysis of journals and essays from the subjects, Haggerty concluded that previous years of other-directed instruction during K-12 was an impediment to developing self-directed qualities in the subjects.

Canipe (2001) used the SDLRS and LSI to investigate the relationship between self-directed learning readiness and learning styles and the relationship between self-directed learning readiness and learning modes. The study sample was composed of 240 education and behavioral science graduate students. His findings indicate that self-directed learning readiness is present among all four of the learning styles. There was no significant difference between self-directed learning readiness and the four learning styles. There was a significant relationship between self-directed learning readiness and the abstract conceptualization mode and a negative significant relationship on the reflective observation mode. No significant relationship was found between self-directed learning readiness and the concrete experience mode or the active experimentation mode. Canipe surmised that his results support Kolb's theory that self-directed learning is found among all four of the learning styles. Further, because the scores from his study clustered around the point where the two dimensions intersect, Canipe concluded that the

data support Kolb's assertion that adaptability and flexibility in learning style is related to self-direction in learning.

Summary

Awareness of and subsequent reflection on metacognition concepts and learning style information leads to alternate perspectives of the learning process and expands the learner's ability to adapt as needed to different learning environments. Although developing self-directed learning attributes seems contradictory to the idea of self-directed learning, exploring such concepts builds the basis for unifying the two themes of self-directed learning: self-directed learning as a method of implementing the steps in an instructional process and self-directed learning as a personality attribute (Long, 1990; Taylor & Burgess, 1995).

Adult educators must study the psychological characteristics of learners as they relate to self-directed learning abilities in order to have a basis for designing and implementing instructional methods. For example, while research indicates that learning contracts are successful in improving self-directed learning skills (Caffarella, 1983), this method is not always effective with all learners (Boyer, 2003; Caffarella & Caffarella, 1986; Knowles, 1986; Lemieux, 2001, as cited in Berger, Caffarella, & O'Donnell, 2004). Therefore, learning contracts may be an appropriate approach for self-directed instruction, but an inappropriate approach to helping a learner develop self-directed learning characteristics—in other words, learning contracts may be an instructional method rather than a development method (a method to develop intrinsic self-directed learning attributes).

Research about learning style characteristics of self-directed learners should yield

knowledge that will help educators determine the most productive approaches to develop self-directed learning characteristics in learners. Certain personal attributes or perspectives may be prerequisite to developing the ability to engage in self-directed learning. In order to develop competencies in self-directed learning, it is important to know the characteristics that correlate with the propensity to be a self-directed learner. Strengths in certain learning modes, or the flexibility to adjust learning style according to subject content or instructional method, may be related to self-directed learning propensity.

CHAPTER III

METHODOLOGY

Overview

This correlational study examined the relationship between learning style balance and self-directed learning propensity and the relationship between learning dimension preferences and self-directed learning propensity. Information about the age, gender, graduate degree major, and years of full-time professional work experience were collected to describe the research participants.

Participants

The participants of this study consisted of 117 adult students enrolled in graduate courses in the areas of business, education, and health at a mid-sized comprehensive public university in the southeastern United States during the 2009 spring semester. Adult students were defined as individuals who are at least 25 years of age.

Instrumentation

Two instruments were administered to the participants: (1) The Oddi Continuing Learning Inventory (OCLI), a 24-item Likert scale designed to identify self-directed learners; and (2) The Kolb Learning Style Inventory (LSI), revised 1985, a forced-choice 12-item sentence completion scale designed to determine modes of learning and learning styles. A demographic data sheet was given to obtain descriptive information about age, gender, graduate degree program (business, education, health, other), and number of years of full-time professional work experience.

The Oddi Continuing Learning Inventory (OCLI)

The criterion variable was measured by the Oddi Continuing Learning Inventory

(OCLI). Developed by Lorys F. Oddi for her 1984 dissertation, the OCLI is a self-report Likert scale instrument with 24 items. Each item allows a response ranging from 1 to 7. The propensity for self-directed learning is measured on a continuum from 24 (lowest) to 168 (highest). See Appendix A for OCLI license agreement.

Responding to the need for an instrument to measure propensity for self-directedness in learning as a personality construct rather than a self-instruction construct, Oddi (1984; 1986) developed the OCLI to identify self-directed learners. She explains, “The perspective adopted in the present study, therefore, focused on the personality characteristics of individuals whose learning behavior is characterized by initiative and persistence in learning over time” (Oddi, 1986, p. 98). From the self-directed learning literature, Oddi (1984; 1986) developed an extensive list of personality characteristics associated with being a self-directed learner. She then organized related attributes into groups and structured the groups into three overlapping personality dimensions. Thus, the instrument was “developed around three theoretical formulations describing the motivational, affective, and cognitive attributes of the self-directed continuing learner’s personality: Proactive Drive versus Reactive Drive, Commitment to Learning versus Apathy/Aversion to Learning, and Cognitive Openness versus Defensiveness” (Oddi, Ellis, & Roberson, 1990, pp. 139-140).

After conducting a pilot study of the instrument, Oddi (1984, 1986) further refined the OCLI and conducted a study to assess its reliability and validity. In order to verify the external validity of the OCLI, Oddi tested it with other instruments recognized as reliable and valid. To assess convergent validity, three instruments were selected to measure variables related to the OCLI’s construct of self-directed continuing learning. A

fourth instrument designed to measure a variable unrelated to self-directed continuing learning was used to measure discriminate validity.

Oddi (1984, 1986) chose the Leisure Activity Survey (LAS), which measures adult participation in educational activities, to validate the Commitment to Learning versus Apathy or Aversion to Learning (CL/AAL) dimension. The Internal-External Scale (I-E Scale), a measure of locus of control, was selected to validate the Proactive Drive versus Reactive Drive (PD/RD) dimension. Four subscales from the Adjective Check List (ACL), a measure containing adjectives for various personality characteristics, were used as follows: (1) The Affiliation subscale, which describes adaptability in interpersonal relationships, corresponded to the CL/AAL dimension; (2) the Endurance and Self-Confidence subscales related to the PD/RD dimension; and (3) the Change subscale, which contains adjectives associated with a range of attributes from being inventive to being over controlling and conventional, was used with the Cognitive Openness versus Defensiveness (CO/D) dimension. In researching self-directed learning attributes, Oddi found that intelligence is not a determining factor for being a self-directed learner; therefore, the Shipley Institute of Living Scale (Shipley), which measures adult intelligence (IQ), was chosen to demonstrate discriminate validity.

For the validation study, Oddi (1984, 1986) administered the OCLI along with a demographic questionnaire and one of the above mentioned instruments to 271 graduate students in the areas of law (N=110), adult education (N=83), and nursing (N=78). The sample included 106 men and 165 women (Oddi, 1984). The final scores from the study ranged from 44 to 161 (Oddi, 1984, 1986). Oddi (1986) found that “The total group (271) exhibited a range of 117, a mean of 123.627, a standard deviation of 19.026, and a

median of 126” (p. 102). After deleting two items that correlated negatively with the total score, “the remaining 24 items yielded an internal consistency (standardized coefficient alpha) of .875. Test/retest reliability was .893” (Oddi, 1986, p. 103). Except for the I-E Scale and the Change subscale of the ACL, the instruments chosen to measure convergent validity did show significant correlation with the OCLI; and the Shipley, selected as a measure of discriminate validity, did not significantly correlate with the OCLI. The final results verified that the OCLI is a valid and reliable instrument to measure self-directed learning propensity.

Further evidence of the validity of the OCLI is provided by Six (1989) and Harvey, Rothman, and Frecker (2006). Using the data sets from Oddi’s original study (N=271), Lander’s study (1989 as cited in Six, 1989) (N=98), and his own 1987 study (N=328), Six (1989) investigated the factor analysis of the OCLI to determine if the factors established in the validation study would replicate across other study samples. Six (1989) found that “the factors derived by Oddi do not break up to form new factors under different study conditions” (p. 50). The study results indicate that the OCLI factors replicate across samples and that the core dimensions are sound.

Harvey et al. (2006) used OCLI scores from a previous research project (N=250) with a study population of Canadian undergraduate medical students to replicate Oddi’s obliquely rotated factor analysis. Their factor analysis results were comparable to those of Oddi (1984, 1986) and Six (1989). The Six study differed from the Oddi study by one item, while the Harvey, et al. study differed by two items (Harvey et al., 2006, p. 192).

In the field of adult education, the two primary self-report instruments designed to measure self-directed learning attributes are the Oddi Continuing Learning Inventory

(OCLI) and the Self-Directed Learning Readiness Scale (SDLRS). According to West and Bentley Jr. (1991), the main focus of the SDLRS is “an enthusiasm or excitement for learning” while the OCLI’s primary focus is “a proactive approach to learning” (p. 76). The OCLI was selected for this study because its theoretical basis includes attributes of flexibility, adaptability, and self-regulating behavior as characteristics of self-directed learners.

The Kolb Learning Style Inventory (LSI)

The Learning Style Inventory (LSI) version 2 (1985) developed by David A. Kolb was used to collect data on the predictor variables. Originally developed in 1976, a second version of the LSI was developed in 1985. The LSI was revised again in 1996 as LSI-2A and in 1999 as version 3 (LSI-3) (Kayes, 2005). According to Kayes (2005), practically no empirical research has been done on these last two versions of the LSI (p. 249). In reviewing the literature, this researcher found that most of the published studies are based on the LSI 1985 version. Therefore, the LSI 1985 version was used in this study and is referred to as the LSI. When versions other than the 1985 version of the LSI are referenced, a parenthetical notation will be made to indicate the version used.

The LSI uses a forced-choice sentence completion method to obtain raw scores for four learning modes. The learning modes are Abstract Conceptualization (AC) (conceptualizing), Concrete Experience (CE) (experiencing), Active Experimentation (AE) (acting/doing), and Reflective Observation (RO) (reflecting). Four possible sentence endings, which correspond to the four learning modes, are ranked from 1 to 4 for each of 12 sentences.

After obtaining a raw score for each mode, combination scores are obtained. The

combination scores indicate a preference for the learning mode on two bi-polar learning dimensions: the prehension learning dimension of conceptualizing/experiencing (AC – CE) and the transformation learning dimension of acting/reflecting (AE - RO). To arrive at the combination score for the prehension dimension, the CE scores are subtracted from the AC scores (AC-CE). Likewise, to arrive at the combination score for the transformation dimension, the RO scores are subtracted from the AE scores (AE-RO). This study used the two combination scores to determine the preference for abstract or concrete experiences on the prehension dimension and the preference for action or reflection on the transformation dimension.

Learning style balance for each dimension was measured by the degree of distance from the center intersecting point of the two bi-polar learning dimensions using the scoring method devised by Mainemelis et al. (2002). With this scoring method, learning style balance on each learning dimension is calculated from the absolute value point of the two dimensions adjusted for population variation (p. 8). According to Kolb (1985) in the LSI Self-Scoring Inventory and Interpretation Booklet, “The closer the data point is to the center of the grid, the more balanced your learning style. If the data point falls near any of the far corners of the grid, you tend to rely heavily on one particular learning style” (p. 6). The formulas for learning style balance are $ABS[AC-(CE+4)]$ for the AC-CE prehension dimension and $ABS[AE-(RO+6)]$ for the AE-RO transformation dimension. A score of 0 represents the mid point or absolute balance between the two dialectical modes on each dimension. Therefore, low scores indicate more balance, while high scores indicate less balance between the two opposing modes on each dimension. The total range of learning style balance scores on the AC-CE prehension dimension are

0 to 40 while the range for the AE-RO transformation are 0 to 42.

Designed to measure learning style preferences of adults, the LSI is based on experiential learning theory, which emphasizes “the central role that experience plays in the learning process” (Kolb, 1984, p. 20). In reviewing the literature on learning style instruments, Curry (1983) organized the instruments into three layers and placed the LSI (1976) into the information processing group between the inner personality layer and the outer environmental interaction layer. Hickcox (1995) describes information processing as “a set of processes that function at the intersection between fundamental personality levels, individual differences, and environmentally based learning format choices” (p. 32).

The LSI is based on an ethnically-diverse sample of 801 females and 638 males with ages ranging from 18 to 60 and an average of two years of college. The population sample was drawn from 21 different career fields (Smith & Kolb, 1986, p.75). Cronbach alpha scores indicate good internal reliability. The learning mode raw scores range from .73 to .83, and the combination scores range from .81 to .88 on Cronbach alpha. Tukey’s test reveals excellent additivity scores for the combination scores: 1.0 for Abstract-Concrete and .99 for Active-Reflective (Smith & Kolb, 1986, p.74).

Reviews for the LSI are mixed. One criticism of the LSI is directed at the forced choice scoring method for the learning modes which results in ipsative scores (e.g., Atkinson, 1991; Cornwell, Manfredo, & Dunlap, 1991; Henson & Hwang, 2002; Ruble & Stout, 1994), that is, a high score on one mode automatically results in low scores on the other three modes. Ipsative scores cannot be factored; thus, the usual statistical analyses cannot be performed (Henson & Hwang, 2002; Loo, 1996; Mainemelis et al.,

2002). However, as Mainemelis et al. point out, the two dimensional scores are not ipsative.

Other criticisms of the instrument focus on reliability and validity. In addition to his own 1989 study with first year college students (N=107) which found coefficients ranging from .49 to .72 over a 5-week interval, Atkinson (1991) noted two other studies, Sims et al. (1986) and Veres et al. (1987), that revealed low stability. The first study by Sims et al. tested 181 undergraduate students at a 5-week interval and found coefficients ranging from .24 to .66. In the second study, Veres et al. found coefficients ranging from .25 to .56 for an industrial sample (N=230) when tested at a 3-week interval (n.p.). However, Atkinson also noted, "While Kolb (1985) reported alpha coefficients in the .70s and .80s for the LSI-1985, three independent studies reported alpha coefficients that were generally higher" (n.p.).

DeCoux (1990) examined several nursing research studies, which used the LSI to investigate topics such as differences among nursing students in different degree programs, learning style and achievement, and teacher/learner learning style match. DeCoux found that the studies either showed no relationship between learning style and the research variables or the results were inconsistent with Kolb's predictions. Due to the validity and reliability problems associated with the LSI, DeCoux recommends discontinuing use of the LSI in nursing research.

After reviewing numerous studies, Loo (1997) concluded that "test-retest correlation, differences between means and other methods emphasizing group effects" (n.p.) were inappropriate methods to study stability and change in learning styles. He explains, "A more central concern in this paper is that stability and change were assessed

using statistical techniques that are more appropriate for ‘dimensions’ than ‘categories’” (n.p.). The four learning styles in the LSI are categories rather than dimensions and other statistical techniques could be more useful in assessing the stability and change” (n.p.). Related to Loo’s finding are studies that found support for the two dialectical learning dimensions (e.g., Geiger & Pinto, 1991, 1992; Loo, 1996, 1999; Yahya, 1998). According to Metallidou and Platsidou (2008), most of the LSI research studies have supported the internal reliability of the learning mode constructs, and the empirical studies that have been critical of the LSI construct validity involved the constructs of the learning styles instead of the learning modes (p. 115).

In analyzing 81 studies and articles about the LSI and/or Kolb’s experiential learning theory, Hickcox (1991) found that 61.7% or 50 studies supported the theory and/or the instrument, 16.1% or 13 studies showed mixed support, and 22.2% or 18 studies did not support Kolb’s theory or the LSI (p. 319). Hickcox noticed that “the majority of adult education researchers in four academic areas found Kolb’s formulation of experiential learning theory and/or the LSI effective and applicable” (p. 319). Hickcox observed that the researchers who criticized the LSI either did not appreciate or did not understand the underlying theory of the instrument. She states, “The researchers who have opposed Kolb’s theory and/or LSI tended to focus on the quantitative psychometric arguments and placed less emphasis on the meaning and theoretical framework of the theory. Whereas [sic] the researchers who have supported Kolb’s theory and/or LSI tended to emphasize the theory and understanding of the theory’s applications” (pp. 319-320). Kolb (1984) emphasized that learning style should be viewed as a stable state instead of a fixed trait. This flexibility of learning style can have a negative effect on the

psychometric results of most research studies. Another explanation for conflicting results with the LSI was noted by Geiger and Pinto (1991) who observed design flaws in learning style research that used “cross-sectional methodologies to test longitudinal hypotheses” (p. 761). Curry (1983) found that most of the learning style studies with negative results were too rigid and simple in their designs because they treated learning styles as if they were fixed attributes like eye color (p. 5).

Even though Garner (2000) argued that there are flaws in Kolb’s work, Garner agreed that “Kolb’s learning cycle has a positive role to play in informing students about the learning processes” (p. 347). In addition to citing studies negative to the LSI, Garner cited positive studies that “all strongly emphasized the usefulness of Kolb’s learning style theory with respect to individual development and the learning process, highlighting that it was a useful way of showing the different possible approaches to learning” (p. 347). Garner further stated, “The implications for Kolb’s work is [sic] that it is appropriate to use his ideas to make the learning process explicit, increasing learners, [sic] awareness of different approaches to, and stages within, learning” (p. 347).

Criticisms regarding test-retest reliability of the LSI may be attributed to balance on the learning style dimensions whereby the difference of one point on the scale results in a different learning style classification. Studies that conclude the LSI is not a valid indicator of learning style may be flawed because the research methodology in these studies did not recognize the influence of balanced learning styles upon the test-retest results. A three-year longitudinal study of college students (N=40) by Geiger and Pinto (1991) illustrates the importance of examining the placement of the learning style scores. They observed, “the majority of subjects exhibited somewhat ‘balanced’ learning style

preferences; that is, they could be graphically represented as being classified somewhat near the axes of Kolb's (1985) learning style grid" (p. 761). They also noted a significant change in learning style classifications, which they attributed to having a high number of subjects with balanced learning styles in the study. "To test this assumption, the scores of subjects were plotted on Kolb's learning style grid. The results support the contention that significant classification changes were possible due to the proximity of many respondents to the two axes" (p. 761). It appears that over a period of time, individuals who have balanced learning styles are more likely to show a change in learning style than those individuals who have extreme learning styles.

Three criteria are recommended for selecting a learning style instrument: conceptual or theoretical base; research data, which include validity, reliability and norms; and practical considerations such as ease of administration and scoring and interpretation (James & Blank, 1993; James & Maher, 2004). The LSI was selected for this study in accordance with these criteria. First, the theoretical underpinning of the LSI matches the concept of self-directed learning. Second, the validity and reliability issues concerning the LSI target the four learning styles rather than the combination scores, which are used in this study. Furthermore, the test-retest reliability criticisms do not take into account balanced learning style scores that border different learning style classifications. Third, the LSI was normed for adults. Fourth, the LSI only requires approximately five minutes to administer, and it is easy to score and interpret. Finally, since the purpose of this study was to research learning style characteristics that are related to self-directed learning, the LSI was a good fit because it measures learning preferences, not fixed styles.

Although there have been questions about the psychometric strength of the LSI, the theory base that experience is central to the learning process made the LSI the best suited instrument for this study. The developmental aspects of integrated learning attributes correspond to the ideology of self-directed learning characteristics of adult learners. Further, the LSI's design, which yields scores that can be used to indicate learning style balance, was a key factor in selecting the LSI to measure the predictor variables.

Demographic Questionnaire

Information about the age, gender, graduate degree program (business, education, health, other), and years of full-time work experience of the participants was collected with a demographic questionnaire (Appendix B).

Procedures for Data Collection

Data collection was conducted as follows:

1. Approval from the Human Subjects Protection Review Committee was obtained (Appendix C).
2. Graduate classes in business, education, and health with adult students who met the age criterion were identified.
3. Upon approval from instructors of identified classes, the oral presentation and a copy of the oral presentation were given in the classes to explain the study and solicit subjects.
4. Depending upon the instructor's schedule, the instruments were given in class or during the class break.
5. Participants were administered the Oddi Continuing Learning Inventory (less than

ten minutes), the Kolb Learning Style Inventory (five minutes), and the demographic data sheet (one minute).

Analysis of Data

The predictor variables were learning dimension and learning style balance. The criterion variable was the propensity for self-directed learning. All hypotheses were tested by Pearson correlation at the .05 level of significance.

CHAPTER IV

RESULTS

Overview

The purpose of this study was to investigate the relationships of learning style balance and learning dimensions to self-directed learning propensity among adult learners. Only individuals 25 years of age or older were recruited to participate in the study. Data were collected from subjects enrolled in traditional face-to-face graduate courses in the colleges of business, education, and health. A total of 119 subjects participated in this study. Responses from two subjects were removed due to inaccurate completion of one of the research instruments; this left a total of 117 responses for analysis.

Descriptive Data

Table 1 lists the age, gender, years of professional work experience, and graduate degree program data collected for this study. These data were collected for description purposes only and were not planned to be used as variables.

Age

The data revealed that most of the subjects were in the age bracket of 25 to 30 (47%). The age bracket of 31 to 35 was the next largest group representing almost 20% of the subjects. The fewest number of subjects—just slightly over 9%, were in the age brackets of 46 to 50 and 51 to 55 combined. Although the demographic questionnaire allowed for responses from subjects in the age groups of 56 to 60, 61 to 65, and 66 or older, none of these age groups were selected.

Table 1

Demographic Data

Demographic	Frequency	Percent
Age		
25 to 30	55	47.0
31 to 35	23	19.7
36 to 40	13	11.1
41 to 45	15	12.8
46 to 50	6	5.1
51 to 55	5	4.3
Gender		
Female	78	66.7
Male	39	33.3
Professional Work Experience		
0 years	6	5.13
1 to 5 years	43	36.75
6 to 10 years	29	24.79
11 to 15 years	14	11.96
16 to 20 years	14	11.96
21 to 25 years	8	6.85
26 to 30 years	3	2.56

Table 1 (continued).

Demographic	Frequency	Percent
Graduate Degree Program		
Business	29	24.79
Education	36	30.77
Health	43	36.75
Other	9	7.69

Gender

By gender, the sample contained more females ($n=78$) than males ($n=39$), with females comprising two-thirds of the subject population. By graduate degree program, there were 15 females and 14 males in business; 28 females and 8 males in education; 27 females and 16 males in health; and 8 females and 1 male in other programs.

Professional Work Experience

The number of years of professional work experience ranged from 0 to 30 years. More than a third (37%) of the subjects had 1 to 5 years of work experience as a professional. Almost 25% of the group had 6 to 10 years of professional work experience, while 24% were in the 11 to 20 year range for such work experience. The single largest frequency was 15 subjects with 5 years of experience. Only 5% of the subjects did not have any professional work experience.

Graduate Degree Program

The graduate degree program data were almost evenly distributed among the

three colleges of business, education, and health, with business having the fewest number of subjects and health having the largest number of subjects. There were 29 business majors, 36 education majors, and 43 health majors. The education majors represented 6% more of the total group than the business majors while the health majors represented 6% more of the total group than the education majors. The health majors represented 12% more of the total group than the business majors. Less than 8% of the respondents indicated a degree program of “other.”

Descriptive Statistics

Table 2 contains the descriptive statistics for the learning modes, the two learning dimensions, the balance on each of the two learning dimensions, and the Oddi Continuous Learning Inventory (OCLI).

Learning Dimensions

Learning mode scores are prerequisite to calculating scores for the variables of learning dimensions and learning style balance. The learning modes, which represent approaches to taking in and processing experience, are abstract conceptualization (AC), concrete experience (CE), active experimentation (AE), and reflective observation (RO). In response to 12 sentence endings on the Learning Style Inventory (LSI), subjects ranked their choice of learning modes on a scale of 1 to 4, with 4 as most descriptive of their approach to learning and 1 as least descriptive of their approach to learning. Because the modes on each of 12 sentence endings are ranked from 1 to 4, the minimum score for any one mode is 12 while the maximum score for any one mode is 48. In this study, the scores on the CE and AC modes each ranged from 12 to 48; the RO scores ranged from 14 to 47; and the AE scores ranged from 17 to 48.

Table 2

Descriptive Statistics – Scales, Means, Standard Deviations, and Minimum and Maximum Scores

Scale	Mean	Standard Deviation	Minimum	Maximum
Learning Modes (range 12 to 48)				
AC	32.94	7.53	12	48
CE	24.03	7.85	12	48
AE	32.14	7.62	17	48
RO	31.37	8.10	14	47
Learning Dimensions (Prehension range -36 to 36; Transformation range -36 to 36)				
Prehension AC-CE	8.91	13.08	-34	32
Transformation AE-RO	.77	13.39	-28	30
Learning Style Balance (Prehension range 0 to 40; Transformation range 0 to 42)				
Prehension AC-CE	11.06	8.48	00	38
Transformation AE-RO	11.56	8.49	00	34
OCLI (range 24 to 168)	123.04	17.07	65	154

Learning dimensions are representations of the learning processes which are used in combination to take in and process experience. The prehension or taking in dimension contains the bi-polar opposite learning modes of abstract conceptualization (AC) and concrete experience (CE). The transformation or processing dimension contains the bi-polar opposite learning modes of active experimentation (AE) and reflective observation (RO). The learning dimension scores indicate one's preference for taking in experience

abstractly or concretely on the prehension dimension and the preference for transforming experience actively or reflectively. To calculate scores on the prehension dimension, CE scores are subtracted from AC scores (AC-CE). Similarly, to calculate scores on the transformation dimension, RO scores are subtracted from AE scores (AE-RO). These combination scores are then plotted on a scoring grid whereby the prehension dimension, represented by a vertical line, and the transformation dimension, represented by a horizontal line, intersect. Because the intersecting point of the prehension and transformation dimensions on the LSI scoring grid is based on population percentile scores, rather than zero, a score of 4 on the prehension dimension and a score of 6 on the transformation dimension represent the points closest to where the two dimensions intersect.

It should be noted that although the scores shown on the LSI scoring sheet grid range from -27 to 29 on the prehension dimension and from -21 to 28 on the transformation dimension, in actuality, the scores have the potential to range from -36 to 36 on each dimension. Since there are twelve sentences with a rank order choice from 1 to 4 for each mode, the highest possible score on a single mode is 48 while the lowest possible score on a single mode is 12. For example, using the formula AC-CE on the prehension dimension, if the AC score is 48 and the CE score is 12, the resulting score is 36; however, if the AC score is 12 and the CE score is 48, the resulting score is -36.

Because the intersecting point for the prehension dimension is slightly above 4, scores from 4 to 36 are in the direction of the abstract mode; and scores from 3 to -36 are in the direction of the concrete mode. In this study, the scores on the prehension learning dimension of abstract conceptualization – concrete experience (AC-CE) ranged from 32

to -34. The scores on the abstract side of the dimension ranged from 4 to 32, while the scores on the concrete side of the dimension ranged from 3 to -34. The mean score of 8.9060 on the prehension dimension was in the direction of the abstract mode. The standard deviation was 13.08. This preference for the abstract mode over the concrete mode for graduate students corresponds to findings in the studies done by Adenuga (1989) and Mainemelis et al. (2002).

The intersecting point for the transformation dimension is slightly to the right of a score of 6; therefore, scores from 5 to -36 are in the direction of the reflective mode; and scores from 6 to 36 are in the direction of the active mode. In this study, the scores on the transformation dimension of active experimentation – reflective observation (AE-RO) ranged from -28 to 30. The scores on the active side of the dimension ranged from 6 to 30, while the scores on the reflective side of the dimension ranged from 5 to -28. The mean score of .7692 on the transformation learning dimension was in the direction of the reflective mode. The standard deviation was 13.39. This preference for the reflective mode over the active mode conflicts with the findings in the studies done by Adenuga (1989) and Mainemelis et al. (2002).

In this study, the mean score on the prehension dimension was only five points from the intersecting point and the mean score on the transformation dimension was only four points from the intersecting point. This indicates that there were relatively few extreme scores on either dimension. However, of the extreme scores that did occur in this study, some were close to the most extreme scores possible.

Learning Style Balance

The balanced profile scoring method developed by Mainemelis et al. (2002) was

used to calculate balance on each of the two learning dimensions. The formulas are $ABS[AC-(CE+4)]$ for the AC-CE prehension dimension and $ABS[AE-(RO+6)]$ for the AE-RO transformation dimension. As described in chapter three, these formulas set the balance point for each dimension to 0; that is, a score of 0 represents the mid point or absolute balance between the two dialectical modes on each dimension. Therefore, low scores represent more balance or integration between the two dialectical modes, while high scores represent less balance or more specialization toward one mode over the other mode. The total range of possible balanced scores on the AC-CE prehension and the AE-RO transformation learning dimensions are 0 to 40 and 0 to 42 respectively. In this study, the balanced scores on the AC-CE prehension learning dimension ranged from 0 to 38, with a mean of 11.06 and a standard deviation of 8.48. On the AE-RO transformation learning dimension, balanced scores ranged from 0 to 34, with a mean of 11.56 and a standard deviation of 8.49. The balanced score ranges and standard deviations in this study are similar to those reported in the Mainemelis et al. (2002) study. They found balanced scores on the prehension dimension that ranged from 0 to 33, with a mean of 11.04 and a standard deviation of 7.39, while balanced scores on the transformation dimension ranged from 0 to 33, with a mean of 10.90 and a standard deviation of 6.83.

Oddi Continuous Learning Inventory (OCLI)

OCLI scores ranged from 65 to 154, a range of 89. The total possible scores on the OCLI are from 24 to 168, a range of 144. The mean score for the OCLI was 123.042 with a standard deviation of 17.065. The scores in this study are similar to the OCLI's normative mean score of 123.627 and standard deviation of 19.026 (Oddi, 1984, 1986).

The range of 89 in this study is smaller than the range of 117 found in the OCLI norm scores.

Statistical Data

In this study, the following research questions were tested by Pearson correlation at the .05 level of significance:

1. Is there a significant relationship between the prehension learning dimension of abstract conceptualization – concrete experience (AC-CE) and self-directed learning propensity for the adult learner?
2. Is there a significant relationship between the transformation learning dimension of active experimentation – reflective observation (AE-RO) and self-directed learning propensity for the adult learner?
3. Is there a significant relationship between learning style balance on the prehension learning dimension of abstract conceptualization – concrete experience (AC-CE) and self-directed learning propensity for the adult learner?
4. Is there a significant relationship between learning style balance on the transformation learning dimension of active experimentation – reflective observation (AE-RO) and self-directed learning propensity for the adult learner?

Questions 1 and 2 involved the predictor variables of each of the two learning dimensions and the criterion variable of self-directed learning propensity. As shown on Table 3, there was no significant relationship between the prehension learning dimension of AC-CE and self-directed learning propensity. The transformation learning dimension of AE-RO was significantly correlated with self-directed learning propensity at the .227 level with significance at $p < .05$.

Table 3

The Relationship between Learning Dimensions and Self-Directed Learning Propensity

Variable	Pearson Correlation	Significance
Learning Dimension		
Prehension AC-CE	-.078	.401
Transformation AE-RO	.227	.014

Questions 3 and 4 were concerned with the correlation between learning style balance on each of the learning dimensions and self-directed learning propensity. Table 4 shows there was no significant relationship between learning style balance and self-directed learning propensity on either learning dimension.

Table 4

The Relationship between Learning Style Balance and Self-Directed Learning Propensity

Variable	Pearson Correlation	Significance
Learning Style Balance		
Prehension AC-CE	.070	.450
Transformation AE-RO	-.081	.388

Figure 2 shows the distribution of scores on the Learning Style Inventory scoring grid. Three scores are not shown on the grid because they were identical to another score; these overlapping scores are represented by a single icon. As shown on the grid, the majority of the subjects were in the assimilator category. There were 46 subjects in the

assimilator category (reflective/abstract), 26 subjects in the diverger category (reflective/concrete), 26 subjects in the converger category (active/abstract) and 19 subjects in the accommodator category (active/concrete). Even though the reflective mode of the transformation dimension and the abstract mode of the prehension dimension had an equal number of scores, only the reflective orientation had a significant relationship with self-directed learning propensity.

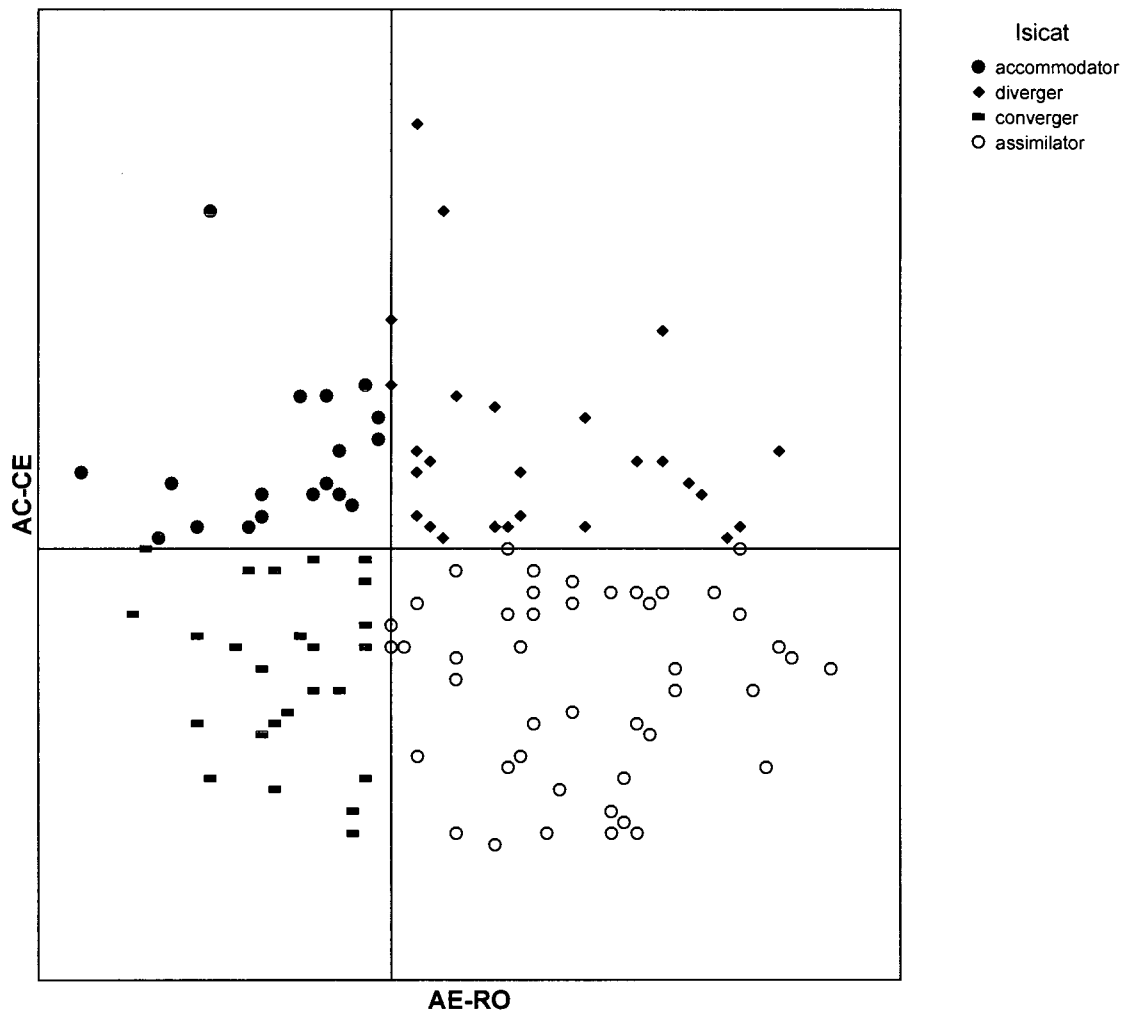


Figure 2. Distribution of Learning Style Inventory Scores

Ancillary Findings

Although age, gender, professional work experience, and graduate degree program were demographic descriptors rather than variables in this study, the raw data for the demographic descriptors appeared to show a possible relationship between these data and self-directed learning propensity. Therefore, these data were examined.

A one-way analysis of variance of the relationship between each of the demographic descriptors and the OCLI scores revealed that age and gender were the demographics with a significant relationship to self-directed learning propensity. See Table 5 for means and standard deviations. The age relationship was found in the 46-55 year age group, $F(4,112)=2.588, p=.041$. The LSD post hoc procedures revealed that the 46-55 age group scored significantly higher on the OCLI than all the other age groups with the exception of the 41-45 age group. Although the 46-55 age group scored higher on the OCLI than the 41-45 age group, the difference was not significant. A t-test for the gender scores showed that the female scores were significantly higher on the OCLI than the male scores, $t(115)=2.536, p=.013$.

This finding of a significant relationship for higher female scores on the OCLI corresponds to the findings in Oddi's (1984) study. Lema (2006), using the OCLI, also found a significant relationship for females to self-directed learning, but no significant relationship for age to self-directed learning. The significant relationship of age and gender to self-directed learning conflicts with findings from other studies (e.g., Adenuga, 1989; Braman, 1998; Wilson, 1992). It should be noted that these studies were conducted with the Self-Directed Learning Readiness Scale (SDRLS) to measure self-directed learning.

Table 5

The Relationships between Age and Gender and Self-Directed Learning Propensity

	Frequency	Mean	Standard Deviation	Minimum	Maximum
Age					
25 to 30	55	120.2000	18.1122	65	149
31 to 35	23	121.3913	16.9805	68	154
36 to 40	13	121.2308	14.9228	96	143
41 to 45	15	127.7333	16.4424	98	152
46 to 55	11	136.4545	6.3931	125	147
Gender					
Female	78	125.8077	15.9488	68	154
Male	39	117.5128	18.0698	65	147

Other ancillary findings were based on comments made by the research participants. Most of the students were eager to participate in the study and expressed interest in learning more about learning styles and how to improve their ability to learn, especially in subjects that were difficult for them. Some of the students mentioned that they learned in certain ways or that they were “really good” in certain subjects, but were “terrible” in one particular subject. There seemed to be sense of frustration about not being able to learn some subjects as easily as other subjects. One student said her way of learning depended on what she was learning. Her comment seemed to surprise some of the other students.

While taking the OCLI, students would occasionally ask for clarification to a test item. After questioning an item related to reading preferences, one of the students in the 25-30 age group said, “I spend all my time reading for school—I don’t have time to read anything else.” Another student in the same age group made a similar comment about not having time for hobbies because of the amount of time devoted to schoolwork. These individuals may have had low scores on the OCLI which may not accurately reflect their true propensity for self-directed learning.

CHAPTER V

DISCUSSION

The population of adults is extremely diverse—more so than younger populations. Each year of life brings another year of diversity among individuals. Rather than by chronological age, adults may be more accurately defined by learning environments, work and personal life situations and responsibilities, socioeconomic factors, and physical or mental health conditions. As Long (2004) points out, “it is erroneous to speak of ‘*the* adult learner’ as if there is a generic adult that can represent all adults” (p. 25). Therefore, the implications from this study are tentative and should be considered in the broader context of theory building in adult learning and development.

Purpose and Procedures

As Guglielmino (2008) states, the importance of studying self-directed learning is two-fold: self-directed learning is the most natural way to learn; and the fast pace of societal and technological changes demand self-directed learning abilities. Thus, a better understanding of adult learning processes in relation to self-directed learning propensity is important for enhancing educational practices and for supporting theory development in adult learning.

The purpose of this study was to examine the relationships of certain learning style characteristics to self-directed learning propensity. The learning style characteristics investigated were learning style balance, measured by a scoring method developed by Mainemelis et al. (2002), and learning style dimensions as measured by the Kolb Learning Style Inventory (LSI). The Oddi Continuous Learning Instrument (OCLI) was used to measure self-directed learning propensity.

Data for this study were collected and analyzed in the spring 2009 semester. After obtaining approval from the university's Human Subjects Protection Review Committee, graduate classes in business, education, and health with a high number of adult students were identified. Graduate faculty in these classes granted permission to explain the study and solicit subjects in their classes. However, an unexpected obstacle in recruiting participants was encountered. Due to copyright requirements, which restrict electronic dissemination of the instruments, a large number of the adult students who fit the age criterion were not able to participate in the study because they were exclusively enrolled in online courses. Therefore, the study was limited to students enrolled in traditional face-to-face classrooms. Depending upon the instructor's schedule, the instruments were given in class or during the class break. Because the LSI 1985 is no longer in print, permission was obtained from Hay Group to use this version. See Appendix D for the conditional use agreement. Participants were administered the Oddi Continuing Learning Inventory, the Kolb Learning Style Inventory, and a demographic data sheet, which contained information about age, gender, years of professional work experience, and graduate degree program in the categories of business, education, health, and other.

Summary of Findings

This study examined learning style balance and learning dimensions in relation to self-directed learning propensity. In this study, the findings indicate that learning style balance is not significantly related to self-directed learning propensity. However, self-directed learning propensity was found to be significantly related to the transformation learning dimension (active-reflective) in the direction of the reflective mode. No

significant relationship was found between the prehension learning dimension (abstract-concrete) and self-directed learning. An ancillary finding was that age and gender were significantly related to self-directed learning. Females and respondents in the age category 46-55 scored significantly higher on the OCLI than did males and respondents in three other age groups. Finally, comments from some of the students in the 25-30 age group indicated that the amount of time they were devoting to graduate school interfered with learning activities listed on the OCLI as indicating self-directed learning propensity. Most of the students expressed a high interest in learning more about learning styles and in finding ways to improve their learning abilities, yet few seemed to be aware that learning approaches could be flexible.

Conclusions and Discussion

Four research questions guided this study. The first two questions considered the relationships between each of two learning dimensions and self-directed learning propensity. The third and fourth questions dealt with the relationship between learning style balance on each dimension and self-directed learning propensity.

The first question was about the relationship between the prehension learning dimension and self-directed learning propensity.

1. Is there a significant relationship between the prehension learning dimension of abstract conceptualization - concrete experience (AC-CE) and self-directed learning propensity for the adult learner?

The study results showed no significant relationship between the prehension learning dimension and self-directed learning propensity. However, the study group average showed a preference for the abstract mode on the prehension dimension. This

preference for the abstract mode over the concrete mode is consistent with the study groups in studies done by Adenuga (1989), Baxter (1993), and Mainemelis et al. (2002). These researchers speculated that the academic environment, which encourages abstract thinking abilities, influenced students' preference for the abstract mode over the concrete mode.

The second question was about the relationship between the transformation learning dimension and self-directed learning propensity.

2. Is there a significant relationship between the transformation learning dimension of active experimentation - reflective observation (AE-RO) and self-directed learning propensity for the adult learner?

The study results indicated a strong significant relationship between the transformation learning dimension and self-directed learning propensity in the direction of the reflective mode. The averaged scores for the study group as a whole also showed a preference for the reflective mode over the active mode on the transformation dimension.

Similar to the graduate school environment that promotes abstract preferences on the prehension dimension; reflective learning approaches on the transformation dimension are emphasized in a number of disciplines. Some of the disciplines related to the reflective mode are social work, psychology, nursing, education, sociology, and law (Kolb, 1985). Due to the preference for the reflective mode in these disciplines, the high number of subjects in health and education in this study may have been an influencing factor for the research findings in question two.

In graduate school, the focus is on theory and examining ideas from multiple points of view. A focus on multiple perspectives and careful observation are

characteristics of individuals who prefer to learn in the reflective mode. In his research for developing the LSI, Kolb (1984) found that reflective observation learners “reported perceptually related environmental factors as being helpful. These included teachers providing expert interpretations and guiding or limiting discussions, output being judged by external criteria or field or discipline, and lecturing” (p. 200). From Kolb’s description of the reflective learner’s preferences, the traditional face-to-face classroom is more aligned with the learning preferences of the reflective learners than are online courses. This absence of exclusively online learners in this study may have further increased the number of reflective learners in the subject pool. The high number of subjects with preference for the reflective mode and the graduate studies environment, which fosters learning through the reflective mode, provides a possible explanation for the findings in this study.

Questions 3 and 4 had the same results and are discussed together.

3. Is there a significant relationship between learning style balance on the prehension learning dimension of abstract conceptualization - concrete experience (AC-CE) and self-directed learning propensity for the adult learner?
4. Is there a significant relationship between learning style balance on the transforming learning dimension of active experimentation - reflective observation (AE-RO) and self-directed learning propensity for the adult learner?

The study results showed there was no significant relationship between learning style balance on either dimension and self-directed learning propensity. As discussed in Chapter III, on the LSI, a very high score on a single mode will automatically reduce the scores on the other three modes. The lack of correlation between learning style balance

on the transformation dimension and self-directed learning propensity is attributed to the self-directed learners' high scores on the reflective mode. These high scores on the reflective mode may have also interfered with balance on the prehension dimension.

The study group, on average, had a learning style balance level that was approximately one-fourth of the distance from absolute balance on both dimensions; this indicates a moderately high level of learning style balance for the group. It is interesting that the level of learning style balance for the study group was almost identical for the two dimensions. This means that the group, on average, was able to take in experience to the same degree that they transformed experience. There were a few balanced scores on each of the dimensions; however, either these subjects had lower scores on the OCLI, or the subjects with high scores on the OCLI had high reflective mode scores which counteracted the balanced scores.

Ancillary findings indicated significant relationships for the 46-55 age group and for females to self-directed learning propensity. These findings conflict with other studies (e.g., Adenuga, 1989; Braman, 1998; Ware, 2003) that showed no significant relationship between age and gender to self-directed learning propensity. However, a significant relationship between females and self-directed learning has been found in other studies (e.g., Guglielmino, Guglielmino, & Long, 1987; Lema, 2006; Oddi, 1984).

This study had a larger number of subjects in the higher age groups than the studies which indicated no significant relationship between age and self-directed learning propensity. According to Caffarella and Barnett (1994), individuals become more reflective with age. The preference for the reflective mode by academic discipline in combination with the increased inclination for reflection with age may have influenced

the positive correlation between the reflective mode and self-directed learning propensity. In addition, the majority of the female subjects were in the higher age group; therefore, age may have influenced the relationship between self-directed learning propensity and gender.

Finally, the comments and attitudes of the students provided some insight into the subjects' knowledge about and interest in learning style processes. The students' remarks regarding lack of time to engage in self-directed learning activities as measured by the OCLI highlight the situational aspects of self-directed learning.

Upon initial review, the results of this study seem to conflict with Kolb's experiential learning theory. Kolb (1984) theorized that as individuals progress in their learning development, they are able to resolve dialectical learning differences more readily. These dialectical differences are represented as a preference for taking in experience in a concrete or abstract way and transforming experience in an active or reflective way. He conceptualized learning development as a spiral whereby the learner progresses from specialized ways of learning to being able to adapt one's learning approach to meet the demands of the learning environment. As learners move from specialization to integration they move from dependency to self-directedness. According to Kolb, the selection of learning style is related to the context of the learning environment in regard to the content being studied. This may be an explanation for the unexpected results found in this study; that is, the self-directed learners did not demonstrate learning style balance because they had adapted to the learning approach needed to succeed in graduate-level courses for their discipline. Thus, what appears to be specialization in a particular learning style may instead be an adaptation technique.

Hoare (2006) has observed that adults do not need to change their way of interacting with the environment if their current approach is successful; however, when the situation warrants another approach, successful, flexible learners do adapt as needed.

Another possible explanation for the surprising results in this study is that even though the LSI instructions read to rank the twelve sentence endings in the order of how one typically learns, the participants, because they were in a classroom setting, may have responded to the LSI in terms of how they learn in the context of graduate coursework rather than considering how they learn in general. It is also possible that to some of the students the term “learning” is limited to learning that takes place through formal instruction.

Studies have suggested a possible connection between the reflective learning mode on the transformation dimension and success in graduate coursework. Using the LSI, Smits, Verbeek, Nauta, Cate, Metz, and van Dijk (2004) investigated knowledge retention of medical doctors in a health training program. Their results indicated that 40% of the subjects were assimilators. The assimilator learning style includes reflective observation on the transformation dimension and abstract conceptualization on the prehension dimension. The learning styles of the remaining subjects were almost evenly distributed among the other three styles. Their study indicated that the accommodator learning style, which is the opposite of the assimilator style, had the least amount of knowledge retention. Smits et al. further cited research by Lynch (1998) and Pianese, Rydman, and Rubens (1996) that indicated the theoretical exam scores for public health students with assimilator learning styles were significantly higher than the scores of students with other learning styles.

One other possible factor in the high correlation between the reflective mode on the transformation dimension and self-directed learning may be related to the OCLI. Since the OCLI was developed with graduate students in the disciplines of health, education, and law, the OCLI itself may have incorporated some of the same attributes found in learners who prefer the reflective mode.

Even though it was indicated that self-directed learning propensity in this study did not significantly correlate with a balanced learning style, the study results suggest that self-directed learners do adapt to their learning environment. Since integrative development means learners are able to adapt their learning style to the current learning environment as needed, the results may be interpreted to mean that the self-directed learners had adapted to the graduate-level higher education environment. Therefore, it may be concluded from this study that learning style balance may not be an indicator of learning style flexibility for self-directed learners. For self-directed learners, the opposite may be true—a learning style imbalance caused by using a learning mode that matches the environment may be the better indicator of learning style flexibility. In experiential learning theory, the interaction between the “internal personality dynamics and external social forces” (Kolb, 1984, p. 143) is manifested by the individual changing to fit the environment or by the individual selecting an environment that fits his or her personality.

It cannot be determined from the results of this study if the subjects with higher self-directed learning propensity scores are being flexible in their learning style to temporarily match the learning environment or if they are in the specialization stage of development. The latter supposition would be contradictory to the theory of experiential learning, which defines the highest level of adult development as one of integration and

self-direction. Based on experiential learning theory, it may be implied that for adults who have low propensity for self-directed learning, specializing in a learning style that is not congruent with the learning environment may be a deterrent to developing self-directed learning attributes.

Another possibility to consider from the conflicting results of this and other studies related to self-directed learning and learning style (e.g., Adenuga, 1989; Canipe, 2001; Haggerty, 2000; Theil, 1984) is that other, more intrinsic, self-motivating qualities are more relevant to being a self-directed learner than are learning styles (Canipe, 2001). Several researchers have reported positive significant relationships between self-directed learning readiness and psychological variables such as self-efficacy (e.g., Lema, 2006; Oliveira & Simoes, 2006) and resilience (Robinson, 2003).

An additional factor affecting the study results may be related to situational aspects rather than to personality attributes or the skills (readiness) for self-directed learning. For example, one of the graduate students said in response to an item on the OCLI that referred to reading preferences, "I spend all my time reading for school—I don't have time to read anything else." Another student made a similar comment about not having time for hobbies because of the amount of time devoted to schoolwork. These statements, rather than showing lack of self-directed learning propensity, seem to indicate the ability to set priorities. These individuals may have had low scores on the OCLI which may not accurately reflect their true propensity for self-directed learning. If, in fact, these students did score low on the OCLI because of their situation and not because of psychological characteristics or skills, it seems that further investigation into measures of self-directed learning propensity and readiness is warranted.

Student comments and reactions indicated that students are eager to learn about learning processes and ways to improve their learning abilities. In addition, the students in the youngest age group (25-30) did not appear to be aware of learning style theory, and seemed surprised to hear that one could use different learning approaches based on the subject being learned.

Limitations

The participants in this study were all graduate students, 25 years of age or older, in three academic colleges in a mid-sized comprehensive public university in the southeastern United States. The colleges represented were business, health, and education. The research instruments were given to students enrolled in traditional face-to-face classes. The results found in this study may not be generalizable to younger populations with less formal education, or to populations in other geographic areas, colleges, or other departments within the colleges represented in the study. In addition, students enrolled exclusively in online courses are not represented in this study; therefore, the results from this study cannot be generalized to students who are exclusively enrolled in online courses.

There were age differences among the three college groups: a large majority of the business students were in the lowest age group (25-30) while the health and education student age groups were more evenly distributed. There was also a small, but noticeable, difference in the number of students in each college group, with the business college group having the fewest number of students among the three groups. These age and group size disparities between the business group and the other two groups prohibited between-group comparisons by college group.

In conclusion, this research study had the following findings:

1. On average, the overall subject population had fairly high scores on the OCLI. They preferred the abstract mode over the concrete mode on the prehension learning dimension and preference was for the reflective mode over the active mode on the transformation learning dimension. The averaged balanced learning scores were almost identical for both the prehension and the transformation learning dimensions. These averaged balance learning scores were approximately one-fourth of the distance from absolute balance, which indicates a moderately high level of learning style balance for the group.
2. The transformation dimension in the direction of the reflective mode, age, and gender had significant positive correlations with self-directed learning propensity. These relationships may have been influenced by the learning style and self-directed learning instruments, the high number of students in disciplines and in age groups that favor the reflective mode, and the traditional face-to-face classroom setting.
3. There was no significant relationship between the prehension dimension and self-directed learning propensity, nor was there a significant relationship between learning style balance and self-directed learning propensity. Obviously, a high score in the direction of one mode on a dimension prevents learning style balance on the same dimension, and it may also influence the learning style balance on the other dimension.
4. Most students have an interest in understanding learning style information. For some students, situational factors, rather than personality attributes, may inhibit

participation in self-directed learning activities.

Recommendations for Practice

From this study and other studies relating learning style characteristics to self-directed learning, it appears that there is no one style that is exclusively identified with self-directed learning propensity. It appears that self-directed learners have the ability to adapt to the learning environment as needed. However, for individuals who have lower levels of self-directedness, educators can facilitate the development of self-directed learning abilities and learning style flexibility.

By focusing on the characteristics of the learner, education becomes learner-centered rather than teacher-centered. The adult educator's role becomes one of a mentor and facilitator (Guglielmino, 2008), who develops "learning experiences, processes, and environments" (Duderstadt, 2000, p. 84) for the learner. Knowledge and awareness of learning processes and preferences is the first step to helping learners develop abilities to adapt their learning processes to the learning environment, the situation, or to the subject being learned. This understanding of learning processes also has implications for organizations. Often people responsible for instituting new technologies and procedures have little or no background in andragogical concepts. Therefore, they frequently implement changes in a way that are expedient or easily available rather than taking into account the various learning processes of the end users.

Being aware of how people learn should not be limited to the domain of educational psychology. All educators, regardless of their discipline, should have in-depth knowledge of learning awareness principles and practices. Learning concepts should be integrated into all courses and explicitly discussed with the students. However,

unless they were exposed to learning awareness in their education, most educators will feel awkward in incorporating this discussion into their classrooms. Therefore, a university-wide environment of learning awareness should be implemented with a focus on faculty development.

Educators in formal education settings should recognize that most adult learners are transitioning from an action-oriented work environment to a reflection-oriented formal education environment. The ability to make this transition from one environment to another requires learning flexibility, and this flexibility can be developed in all learners. Educators cannot assume that learners who do well in coursework are self-directed learners or that they do not need guidance in learning style flexibility. The factors that lead to learning success in a formal education setting may not be the same factors that determine learning success in other settings (Candy, 1991).

To prepare learners for self-directed learning in e-learning, Guglielmino and Guglielmino (2003) recommend an “awareness” session so that learners can be conscious of and discard “old thought patterns” that have resulted from years of formal educational experiences. They assert that the most important learner quality for success in e-learning is self-directedness, and the prerequisite for developing self-direction is self-knowledge. They encourage assessment of technology readiness, self-directed learning readiness, and preferred learning style. Follow up sessions are held to identify learning obstacles and to develop strategies to improve learner success.

It is recommended that educators use a variety of teaching methods to stretch a learner’s abilities to learn through the four learning modes. By incorporating methods that use all the modes, no single learning type is neglected, and all the learners are

exposed to learning through the other modes. The preferred learning activities for each of the four modes are as follows:

- Concrete experience – Peer feedback, group projects, field trips, demonstrations, role play, and case studies;
- Reflective Observation – Lectures, discussion groups, journal writing, inquiry projects, brainstorming, and writing reflective papers;
- Abstract Conceptualization – Lectures, case studies, individual projects, debates, problem-solving activities, and forums and panels;
- Active Experimentation – Small group discussions, projects, peer feedback, problem-solving exercises, and role plays (Claxton, 1990, as cited in Lewis & Williams, 1994; Kolb, 1984; MacKeracher, 2004).

By guiding learners through the various ways of learning, the educator becomes a mentor who provides learners with the necessary support to try alternate ways of learning.

An educator who plans to use a learning style instrument should carefully consider the purpose for such testing. According to Cranton (2000), psychological instruments are an avenue for learners to gain self-awareness and insight into their learning processes—they should not be used to categorize people. Such instruments should be used by educators to generate examination of and discussion about learning processes. And, as Geiger and Pinto (1991) observed, when using the LSI, the dimensional learning scores should be examined for proximity to the intersection of the prehension and transformation dimensions. This is important because a person who scores close to the intersecting point on one or both dimensions uses learning processes that are very different from the processes used by a person whose score is on the extreme

end of a dimension.

As previously noted, the work environment exerts an influence of specialization on adult development. To facilitate progress toward self-directness and flexibility in learning processes, educators of adults should develop short transition exercises at the beginning of class to enable individuals who work full time to make the mental shift from a work environment to an educational setting. Such exercises are needed because most educational settings require learning processes that are different from the learning processes needed at work. These transition exercises could be in the form of short, small-group discussions about using learning processes appropriate to the learning environment and to the subject being studied. Students could write short daily comments about the learning processes they are using at work and bring these comments to class for discussion during the transition exercises. Such processes integrate learning development with subject knowledge development.

Adult educators are adult learners too. Educators should examine their own learning processes and assumptions about themselves as learners (Cranton, 1994). According to researchers (e.g., Davidson, 1990; Felder, 1996; Kolb, 1984), the learning style of the educator influences the teacher's interaction with learners. To prevent their own learning approach from dominating the education process, educators should use a variety of teaching techniques.

Recommendations for Future Research

With few exceptions, most LSI research results have been reported by the four categories (accommodator, diverger, assimilator, converger) without examining the proximity of the scores to the intersecting point. As Geiger and Pinto (1991) discovered,

it is important to include data about the dimensional scores to track changes and distinguish patterns in the data. By only reporting the categories, important data about the way subjects resolve the dialectical tension between the two modes is lost. However, from studies that contain scatter plots or other graphing information, it appears that in graduate populations there are few extreme scores. This indicates that most graduate students have learned how to adapt their learning style to the environment.

The comments from the students raised questions about situational factors that interfere with self-directed learning activities and their possible responses to the OCLI because of these factors. Brookfield (1986) cautioned against the use of quantitative self-report instruments to measure self-directedness because he was skeptical that such attributes could be quantified. Brookfield (1984, 1986) also questioned the use of structured interviews that do not differentiate between the different types of learning projects. He states, "To compare dealing with divorce or bereavement with learning how to repair a car is methodologically unsound" (1984, p. 17). Brookfield's assessment of different types of learning needs corresponds to Merriam and Caffarella (1999) description of two types of intentional learning: learning for leisure and learning for the purpose of coping with new situations. Both types of intentional learning require self-directed learning abilities, and research is needed to understand the different learning processes involved with these two contrasting learning needs.

Other remarks from the students indicated a high interest in improving learning processes, yet little awareness about learning flexibility. Since the basis for such comments cannot be captured with quantifiable research methods, phenomenological research methods should be used to gain a deeper understanding of adult learning

processes and learners' perceptions and beliefs about learning processes. For future research that uses quantitative measures, perhaps the research method could incorporate a qualitative component to delve deeper into the meanings of the subject's responses to the instruments. This would not only provide insight into the perceptions and thought processes of the learners, but would also provide information for enhancement and further development of the quantitative instruments.

In 1984, Brookfield pointed out that little research had been conducted on the self-directed learning activities of adults with lower education levels (high school or less). Today, there are still few studies about the self-directed learning activities of adults in this group. Attention needs to be paid to groups beyond professionals and populations in higher education. In addition, consideration should be given to activities beyond professional development or spare-time projects. Focus needs to be directed to self-directed learning activities in critical life situations such as matters related to health, finances, family, and community challenges.

The findings from this research study leads to many questions about self-directed learning in relation to learning styles. Is the ability to change easily from one learning style to another learning style a contributing factor in the ability to engage in self-directed learning? If a person learns how to be flexible in learning approaches, would that person become a self-directed learner? It seems reasonable to think that if people are able to learn easily, they would be more motivated to learn—but is that always the case? Are some learning approaches more flexible or less flexible than other approaches? For example, is it easier or more difficult for a reflective style learner to switch to an active style and vice versa for an active style learner?

Questions about self-directed learning characteristics should also be considered. If the propensity to be a self-directed learner is defined as having personality attributes related to effort, initiative, and persistence to pursue learning, are there learning abilities such as metacognitive abilities that coincide with these personality characteristics? To what degree are the personality attributes that are related to effort, initiative, and persistence affected by having access to learning resources and/or by having certain metacognitive abilities?

If, as according to Deci and Ryan (1981 as cited in Oddi, 1984) and Guglielmino (2008), the drive and desire for continuous learning is the natural state of childhood, why isn't everyone a self-directed learner? Guglielmino points to the "manufacturing model of education" found in formal education settings (starting with elementary school) as the main reason for passivity that exists in some adults. So, if we are naturally self-directed learners who, as children, have been subjected to many years of other-directed learning and extrinsic rewards for learning, how do some people maintain a high level of self-directedness while others do not? What factors contribute to self-directedness resiliency? To what degree do past learning experiences influence personality attributes or abilities related to self-directed learning? The self-directed learners in Gibbons et al.'s (1980) analysis of biographies did not have a formal education beyond high school and even reported that formal education had no effect or a negative effect on their learning efforts. This leads to the following questions: Does formal education inhibit self-directed learning propensity? If formal education is an inhibiting influence in self-directed learning propensity, why are some individuals more affected by this influence than others? For those individuals for whom formal education has had a negative influence on

self-directed learning, what can be done to ameliorate the effect? Are the skills needed to learn in formal settings different from the skills needed to learn in informal settings?

Further, Gibbons et al. (1980) found that the self-directed learners had in common positive family environments. Is a positive family environment an essential component to being a self-directed learner? If so, research into family influences on self-directed learning is warranted. Should such a connection be established, what educational practices can be employed to compensate for negative family influences?

To stay productive amid economic, technological, and cultural changes, large organizations utilize experiential learning techniques such as action learning, future learning, and outdoor challenge programs for their employees (Lewis & Williams, 1994), but these programs are too expensive and time consuming for smaller organizations. What are the most efficient, effective, and economical methods that a small or medium sized organization can employ to promote self-directed learning attributes among its employees?

Further research should be conducted to determine if learning style balance is a negative indicator of adaptive learning approaches. Using the learning style balance scoring method developed by Mainemelis et al. (2002), researchers of previous learning style and self-directed learning studies could use their existing data to analyze learning style balance. Additional research on development of the OCLI should consider the possibility of undue influence from the reflective learning mode on this measure of self-directed learning.

For this study, more useful information would have been derived from having a larger pool of subjects and by having a comparable number of subjects by age and gender

in each college group. It would also have been useful to identify the graduate program by master's or doctoral degree and identify specific degree programs (e.g., social work, community health, health education) listed by college group. Having comparable age and gender groups by college group and having specific degree information would have allowed for between-group comparisons by college and by degree program.

Gibbon et al.'s (1980) research of the biographies of famous experts with low levels of formal education indicates a connection between being an expert and being a self-directed learner. It seems reasonable to assume that an expert is not a passive learner, thus, the learning characteristics and methods of experts may serve as a model from which to study self-directed learning. Therefore, it seems that further investigation into this connection between expertise and self-directedness would be productive. A possible area of such research would be to use Daley's (1999) criteria for novice and expert learners to contrast the learning style balance and learning dimensions between the two groups. Such research would be important to understand the different learning processes between these two groups of learners. Understanding the learning characteristics of experts holds promise for understanding adult learning in general and for self-directed learning specifically. Conversely, Oddi (1984) reported that the Johnstone and Rivera (1965) study found evidence of individuals who had little interest in gaining additional knowledge or learning new skills. Research related to finding a common thread among the experiences and characteristics of these learning-apathetic individuals may provide insight into environmental and psychological deterrents to engaging in self-directed learning.

Learning style balance and learning dimension research conducted with different

adult populations and in different settings may have different results from the findings in this study. For further exploration of the connection between learning style characteristics and self-directed learning propensity, this study could be replicated with adult populations who (1) are enrolled in online coursework exclusively, (2) have completed graduate or undergraduate school and are not enrolled in formal education courses, (3) are currently enrolled in undergraduate coursework, (4) have completed high school and have not enrolled in formal education coursework, or (5) who have not completed high school. Different types of environments for this study include (1) other graduate degree programs, (2) undergraduate degree programs, (3) work settings, (4) work training programs, (5) leisure settings, (6) informal leisure (e.g., hobbies) educational programs, and (7) informal non leisure (e.g., medical concerns) educational programs.

APPENDIX A

OCLI LICENCE AGREEMENT

LICENSE AGREEMENT

Lorys F. Oddi (Licensor) hereby grants a license under the copyright on the Oddi Continuing Learning Inventory (OCLI) to the undersigned Licensee on the following terms and conditions:

1. The license is granted only for use of the OCLI in research to be undertaken by the Licensee as specified in the research proposal provided herewith by the Licensee.

2. The license is granted on a royalty-free basis provided the OCLI is used only for the specified research. Any use of the OCLI for other purposes is strictly prohibited without the express written authorization of the Licensor.

3. The Licensee shall include the following statement in any written report (published or communicated to others) of the research undertaken with the use of the OCLI: "For the purposes of this research, a royalty-free copyright license for the use of the OCLI was granted by Lorys F. Oddi."

4. The Licensee shall provide Licensor with a copy of the final version of any written report (published or communicated to others) of the research undertaken with the use of the OCLI. ITEMS OF THE OCLI WILL NOT BE REPRODUCED OR DISTRIBUTED BEYOND SUBJECTS USED IN THIS STUDY.

5. The Licensee shall provide Licensor with item scores and demographic data, which shall be used only for further development of the OCLI.

AGREED this 14 day of March, 1998

Lorys F. Oddi (Licensor)

(Licensee)

APPENDIX B
DEMOGRAPHIC QUESTIONNAIRE

Please fill in the blank or check the blank space next to your answer.

1. What is your age range?

25 – 30 _____

31 – 35 _____

36 – 40 _____

41 – 45 _____

46 – 50 _____

51 – 55 _____

56 – 60 _____

61 – 65 _____

66 or older _____

2. What is your gender?

Female _____

Male _____

3. How many years of professional work experience do you have?

4. Which of the following best describes your current graduate degree program?

Business _____

Education _____

Health _____

Other (specify) _____

APPENDIX C

HUMAN SUBJECTS REVIEW ACTION



 THE UNIVERSITY OF SOUTHERN MISSISSIPPI

Institutional Review Board

118 College Drive #5147
 Hattiesburg, MS 39406-0001
 Tel: 601.266.6820
 Fax: 601.266.5509
 www.usm.edu/irb

**HUMAN SUBJECTS PROTECTION REVIEW COMMITTEE
 NOTICE OF COMMITTEE ACTION**

The project has been reviewed by The University of Southern Mississippi Human Subjects Protection Review Committee in accordance with Federal Drug Administration regulations (21 CFR 26, 111), Department of Health and Human Services (45 CFR Part 46), and university guidelines to ensure adherence to the following criteria:

- The risks to subjects are minimized.
- The risks to subjects are reasonable in relation to the anticipated benefits.
- The selection of subjects is equitable.
- Informed consent is adequate and appropriately documented.
- Where appropriate, the research plan makes adequate provisions for monitoring the data collected to ensure the safety of the subjects.
- Where appropriate, there are adequate provisions to protect the privacy of subjects and to maintain the confidentiality of all data.
- Appropriate additional safeguards have been included to protect vulnerable subjects.
- Any unanticipated, serious, or continuing problems encountered regarding risks to subjects must be reported immediately, but not later than 10 days following the event. This should be reported to the IRB Office via the "Adverse Effect Report Form".
- If approved, the maximum period of approval is limited to twelve months. Projects that exceed this period must submit an application for renewal or continuation.

PROTOCOL NUMBER: 29010501

PROJECT TITLE: The Relationships of Learning Style Balance and Learning Dimensions to Self-Directed Learning Propensity Among Adult Learners

PROPOSED PROJECT DATES: 01/01/09 to 05/15/09

PROJECT TYPE: Dissertation or Thesis

PRINCIPAL INVESTIGATORS: Sarah Hutto

COLLEGE/DIVISION: College of Education & Psychology

DEPARTMENT: Educational Leadership

FUNDING AGENCY: N/A

HSPRC COMMITTEE ACTION: Exempt Approval

PERIOD OF APPROVAL: 02/17/09 to 02/16/10

Lawrence A. Hosman

 Lawrence A. Hosman, Ph.D.
 HSPRC Chair

2-19-09

 Date

APPENDIX D

LSI VERSION 2 CONDITIONAL USE AGREEMENT


CONDITIONAL USE AGREEMENT

For good and valuable consideration, the receipt and legal sufficiency of which are hereby acknowledged, I hereby agree that the permission granted to me by the Hay Group ("Hay") to receive and utilize, without charge, the Learning Style Inventory, Version 2 ("LSI") is subject to the following conditions, all of which I hereby accept and acknowledge:

1. I will utilize the LSI for research purposes only and not for commercial gain.
2. The LSI, and all derivatives thereof, is and shall remain the exclusive property of Hay; Hay shall own all right, title and interest, including, without limitation, the copyright, in and to the LSI.
3. I will not modify or create works derivative of the LSI or permit others to do so. Furthermore, I understand that I am not permitted to reproduce the LSI for inclusion in my thesis/research publication.
4. I will provide Hay with a copy of any research findings arising out of my use of the LSI and will cite Hay in any of my publications relating thereto.
5. To translate the LSI, I need specific permission from Hay. If permission is granted, I will use the translation for my research only, and I am not permitted to include this translation in my thesis/research publication.
6. Hay will have no obligation to provide me with any scoring services for my use of the LSI other than the Algorithm used to score results.
7. Hay will not be deemed to have made any representation or warranty, express or implied, in connection with the LSI, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose.
8. My rights under this Agreement are non-transferable and non-exclusive and will be limited to a period of two (2) years from the date of this Agreement.
9. Hay may immediately terminate this Agreement by giving written notice to me in the event I breach any of this Agreement's terms or conditions.
10. This Agreement will be construed in accordance with the laws of Massachusetts without recourse to its conflict of laws principles.
11. This Agreement may not be assigned by me without the prior written consent of Hay.

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