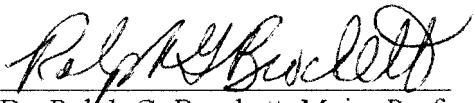
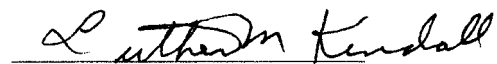


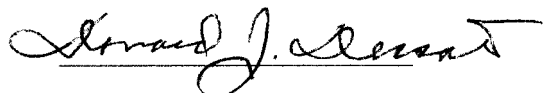
To the Graduate Council:

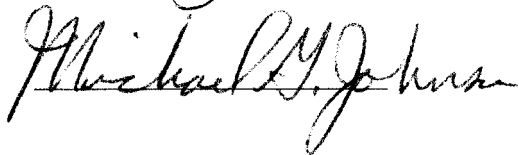
I am submitting herewith a dissertation written by James Boyd Canipe entitled "The Relationship Between Self-Directed Learning and Learning Styles." I have examined the final copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Education.


Dr. Ralph G. Brockett, Major Professor

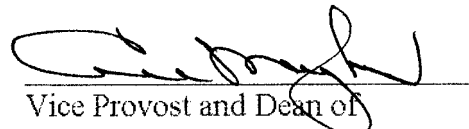
We have read this dissertation
and recommend its acceptance:







Accepted for the Council:


Vice Provost and Dean of
The Graduate School

**THE RELATIONSHIP BETWEEN SELF-DIRECTED LEARNING
AND LEARNING STYLES**

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

**James Boyd Canipe
December 2001**

Copyright © James Boyd Canipe, 2001

All rights reserved

DEDICATION

This dissertation is dedicated to my wife, Nealie Canipe,
my daughters, Jennifer Canipe and Cheryl Canipe,
and to the memory of my parents, Boyd N. Canipe and Louise R. Canipe.

ACKNOWLEDGMENTS

I am deeply appreciative of my major professor, Dr. Ralph G. Brockett, for his encouragement, guidance, and friendship throughout my graduate studies and particularly, during the preparation of the dissertation. Also, special thanks to Dr. Donald J. Dessart, for his advice and support, to Dr. Luther Kindall, for his inspiration and insight, and to Dr. Michael Johnson, for his advice and willingness to serve as a committee member from the Department of Psychology.

Additionally, I would like to thank my fellow students in the Self-Directed Learning Research group--Susan Stockdale, Barry Cox, Dewey Fogerson, Larissa Chuprina, and Bob Donaghy--who were a constant source of encouragement, and who allowed me the opportunity to vent occasional frustrations.

I would also like to express my gratitude to my colleagues at Morehead State University, particularly, Dr. Deborah Abell, the Chair of the Department of Leadership and Secondary Education. She generously supported my research efforts and assisted me greatly when a health emergency arose. Also, I am appreciative of my adult education colleague and friend, Dr. Ross Owen, for his valuable input, and of my colleague and friend, Dr. Dean Owen, who assisted me as well.

Finally, I am deeply indebted to my family--my loving wife, Nealie, for her patience, understanding, and longsuffering; my daughters, Jennifer and Cheryl, for their love and support; my brother, Mickey, for his constant caring; and above all, I thank God for His love, grace, mercy, and faithfulness.

ABSTRACT

The purpose of this study was to examine the relationship between self-directed learning readiness and learning styles. A cluster sample of 260 graduate students enrolled in classes in the College of Education and Behavioral Sciences at Morehead State University at Morehead, Kentucky was utilized in this research.

The Self-Directed Learning Readiness Scale (SDLRS), developed by L. M. Guglielmino (1977), and the Learning Style Inventory (LSI) developed by D. A. Kolb (1984), were administered to the sample as a means of exploring the relationship between the two variables. In addition, a demographic questionnaire was used to describe the characteristics of the sample.

The results of this research suggest that there are no significant differences between self-directed learning readiness and the four learning styles as defined by the LSI ($p > .05$). Thus, self-directed learning readiness in this study appears to occur across all learning styles, instead of being identified with a particular learning style.

Furthermore, the results of this study indicate that there are significant correlations between self-directed learning readiness and two of the modes of learning at an alpha level of .05--one positive and one negative. However, these correlations are very weak. Therefore, for the most part, self-directed learning readiness appears to occur across all modes of learning, and this relationship between the SDLRS and the modes of learning of the LSI can be described as an amalgamation. Furthermore, this relationship could perhaps be described as "apples and oranges." Yet, the lack of strong relationships and the lack of significant differences may also suggest that self-directed learning readiness is

a part of all learning styles and all the modes of learning and does not relate to one particular learning style or mode of leaning.

Recommendations for further research include studies that consider different socio-economic, ethnic, and racial groups among graduate students. Also, the use of different instruments to measure the variables of self-directed learning and learning styles, as well as exploration of various conceptualizations of self-directed learning and learning styles, may bring further insight into these relationships. Finally, it is recommended that a different target population should be studied, such as those who are GED recipients.

TABLE OF CONTENTS

CHAPTER	PAGE
1. INTRODUCTION.....	1
Statement of the Problem	2
Purpose of the Study	3
Research Questions.....	3
Conceptual Framework	4
Significance of the Study.....	12
Assumptions	13
Limitations.....	13
Terms and Definitions.....	13
Summary	16
2. REVIEW OF LITERATURE	17
Self-Directed Learning.....	17
Learning Styles.....	41
Connecting Self-Directed Learning and Learning Styles	50
Summary	54
3. METHOD.....	55
Population and Sample	55
Research Design	56
Instrumentation	57
Procedure.....	62
Data Analysis	63
Summary.....	64
4. ANALYSIS OF DATA.....	66
Demographic Profile	66
Self-Directed Learning Readiness Scale.....	70
Learning Style Inventory.....	73
Analysis of Research Questions	76
Summary	84
5. CONCLUSIONS, DISCUSSION, AND RECOMMENDATIONS.....	87
Purpose and Procedure	87
Conclusions.....	90
Discussion and Implications	92
Recommendations for Future Research	96
Summary.....	97

REFERENCES	99
APPENDICES	108
Appendix A.....	109
Appendix B.....	113
Appendix C.....	114
VITA.....	115

LIST OF TABLES

TABLE	PAGE
1. Demographic Data	68
2. Comparison of Self-Directed Learning Readiness Scores.....	71
3. Cronbach's Coefficient Alpha for the Self-Directed Learning Readiness Scale and the Learning Style Inventory	72
4. Learning Style Inventory Frequencies.....	73
5. One Way Analysis of Variance of the Variables: Self-Directed Learning Readiness Scale and the Learning Style Inventory	77
6. Multiple Comparisons: Tukey's Honestly Significant Different Method.....	78
7. Pearson Product Moment Correlation Coefficients for the Self-Directed Learning Readiness Scale and the Learning Style Inventory	80
8. Coefficients of Determination Derived from the Pearson Product Moment Correlation Coefficients Between the SDLRS and the Modes of Learning of the LSI	81

CHAPTER 1

INTRODUCTION TO THE STUDY

Self-directed learning has long been recognized as an important area of study in adult education. Its roots have been traced from Descartes and Socrates and more recently, to Frank Lloyd Wright and Malcolm X, as a method of learning in which an individual takes responsibility for his or her own learning (Brockett & Hiemstra, 1991). Self-directed learning is a popular theme since many adults desire to continue learning throughout their lives and enjoy choosing what to learn and how to learn it (Garrison, 1997). As Knowles (1975) stated, self-directed learning is not an educational fad, but a “basic human competence—the ability to learn on one’s own” (p. 17).

Furthermore, Brockett and Hiemstra (1991) reported that self-directed learning is a broad term that encompasses such factors as “the learner taking primary responsibility for planning, implementing, and evaluating learning,” as well as “personality characteristics that predispose one toward accepting responsibility for one’s thoughts and actions as a learner” (p. 29). In addition, Long (1990) suggested a psychological factor in self-directed learning to the extent that the learner has primary control of the learning process. It is this cognitive aspect of self-directed learning that serves as the focal point for this study.

Learning style has been defined as the “manner in which, and conditions under which, learners most efficiently and most effectively perceive, process, store, and recall

what they are attempting to learn” (James & Blank, 1993, p. 48). In addition, Korhonen and McCall (1986) explained that learning style is similar to the concept of cognitive style, but is more specific in that it refers to a learner’s “characteristic means of perceiving and processing information” (p. 21).

Bonham (1988b) noted an increase in the literature on learning styles and learning style instruments. However, she pointed out that the preponderance of research in this area has been done with learning styles of children rather than adults, suggesting that additional research with adults and learning styles is needed. Educators and researchers alike have become increasingly aware of the importance of learning styles. Individuals have various ways they prefer to learn, and understanding this diversity should be a goal of educational research (Reiff, 1992).

Statement of the Problem

With the emphasis in adult education on both self-directed learning and learning styles, it would seem worthwhile to study these two variables in relation to one another. Hence, the query: Is there an indication that self-directed learning may be connected to a particular style of learning? While some studies have pointed to a relationship between self-directedness and learning styles, there has been no conclusive evidence that self-directedness is related to a particular learning style. Furthermore, much of the theory from Kolb (1984) and others has suggested that self-directed learning was found across learning styles instead of being relegated to just one style. Therefore, the emphasis of this study is to determine if a significant relationship exists between self-directed learning and

individual learning styles. Also, the study will examine the extent to which differences in self-directedness exist across different learning styles.

Purpose of the Study

The purpose of this study is to investigate the relationship between self-directed learning readiness and learning styles and, further, to examine differences in self-directed learning readiness across different learning styles. The relationship between self-direction in learning and learning styles may provide insight for educational theorists, academicians, and those seeking to gain a better understanding of adult learning. An awareness of such a relationship could enhance educational practice and may add to our understanding of the cognitive aspect of self-directed learning among adults.

Research Questions

In order to examine the problem identified above, the following research questions will be addressed:

1. Is there a significant difference between self-directed learning readiness and the four learning styles of the Kolb Learning Style Inventory?
2. If significant differences are found in Question # 1, where do these differences occur?
3. Is there a significant relationship between self-directed learning readiness and each of the four modes of the Kolb Learning Style Inventory?

To address this research question, four sub-questions will be posed:

- a) Is there a significant relationship between self-directed learning readiness and concrete experience?

- b) Is there a significant relationship between self-directed learning readiness and reflective observation?
- c) Is there a significant relationship between self-directed learning readiness and abstract conceptualization?
- d) Is there a significant relationship between self-directed learning readiness and active experimentation?

Conceptual Framework

According to Long (1990), “The learner has consciously accepted the responsibility to make decisions, to be one’s own learning change agent, rather than abrogating the responsibility to external sources or authorities” (p. 332). So, what is it that points one to becoming his or her own learning change agent? Long suggested three conceptual aspects of self-directed learning that give insight into this question. First, he explained a sociological dimension of self-directed learning in which the learner is seen to be socially independent, though independent learning has sometimes been viewed as learning in isolation.

Second, Long (1990) wrote of a pedagogical dimension of self-directed learning that refers to pedagogical methods utilized by the learner. The learner is free to set his or her own learning goals, choose the needed resources, decide the amount of time required, and plan the appropriate evaluation.

Third, Long (1990) identified a psychological dimension of self-directed learning where emphasis is on the learner’s cognitive ability, including the capacity for critical thought and reflection. Long believed that this psychological power of the learner to

maintain active control of the learning process is paramount in achieving self-directed learning. He stated, “Psychological self-directedness, or psychological control is the necessary and sufficient cause for self-directed learning” (p. 333).

Furthermore, Brockett and Hiemstra (1991) synthesized Long’s (1990) analysis of the sociological, pedagogical, and psychological aspects of self-directed learning into a framework they termed the Personal Responsibility Orientation (PRO) model. This model illustrates the distinction between learner self-direction and self-directed learning. The former involves characteristics of the learner whereas the latter deals with characteristics of the instructional process. While the PRO model distilled Long’s analysis into two branches, it was actually the culmination of these two branches that created a reconstitution of the encompassing term “self-direction in learning”. The learner self-direction of the PRO model coincided with Long’s psychological dimension.

In fact, Long (1990) was so convinced of the powerful effect of the psychological dimension of self-directed learning, it would lead one to suspect that the answer to previous questions concerning a learning change agent can be found more in the psychological realm than anywhere else. Moreover, Long wrote, “Self-learning or self-directed learning, if preferred, occurs only when the learner primarily controls the learning (cognitive) processes” (p. 334).

Therefore, it seems that since there is a strong psychological dimension to self-directed learning a study exploring this dimension in relation to the concept of cognitive learning styles could offer further insight into the self-directed learning process. If so, then one might conclude that there is a high degree of association between self-directed learning and any one of the four learning styles identified by Kolb (1984). This may lead

to understanding which groups of learners have a greater propensity toward self-direction.

On the other hand, it may be possible that no particular learning style is associated with self-directed learning. This may indicate adaptability among those with a high degree of self-direction. As was pointed out by Long (1990), self-directed learners are autonomous, as well as flexible and adaptive. Long's idea of the flexible and adaptable self-directed learner is a vital link to this study since it provides a strong theoretical underpinning that leads this author to speculate that self-directed learners can be found across all four learning styles.

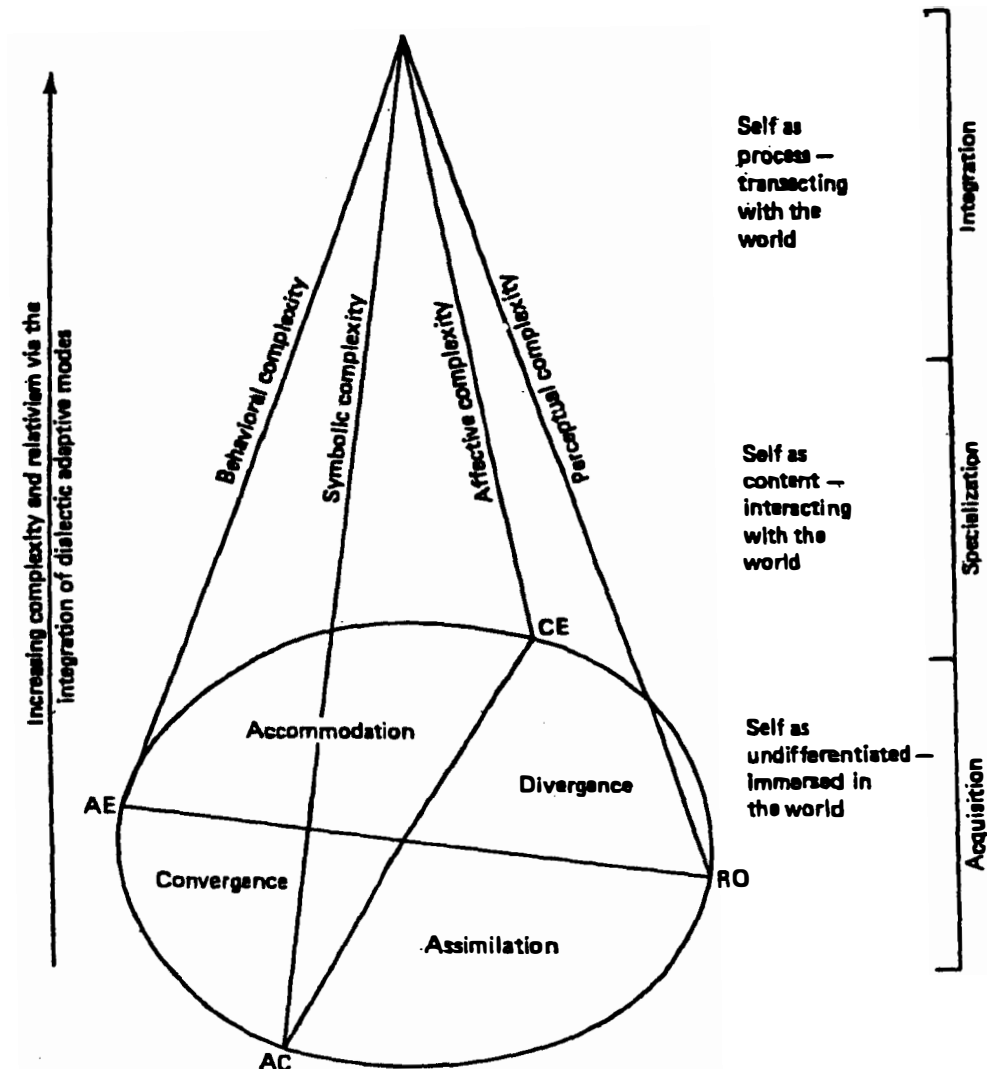
Previous studies examining self-directed learning and cognitive learning styles have shown interesting outcomes. For example, a study using Kolb's Adaptive Style Inventory, a modified version of the Learning Style Inventory, yielded insight into the relationship between self-directed learning and four learning style areas (abstract conceptualization, reflective observation, concrete experience, and active experimentation) (Kolb, 1984). According to this study, there was an indication that self-directed learning was more closely correlated in the direction of active experimentation than in the other areas.

Theil (1984) also suggested that self-directed learning correlates more with the accommodator learning style than with the other three styles. He noticed that accommodators seem to learn better when using concrete experience and active experimentation. Accommodators, who are characterized by their ability to adapt quickly to changing circumstances, often excel in carrying out plans, experimenting, and getting involved in new experiences. They tend to solve problems intuitively, using trial and

error. Theil found these learners often relied on others for information rather than their own analysis. However, Theil's (1984) finding may be somewhat questionable since he used narrow criteria to define the characteristics of successful self-directed learners. Yet, in spite of Theil's narrow definition of self-directed learning, his study linked the self-directed learner with the accommodator learning style. His conclusion may spark interest for further research.

Kolb (1984) proposed in his theory of growth and development a relationship between learning styles and self-directedness. Referring to Figure 1, which depicts Kolb's experiential learning theory of growth and development, self-direction is viewed as being at the apex of the cone instead of at the base. This suggests that a high degree of self-directedness may not fall distinctly within any one learning style, and perhaps that self-directedness is more closely related to all the learning styles, rather than any particular one of the four. Kolb pointed out:

The four dimensions of growth are depicted in the shape of a cone, the base of which represents the lower stages 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 stages of development, however, the adaptive commitment to learning and creativity produces a strong need for integration of the four adaptive modes. (p. 141)



(Kolb, 1984, p. 141)

Figure 1. The Experiential Learning Theory Of Growth and Development

In other words, it appears that a high degree of self-directedness may not fall solidly into any one learning style or dimension of growth, but perhaps would be more toward the center of Figure 1, where the four modes converge. This is consistent with self-directed learning theory that highly values flexibility and adaptability. This point was further underscored by Long's (1990) description of a self-directed learner, which was mentioned previously in this chapter.

In an article entitled, "Self-Directed Learning: The Ultimate Learning Style," Robotham (1995) insisted that the most successful learners are flexible and able to choose across learning styles, utilizing the one that best meets the demands of the learning project and/or learning situation. These flexible learners are not limited to one particular learning style. Robotham described self-directed learning as "this ability of an individual to actively select from a personal style or skills portfolio" (p. 1). Further, he submitted that this capability to respond to specific needs or situations is especially desirable in the workplace.

Robotham's (1995) observations underscore the importance of flexibility and adaptability in self-directedness. Another example of the need for flexibility and adaptability in learning is cited by Felder (1996). He acknowledged that individuals have different learning styles, or preferences, in how they learn and process information. Some learners focus on facts and data, while others work from theories and models. Visual information, such as pictures and diagrams, stimulates some students more than verbal explanations. Still, some learners respond to active learning, and other students excel using their introspective abilities.

From this it is possible to conclude that in order to successfully function in the workaday world, particularly in a profession, a person needs to work well within all learning styles. Competent career professionals are required to process information regardless of the form in which it comes. This concurs with Robotham's (1995) view that adaptability and flexibility are truly trademarks for proficient learning, whether it is self-directed or other-directed. Furthermore, Felder (1996) went as far as suggesting that teaching to one's preferred learning style may actually hinder learning. If students receive academic instruction only in their preferred learning style they may not be challenged to "develop the mental dexterity they need to reach their potential for achievement in school and as professionals" (p. 1). Felder maintained that students should be encouraged to build their capacity to process information from all modes of learning.

This seems to corroborate Kolb's (1984) concept of integrative complexity among the four learning modes when Kolb theorized that higher order learning, including self-actualization, independence, and self-directed learning, is characterized by increased development and the ability to adapt and integrate the four learning modes (See Figure 1). Kolb suggested that growth in one style of learning stimulates growth in the others as well. Creativity and growth are exemplified by the ability to integrate and adapt among the different modes of learning.

In the Learning Style Inventory, Kolb (1995) listed some strategies for developing learning style skills. One such strategy is to, "Practice and develop learning skills in areas that are the opposite of your present strengths" (p.10). Kolb admitted that learning to use the skills associated with the learning style opposite of what one is comfortable with can be very awkward and challenging, but can reward the learner by bringing about more

flexibility. Kolb encouraged this strategy since “in the long run your increased flexibility will allow you to cope with challenges of all kinds” (p. 10). Thus, developing the ability to learn through all four learning styles appears to create more effective learning.

Holtzclaw (1985) noted that certain situations require learners to use opposing abilities. Therefore, the learner must select the appropriate skill for the desired learning outcome. The learners who seem more flexible in processing information are suspected to have a capacity for utilizing skills equally from the various learning modes.

Similarly, Kolb (1984) noted that Jung, in his theory of psychological types, suggested that a person who has achieved a high level of personal fulfillment and adaptation to the demands of society has been able to integrate the various styles of learning so effectively that no one mode is dominant in that person’s development. Kolb submitted, “Fulfillment, or individuation, as Jung calls it, is accomplished by higher-level integration and expression of nondominant modes of dealing with the world” (p. 144).

Therefore, Kolb (1984) and others interested in learning styles and modes have suggested that high levels of learning, including self-directed learning, are characterized by one’s ability to successfully process information. It is not simply a matter of rigidly responding within an individual learning mode, but by adapting and integrating among the learning styles, so that no one learning style or mode co-opts the learning process.

In summary, according to Kolb (1984), Theil (1984), Robotham (1995), Felder (1996), and others, there appears to be a link between self-directed learning and learning styles, although there is no general consensus on the exact nature of that link. For example, Theil’s research pointed to a relationship between self-directed learning and the learning style of accommodator. Some of Kolb’s research using the Adaptive Style

Inventory suggested that a high degree of self-directed learning correlates positively with adaptive flexibility.

Yet, in some of Kolb's (1984) other writing he predicted that self-directedness is associated with integrative connectedness among the four learning styles. Others, including Robotham (1995), Felder (1996), and Holtzclaw (1985), have supported the idea that self-directed learning embodies flexibility and adaptability, thereby augmenting the claim that highly self-directed learners tend to be able to utilize skills from all the learning styles as they effectively process information. No doubt this represents a clarion call for further research into the relationship between self-directed learning and learning styles.

Significance of the Study

The focus of this study is on the adult learner in a university setting and how learning styles relate to self-directed learning among these students. Even though a few studies in this area have been published, research for the most part has been scant. Therefore, it is hoped that findings from this study will add to the research database as well as the literature.

The findings of this study may provide insight into the cognitive or psychological aspect of self-directed learning, an area that has been neglected (Long, 1990). As mentioned previously, a few studies have linked particular learning styles to self-directed learning. If the findings of this study also corroborate with earlier studies, then it is likely that more interest will be aroused in researching this area. On the other hand, different findings could also spark research in other areas as well. Moreover, the relationship

between self-directed learning and learning styles could perhaps be an important tool toward enhancing self-directed learning. For example, if evidence can be provided to establish a link between particular learning styles and self-directed learning, then businesses, industry, and academia could perhaps better optimize the product and process of self-directed learning.

Assumptions

The assumptions of the study are listed in the following statements. First, students have particular learning styles, and these styles can be identified and measured by the Kolb Learning Style Inventory. Second, the two instruments, the Self-Directed Learning Readiness Scale and the Kolb Learning Style Inventory are both valid and reliable. Third, the researcher used a process that allowed for fair and equal administration of the instruments.

Limitations

The main limitations of the study are summarized as follows. First, the cluster sample was comprised of adult graduate students from one university campus; thus the results are not generalizable beyond the sample. Second, the SDLRS and the Kolb Learning Style Inventory are self-report instruments with the usual limits associated with this type of instrumentation.

Terms and Definitions

Accommodator – One of Kolb's (1984) learning style types, an accommodator combines a preference for learning by concrete experience and active experimentation. Students with this learning style preference have the ability to learn primarily from "hands-on" experience. They like new and challenging experiences and tend to rely on intuition and information from others rather than on their own technical analysis in problem solving.

Adult student – Anyone at least 18 years old and enrolled either part-time or full-time in a graduate level course at a university.

Assimilator – Assimilator is another of Kolb's (1984) four learning style types identified by the Learning Style Inventory. It combines learning by abstract conceptualization and reflective observation. Kolb pointed out that, "This orientation is less focused on people and more concerned with ideas and abstract concepts. Ideas, however, are judged less in this orientation by their practical value" (p. 78).

Converger – One of Kolb's (1984) learning style types, the converger, has a preference for learning by abstract conceptualization and active experimentation. Kolb noted that, "The greatest strength of this approach lies in problem solving, decision making, and the practical application of ideas. We have called this learning style *converger* because a person with this style seems to do best in situations like conventional intelligence tests, where there is a single correct answer or solution to a question or problem" (p. 77).

Diverger – Another of Kolb's (1984) learning style types, the diverger combines learning by concrete experience and reflective observation. Kolb explained, "The greatest strength of this orientation lies in imaginative ability and awareness of meaning and values. The

primary adaptive ability of divergence is to view concrete situations from many perspectives and to organize many relationships into a meaningful ‘gestalt’” (pp. 77-78).

Learner self-direction – A personality characteristic that creates a propensity for learning on one’s own (Brockett & Hiemstra, 1991).

Learning style – Learning style is a concept that deals with how an individual learner best perceives and processes information (Kolb, 1984). Additionally, Keefe (1988) defined learning style as how a learner “perceives, interacts with, and responds to the learning environment” (p. 3).

Learning Style Inventory – The Learning Style Inventory (LSI) is a 12-item self-reporting instrument that was designed by Kolb (1984) to measure learning preferences among Kolb’s four learning styles.

Self-directed learning – Brockett and Hiemstra (1991) defined self-directed learning as learning that involves the learner “taking primary responsibility for planning, implementing, and evaluating learning” as well as “...accepting responsibility for one’s thoughts and actions as a learner” (p. 29).

Self-directed learning readiness – Readiness in self-directed learning is the “... extent to which individuals perceive themselves to possess skills and attitudes frequently associated with self-directedness in learning” (Brockett and Hiemstra, 1991, p. 56).

Self-Directed Learning Readiness Scale – To bridge the theoretical gap from descriptive models to predictive models the Self-Directed Learning Readiness Scale (SDLRS) was developed in 1977 by Lucy Guglielmino (1977). The SDLRS is a 5-point Likert scale containing 58 items and is designed to assess self-directed learning readiness.

Summary

This dissertation is comprised of five chapters. Chapter 1 included the following: introduction, statement of the problem, purpose of the study, research questions, theoretical framework, previous research, significance of the study, assumptions, limitations, definitions, and summary. Chapter 2 is a literature review of self-directed learning and learning styles. Chapter 3 is a description of the population and sample, research design, instrumentation, procedure, data analysis, and a time line. Chapter 4 presents the analysis of data. Chapter 5 includes a summary, conclusions, implications, and suggestions for further research.

CHAPTER 2

REVIEW OF LITERATURE

The purpose of this study is to examine the relationship between self-directed learning readiness and learning styles among university graduate students. Chapter 1 contained an introduction, statement of the problem, purpose of the study, and conceptual framework. Also included in Chapter 1 were the significance of the study, assumptions, limitations, terms and definitions, and summary.

Chapter 2 reviews the literature relevant to self-directed learning and learning styles. First, literature relating to self-directed learning is explored. Then literature concerning learning styles is investigated. Finally, studies that may suggest links between self-directed learning and learning styles are examined.

Self-Directed Learning

Self-directed learning has been cited as "one of the most exciting and important areas of adult education to emerge over the past several years" (Brockett, Hiemstra, & Penland, 1982). Though the term "self-directed learning" has only been in wide use since the 1970's, the concept of self-learning was exemplified in the lives of historical figures such as Socrates, Alexander the Great, Caesar, and Descartes.

An important early American, Benjamin Franklin, was a prodigious example of a self-directed learner, and he is sometimes considered to be one of the originators of adult

education in the United States (Brockett & Hiemstra, 1991). In an effort to learn more about what characteristics influence self-directed learners, Gibbons et al. (1980) studied the biographies of 20 self-educated learners, such as Harry Truman, Pablo Picasso, Will Rogers, and Virginia Woolf. These learners were identified as those who excelled in their fields of expertise without the benefit of formal education past secondary school.

Brockett and Hiemstra (1991) pointed out, "Clearly, self-direction in learning has played an important, though sometimes easy to overlook, role in history" (p. 9). Though the study of self-direction is comparatively a modern topic of research, the lives of such notables as Mendel, Michaelangelo, and Shakespeare are indicative of the fact that there have been many great self-directed learners throughout the ages (Gibbons, et al., 1980).

What is Self-Directed Learning?

Much has been written over the past 30 years in an effort to understand more about the concept of self-directed learning. Many terms including self-education, self-learning, autodidaxy, and self-regulated learning have been used in literature to refer to self-direction in learning (Long, 2000). In addition, there have been multiple models developed to offer frameworks for conceptualizing self-directed learning. Some definitions and representative models are provided in an attempt to contribute to a greater understanding of this approach to learning.

Background and Definitions

Self-direction in learning has been defined in numerous ways. According to Knowles (1975), self-directed learning is a process "in which individuals take the

initiative, with or without the help of others, in diagnosing their learning needs, formulating learning goals, identifying human and material resources for learning, choosing and implementing appropriate learning strategies, and evaluating learning outcomes” (p. 18). Furthermore, he suggested that when individuals take the initiative for their own learning that the whole process is enhanced as opposed to those who passively wait to be taught. Merriam and Caffarella (1999) described self-directed learning as a process of learning “in which people take the primary initiative for planning, carrying out, and evaluating their own learning experiences” (p. 293).

Brockett and Hiemstra (1991) suggested that the concept of self-directed learning has evolved over the years as increased understanding has resulted from research in this area. They chose to broaden the idea into what they termed self-direction in learning, which is divided into two main constructs--self-directed learning, as it has generally been defined in the literature, and learner self-direction. Brockett and Hiemstra pointed out that learner self-direction “centers on a learner's desire or preference for assuming responsibility for learning” (p. 24). They continued, “Thus, self-direction in learning refers to both the external characteristics of an instructional process and the internal characteristics of the learner, where the individual assumes primary responsibility for a learning experience” (p. 24). Their PRO model, discussed later in this chapter, expands on this broader definition.

As adult educators began to refine the meaning of self-directed learning, Brookfield (1984) grappled with the term as he questioned whether much of what is called self-directed learning should actually be designated as self-education. Self-education denotes an individual “undertaking to arrange the external conditions necessary

to produce and internal change" (p. 61). On the other hand, he contended that learning refers to change in a person's abilities that involve observable permanent change in that individual's behavior. Brookfield (1985) offered a definition of self-directed learning among adults as becoming apparent "when the techniques of self-direction are married to a critical scrutiny of existing values, beliefs, and social forms, and a conscious attempt by the adults concerned to re-create aspects of their work lives, personal relationships and socio-political structures" (p. 63).

Frameworks for Understanding Self-Directed Learning

As an approach to further define self-directed learning, three theoretical models are examined in order to capture the concept from differing perspectives. One is based entirely on an instructional point of view. Another model evolves from the constructivist view of learning through self-direction. The third model combines treating self-directed learning as an instructional model as well as a personality characteristic.

Grow's Staged Self-Directed Learning Model. Grow (1991) devised the Staged Self-Directed Learning (SSDL) model in which self-directed learning is viewed as occurring in four stages with the lowest level of learning evident in Stage 1 learners and the highest level of self-direction is characterized by learners at Stage 4. Grow's SSDL instructional model is a thoughtful attempt to explain a learner's progression toward self-directedness and the accompanying teaching styles that best suit each stage of learning.

Grow (1991) described self-directed learners as those who know how to learn and are motivated to explore independently. Therefore, students who are at Stage 1 can not be considered to be self-directed learners, but rather learners who are dependent upon

their teachers. Grow contended that the goal of Stage 1 teachers should be to prepare students to move to a level of self-direction, the highest level being Stage 4. This stage of learner is characterized by being highly self-directed--they are confident, independent learners who make use of available resources, experts, and institutions. They set their own standards and goals. These mature students view their teachers as mentors. For the teacher, the subject is no longer the focus; the student is the focus. The teacher serves to cultivate the learner's personal empowerment. Due to the maturity of the student, the role of the teacher diminishes and the learner becomes most prominent in the process. The teacher of a student at Stage 4 may occasionally monitor student progress, offer direction, serve as a sounding board, and help evaluate, but the ultimate goal of this teacher is to become unnecessary (Grow, 1991).

Even though Grow's (1991) model appears to be practical and comprehensive, criticisms have arisen. For example, Tennant (1992) cited unanswered questions concerning the progression through the various stages of the SSDL model, such as, "When should teachers change their style of teaching?" and "Should the change in teaching style coincide with the student's progress or come before or after the student has shown progress?" Also, "Who determines the learner's ability and willingness to learn? Is this determined by the teacher or the student?" and "What if the student has the ability, but not the willingness to learn, then what teaching style is warranted?" (p. 165). Tennant suggested that Grow's model is too simplified to deal with some of these complex issues that teachers must face, though he acknowledges it can be a springboard for further discussion in the arena of studying self-directedness.

When confronted with Tennant's (1992) suggestion that important questions had been neglected, Grow (1994) maintained that though his model does not address all possible details, he did touch on the subject of when teachers need to change their styles. He also asserted that teachers are responsible for judging a student's learning stage through observation and experiences with the student. Grow further defended his model by relating that many educators have found his SSDL model helpful in developing self-directedness in students (Grow, 1994).

Candy's model of self-direction in learning. Candy (1991) developed a model for promoting self-direction in learning that emanates from a constructivist perspective and focuses on three major dimensions: competence, resources, and rights. One aspect of Candy's model emphasizes the importance of competency skills, such as literacy, numeracy, researching, goal setting, time management, curiosity, critical thinking, and self-evaluation, in an individual's ability to be self-directed. Candy cautioned that while adult education should be involved in helping the learner construct these understandings and develop these skills, some of these skills are so complex that they cannot be mastered in the span of one or two education classes. Such competencies sometimes take a lifetime to thoroughly develop.

The second major facet of Candy's (1991) model centers on resources. Facilitators can enhance a learner's self-directedness by making learning resources readily available. These include libraries, resource centers, laboratories, computers, documentaries, computer software, and could even include time, money, internships, and job placements. Ideally, these resources should be widely available nationally and internationally, if individual learners are to maximize their self-directedness.

The third domain of Candy's (1991) model has to do with the issue of personal rights. Candy explained that this "most difficult and delicate aspect of self-direction" refers to "what is actually permitted and what the individual believes is permitted" (p. 420). An individual's ability to be self-directed in learning has a lot to do with whether one believes in oneself and has sufficient self-confidence. Often, the learner's limits in self-directedness are more imaginary than real. Candy submitted that though education can have a role in enhancing a student's self-image, it may be, at best, only a partial solution, since there are many varied factors in developing one's self-esteem.

Further, Candy (1991) wrote of a "glass tunnel" that can impede self-direction. The glass tunnel is characterized by peer pressure, closed ranks of the profession (resistance to those not part of the group), and those implicit criteria that identify one as being an expert in his/her field, such as the proper use of syntax and vocabulary unique to that particular field. Any of these conditions can deter a person from reaching a higher level of self-direction; therefore, the term "the glass tunnel".

Merriam and Caffarella (1999) noted that Candy's constructivist perspective is "congruent with much of adult learning theory" (p. 262) and listed Candy's model as one of several models that is sophisticated in its conceptualization of self-directed learning. Further, they pointed out that it stimulates reflection and contemplation of the nature of self-direction in learning. In addition, Garrison (1992) endorsed Candy's emphasis on the concept of personal autonomy in the learning process. Such autonomy suggests that learning is ultimately the responsibility of the learner.

Brockett and Hiemstra's PRO model. A third view of self-directed learning is represented by Brockett and Hiemstra's (1991) PRO model. This model offers a

philosophical and psychological approach to understanding the dimensions of self-directedness and is presented as a framework for better understanding self-direction in learning. It separates self-direction into two components. One is *self-directed learning*, which refers to the teacher-student instructional process in which the student is primarily responsible for his or her own learning, while the teacher serves as a facilitator of the teaching-learning process. The other concept is *learner self-direction*, which refers to characteristics of the individual learner that contributes to one's self-directedness. Self-directed learning is viewed as being external, or outside the learner; while learner self-direction is considered to be internal, having to do with the learner's personal characteristics. Brockett and Hiemstra (1991) suggested that an individual's ability and willingness to control one's learning determines one's level of self-direction in learning. The PRO model is designed not only to "serve as a way of better understanding self-direction, it can also serve as a framework for building future theory, research, and practice" (Brockett & Hiemstra, 1991, p. 26).

Personal responsibility in the PRO model refers to the control an individual has over his thoughts and actions. Though a person cannot always control his or her environment and circumstances, one can control one's response to those circumstances. A person's ability and willingness to control one's learning determines the level of self-direction in learning (Brockett & Hiemstra, 1991).

Brockett and Hiemstra (1991) have drawn from the writings of Oddi in developing the two dimensions—process and personality—of their model. In addition, Brockett and Hiemstra have synthesized Long's (1990) analysis of the sociological, pedagogical, and psychological aspects of self-directed learning into their PRO model.

This model, with its distinction between learner self-direction and self-directed learning, distilled Long's analysis into two branches. It was actually the culmination of these two branches that created a reconstitution of the encompassing term "self-direction in learning". The learner self-direction of the PRO model coincided with Long's psychological dimension, whereby the learner has primary control of the learning process.

Hiemstra and Brockett (1994) viewed the role of personal responsibility in their model as key to understanding self-direction in learning, and stressed the importance of adults taking primary responsibility for their personal learning in the teaching-learning process. They also asserted their belief that personal responsibility is inherent in each individual to a certain degree. Furthermore, Brockett and Hiemstra, whose PRO model is rooted in humanistic philosophy and psychology, contended that a learner's degree of responsibility can be increased by an educator's employment of the humanistic philosophy in the instructional process.

In a review of the book Self-Direction in Adult Learning: Perspectives on Theory, Research, and Practice, Flannery (1993) insisted that Brockett and Hiemstra (1991) minimized the importance of society and socialization when developing the PRO model. According to her criticism, one's social role in society, one's relationship with another's culture, and one's preferred method of communicating and learning are ignored in the model. Moreover, Flannery suggested that Brockett and Hiemstra offered a monolithic approach to self-directed learning, whereby the values and beliefs of the learner are not considered. Hence, the sociological principles inherent in the learning process are not addressed by the PRO model. This may well warrant the concerns Flannery raised.

Garrison (1997) regarded Brockett and Hiemstra's (1991) model as a “positive development”, yet he also pointed out that “the psychological dimension appears limited by the fact that it represents only a personality factor or disposition to be self-directed” (p. 20). Furthermore, he asserted that what Brockett and Hiemstra termed personality factors might better be thought of as “motivational dispositions”. In addition, Garrison questioned how the PRO model’s critical reflection can be considered a personality characteristic. He concluded, “The challenge is to take a more comprehensive perspective and integrate cognitive and metacognitive processes in self-directed learning” (Garrison, 1997, p. 20).

While the PRO model is presented as a framework for better understanding self-direction in learning, Hiemstra and Brockett (1994) admittedly have not tried to impose their notions of self-direction on others who have differing perspectives. Rather, they suggested that their motivation in sharing their model with educators was to encourage other informed ways of thinking and acting. Merriam and Caffarella (1999) pointed out that the PRO model is an interactive model in which two or more factors interact to generate self-directed learning. Certainly, the PRO model lends further insight into the concept of self-directedness.

Research on Self-Directed Learning

Much research has been undertaken to illuminate understanding of self-directed learning, especially since 1970. Groundwork for such investigation was laid by Houle (1961) when he interviewed 22 adult learners and classified them according to whether they were goal oriented, activity oriented, or learning oriented. This last category

represented those who would be considered similar to self-directed learners. His research was followed up by Tough (1971), and the pathway was established for further extensive research. The more recent research into self-directed learning has revealed multiple components of the concept and the need to categorize such research has arisen. One effort to classify this research base is illustrated by three streams of inquiry (Brockett & Hiemstra, 1991), who have divided the research as 1) descriptive learning projects of adults, 2) qualitative research in self-directed learning, and 3) research that deals with measurement of degrees of self-directed learning.

Learning Projects Research

One stream of inquiry deals with descriptions of adults' self-planned learning projects and the frequency of such projects, such as that initiated by Tough (1971). Tough set the stage for studying what came to be called self-directed learning when he raised questions about learning, such as "How common are adults' 'deliberate' efforts to learn?" "How much time do they spend on learning projects?" and "To what degree is this learning self-planned?" Tough explored the number of adult self-planned learning projects undertaken during the course of a year. He defined a learning project as "simply a major, highly deliberate effort to gain certain knowledge and skill (or to change in some other way)" (p. 1). Furthermore, he set the criterion for a learning project as one that required at least seven hours of the learner's time over the course of six months.

Tough (1971) and his associates interviewed 66 people from the following seven populations:

- 1) blue-collar factory workers;
- 2) men in lower-level white-collar jobs;
- 3) women in lower-level white-collar jobs;
- 4) beginning elementary school teachers;
- 5) city government politicians;
- 6) psychology and sociology professors; and
- 7) upper-middle-class women with preschool children.

Careful attention was given to the interview process to help participants recall their self-planned learning projects. Tough found that 98 percent had conducted a learning project over the course of a year and that the mean was 8.3 learning projects. The mean amount of time spent on learning projects was 816 hours per year, though the range was 0 to 2509 hours.

Perhaps the most unique aspect of this study is that Tough (1971) asked participants to identify the primary planner for each project. He found that the vast majority of learning projects (nearly 70%) were planned by the individuals themselves. Tough described adult learning as an "iceberg" where most learning takes place beneath the visible surface.

Tough's study spawned a host of replication studies using different population. Examples include studies of mothers with preschool-age children (Coolican, 1973), rural and urban adults in Tennessee (Peters & Gordon, 1974), older adults (Hiemstra, 1975; Ralston, 1981) and a U.S. national sample (Penland, 1977). While there are some

differences in specific percentages, on the whole, these studies further support a general finding that roughly 70% of all learning projects are self-planned.

Qualitative Research in Self-Directed Learning

A second stream of inquiry involves studying self-directed learning through qualitative research designs. The methodology for this category of research utilizes procedures such as observation and interviewing in an attempt to better conceptualize self-directed learning (Brockett & Hiemstra, 1991). In one of the first such studies, Gibbons et al. (1980) studied the biographies of people who had become experts in their field despite having no more than a high school education. To learn more about the process of self-education the biographies of 20 notable achievers, such as Walt Disney, Virginia Woolf, Wilbur Wright, Henry Ford, and Malcolm X were analyzed for prominent features of their personalities or lives. Gibbons and his colleagues explained, "The purpose of analysis is to find clues rather than proofs, clues that will both lead us to more pointed empirical investigations of self-directed learners and guide our search for effective ways to teach self-directed leaning" (p. 45). Some of their findings conflict with the premises held by most educators. For example, the great diversity in kinds of skills and expertise developed by these advanced learners counters the comparatively limited range of subjects and skills stressed in education. Also, it was noted that extracurricular activities were most often responsible for spurring these self-learners' interests into their chosen field. One interesting observation was that formal education, in this case, elementary or high school, was cited by the self-directed learner as being of little significance. Gibbons et al. (1980) revealed, "School seems to play a remarkably

insignificant role in their becoming expert, and when it is influential, the effect is often reported as negative" (p. 47). Educators may want to further investigate this statement as a possible insight to improve lifelong learning.

The researchers found that the top ten characteristics associated with self-direction were:

- 1) primary experience in the area,
- 2) industriousness,
- 3) perseverance,
- 4) self-disciplined study,
- 5) curiosity,
- 6) single-minded pursuit,
- 7) creativity,
- 8) ingenuity,
- 9) self-confidence, and
- 10) natural ability.

In another qualitative analysis Spear and Mocker (1984) analyzed interviews from a sample of 158 people who were at least 16 years old, did not have high school diplomas, and were engaged in a learning project. Seventy-eight of these were involved in self-directed learning projects. Spear and Mocker focused their analysis on questions of how resources were acquired and why and how decisions were made concerning the learning projects. Surprisingly, they reported a lack of preplanning by most of the interviewees with regard to their learning efforts, though Spear and Mocker found "evidence of definite order, deliberateness and logic in the process" (p. 3). Furthermore,

these self-directed learners did not choose their resources from a wide variety of resources, but rather often chose a single resource that was available in their environment. They wrote:

Because self-directed learning occurs in a natural environment dominated by chance elements and is in contrast to the artificial and controlled elements which characterize formal instructional environments, it seems useful to investigate the possibly differing effects of the natural environments on the learning process.

This is opposed to seeking to understand self-directed learning by imposing what is known about formal learning upon it. (p. 9)

Therefore, Spear and Mocker concluded that a learner's projects are often limited by one's individual circumstances.

Other qualitative research includes Kasworm's studies (1988a, 1988b) that examined self-direction as it relates to formal learning. Based on her interviews with college students, she conjectured that self-direction is a notable factor in college classrooms. Additional qualitative research was undertaken by Smith (1990) when she focused on the role of librarians in facilitating self-directed learning. She proposed, as a result of interviews with 22 librarians from public libraries, that timid learners could develop into more confident learners with the help of librarians acting as facilitators.

In a qualitative investigation of the Wright brothers' self-planning efforts that resulted in their historical first flight, Cavaliere (1992) noted that Wilbur and Orville Wright "planned, developed, and completed one of the most vivid examples of a self-planned, self-directed adult learning project" (p. 51). Their successful learning project took place completely outside the realm of an educational setting. Cavaliere studied their

behaviors that led to their accomplishment and found evidence of four basic cognitive processes--goal setting, focusing, persevering, and reformulating. These processes were repeated during five stages outlined by Cavaliere as follows: 1) inquiring, 2) modeling, 3) experimenting and practicing, 4) theorizing and perfecting, and 5) actualizing. Furthermore, her qualitative study emphasized the importance of practice and perseverance in achieving self-planned learning goals.

These qualitative research studies offer a richness of detail and insight from a human touch perspective. Unlike their counterpart, quantitative research, these qualitative approaches, with their thickness of description, provide a dimension of understanding of self-directed learning that is not generally captured through numerical data.

Measurement of Self-Directed Learning Levels

The third stream of inquiry includes research that explores the degree of self-directedness a person possesses or possible relationships among self-directedness and certain variables assumed to be associated with self-directed learning, such as creativity, intellect, and life satisfaction (Brockett & Hiemstra, 1991). The research referred to in this chapter, including that of Torrance and Mourad (1978a, 1978b), Brockett (1985a), Adenuga (1991), Wood (1994), and Owen (1996), involves participants completing the SDLRS; however, other instruments have also been developed to measure self-directed learning. These studies (Torrance and Mourad, 1978a, 1978b; Brockett, 1985a; Adenuga, 1991; Wood, 1994; & Owen, 1996) could be categorized in this third stream of inquiry--seeking to investigate the relationship between self-directed learning and certain other variables. Moreover, the present study would also be an example of this stream of

inquiry. The Oddi Continuing Learning Inventory (OCLI) (Oddi, 1986) will be the first measurement scale described in this section. Following it will be an examination of Pilling-Cormick's (1996) Self-Directed Learning Perception Scale (SDLPS). Finally, an analysis of the Self-Directed Learning Readiness Scale (SDLRS), which was utilized in this study, will be presented.

Oddi Continuing Learning Inventory (OCLI). The OCLI was designed to identify learners whose personality constructs would predispose them to begin learning projects and continue these projects over time through various modes. Oddi (1986) sampled 271 graduate students in an effort to show external validity for this scale. The mean score on the OCLI was 123.6 with a standard deviation of just over 19. The median was 126. Twenty-four of the 26 items demonstrated an internal consistency of .87 and a test-retest reliability of .89. According to Oddi's research the OCLI demonstrated a satisfactory degree of reliability and validity.

Six and Hiemstra (1987) found that the OCLI did not predict students' ability as self-directed learners in a classroom environment when they compared OCLI scores with scores from a scale designed to measure the self-directedness of learners in a classroom setting. However, results from a study by Six (1989) that replicated the OCLI test parameters across study samples indicated that three factors from the OCLI—a general factor, ability to be self-regulating, and avidity of reading—"remained stable across studies, demonstrating their generality" (p. 50). Six further described the underlying dimensions of the OCLI as being robust, but he pointed out a weakness in the confidence level that the OCLI was actually measuring what it purported to measure.

In a study comparing the SDLRS and the OCLI, Landers (1990) found that on the SDLRS eight factors correlated significantly with its total score, but that only two of the three factors of the OCLI correlated significantly with the total OCLI score. In addition, internal reliability of the OCLI was found to be weak. Landers concluded that the SDLRS was the preferable of the two instruments for measuring self-directedness.

The OCLI was employed in a study relating to intellectual development, as well as one that measured hemisphericity. Shaw (1987) found that as readiness for self-directed learning increases, so too does intellectual development. Additionally, Blackwood (1989) found a positive relationship between self-directedness and hemisphericity of the left brain. Though the OCLI has been utilized less often in research relating to self-directed learning as the SDLRS, Brockett and Hiemstra (1991) defended the OCLI as having “made an important contribution to the knowledge base” (p. 80). However, they cautioned that further research should be undertaken on both the OCLI and the SDLRS.

Self-Directed Learning Perception Scale (SDLPS). The Self-Directed Learning Perception Scale (SDLPS) was developed by Pilling-Cormick (1996) and was based on her Self-Directed Learning Perception (SDLP) model, which emphasizes the "process of SDL as the interaction between student and educator taking place within the varying context of control" (p. 28). She contended that learning and facilitating in the process of self-directed learning are shared by the student and the educator and that these processes are ultimately limited by the degree of control the student exerts over the learning experience. Pilling-Cormick (1996) described four dimensions that influence this important element of control: 1) social constraints, 2) environmental characteristics,

3) student characteristics, and 4) educator characteristics. These dimensions are viewed by Pilling-Cormick as fluid and variable, according to the context of any particular learning experience. This umbrella of control in her model encircles the student-educator interaction.

Furthermore, asserting that other measurements of self-directed learning do not address the process of self-directed learning, Pilling-Cormick (1996) used her SDLP model as a foundation for designing the SDLPS, focusing on the five environmental characteristics in her model. These five environmental characteristics are:

- 1) physical aspects of the institution;
- 2) physical aspects of the classroom;
- 3) how the institution functions;
- 4) how the course functions; and
- 5) supportive climate for building relationships.

The SDLPS is a questionnaire that contains 57 Likert-type items on which respondents mark the degree to which they find factors helpful to their learning in a particular course they are taking. The resulting scores of the SDLPS are expected to suggest reasons for any problems students perceive with their learning environments and thus, aid educators in creating a supportive environment for self-directed learning.

In addition, Pilling-Cormick (2000) developed the SDLPS Profile, which consists of definitions, overall SDLPS scores, SDLPS component scores, and suggestions for using the component scores. This profile can be used in conjunction with the administration of the SDLPS and provides for greater utilization of the SDLPS.

Furthermore, Pilling-Cormick and Kops (2000) utilized a training version of the SDLPS

when they studied self-directed learning in an organization, and Pilling-Cormick and Bulik (2000) used a clinical version of the SDLPS when they studied the self-directed learning environment of medical students in clinical training. While the SDLPS is a relatively new instrument and to date has not been widely used, its creator suggested future research is needed in academic, training, and clinical settings (Pilling-Cormick and Bulik, 2000).

Self-Directed Learning Readiness Scale (SDLRS). The Self-Directed Learning Readiness Scale (SDLRS) is an instrument developed by Lucy M. Guglielmino (1977) as an effort to predict the degree to which learners perceive themselves as having skills and attitudes related to self-directed learning. The SDLRS is a 58-item, 5-point Likert scale that purports to measure self-directed learning readiness in terms of the following eight factors: 1) love of learning; 2) learner self-concept; 3) learner tolerance for risk, ambiguity, and complexity; 4) creativity; 5) view of learning as a lifelong activity; 6) learner initiative; 7) self-understanding; and 8) acceptance of responsibility for one's own learning.

However, L. M. Guglielmino (personal communication with R. Brockett, February 2, 2000) determined that when the SDLRS is administered the scores of the factors should be calculated as one total score, rather than finding a subscore for each factor. She concluded that subscores taken from the factors would have low reliability. Also, these subscores tend to vary by sample and therefore, would not be representative of other samples.

Among the studies utilizing the SDLRS were those of Torrance and Mourad (1978a, 1978b), Brockett (1985a), Wood (1994), and Owen (1996). Torrance and Mourad

found that as learners age they exhibit more self-directed readiness skills. Furthermore, they recommended using the SDLRS to assess the self-directed learning readiness of gifted students. Brockett's study employed the SDLRS in its finding that a relationship between learning readiness and life satisfaction exists among older adults. The study of sixty-four older adults suggested that individuals who had more formal education tend to score higher on self-directed learning readiness as measured by the SDLRS. Wood studied 103 adult learners who had inquired into undergraduate college evening classes. Utilizing the SDLRS, she found a significant relationship between deterrents to participation in higher education and self-directed learning readiness. In other words, minimizing deterrents to adults entering college allowed for greater readiness for self-directed learning among these students. Owen (1996) found a positive relationship when he measured the self-directed learning readiness of graduate students using the SDLRS and compared those scores to students' scores on TestWell, an instrument assessing one's perceived wellness.

Research has indicated that the reliability of the SDLRS is quite high. Guglielmino (1977) reported the reliability of the instrument as .87; also, Brockett (1985a) found a reliability of .87, though an item analysis found that 12 of 58 items did not correlate significantly with the total scale (Brockett (1985b). Wood (1994) further reported high reliability of the SDLRS by Cronbach's coefficient alpha of .96. Owen's (1996) study of graduate students ($n = 185$) surveyed by the SDLRS determined that the split-half reliability of the SDLRS was .87, and the reliability as found by utilizing Cronbach's coefficient alpha was .92, also indicating high reliability of the SDLRS.

While the SDLRS has been a widely accepted instrument for measuring self-directed learning readiness, criticism has arisen from several quarters. In addition to noting that 12 items on the SDLRS did not correlate to the total score, Brockett (1985b) asserted that the instrument is less appropriate for those adults with lower levels of formal education. Brockett's (1985a) research with older adults resulted in several individuals not completing the instrument for two reasons--because the participants thought the instrument was confusing or felt it did not relate to their present life situation. Also, some responses were found to be incomplete or judged to be contradictory. As a result of these complications in the administration of the SDLRS, one-third of the original sample had to be discarded. Therefore, Brockett (1985b) suggested that confusion among respondents might point to a bias of the SDLRS toward those with higher education since the mean level of formal education in his sample was 10.4 years. Other concerns were raised about the eight factors presented by the SDLRS (West & Bentley, 1990) and its construct validity (Delahaye & Smith, 1995).

Brookfield (1985) had strong reservations about the overuse and/or misuse of the SDLRS. He, too, judged it to be quite insufficient for measuring self-directed learning readiness among working class adults. Indeed, Brookfield decried the lack of research on self-directed learning with those adults not having American middle class backgrounds. While Brookfield recognized that the SDLRS is useful as a means of measurement among "educationally advantaged adults" (p. 62), he warned that to consider the SDLRS a suitable measurement of all adults' self-directed learning readiness is somewhat of an oversimplification.

However, the most scathing attack was leveled by Field (1989). First, he questioned Guglielmino's (1977) employment of the Delphi technique as a basis for generating items. Second, he pointed out that Guglielmino failed to define the key terms "readiness" or "self-directed learner." Third, Field noted that approximately 30% of the items on the SDLRS were stated negatively, such as "I don't work very well on my own," and he questioned the validity of these items. Fourth, he asserted that items were added to the SDLRS after the tests of validation were performed. Finally, Field (1989) concluded that the SDLRS was so flawed that researchers should discontinue use of the instrument.

In response to Field, Guglielmino (1989), Long (1989), and McCune (1989) each strongly defended the use of the SDLRS. They suggested that Field's (1989) research contained a number of errors and that his strident remarks were unfounded. Guglielmino (1989) defended her development of the SDLRS in each of the four areas of concern raised by Field. First, she asserted that the Delphi was not used to select items for the SDLRS, but rather "as a means of arriving at a consensus" (p. 236) on characteristics representative of self-directed learners. Second, she reported that she did not define the term "self-directed learner," but it was defined by the Delphi panel of experts, which is more desirable than an individual definition. Third, Guglielmino defended her use of reverse items by pointing out that such items are often used in measurement scales to encourage the participants to read the items carefully, and that such items are more appropriately termed reverse items, rather than the term "negative items" that Field used. Fourth, Guglielmino noted that additional items were added to the SDLRS after the first field test, but not after validity analysis of the SDLRS.

While Guglielmino (1989) concluded that “there are some problems inherent in the development of any scale” (p. 239), and she welcomed constructive criticism of the SDLRS, she maintained that Field’s criticism of the instrument was not constructive. She argued that Field’s (1989) data did not support his conclusions and that his study due to its many errors did “not merit serious consideration” (p. 240). Guglielmino reiterated her position that the SDLRS is a valid and reliable tool for measuring self-directed learning readiness.

Long (1989) also noted inaccuracies in Field’s (1989) assumptions and conclusions. While Long admitted that continued study of the validity and reliability of the SDLRS is certainly warranted, he emphasized “that Field’s study has made a very limited contribution to knowledge concerning SDLRS validity and reliability” (p. 242).

McCune (1989) pointed out that Field gathered statistical data on a modified form of the SDLRS, but drew conclusions as though they were based on the standard version of the instrument. She found his method “problematic” and “egregious” (p. 244), particularly in his discussion of factor analysis. As a strong proponent of the usefulness of the SDLRS, McCune was concerned that future researchers might not utilize the SDLRS as a result of Field’s negative report. McCune explained, “Such an outcome would be detrimental not only to adult education research but to the field of adult education in general” (p. 245). Brockett and Hiemstra (1991), as well, extended their support to the SDLRS as an important tool for researchers in the area of self-directed learning, with the caveat that the scale be used in a way that acknowledges its limitations.

As a follow up to the responses by Guglielmino (1989), Long (1989), and McCune (1989), Field (1990) reexamined his earlier conclusions (Field, 1989) and

evaluated the assertions made by Guglielmino, Long and McCune. He scrutinized the four areas of concern from his 1989 article and maintained his previous summation that there are serious flaws in the SDLRS. Moreover, he questioned whether self-directed learning readiness is a construct that can be measured by any pencil-and-paper survey. Field (1990) noted two mistakes from his earlier analysis of data, pointing out that his use of the Mann-Whitney U test on the SDLRS was inappropriate and that his criticism of Guglielmino's use of principal components analysis was unjustified. Nonetheless, Field asserted that his conclusions about the weakness of the validity and structure of the SDLRS and its unacceptability as a measurement scale were not affected by these errors.

In summation, there has been a considerable amount of research in the area of self-directed learning. Tough's (1971) study of learning projects became a catalyst for further research in this area. In addition, Gibbons et al. (1980) spurred interest in qualitative research of self-directed learners. Finally, with Guglielmino's (1977) development of the SDLRS, measurement of self-directed learning readiness and the study of relationships among variables associated with self-directed learning became a focal point for much recent research.

Learning Styles

Educational research indicates that individuals have different learning styles or ways they prefer to learn. By the time learners reach adulthood, most have developed strengths or preferences in the way they perceive and process information. Adults are generally believed to learn in different ways, and these preferred ways of learning have many implications for adult educators (Torrance & Rockenstein, 1988).

Much has been written about differences in learning styles or learning preferences in the past three decades, and many instruments have been developed for the purpose of assessing students' learning preferences. Varying approaches have been employed in identifying individual learning differences (Torrance & Rockenstein, 1988; Woolfolk, 1998). Kolb (1984) suggested that learners exhibit differing learning styles based on learning skills that have been developed over the life cycle. These styles are evidenced by individuals preferring various learning activities that they find most suitable to their learning strengths.

Background and Definitions

Woolfolk (1998) described learning styles as "approaches to learning and studying" (p. 135). James and Blank (1993) and Keefe (1988) pointed out that the term "learning style" is an expansive concept that involves cognitive, affective, and physiological factors, as well as other elements of the learning process. James and Blank defined learning style as "the complex manner in which, and conditions under which, learners most efficiently and most effectively perceive, process, store, and recall what they are attempting to learn" (p. 48).

Further, Keefe (1988) noted that these cognitive, affective, and physiological factors combine to indicate "how a learner perceives, interacts with, and responds to the learning environment" (p. 3). He explained that learners demonstrate individual learning styles in their behavioral patterns with which they approach learning experiences. In addition, Claxton and Murrell (1988) found that learning styles have merited much

attention among academicians who have sought to study them at various levels, including personality, information processing, instructional methods, and social interaction.

Two of the three broad categories of learning styles designated by Keefe (1979) are affective style, which concentrates on emotions and values in the learning process, and physiological style, which deals with the roles of various physical functions of the body as related to learning. Affective learning styles include 1) conceptual level, 2) locus of control, 3) achievement motivation, and 4) social motivation (Sims & Sims, 1995). Moreover, physiological learning styles have to do with visual, auditory, tactile, and kinesthetic preferences of the learner, as well as health-related behavior, biorhythms, individual need for mobility, and preferences for certain environmental components. Cognitive learning styles, which focus on perception and mental functioning in the learning process make up the third category of learning styles, which is prominent in the literature on this subject (Sims & Sims, 1995). Ferro (1993) maintained all three domains are important and interrelated in the learning process. Educators are encouraged to address each area in the instructional process in order to involve the whole person.

Nevertheless, Woolfolk (1998) pointed out that often the terms "cognitive learning styles" and "learning styles" are often interchanged. Educators tend to use the term "learning styles" while psychologists often refer to "cognitive styles" in their discussion of ways that individuals prefer to process information. Woolfolk noted that cognitive styles are characterized by individual learners having varying preferences when it comes to the method that they find most beneficial for receiving and responding to learning activities.

Sims and Sims (1995) defined learning style as "the typical ways a person behaves, feels, and processes information in learning situations" (p. 194). They continued, "Learning style is demonstrated in that pattern of behavior and performance by which an individual approaches educational experiences" (p. 194). However, Woolfolk (1998) argued that in many instances educators are actually referring to learning preferences when they write or speak about learning styles. She stated, "Learning preferences are individual preferences for particular learning environments" (p. 135).

Conceptualization of Learning Styles

Sims and Sims (1995) stressed the importance of educators understanding individual differences and styles of learning in their endeavors to enhance teaching and training students. Students bring to the classroom their individual learning style preferences replete with learning strengths and weaknesses. Sims and Sims stated, "To enhance learning, instructors and trainers must recognize that individuals learn and think differently, and what may be an optimal learning or training method for one may discourage another" (p. 193). Therefore, an awareness of individual learning styles and corresponding efforts to address these varying learning styles on the part of educators and trainers can promote better learning environments and enhance the learning process.

Riding and Rayner (1998) categorized several learning style models according to similarities in psychometric design, conceptualization of learning, and relevance to a

learning style construct. They analyzed ten learning style models and designated them as being in one of the following categories:

- 1) Models based on the learning process;
- 2) Models grounded in orientation to study;
- 3) Models based on instructional preference; and
- 4) Models based on cognitive skills development.

The first three of these groupings focus on individual differences in the process of learning, rather than on differences within the learner. The fourth category involves an individual's learning profile, consisting of the learner's cognitive skills and abilities and behavioral characteristics. Though Riding and Rayner (1998) suggested limitations to many of these models of learning styles, such as a lack of stability and weak construct validity, they pointed out the necessity for frameworks involving the construct of individual differences that can be utilized in the application of learning style theory.

Research on Learning Styles

James and Blank (1993) noted that although much research has been conducted on elements of the learning process, this process proves to be a challenging and complex construct. More than 32 instruments have been on the market for identifying and assessing individual learning styles (Sims & Sims, 1995). James and Blank (1993) undertook a critique of instruments for identifying learning styles of adults. They settled on a taxonomy that grouped learning style instruments according to three major dimensions--information processing, perceptual modality, and personality factors. Some instruments, rather than being categorized as one of these three groupings, were

considered to be a combination of the three. James and Blank (1993) intended their critique as a guide in choosing a learning style instrument that meets the particular needs of adult educators.

However, James and Blank (1993) perhaps raised a red flag when they reported, "One of the most important and troubling results of numerous research studies is that they often fail to yield solid evidence that the construct of learning style truly exists" (p. 54). These authors suggested that tests of reliability and validity of the various learning style instruments are often "contradictory or inconclusive" (p. 54). They pointed out that some authors of learning style instruments that they examined had portrayed their instruments as having strong validity and/or reliability data, although the research base did not support those findings. Finally, James and Blank recommended further research in all areas relating to identification of learning styles. Nonetheless, a sampling of these models and instruments is described as follows, with greater detail accompanying Kolb's LSI, since that instrument is utilized in this study.

Gregorc Style Delineator. One framework for conceptualizing individual preferences for perceiving and processing information is offered by Gregorc (1982) who offered the Gregorc Style Delineator. Gregorc's four learning styles and some characteristics of each style are listed:

- 1) concrete sequential - objective, persistent, and oriented toward details;
- 2) abstract sequential - analytical, logical, and research oriented;
- 3) abstract random - sensitive, aware, spontaneous; and
- 4) concrete random - intuitive, experimenting, and creative.

The Gregorc Style Delineator is a self-report instrument that prompts respondents to rank descriptive items as to how well these words describe them as thinkers and learners. Riding and Rayner (1998) suggested that the literature supporting this instrument was generally descriptive, rather than quantitative. James and Blank noted that the Gregorc Style Delineator is an information processing instrument that is widely used. They ranked it as "moderate" in terms of validity, reliability, and strength of research base and "strong" in its overall usability.

Honey and Mumford's Learning Styles Questionnaire (LSQ). Another learning style model based on the learning process is one proposed by Honey and Mumford (1986, 1992). They developed the Learning Styles Questionnaire (LSQ), an 80 item self-report instrument that attempts to identify learning styles based on their model. Those learning styles and corresponding characteristics are as follows:

- 1) activists - engaging in active, intuitive, decision-making;
- 2) theorists - focusing on ideas, logic, and systematic planning;
- 3) pragmatists - engaging in discussion, debate, risk-taking, and practical applications; and
- 4) reflectors - focusing on understanding and meaning, observing process, and predicting outcomes.

Riding and Rayner (1998) reported that questions have been raised concerning the predictive validity of the LSQ, but a factor analysis provided strong construct validity for two of the instrument's factors--analysis and action. James and Blank (1993) ranked the LSQ as "moderate" in evidence of validity, reliability, and strength of research base. It was considered "strong" in overall usability and judged as being easy to administer.

Kolb's Learning Style Inventory (LSI). Kolb's LSI is included in the category of models based on the learning process. Kolb (1984) developed four learning style types that emanated from his study of the experiential theory of learning, a theory rooted in the works of Dewey, Lewin, and Piaget. According to this theory of learning, one's ideas, rather than being "fixed and immutable" (p. 26) as behaviorists would assume, are rather fluid and changing based on one's experience. Learning becomes an evolving process with the learner's experience constantly shaping and modifying his/her learning. Kolb identified four learning modes that are involved in the cycle of experiential learning. These are concrete experience (having to do with feeling), reflective observation (having to do with watching), abstract conceptualization (having to do with thinking), and active experimentation (having to do with doing). Kolb's four learning style types are the diverger, a learner who combines concrete experience and reflective observation; the assimilator, who combines abstract conceptualization with reflective observation; the converger, who combines abstract conceptualization with active experimentation; and the accommodator, who combines active experimentation with concrete experience "to learn and solve problems" (Katz, 1988, p. 364). These four learning styles are further defined in Chapter 1. After an extensive review of cognitive and learning style theory, Bonham concluded that Kolb's theory of experiential learning was the most thoroughly developed among the theories that cover the life span (Truluck & Courtenay, 1999).

Kolb's (1984) experiential learning theory led to his development of the Learning Style Inventory (LSI), a 12-item instrument that was designed to measure learning preferences among the learning modes of concrete experience, abstract conceptualization, reflective observation, and active experimentation. Scores are plotted on a grid in order to

identify four learning styles, assimilator, diverger, converger, and accommodator, that lay in the quadrants outlined by the four learning modes. Since the LSI was developed based on adult samples, it is utilized in assessing learning style preferences of adults (Truluck & Courtenay, 1999).

Among those investigating the validity and reliability of Kolb's LSI are Willcoxson and Prosser (1996). Their study included a sample of 191 university arts and sciences students. They found the LSI to have a high degree of reliability with Cronbach's coefficient alpha reliabilities between .81 and .87. They also found evidence of validity, but some variation was noted based on whether the subjects were studying the sciences or the arts.

When Yahya (1998) further examined data from Willcoxson and Prosser's (1996) research by re-analyzing the correlation matrix, there was support for Willcoxson and Prosser's correlation analysis. In addition, the LSI was shown to have high construct validity when using a two-factor solution. Hickcox (1995) reported that the LSI "was psychometrically rated as strong in regard to reliability and fair in terms of validity" (p. 34).

However, Cornwell and Manfreda (1994) pointed out that many researchers in the field of management have tested Kolb's learning theory using the LSI and that the results of these empirical studies have often failed to support Kolb's theory. Furthermore, Cornwell and Manfreda noted that the LSI's psychometric qualities have been questioned—particularly relative to the use of the ipsative scoring scale. This type of scale requires the participant to rank four choices per item in order of most preferable to least preferable.

In another study, Raschick and Maypole (1998) administered the LSI to 45 students and 40 of their field supervisors to assess their preferred learning styles. They stated the internal reliability of all variables was found to be “quite high” (p. 6). Raschick and Maypole were enthusiastic about using the LSI to identify students’ and supervisors’ preferred learning styles. They found this information enhanced the relationship between these two groups. Regarding this relationship, Raschick and Maypole (1998) wrote that Kolb’s learning theory and his LSI “have enabled both groups to view learning as a four-step process that involves experiencing, reflecting, conceptualizing, and creatively experimenting” (p. 9). Therefore, in contrast to Cornwall and Manfredo’s (1994) less than enthusiastic support for the LSI, Raschick and Maypole endorse Kolb’s instrument as a valuable tool for improving the learning process.

James and Blank (1993) categorized the Kolb LSI as an inventory that is included in the broad dimension of information processing. James and Blank found the Kolb LSI to be “weak” in validity, “moderate” in reliability and strength of research base, and “strong” in overall usability. They noted that the Kolb LSI was widely used. Moreover, according to Hickcox (1995), Kolb’s LSI appears to have been the inspiration for four other learning style inventories--one by McKenney and Keen, one by Honey and Mumford, both used in business administration, one by Marshall and Merritt, and one by Gregorc and Ward, both of which are used in educational settings.

Connecting Self-Directed Learning and Learning Styles

While the relationship between self-directed learning and learning styles remains unclear, studies such as Theil’s (1984) have suggested that self-directed learning may be

more closely related to an accommodator learning style than with the other three styles. He noted that most of the participants in his study that were considered effective self-directed learners were found to have an accommodator learning style. Accommodators are aligned with the learning modes of concrete experience and active experimentation. These learners are characterized by their ability to get things done, to adapt easily to ever changing circumstances, to reach for new experiences, and to gather information from outside sources.

A study using Kolb's Adaptive Style Inventory (ASI), a modified version of the Learning Style Inventory, Kolb (1984), indicated that self-directed learning is more closely correlated in the direction of active experimentation than in other learning styles. Kolb wrote, "The relationship between total adaptive flexibility and the person's degree of self-directedness was significantly positive ($r = .26, p < .05$) and, as might be predicted, determined primarily by adaptive flexibility in active experimentation (self-directedness with AEAF, $r = .28, p < .05$). These results suggest that those at higher levels of integrative development as measured by the ASI are more self-directed and display that self-directedness through choiceful variation of their active behavior in different situations" (p. 220). In this use of the ASI Kolb suggested a positive relationship between self-direction and active experimentation.

However, Kolb (1984) proposed in his theory of growth and development a relationship between learning styles and self-directedness. Kolb viewed self-direction as being at the apex of the cone instead of at the base. Kolb pointed out:

The four dimensions of growth are depicted in the shape of a cone, the base of which represents the lower stages 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 stages of development, however, the adaptive commitment to learning and creativity produces a strong need for integration of the four adaptive modes. (p.140)

This theory suggests that a high degree of self-directedness may not fall boldly or distinctly within any one learning style and perhaps that self-directedness is more closely related to all the learning styles, rather than any particular one of the four.

In a study of graduate students, Adenuga (1991) found that learning style preferences, along with formal education and demographic variables, are important factors in an adult's likeliness to develop as a self-directed learner. Her findings suggested that a learner who prefers both active experimentation and abstract conceptualization, which is the learning style of a converger, tends to be strong in self-directed learning readiness. She cautioned that future studies needed to be undertaken in order to corroborate her findings.

Gehan (1998) conducted a correlational study with professional nurses and found no relationship between scores on Kolb's LSI and self-directed learning as determined by a questionnaire on continuing education. A somewhat broader study, in terms of personality variables, was undertaken by Kreber, Cranton, and Allen (2000), when they investigated the nature of self-directed learning readiness and certain characteristics of learners. The SDLRS and Kolb's LSI were two of the instruments completed by the sample of 86 undergraduate students, along with three other instruments that measured

critical thinking skills, creative thinking skills, and psychological types. Kreber, Cranton, and Allen (2000) speculated about the relationship of self-directed learning readiness and learning styles when they wrote:

Should it turn out that logical reasoning ability and creative reasoning ability both predict self-directed learning readiness, and logical reasoning ability and creative thinking ability are associated with different learning styles, then Kolb's learning cycle would have profound implications for promoting self-directed learning readiness. (pp. 99-100)

However, Kreber, Cranton, and Allen (2000) found no correlation with total SDLRS scores and learning styles. They concluded that the results of their study did not support the hypothesis that a relationship exists between learning styles and self-directed learning readiness.

While there is no clear relationship between self-directed learning and learning styles, several studies previously cited pointed to a link between self-directed learning and a particular preferred learning style. On the other hand, there are other studies, including Kolb's (1984) research indicating that self-directedness is more of a learning process that involves flexibility, adaptability, and integrativeness. Therefore, this perspective dealt with learning across learning styles, rather than one preferred learning style being the catalyst for self-direction. More research in this area is warranted based on a lack of well-defined conclusions.

Summary

In summation, Chapter 2 has attempted to define self-directed learning and learning styles, as well as provide a broad overview of the literature relating to the two. Although scant research has been done linking self-directed learning and learning styles, a few studies were noted and their conclusions were reported.

CHAPTER 3

METHOD

As was pointed out in Chapter 1, this study is an investigation of the relationship between learning styles and self-directed learning. Included in Chapter 3 is a description of the population and sample, research design, instrumentation, procedure, and data analysis.

Population and Sample

The population for this study was comprised of graduate students enrolled in the College of Education and Behavioral Sciences at Morehead State University in Morehead, Kentucky during spring semester of 2001. Morehead State University is located in rural eastern Kentucky with a 2001 total enrollment of approximately 8,000 undergraduate and graduate students. It mostly serves the population of northeastern and eastern Kentucky (Morehead State University Graduate Catalog, 2000).

A cluster sample was used to represent the population. This means that groups were randomly chosen, and that the individuals within these groups made up the sample. Cluster samples were generated by first defining the population and then determining the required sample size. Selecting the sample was achieved by finding the average (mean) number of students per cluster and then determining the number of clusters needed for the required sample size. Finally, the clusters were selected randomly (Gay & Airasian,

2000). The clusters in this study were comprised of graduate level classes conducted in the College of Education and Behavioral Sciences at Morehead State University that were regularly scheduled and met at least once weekly for the entire semester. Since the population consisted of approximately 850 graduate students, the optimal sample size was 260 (Gay and Airasian, 2000). The actual sample was 240 since 20 students had either declined to participate in the study, omitted parts of the surveys, or not followed directions in marking the surveys.

Research Design

For this study a combination of two designs were employed: correlational and causal-comparative. Correlational research allows one to investigate whether a significant relationship exists between variables. Furthermore, the coefficient of correlation allows one to ascertain the degree of relatedness. For example, a coefficient of +1.00 indicates that two variables are perfectly and positively correlated. On the other hand, a coefficient of correlation of -1.00 indicates that two variables are perfectly correlated negatively. Finally, a coefficient of correlation of .00 means there is no correlation between variables. Also, in a correlational design there is no manipulation of variables (Ary, Jacobs, & Razavieh, 1996).

A causal-comparative design, sometimes known as *ex post facto*, allows the researcher to investigate variables that have already occurred or variables that cannot be manipulated. Gay & Airasian (2000) pointed out that causal-comparative research seeks to make a cause and effect statement and that as such, it produces a “stronger relationship among variables” than do descriptive and correlational research (pp. 13-14). However, in

this study the researcher had no control over the cause, or independent variable, which was the individual learning style of the research participant. The effect, or dependent variable, in this study was the degree of self-directed learning readiness in participants. The results of this causal-comparative research should suggest whether there is a cause-effect relationship between these two variables (Gay & Airasian, 2000).

Instrumentation

Three instruments were utilized. The first instrument was the Self-Directed Learning Readiness Scale (Appendix A), developed by Lucy M. Guglielmino (1977); it was used to measure self-directed learning readiness. The second instrument used was the Kolb Learning Style Inventory (Appendix B), developed by David A. Kolb (1984); it was used to determine learning styles. The third instrument employed was the Demographic Questionnaire (Appendix C), designed to describe the sample. These instruments are described below.

The Self-Directed Learning Readiness Scale (SDLRS)

The Self-Directed Learning Readiness Scale (SDLRS) was developed by Lucy M. Guglielmino (1977) in order to predict the degree to which learners perceive themselves as having skills and attitudes related to self-directed learning. The SDLRS is a 58-item, 5-point Likert scale that yields a total score for self-directed readiness. Brockett and Hiemstra (1991) pointed out the SDLRS has been noted for its use in exploring relationships between self-directed learning and other variables, as well as in assessing learners' perceptions of their readiness as self-directed learners. Also, Candy (1991)

described the SDLRS as being a research instrument that has come directly out of the field of adult education and has quickly gained prominence among adult educators.

Guglielmino (1977) reported a reliability coefficient of .87 for the SDLRS.

Further, validation of the instrument has been described by other writers (e.g. Brockett & Hiemstra, 1991; Merriam & Caffarella, 1999). Brockett and Hiemstra, for example, noted:

Further validation support for the scale has been reported by Long and Agyekum (1983,1984) in their multitrait-multifactor study, Finestone (1984) in a construct validation study of the instrument, and Reynolds (1986) and Long (1987) through item-total correlations for each of the fifty-eight SDLRS items. (p. 69)

However, criticism of the SDLRS was raised by Brockett (1985b) when he suggested that the SDLRS was more appropriate for college students and adults who had completed high school, but less relevant for those adults who have had little or no schooling. Hence, this criticism was addressed later by Guglielmino when she revised the readability level of the SDLRS to accommodate those adults with less than college level reading skills and lower English proficiency. In addition, Candy (1991) pointed out a weakness in the SDLRS due to unclear terms utilized in the instrument that may result in “some confusion as to precisely what is being measured” (p. 153). Bonham (1991), too, was skeptical of the SDLRS and suggested that more research was necessary to verify its validity.

But perhaps the most strident criticism came from Field (1989) concerning the construct validity of the SDLRS when he found deficiencies in its construction, declaring it flawed and invalid as a measure of self-directed learning readiness. He maintained that,

rather than measuring self-directed learning readiness, the SDLRS was closer to measuring love and enthusiasm for learning. However, in rebuttals to Field, Guglielmino (1989), Long (1989), and McCune (1989) each rejected Field's findings, insisting that his study was not creditable due to its many errors and omissions. These points were discussed more fully in Chapter 2.

Despite concerns that have been raised relative to the SDLRS, some of which are worthy of serious consideration, the instrument has a demonstrated record and conceptually met the needs of this study, particularly because the current study is based on a sample of adults with a college-level education. Brockett and Hiemstra (1991) offered the following in support of the SDLRS as an important instrument in the study of self-directed learning:

We believe that despite several apparent substantive and methodological concerns, the SDLRS has made a most important contribution to present understanding of the self-directed learning phenomenon by generating considerable research, controversy, and dialogue. We think that this contribution ultimately outweighs the limitations that seem to be inherent within the instrument. Indeed, the SDLRS has made it possible to advance the knowledge base of self-direction in ways that otherwise probably would not have been possible. (pp.74-75)

Therefore, the SDLRS, having received a degree of acceptance in the field of adult education, and the area of self-directed learning, in particular, was utilized as an instrument in this study. The SDLRS has gained prominence for its use in exploring

relationships between self-directed learning readiness and other variables, which was the focus of this study.

Kolb Learning Style Inventory (LSI)

The Kolb Learning Style Inventory (LSI) is a survey instrument that measures the cognitive traits in learning styles. It is designed for a specific population—college students, and is based on the experiential theory of learning, which was discussed in Chapter 2, which focuses on the interaction of personal experience and the learning process (Williams, 1995).

The LSI consists of 12 complete sentences with the choice of four possible answers ranked from four (high) to one (low). There is no correct or incorrect answer, but rather a description as to how the respondent prefers to learn. These scores are then tallied and arranged so as to indicate a particular learning style – for example, an accommodator, converger, assimilator, or diverger. Further, the LSI assesses two distinct dimensions and four categories of learning modes: concrete experience versus abstract conceptualization and reflective observation versus active experimentation (Kolb, 1984). The LSI has been used widely in academic settings (Kolb, 1984, 1995; Claxton & Murrell, 1988), as well as in vocational venues (Arndt & Underwood, 1989).

James and Blank (1993) compared the LSI to other learning style instruments in the areas of validity, reliability, and overall instrument usability. They rated the LSI as weak in validity, moderate in reliability and research base, and strong in overall usability. Also, Bonham (1988b) echoed criticism of the LSI regarding “its brevity and resulting lack of reliability” (p. 14). In addition, Bonham asserted that, “Choices are sometimes

more difficult to make because they are not within the same dimension (they are not opposites)” (p. 15).

On the other hand, a resounding endorsement of the LSI was given by Korhonen and McCall (1986), when they suggested that research on learning styles endorsed Kolb’s model as “a breakthrough” in its representation of learning styles (p. 21). In addition, internal reliability is very good as reported by Cronbach’s alpha ($n=268$). The alpha ranged from .73 to .88. A correlational study of all scale scores verified the strong negative relationship that one would expect to exist between active experimentation and reflective observation and between abstract conceptualization and concrete experience (Kolb, 1995). Further, Kolb (1999) found the LSI to be statistically reliable and valid.

Therefore, despite some criticism of the LSI, the instrument was used in this study to investigate the relationship between learning styles and self-directed learning readiness. It has been touted as a worthy innovation in its representation of learning styles (Korhonen & McCall, 1986; McCarthy, 1980). Moreover, the LSI is particularly pertinent to this study since its foundational theory strongly suggests that self-directedness is a likely outcome of the integration of the four dimensions of learning (Kolb, 1984).

Demographic Questionnaire

This study obtained demographic information from the sample using a Demographic Questionnaire designed by the researcher. Even though this information was not part of the statistical data analysis of the study, it was an attempt to provide a better description of the sample. Merriam and Caffarella (1999) encourage researchers to

identify such demographic variables as age, gender, educational level, ethnic origin, and socioeconomic status.

Procedure

Permission was obtained from the Human Subjects Institutional Review Boards at both the University of Tennessee, Knoxville, and Morehead State University in Morehead, Kentucky prior to administering the LSI, the SDLRS, and the Demographic Questionnaire. Professors from each of the selected classes in the cluster sample from the College of Education and Behavioral Sciences at Morehead State University were contacted by letter and a follow up personal visit, telephone call, or e-mail. Their cooperation was solicited in the administration of the three instruments to their classes. When agreed upon by the professor of each class selected, the author of this study personally administered the instruments. Otherwise, the professor administered the instruments to his/her class and immediately returned them to the author. Approximately thirty minutes of class time was necessary for participants to complete the three instruments. Confidentiality among the participants was maintained since all instruments were filled out with no name or other identifying mechanism attached to the instrument. In other words, there was anonymity among the participants.

The LSI and the SDLRS were scored. These data were analyzed to determine whether the research questions posed earlier were statistically significant. Also, the Demographics Questionnaire was tallied to provide information about the sample.

Data Analysis

This study used the following statistical procedures to test the research questions: Pearson product-moment correlation coefficient, one-way analysis of variance, and Scheffe's post hoc multiple comparison test. Descriptive statistics used in this study included means and standard deviations. The analysis of data was performed through the use of the Statistical Package for the Social Sciences (SPSS).

Question # 1. *Is there a significant difference between self-directed learning readiness and the four learning styles of the Kolb Learning Style Inventory?* This question was answered by using a one-way ANOVA derived from the total scores on the SDLRS and the LSI.

Question # 2. *If significant differences are found in Question # 1, then where do these differences occur?* This question was answered by using Tukey's post hoc multiple comparison test.

Question # 3. *Is there a significant relationship between self-directed learning readiness and each of the four modes of the Kolb Learning Style Inventory?*

To address this research question, four sub-questions were posed.

- a) *Is there a significant relationship between self-directed learning readiness and concrete experience?*
- b) *Is there a significant relationship between self-directed learning readiness and reflective observation?*
- c) *Is there a significant relationship between self-directed learning readiness and abstract conceptualization?*

d) Is there a significant relationship between self-directed learning readiness and active experimentation?

These questions were answered by utilizing the Pearson r and Spearman's ρ derived from the total scores of the SDLRS and the LSI.

Summary

The population for this study was approximately 850 graduate students enrolled in the College of Education and Behavioral Sciences at Morehead State University in Morehead, Kentucky during spring semester of 2001. Cluster samples of graduate level classes were randomly selected until the sample size reached the optimal number of 260 students. These students were asked to complete the SDLRS, Kolb's LSI, and the Demographic Questionnaire. The actual sample was reduced to 240 after 20 students had either declined to participate, omitted parts of the surveys, or not followed directions in marking the surveys.

This study combined the use of two designs, correlational and causal-comparative, to investigate whether a significant relationship exists between self-directed learning readiness and learning styles as defined by Kolb (1984). Statistical procedures utilized to test the research questions were the one-way analysis of variance to answer Question 1, Scheffe's post hoc multiple comparison test and Duncan's multiple range test to answer Question 2, and the Pearson product-moment correlation coefficient and Spearman's ρ to answer the four sub-questions of Question 3.

Chapter 4 will present an analysis of the data resulting from the students' scores on the SDLRS, Kolb's LSI, and the Demographic Questionnaire. Furthermore, the three research questions and four sub-question posed by this study will be addressed.

CHAPTER 4

ANALYSIS OF DATA

The purpose of this study was to investigate the relationship between self-directed learning readiness and learning styles and to examine differences in self-directed learning readiness across different learning styles. Chapter 3 described the method for the study, which included details on the population and sample, research design, instrumentation, and data analysis. Chapter 4 presents an analysis of the data gathered from the Self-Directed Learning Readiness Scale (SDLRS) and the Learning Style Inventory (LSI), as well as the Demographic Questionnaire. In addition, the three research questions and four sub-questions posed by this study are addressed.

Demographic Profile

The population for this study was 852, the total number of students enrolled during Spring Semester of 2001 in the College of Education and Behavioral Sciences at Morehead State University in Morehead, Kentucky. This study used a cluster sample, which was achieved by randomly selecting classes of students. The original sample size was 260. However, 19 of these participants failed to complete either the LSI or the SDLRS, resulting in their responses being removed from the sample. Also, one respondent was identified as an outlier. On close examination, it appeared that this respondent did not complete the instruments as instructed. Therefore, that respondent's

scores were discarded from the analysis. Each of the remaining 240 students completed the SDLRS, the LSI, and the Demographic Questionnaire, which provided information about age, gender, race, family income, and education level. Table 1 illustrates these data. From these data, it can be seen that the majority of participants were white females between the ages of 25 and 34, with an average family income of more than \$50,000.

Age

The participants in this study ranged in age from 21 to 55. The mean age was 31.53 and the standard deviation was 7.97. The largest percentage of the sample was comprised of 28 year olds. The fewest responses came from those respondents whose ages were 42, 52, 53, and 55.

Gender

Nearly 72.1 percent of the sample ($n = 173$) were female, while 27.9 percent ($n = 67$) were male. This is indicative of the higher percentage of female graduate students enrolled in the College of Education and Behavioral Sciences at Morehead State University.

Race

Morehead, Kentucky is located in Eastern Kentucky where there is a low minority population. This is reflected in the sample numbers of this study. The percentage of Caucasian participants was 97.5 or 234, while there were 1.7 percent or four

Table 1. Demographic Data

Demographic	Frequency	Percent	Cumulative Percent
Age			
24 or less	42	17.5	17.5
25 to 34	130	54.2	71.7
35 to 44	40	16.7	88.3
45 to 54	27	11.2	99.6
55 or over	1	.4	100.0
TOTALS	240	100.0	
Race			
Caucasian	234	97.5	97.5
African American	4	1.7	99.2
American Indian or Alaskan Native	0	0.0	99.2
Asian or Pacific Islander	1	.4	99.6
Hispanic	0	0.0	99.6
Other	1	.4	100.0
TOTALS	240	100.0	
Gender			
Female	173	72.1	72.1
Male	67	27.9	100.0
TOTALS	240	100.0	
Annual Family Income			
\$10,000 or less	13	5.4	5.4
\$10,000-\$20,000	9	3.8	9.2
\$20,000-\$30,000	43	17.9	27.1
\$30,000-\$40,000	35	14.6	41.7
\$40,000-\$50,000	39	16.3	57.9
More than \$50,000	101	42.1	100.0
TOTALS	240	100.0	
Education Level			
High school diploma or GED	6	2.5	2.5
Associate degree	6	2.5	5.0
Four year college Degree	154	64.2	69.2
Graduate degree	65	27.1	96.3
Other	9	3.8	100.0
TOTALS	240	100.0	

African-American participants, .4 percent or one Asian participant, and .4 percent or one participant was other.

Annual Family Income

The highest number of participants, 101, or 42.1 percent, had an annual family income of over \$50,000. The next highest number of participants, 43, or 17.9 percent, had an annual family income of \$20,000 - \$30,000. Thirty-nine, or 16.3 percent, had a family income of \$40,000-\$50,000 and 35, or 14.6 percent, had an annual family income of \$30,000- \$40,000. Finally, 13, or 5.4 percent, listed their annual family income as \$10,000 or less and nine, or 3.8 percent, had an annual family income of \$10,000 - \$20,000. It should be remembered that this category refers to family, as opposed to individual, income.

Education Level

Since the population for this study was comprised of students enrolled in graduate classes, the largest percentage of participants had a four-year college degree. One hundred fifty-four or 64.2 percent identified themselves as having a four-year college degree. Sixty-five participants, or 27. 1 percent, stated they held a graduate degree. Nine participants, or 3.8 percent, specified "other" on the list of current educational level, while two educational levels were each represented by 2.5 percent or six participants. Even though 12 respondents selected the categories of high school diploma or associate degree, this was assumed to be an error among those who selected this option; or perhaps

these participants were advanced students who had special permission to enroll in a graduate level course.

Self-Directed Learning Readiness Scale (SDLRS)

The Self-Directed Learning Readiness Scale (SDLRS) is a questionnaire developed by Lucy M. Guglielmino (1977) that is designed to measure readiness for self-directed learning. It consists of 58 statements regarding learning and attitudes toward learning that are to be answered according to which level the respondent believes most accurately reflects his or attitude or skill. The responses to each statement can be chosen from the following: (1) "almost never true of me," (2) "not often true of me," (3) "sometimes true of me," (4) "usually true of me," or (5) "almost always true of me." The respondent circles only one response for each statement.

The SDLRS scores of the 240 participants in this study ranged from 172 to 284. The mean SDLRS score was 230.92, with a standard deviation of 22.85. These scores are compared to other SDLRS adult scores found by previous researchers as shown in Table 2. The mean score of 230.9 in this study is almost identical to Adenuga (1991), who reported a mean score of 230.8, and Wood (1994) and Owen (1996) also have nearby means with mean scores of 228.4 and 238.7 respectfully. As with this study, similarly Adenuga and Owen sampled graduate students.

Finally, according to Cronbach's Standardized Scale Alpha (n=240), the reliability of the SDLRS was .92. Hence, the reliability of the SDLRS was found to be very high. This information is also found in Table 3.

Table 2. Comparison of Self-Directed Learning Readiness Scale Scores

Author (Date)	Subjects	N	Mean	Standard Deviation	Range	
					Minimum	Maximum
Canipe (2001)	Graduate Students	240	230.9	22.8	172	284
Owen (1996)	Graduate Students	185	238.7	21.6	157	282
Wood (1994)	Adult Inquirers	103	228.4	31.5	120	276
Adenuga (1991)	Graduate Students	176	230.8	22.3	171	286
Brockett (1985a)	Older Adults	64	212.0	25.4	166	269
Guglielmino (1977)	Graduate Students	91	257.5	20.0	189	285

Table 3. Cronbach's Coefficient Alpha for the Self-Directed Learning Readiness Scale and the Learning Style Inventory

Instruments	Cronbach's Coefficient Alpha
Self-Directed Learning Readiness Scale (SDLRS)	.92
Learning Style Inventory (LSI) (Modes of Learning)	
Concrete Experience	.75
Reflective Observation	.80
Abstract Conceptualization	.81
Active Experimentation	.83

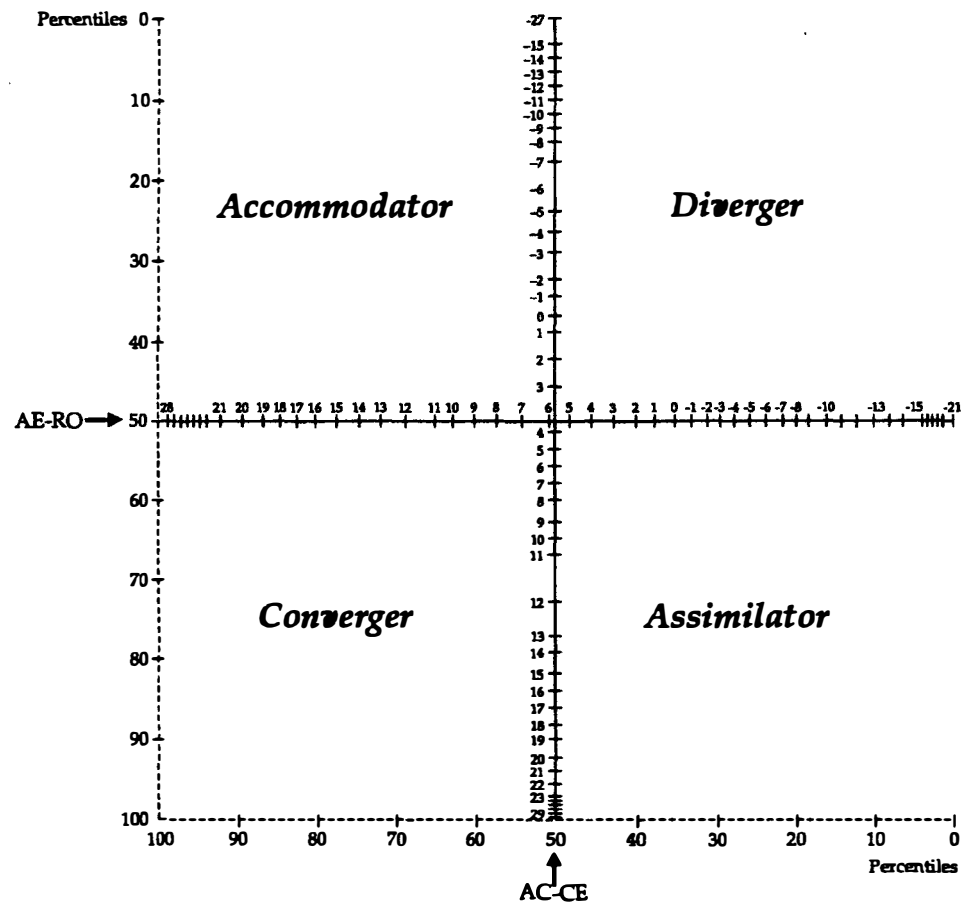
Learning Style Inventory (LSI)

The Learning Style Inventory (LSI) was developed by David A. Kolb in 1976 and revised in 1984 to help determine individual learning style preferences among adults. When data from the LSI are scored the results are plotted on a grid (Figure 2). This places individual results in either the accommodator, assimilator, converger, or diverger quadrants.

The LSI is a survey type instrument that directs students to complete 12 statements with one of four possible endings. The participants rank endings for each statement from 4 (high) to 1 (low) according to how the participant perceives himself/herself as a learner. The four endings correspond to the four modes of learning: concrete experience, reflective observation, abstract conceptualization, and active experimentation.

Responses from 240 graduate students gathered from a random cluster sample yielded a fairly even breakdown among the four learning styles. Sixty-five respondents (27.1%) were accommodators. Sixty-four respondents (26.7%) were divergers. Fifty respondents (20.8%) were convergers, and 61 respondents (25.4 %) were assimilators. Table 4 illustrates these data.

The reliability of the LSI in this study was analyzed using Cronbach's Standardized Scale Alpha. The LSI (alpha) scores (n=240) varied from .75 on concrete experience to .80 on reflective observation, .81 on abstract conceptualization, and .83 on active experimentation. Therefore, according to these statistics the internal reliability of the LSI was found to be good. This is illustrated by Table 2.



(Kolb, 1995, p.6)

Figure 2. Learning Style Type Grid

Table 4. Learning Style Inventory Frequencies

	Frequency	Percent	Cumulative Percent
Accommodator	65	27.1	27.1
Diverger	64	26.7	53.8
Converger	50	20.8	74.6
Assimilator	61	25.4	100.0
TOTAL	240	100.0	

Analysis of Research Questions

This study posed three research questions to investigate the relationship between self-directed learning readiness and learning styles and, further, to examine differences in self-directed learning readiness across different learning styles.

Question # 1. *Is there a significant difference between self-directed learning readiness and the four learning styles of the Kolb Learning Style Inventory?*

This question was answered using a one-way ANOVA derived from the total scores on the SDLRS and the LSI. As shown in Table 5, at an alpha level of .05 no significant differences were found between self-directed learning readiness and the four learning styles of the LSI (accommodator, diverger, converger, and assimilator.) This suggests that self-directed learning readiness is not related to any particular learning style. Therefore, any particular learning style or combination of learning styles is compatible with self-directed learning readiness.

Question # 2. *If significant differences are found in Question # 1, then where do these differences occur?*

While statistically no significant differences were found in Question # 1, the difference in the alpha level and the p-value was so small that the researcher chose to perform further analysis. Therefore, Tukey's post hoc multiple comparison test was computed to determine if pairwise comparisons of the means among the learning styles were found to be significantly different (Ferguson & Takane, 1989).

Table 5. One Way Analysis of Variance of the Variables: Self-Directed Learning Readiness Scale and the Learning Style Inventory

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	4021.524	3	1340.508	2.621	.051
Within Groups	120718.809	236	511.520		
Total	124740.333	239			

Referring to Table 6, Tukey's post hoc multiple comparison test reveals results that are mostly consistent with Question # 1, in which no significant differences were found between the scores of the SDLRS and the LSI. However, a statistically significant difference was found in the pairwise comparison of the converger and diverger. Yet, the mean difference of 11.59, while being statistically significant, was quite small. Therefore, while a significant difference was found, it is unclear whether this would be enough evidence to form a conclusion other than the one previously reached in Question # 1. Thus, the findings in Question # 1 are retained.

Question # 3. *Is there a significant relationship between self-directed learning readiness and each of the four modes of the Kolb Learning Style Inventory?*

**Table 6. Multiple Comparisons:
Tukey's Honestly Significant Difference Method**

(Dependent Variable: SDLRS)

Pairwise Comparisons (A) LSI (B) LSI		Mean Difference (A - B)	Significance
Accommodator	Diverger	6.50	.36
Accommodator	Assimilator	2.83	.90
Converger	Accommodator	5.09	.63
Converger	Diverger	11.59*	.03
Converger	Assimilator	7.92	.26
Assimilator	Diverger	3.66	.80

*p < .05

As was stated earlier, this question is answered by four sub-questions, the first of which is:

a) Is there a significant relationship between self-directed learning readiness and concrete experience?

This relationship was determined by comparing the scores on the SDLRS and the LSI. By utilizing the Pearson Product Moment correlation coefficient, it was found that there was no statistically significant relationship. The correlation was $-.012$ at an alpha level of $.05$. Therefore, there seemed to be no significant link between self-directed learning readiness and the mode of concrete experience. This is illustrated in Table 7.

b) Is there a significant relationship between self-directed learning readiness and reflective observation?

As shown in Table 7, a Pearson Product Moment correlation coefficient of $-.239$ at an alpha level of $.05$ was found. This indicates that a significant negative relationship exists between self-directed learning readiness and the mode reflective observation. Therefore, it is suggested that as self-directed learning readiness scores increase, one's reflective observation score appears to decrease. However, the coefficient of determination ($r^2 = .057$) (Table 8) points to a very weak negative relationship between these two variables. A coefficient of determination or r^2 is a statistic that shows the amount of variation in one variable that is predictable from another variable (Gall, Borg, & Gall, 1996).

Table 7. Pearson Product Moment Correlation Coefficients for the Self Directed Learning Readiness Scale and the Learning Style Inventory

Correlation Between the SDLRS Scores And the LSI (Modes of Learning) Scores	Pearson Coefficient
SDLRS and Concrete Experience	- .012
SDLRS and Reflective Observation	- .239*
SDLRS and Abstract Conceptualization	.171*
SDLRS and Active Experimentation	.050

*p < .01

Table 8. Coefficients of Determination Derived from the Pearson Product Moment Correlation Coefficients Between the SDLRS and the Modes of Learning of the LSI

Correlations Between the SDLRS Scores And the LSI (Modes of Learning) Scores	Coefficients of Determination
SDLRS and Concrete Experience	.000
SDLRS and Reflective Observation	.057
SDLRS and Abstract Conceptualization	.029
SDLRS and Active Experimentation	.003

b) Is there a significant relationship between self-directed learning readiness and abstract conceptualization?

Table 7 shows a Pearson Product Moment correlation coefficient of .171. While this is significant at an alpha level of .05, the coefficient of determination of .029 (Table 8) indicates a weak relationship between the variables. Nonetheless, it suggests that the higher one's abstract conceptualizations score is, the higher the SDLRS score will be. Again, the relationship is very weak.

c) Is there a significant relationship between self-directed learning readiness and active experimentation?

Referring to Table 7, a Pearson Product Moment correlation coefficient of .050 was found. The relationship between the variables was not significant. Thus, it appears there is no link between self-directed learning readiness and the mode of active experimentation.

Finally, Figure 3 provides a graphic illustration of the relationship between the individual scores on the SDLRS and the individual scores on the LSI. The SDLRS is represented by the vertical axis, and the LSI is represented by the horizontal axes. On the horizontal axis labeled AE - RO, AE represents the learning mode active experimentation and RO represents the learning mode reflective observation. A positive score as a result of subtracting RO from AE indicates that the learning mode of an individual is more active. On the other hand, a negative score as a result of subtracting RO from AE shows the learning mode is more reflective (Kolb, 1995). Similarly, on the horizontal axis labeled AC - CE, AC represents the learning mode abstract conceptualization and CE

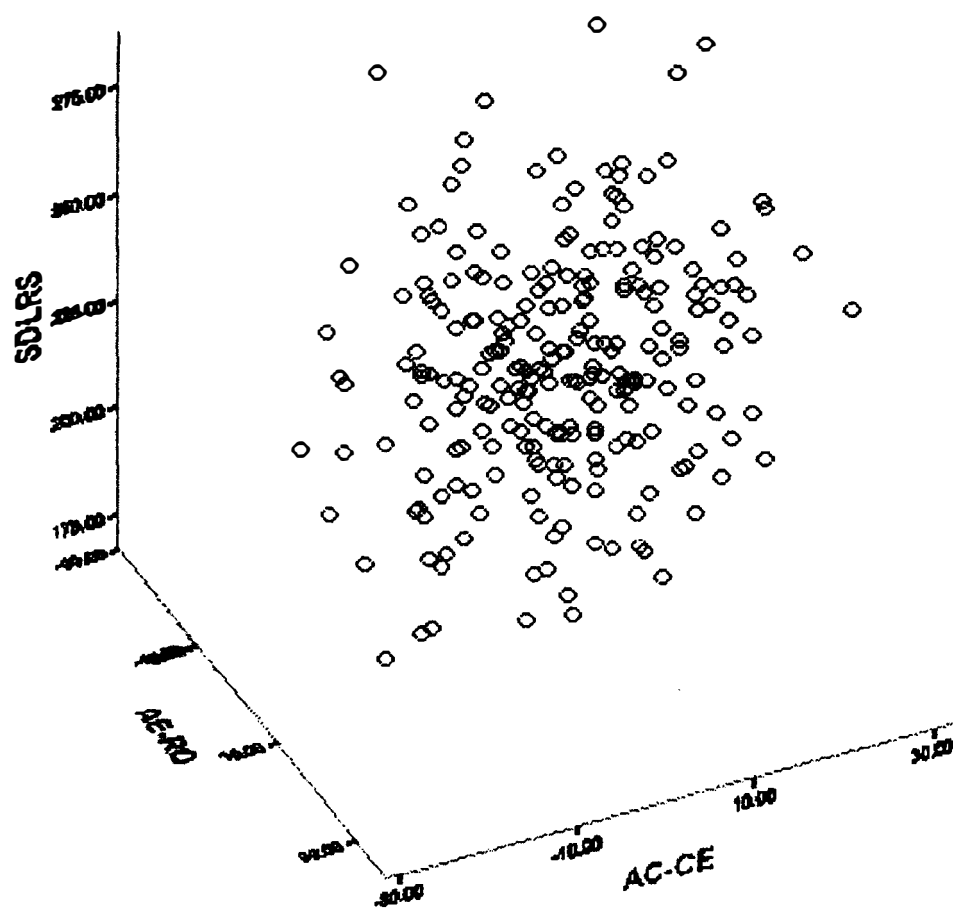


Figure 3. Scatter Diagram of LSI Scores and SDLRS Scores

represents the learning mode concrete experience. A positive score as a result of subtracting CE from AC indicates that the individual's learning mode is more abstract. A negative score as a result of subtracting CE from AC indicates the learning mode of an individual is more concrete (Kolb, 1995).

Again, Figure 3 shows the SDLRS on the vertical axis and the learning modes on the horizontal axes. It illustrates via a scatter plot that there is no distinct pattern that would indicate learners being categorized into a single mode of learning. The scores are scattered around the center of the grid showing a combination of learning modes rather than predominance of a particular mode associated with a certain level of self-directed learning readiness.

Summary

There were 852 graduate students in the population for the study, who were enrolled in the College of Education and Behavioral Sciences at Morehead State University, Morehead, Kentucky for spring term, 2001. A cluster sample of 260 graduate students was randomly selected from this population, and the SDLRS, LSI, and Demographic Questionnaire were administered. However, 19 of these participants failed to complete either the LSI or the SDLRS, resulting in their responses being removed from the sample. Also, one respondent was identified as an outlier, thus leaving a sample size of 240.

Scores on the SDLRS ranged from 172 to 284 with a mean score of 230.92. The LSI instrument showed respondents were fairly evenly distributed among the four

learning styles of accommodator ($n = 65$), diverger ($n = 64$), converger ($n = 50$), and assimilator ($n = 61$).

A one-way ANOVA did not reveal a significant difference between the SDLRS scores and the scores on the LSI at an alpha level of .05. Moreover, Tukey's multiple comparison test was computed and the results were consistent with the one-way ANOVA, except in one pairwise comparison--that of the converger and diverger. While the comparison was statistically significant, the mean difference was quite small. The reliability for the SDLRS was high. Using Cronbach's Standardized Scale Alpha the coefficient was .92. Using the same statistical test for the LSI, the alpha scores ranged from .75 on concrete experience to .80 on reflective observation to .81 on abstract conceptualization to .83 on active experimentation. Therefore, these figures suggest good internal reliability for the LSI.

Pearson Product Moment correlations were examined between the SDLRS and each of the modes of learning as indicated by the LSI. There was no significant correlation found between the SDLRS and the modes of learning concrete experience ($r = -.012$) at an alpha level of .01 and active experimentation ($r = .050$), again at an alpha level of .01. However, there was significance, albeit weak, for the other two modes of learning. Statistical significance in the correlation was found between the SDLRS and the mode of learning reflective observation ($r = -.239$) at an alpha level of .01. Also, a significant correlation was found between the SDLRS and the mode of learning abstract conceptualization ($r = .171$) at an alpha level of .01. The reliability coefficients for each of the modes of learning were good. For concrete experience the alpha was .75, for

reflective observation the alpha was .80, for abstract conceptualization the alpha was .81, and for active experimentation the alpha was .83.

The demographic questionnaire was divided into five areas: age, race, gender, annual family income, and education level. The age of respondents ranged from 21 to 55. The mean age was 31.53, from an N of 240. The age group with the largest frequency (n = 130) or 54.2 % was 25-34. The smallest age group (n = 1) or .4% was age 55 and over.

The majority of the respondents were, by far, Caucasian (n = 234) or 95.5 %. Females were a majority of the respondents (n = 173) or 72.1%, and males made up 27.95% (n = 67). The most frequent annual family income was more than \$50,000 (n = 101) or 42.1%. The most frequent category for education level was for those with a four year college degree (n = 154) or 64.2%. Even though 12 respondents selected the categories of high school diploma or associate degree, this was assumed to be an error among those who selected this option since the population was graduate students.

In the next chapter, a summary of the study will be presented. In addition, the results presented in this chapter will be discussed. Finally, implications and recommendations for further research will be offered.

CHAPTER 5

CONCLUSIONS, DISCUSSION, AND RECOMMENDATIONS

This study was designed in order to examine the relationship between self-directed learning readiness and learning styles among a sample of graduate students. Chapter 1 offered an introduction to the study. In Chapter 2, the literature related to self-directed learning and learning styles was examined. Chapter 3 presented the method for the study. And results of the data were presented in Chapter 4.

In this final chapter, the study will offer a summary of the study and its major conclusions. These conclusions will then be discussed further. Finally, some recommendations for practice and future research will be presented.

Purpose and Procedure

The purpose of the study was to examine relationships between self-directed learning readiness and learning styles and, further, to examine differences in self-directed learning readiness across different learning styles. The relationship between self-direction and learning styles may provide insight for educational theorists, academicians, and those seeking to gain a better understanding of adult learning. An awareness of such a relationship could enhance educational practice and may add to the understanding of the cognitive aspect of self-directed learning among adults.

The population for the study consisted of 852 graduate students enrolled in the College of Education and Behavioral Science at Morehead State University in Morehead, Kentucky for spring term of 2001. A cluster sample of 260 graduate students was randomly drawn.

Professors at Morehead State University whose classes were selected from the cluster sample administered the Self-Directed Learning Readiness Scale (SDLRS), the Learning Style Inventory (LSI), and the Demographic Questionnaire. These completed instruments were returned promptly.

Of the 260 respondents in the study, data from 19 were discarded because the instruments were not fully completed by the participants. One outlier was also observed and discarded. These adjustments reduced the sample size to 240. Each of these remaining 240 students completed the SDLRS, the LSI, and the Demographic Questionnaire, which provided information about age, gender, race, family income, and education level. The majority of the respondents were between the ages of 25 and 34 (54.2%). Furthermore, the majority of these participants were white (97.5%), which is fairly typical of the population of Eastern Kentucky. One hundred seventy-three of the respondents were females (72.1%), and the most common annual family income was reported to be more than \$50,000 (42.1%). This sample was taken from graduate level classes so it was assumed that all participants would be graduate students; however, five percent reported on the Demographic Questionnaire that their highest education level attained was either a high school diploma (or GED) or an associate degree. The author of this study can only assume these students were in error when they marked these

responses, or perhaps had special permission as advanced seniors to enroll in graduate classes.

The LSI was developed by David A. Kolb (1984) to help identify individual learning style preferences among adults. When data from the LSI are scored, the results are plotted on the learning style type grid (See Figure 2 in Chapter 4) labeled with the four modes of learning: concrete experience, reflective observation, abstract conceptualization, and active experimentation. From these combinations of learning modes, the learning styles of the participants are then found to be either accommodators, assimilators, convergers, or divergers.

Outcomes from the LSI in this study had the following results: responses from 240 graduate students gathered from a random cluster sample yielded a fairly even breakdown among the four learning styles. Sixty-five respondents (27.1%) were accommodators. Sixty-four respondents (26.7%) were divergers. Fifty respondents (20.8%) were convergers, and 61 respondents (25.4 %) were assimilators.

The SDLRS is a Likert-type scale developed by Lucy M. Guglielmino in 1977 that is designed to measure self-directed learning readiness. The scale consists of 58 statements regarding learning and attitudes toward learning that are to be answered according to the degree that the subject perceives is most applicable to the respondent. The SDLRS scores of the 240 participants in this study ranged from 172 to 284, and the mean SDLRS score was 230.92, with a standard deviation of 22.85.

Conclusions

This study examined three research questions and four sub-questions as a method in order to determine a possible relationship between self-directed learning and learning styles. Conclusions are presented below.

Question # 1. *Is there a significant difference between self-directed learning readiness and the four learning styles of the Kolb Learning Style Inventory?*

No significant difference was found between the means of the SDLRS and the means of the LSI at an alpha level of .05. Statistical significance was found at .051. Finding no difference between learning styles and self-directed learning readiness shows that self-directed learning readiness was not linked to any one learning style as defined by the Kolb Learning Style Inventory.

Question # 2. *If significant differences are found in Question # 1, then where do these differences occur?*

While no significant differences were found in Question # 1, a post hoc multiple comparison test was utilized since there was extreme closeness between the alpha level and the p-value. Tukey's multiple comparison test revealed a statistically significant difference between the means of the converger and diverger. Nonetheless, this difference was quite minute and provided less than overwhelming evidence to negate the results found in Question # 1. However, it does raise possibilities for future investigation.

Question # 3. *Is there a significant relationship between self-directed learning readiness and each of the four modes of the Kolb Learning Style Inventory?*

This question is answered by the following four sub-questions:

a) Is there a significant relationship between self-directed learning readiness and concrete experience?

No significant correlation was found between the SDLRS and the LSI. The alpha level was .05 with a Pearson coefficient of .012. Therefore, no link between self-directed learning readiness and the mode of learning, concrete experience, was established.

b) Is there a significant relationship between self-directed learning readiness and reflective observation?

A significant negative correlation of $-.239$ at an alpha level of .05 was found. Even though the relationship was significant, a correlation coefficient of $.057$ points to a very weak relationship. Given the weak relationship between self-directed learning readiness and reflective observation, one may infer that those individuals whose LSI scores fall within the area of reflective observation will also score low on the SDLRS. However, one must be very cautious in making such a conclusion for as mentioned earlier, the coefficient of correlation of $.057$ indicated that about six percent of the variance in self-directed learning readiness scores can be predicted by the variable, reflective observation (Ferguson & Takane, 1989).

c) Is there a significant relationship between self-directed learning readiness and abstract conceptualization?

A significant positive relationship of $.171$ was found between the scores of the SDLRS and the abstract conceptualization the mode of learning at an alpha level of .05. Although a statistically significant relationship between the variables was found, it was very weak. Moreover, the correlation coefficient between the scores on the SDLRS and

abstract conceptualization, was .029, which means that about three percent of the variance in the scores of the SDLRS could be predicted by the variable, abstract conceptualization. Therefore, to state that scores on the SDLRS would be higher from individuals whose scores on the LSI fall within the mode of learning, abstract conceptualization, can not be done with much confidence (Ferguson & Takane, 1989).

d) Is there a significant relationship between self-directed learning readiness and active experimentation?

There was no significant relationship between the score on the SDLRS and active experimentation. A Pearson coefficient of .050 was found at an alpha level of .05. Since no statistically significant relationship was established, there does not appear to be a link between SDLRS and the mode of learning, active experimentation.

Discussion and Implications

The impetus driving this study was in large part based on Long's (1990) identification of a psychological dimension of self-directed learning, which emphasizes the learner's cognitive ability, including the capacity for critical thought and reflection. Long believed that this psychological power of the learner to maintain active control of the learning process is paramount in achieving self-directed learning.

Further, Brockett and Hiemstra (1991) synthesized Long's (1990) analysis of the psychological aspects of self-directed learning into a framework they termed the Personal Responsibility Orientation (PRO) model. This model illustrates the distinction between learner self-direction and self-directed learning. They suggested that learner self-direction

deals with the characteristics of the learner, while self-directed learning involves characteristics of the instructional process.

While the PRO model distilled Long's (1990) analysis into two branches, it was actually the culmination of these two branches that created a reconstitution of the encompassing term "self-direction in learning" (Brockett & Hiemstra, 1991). The learner self-direction of the PRO model coincided with Long's psychological dimension. Therefore, it seemed that since there is a strong psychological dimension to self-direction in learning a study exploring this dimension in relation to the concept of cognitive learning styles could offer further insight into the self-directed learning process.

Moreover, Kolb (1984) proposed in his theory of growth and development a relationship between learning style types and self-directedness. He suggested that a high degree of self-directedness may not coincide with any particular learning style, but instead, be linked to all four learning styles--assimilator, converger, diverger, and accommodator. Kolb theorized that at the highest stages of learner development the four modes of learning--reflective observation, active experimentation, concrete experience, and abstract conceptualization--are integrated by the learner to produce a high level of self-direction. This would indicate, as others have suggested, that successful self-directed learners are flexible and adaptable and are able to choose across learning styles, utilizing the one that best meets the demands of a particular learning project and/or learning situation (Robotham, 1995, Felder, 1996).

However, Theil's (1984) research indicated that the accommodator learning style is significantly related to self-directedness. This finding gave rise to the author of this

study's conjecture that self-directed learning readiness may be related to a particular learning style instead of being indifferent to all four learning styles.

Moreover, if a particular learning style could be paired with self-directed learning readiness, then this would hold much promise for identifying self-directed learners and facilitating the learning process. For example, if the learning style of an accommodator or diverger or assimilator or converger could be identified as the predominant style related to self-directed learning readiness, there might be the potential to predict successful learning outcomes for college courses with a self-directed learning component, such as some web-based courses.

Furthermore, Adenuga's (1991) findings suggested that the relationship between self-directed learning readiness and the learning style of a converger was strong. These findings further bolstered the author of this study's conjecture that self-directed learning readiness is related to a particular learning style. Yet, the findings of this research do not support the conjecture. In fact, opposite results were noted. There was found to be no significant difference between self-directed learning readiness as measured by the SDLRS and the learning styles of the Kolb LSI. Also, there were only two statistically significant correlations between the SDLRS and the learning modes of the LSI, and these were observed to be very weak correlations. Therefore, one may surmise that the relationship between learning styles and self-directed learning readiness may be an "apples and oranges" type of comparison, thus shedding less insight into this relationship than was originally suspected.

On the other hand, the data support Kolb's (1984) contention that self-direction is more conducive to those who exhibit a high degree of adaptability and integrativeness in

the learning process. This is illustrated by Figure 1 in Chapter 1, in which the apex of the cone represents adaptability and integrativeness and corresponds with the intersection of the learning modes, reflective observation - active experimentation and concrete experience - abstract conceptualization. Accordingly, this apex corresponds to the center point of the learning styles, (accommodator, diverger, assimilator, and converger), where they too converge. In other words, the center point of the base of the cone extending to the apex represents that point when a learner would be more adaptive by utilizing all four modes. Also, at that point one would be more integrative by drawing on all four learning styles and not exclusively in one mode of learning or exclusively in one learning style.

Therefore, referring to Figure 3 in Chapter 4, it can be seen that the scores of the SDLRS and the LSI scatter around the center where the convergence of the learning styles and learning modes occurs. This is consistent with Kolb's (1984) theory.

As stated earlier, this study indicated the relationship between the scores of the SDLRS and the scores of the LSI conformed to no particular relational pattern. Rather, the scores were distributed in a circular fashion more toward the center of Figure 3, thereby suggesting that perhaps self-directed learning readiness may be more closely related to all the learning modes and all the learning styles, rather than any particular mode or style.

It is possible that several implications can be inferred from the findings of this study. First, since self-directed learning appears to be an integrative process, then to foster self-directedness, perhaps one should strive to amalgamate all learning styles in the learning process and not rely solely on one's predominate style of perceiving and processing information. For example, one who has a learning style of a diverger would

want to integrate the other three styles-- accommodator, assimilator, and converger, into one's learning process. Therefore, the learner gains adaptability, flexibility, and integrativeness, all of which are hallmarks of being self-directed.

A second implication of this study centers on the data set. While much has been written in the area of self-directed learning and much research has been conducted on learning styles, far less has been written about these concepts in a relational sense. Therefore, the data presented in this study add information to the body of literature that is, for the most part, scarce. This should provide future researchers some additional insight into this area of study.

Third, as was previously mentioned, no significance was found between self-directed learning readiness and the Kolb learning styles. Additionally, there was no significant correlation between self-directed learning readiness and two modes of learning and very weak correlations between self-directed learning readiness and the other two modes of learning. Yet an interesting implication deals with the descriptive statistic concerning the mean of the SDLRS scores. This figure was quite consistent with the results of other studies using the SDLRS with college students (Adenuga, 1991; Wood, 1994; Owen, 1996). So, perhaps, this research adds support to the idea of a stable mean SDLRS score among college students.

Recommendations for Future Research

The population of the study was limited to a specific group of adult learners, which was comprised of graduate students at a regional university in eastern Kentucky.

Therefore, the study has limited generalizability. Nonetheless, the following recommendations are offered for further research.

1. Further research is warranted in replicating this study using a more diverse college student population in terms of racial identity, ethnicity, and socio-economic status backgrounds.

2. Research is needed to study the relationship between self-directed learning readiness and learning styles by using different measures of these variables. Perhaps alternative instruments to the SDLRS and the LSI should be considered since there have been concerns raised by several prominent researchers about the validity and usefulness of these instruments.

3. Research is needed to study the relationships between self-directed learning and learning styles using populations other than college students. Perhaps a study involving GED students may be an area to consider as opposed to the formal classroom instruction given traditional students.

4. Research is needed to explore different conceptualizations of self-directed learning and learning styles. Perhaps alternative ways of viewing these constructs would offer greater insight and a broader perspective.

Summary

While the nature of the relationship between self-directed learning and learning styles may need refining, evidence from this study suggests that self-directed learning readiness occurs among all four learning styles--diverger, accommodator, assimilator, and converger. More importantly, however, this study indicates that self-directed learning

readiness is more of an amalgamation of learning styles and modes of learning--reflective observation, active experimentation, concrete experience, and abstract conceptualization. Also, this is consistent with Kolb's (1984) experiential learning theory of growth and development, which characterizes self-directedness as the ability to incorporate all four learning styles into the learning process. Such proficiency leads to integrativeness, flexibility, and adaptability in learning.

While the author of this study speculated that a predominant learning style would be related to self-directed learning readiness, the data from the research, as have been explained earlier, do not support this conjecture. Therefore, in the opinion of this author, perhaps further attention should be directed to the relationship between self-directed learning and other cognitive constructs, rather than continuing to speculate as to this perceived notion that a high degree of self-directed learning readiness is commensurate with the identification of a particular learning style. Though the cognitive aspect of self-directed learning presents a challenge for further study, resources directed to this endeavor may return a greater benefit when aimed toward an aspect other than the relationship between self-directed learning readiness and learning styles.

REFERENCES

REFERENCES

- Adenuga, T. (1991). Demographic and personal factors in predicting self-directedness. In Long, H. B. & Associates (Eds.), Self-directed learning: Consensus and conflict (pp. 93-106). Norman, OK: Oklahoma Research Center for Continuing Professional and Higher Education of the University of Oklahoma.
- Arndt, M. J., & Underwood, B. (1989). Learning style theory and patient education. The Journal of Continuing Education in Nursing, 21(1), 28-31.
- Ary, Jacobs, & Razavieh. (1996). Introduction to research in education (5th ed.). Fort Worth, TX: Harcourt Brace College Publishers.
- Blackwood, C. C. (1989). Self-directedness and hemisphericity over the adult life span. (Doctoral dissertation, Montana State University). Dissertation Abstracts International, 50, 328A.
- Bonham, L. A. (1988a). Learning style use: In need of perspective. Lifelong Learning, 11(5), 14-17.
- Bonham, L. A. (1988b). Learning style instruments: Let the buyer beware. Lifelong Learning, 11(6), 12-16.
- Bonham, L. A. (1991). Guglielmino's Self-Directed Learning Readiness Scale: What does it measure? Adult Education Quarterly, 41(2), 92-99.
- Brockett, R. G. (1985a). The relationship between self-directed learning readiness and life satisfaction among older adults. Adult Education Quarterly, 35(4), 210-219.
- Brockett, R. G. (1985b). Methodological and substantive issues in the measurement of self-directed learning readiness. Adult Education Quarterly, 36(1), 15-24.
- Brockett, R. G., & Hiemstra, R. (1991). Self-direction in adult learning: Perspectives on theory, research, and practice. London: Routledge.
- Brockett, R. G., Hiemstra, R., & Penland, P. R. (1982). Self-directed learning. In C. Klevins (Ed.), Materials and methods in adult and continuing education (pp. 171-178). Los Angeles: Klevins Publications.
- Brookfield, S. (1984). Self-directed adult learning: A critical paradigm. Adult Education Quarterly, 35(2), 59-71.

Brookfield, S. (1885). Analyzing a critical paradigm of self-directed learning: A response. Adult Education Quarterly, 36(1), 60-64.

Candy, P. C. (1991). Self-direction for lifelong learning: A comprehensive guide to theory and practice. San Francisco: Jossey-Bass.

Cavaliere, L. A. (1992). The Wright brothers' odyssey: Their flight of learning. In L. A. Cavaliere and A. Sgroi (Eds.), Learning for personal development. New Directions for Adult and Continuing Education, (53). San Francisco: Jossey-Bass.

Claxton, C. S., & Murrell, P. H. (1988). Learning styles. Eric Digest. Available online at: <http://ericae.net/edo/ED301143.htm> (10, Jan. 2000).

Cohen, L., & Manion, L. (1989). Research methods in education (3rd ed.). London: Routledge.

Cornwell, J. M. & Manfredo, P. A. (1994). Kolb's learning style theory revisited. Educational and Psychological Measurement, 54, 317-328.

Delahaye, B. L., & Smith, H. E. (1995). The validity of the learning preference assessment. Adult Education Quarterly, 45(3), 159-173.

Felder, R. M. (1996). Matters of style. Available online at: <http://www2.ncsu.edu/unity/lockers.../felder/public/Papers/LS-Prism.htm> (6, Dec. 1999).

Ferguson, G. A. & Takane, Y. (1989). Statistical analysis in psychology and education (6th ed.). New York: McGraw-Hill.

Ferro, T. R. (1993). The influence of affective processing in education and training. In D. D. Flannery (Ed.), Applying cognitive learning theory to adult learning. New Directions for Continuing Education, (59). San Francisco: Jossey-Bass.

Field, L. (1989). An investigation into the structure, validity, and reliability of Guglielmino's Self-Directed Learning Readiness Scale. Adult Education Quarterly, 39(3), 125-139.

Field, L. (1990). Guglielmino's Self-Directed Learning Readiness Scale: Should it continue to be used? Adult Education Quarterly, 41(2), 100-103.

Flannery, D. D. (1993). Book reviews. Adult Education Quarterly, 43(2), 110-112.

Gall, M. D., Borg, W. R., & Gall, J. P. (1996). Educational research: An introduction (6th ed.). White Plains, NY: Longman Publishers.

Garrison, D. R. (1992). Critical thinking and self-directed learning in adult education: An analysis of responsibility and control issues. Adult Education Quarterly, 42(3), 136-148.

Garrison, D. R. (1997). Self-directed learning: Toward a comprehensive model. Adult Education Quarterly, 48(1), 18-33.

Gay, L. R. & Airasian, P. (2000). Educational research: Competencies for analysis and application (6th ed.). Upper Saddle River, NJ: Merrill.

Gehan, K. (1998). Psychological type and learning style among nurses. In Cranton, P. (Ed.), Psychological type in action. Sneedville, TN: Psychological Type Press.

Gibbons, M., Bailey, A., Comeau, P., Schmuck, J., Seymour, S., & Wallace, D. (1980). Journal of Humanistic Psychology, 20(2), 41-56.

Gregorc, A. F. (1982). An adult's guide to style. Maynard, MA: Gabriel Systems.

Grow, G.O. (1991). Teaching learners to be self-directed. Adult Education Quarterly, 41(3), 125-149. Expanded version available online at: <http://www.famu.edu/sjmga/ggrow> (26, Mar. 1999).

Grow, G. (1994). In defense of the staged self-directed learning model. Adult Education Quarterly, 44(2), 109-114.

Guglielmino, L. M. (1977). Development of the self-directed learning readiness scale (Doctoral dissertation, University of Georgia, 1977). Dissertation Abstracts International, 38, 6467A.

Guglielmino, L. M. (1989). Guglielmino responds to Field's investigation. Adult Education Quarterly, 39(4), 235-240.

Guglielmino, L. M. (2000). (personal communication with R. Brockett, February 2, 2000).

Hickcox, L. K. (1995). Learning styles: A survey of adult learning style inventory models. In R. R. Sims & S. J. Sims (Eds.), The importance of learning styles (pp. 25-47). Westport, CT: Greenwood Press.

Hiemstra, R. (1975). The older adult and learning. (ERIC Document Reproduction Service No. ED 117 371).

Hiemstra, R., & Brockett, R. (1994). From behaviorism to humanism: incorporating self-direction in learning concepts into the instructional design process. New Ideas About Learning. Norman, OK: Oklahoma Research Center for Continuing Professional and Higher Education, University of Oklahoma. Available online at: <http://www.flinet.com/~pba-cct/SDL/sdlhuman.html> (15, Aug. 1999).

Holtzclaw, L. R. (1985). Adult learners' preferred learning styles, choice of courses, and subject areas for prior experiential learning credit. Lifelong Learning, 8(6), 23-27.

Honey, P. & Mumford, A. (1986). Using your learning styles. Maidenhead: Peter Honey.

Honey, P. & Mumford, A. (1992). The manual of learning styles. Maidenhead: Peter Honey.

Houle, C. O. (1961). The inquiring mind. Madison, WI: The University of Wisconsin Press.

James, W. B., & Blank, W. E. (1993). Review and critique of available learning style instruments for adults. In D. D. Flannery (Ed.), Applying cognitive learning theory to adult learning. New Directions for Continuing Education, (59). San Francisco: Jossey-Bass.

Kasworm, C. E. (1988a). Self-directed learning in institutional contexts: An exploratory study of adult self-directed learners in adult education. In H. B. Long and Associates (Eds.), Self-directed learning: Application and theory (pp. 65-98). Athens, GA: University of Georgia, Adult Education Department.

Kasworm, C. E. (1988b). Part-time credit learners as full time learners: The role of self-directed learning in their lives. Paper presented at the annual conference of the American Association for Adult and Continuing Education, Tulsa, OK.

Katz, N. (1988). Individual learning style: Israeli norms and cross-cultural equivalence of Kolb's learning style inventory. Journal of Cross-Cultural Psychology, 19(3), 361-379.

Keefe, J. W. (1979). Learning style: An overview. In J. W. Keefe (Ed.), Student learning styles: Diagnosing and prescribing programs. Reston, VA: National Association of Secondary School Principals.

Keefe, J. W. (Ed.). (1988). Profiling and utilizing learning style. Reston, Virginia: National Association of Secondary School Principals.

Knowles, M. S. (1975). Self-directed learning. New York: Association Press.

Kolb, D. A. (1984). Experiential learning: Experience as the source of learning and development. Englewood Cliffs, New Jersey: Prentice Hall.

Kolb, D. A. (1995). Learning-Style Inventory, 1995: Technical specifications. Boston: McBer and Company.

Kolb, D. A. (1999). Learning Style Inventory. Boston, MA: Hay/McBer Training Resources Group.

Korhonen, L. J., & McCall, R. J. (1986). The interaction of learning style and learning environment on adult achievement. Lifelong Learning, 10(2), 21-23.

Kreber, C., Cranton, P. & Allen, K. (2000). If lifelong learning is important ...the relationships between students' self-directed learning readiness, their psychological type, learning style, and creative and logical thinking ability. In H. B. Long and Associates (Eds.), Practice and theory in self-directed learning (pp. 97-113). Schaumburg, Illinois: Motorola University Press.

Landers, K. (1990). The Oddi Continuous Learning Inventory: An alternate measure of self-direction in learning (Doctoral dissertation, Syracuse University, 1989). Dissertation Abstracts International, 50, 3824A.

Long, H. B. (1989). Some Additional criticisms of Field's investigation. Adult Education Quarterly, 39(4), 240-243.

Long, H. B. (1990). Psychological control in self-directed learning. International Journal of Lifelong Education, 9(4), 331-338.

Long, H. B. (2000). Understanding self-direction in learning. In H. B. Long and Associates (Eds.), Practice and theory in self-directed learning (pp. 11-24). Schaumburg, Illinois: Motorola University Press.

McCarthy, B. (1980). The 4 MAT System: Teaching to learning styles with right/left mode techniques. Oakbrook, IL: Excell, Inc.

McCune, S. K. (1989). A statistical critique of Field's investigation. Adult Education Quarterly, 39(4), 243-245.

Merriam, S. B. & Brockett, R. G. (1997). The profession and practice of adult education: An introduction. San Francisco: Jossey-Bass.

Merriam, S. B. & Caffarella, R. S. (1999). Learning in adulthood: A comprehensive guide (2nd ed.). San Francisco: Jossey-Bass.

Morehead State University Graduate Catalog. (2000). Morehead, KY: Morehead State University.

Oddi, L. F. (1986). Development and validation of an instrument to identify self-directed continuing learners. Adult Education Quarterly, 36, 97-107.

Okabayashi, H. & Torrance, E. P. (1984). Role of style of learning and thinking and self-directed learning readiness in the achievement of gifted students. Journal of Learning Disabilities, 17(2), 104-107.

Owen, T. R. (1996). The relationship between wellness and self-directed learning among graduate students. Unpublished doctoral dissertation, University of Tennessee, Knoxville, Tennessee.

Penland, P. R. (1977). Self-planned learning in America. (Contract No. G007603327). Pittsburgh, PA: Pittsburgh University Graduate School of Library and Information Sciences. (ERIC Document Reproduction Service No. ED 184 589)

Peters, J. M. & Gordon, R. S. (1974). Adult learning projects: A study of adult learning in urban and rural Tennessee. Knoxville: The University of Tennessee, Knoxville. (ERIC Document Reproduction Service No. ED 102 431).

Pilling-Cormick, J. (1996). Development of the Self-Directed Learning Perception Scale. Unpublished doctoral dissertation, University of Toronto, Toronto, Ontario, Canada.

Pilling-Cormick, J. (2000). The SDLPS Profile: Using the SDLPS to implement SDL. In H. B. Long and Associates (Eds.), Practice and theory in self-directed learning (pp. 183-194). Schaumburg, Illinois: Motorola University Press.

Pilling-Cormick, J. & Bulik, R. J. (2000). Further investigation into the use of the SDLPS in a clinical setting. In H. B. Long and Associates (Eds.), Practice and theory in self-directed learning (pp. 219-230). Schaumburg, Illinois: Motorola University Press.

Pilling-Cormick, J. & Kops, W. J. (2000). Self-directed learning in the workplace: An exploratory study to identify organizations with a SDL approach to training. In H. B. Long and Associates (Eds.), Practice and theory in self-directed learning (pp. 195-206). Schaumburg, Illinois: Motorola University Press.

Ralston, P. A. (1981). Educational needs and activities of older adults: Their relationship to senior center programs. Educational Gerontology, 7, 231-244.

Raschick, M. & Maypole, D. E. (1998). Improving field education through Kolb learning theory. Journal of Social Work Education, 34(1), 31-43.

Reiff, J. C. (1992). Learning styles. Washington, D.C.: National Education Association.

Riding, R. & Rayner, S. (1998). Cognitive styles and learning strategies: Understanding style differences in learning and behavior. London: David Fulton Publishers.

Robotham, D. (1995). Self-directed learning: The ultimate learning style? Available online at: <http://www.wlv.ac.uk/~bu1821/files/self-dir.htm> (12, May, 2000).

Shaw, D. M. (1987). Self-directed learning and intellectual development: A correlation study. Unpublished master's thesis, Montana State University, Bozeman, MT.

Sims, R. R. & Sims, S. J. (1995). Learning and learning styles: A review and look to the future. In R. R. Sims & S. J. Sims (Eds.), The importance of learning styles (pp. 25-47). Westport, CT: Greenwood Press.

Six, J. E. (1989). The generality of the underlying dimensions of the Oddi continuing learning inventory. Adult Education Quarterly, 40(1), 43-51.

Six, J. E. & Hiemstra, R. (1987). The classroom learning scale: A criterion measure of the Oddi continuing learning inventory. Proceedings of the 28th Annual Adult Education Research Conference. (pp. 233-238). University of Wyoming, Laramie, Wyoming.

Smith, J. C. (1990). Public librarian perceptions of library users as self-directed learners. (Doctoral dissertations, Syracuse University, 1989). Dissertation Abstracts International, 51, 1087A.

Spear, G. E. & Mocker, D. W. (1984). The organizing circumstance: Environmental determinants in self-directed learning. Adult Education Quarterly, 35, 1-10.

Tennant, M. (1992). The staged self-directed learning model. Adult Education Quarterly, 42(3), 164-166.

Theil, J. (1984). Successful self-directed learners' learning styles. Adult Education Research Council, 25, 237-242.

Torrance, E. P. & Mourad, S. (1978a). Self-directed learning readiness skills of gifted students and their relationship to thinking creatively about the future. The Gifted Child Quarterly, 22(2), 180-186.

Torrance, E. P. & Mourad, S. (1978b). Some creativity and style of learning and thinking correlates of Guglielmino's Self-Directed Learning Readiness Scale. Psychological Reports, 43, 1167-1171.

Torrance, E. P. & Rockenstein, Z. L. (1988). Styles of thinking and creativity. In R. R. Schmeck (Ed.), Learning strategies and learning styles (pp. 275- 290). New York: Plenum Press.

Tough, A. (1971). The adult's learning projects. Toronto, Ontario: The Ontario Institute for Studies in Education.

Truluck, J. E. & Courtenay, B. C. (1999). Learning style preferences among older adults. Educational Gerontology, 25, 221-237.

West, R. F. & Bentley, E. B., Jr. (1990). Structural analysis of the Self-Directed Learning Readiness Scale: A confirmatory factor analysis using LISREL modeling. In Long, H. B. and Associates (Eds.), Advances in Research and Practice in Self-Directed Learning. Norman, OK: Oklahoma Research Center for Continuing Education of the University of Oklahoma, 157-180.

Willcoxson, L. & Prosser, M. (1996). Kolb's learning style inventory (1985): Review and further study of validity and reliability. British Journal of Educational Psychology, 66, 251-261.

Williams, C. W. (1995). Relationships between learning style preferences, mathematics attitudes, calculator usage, and achievement in calculus. Unpublished doctoral dissertation, University of Tennessee, Knoxville.

Wood, J. M. (1994). An exploration of adult perception of deterrents to participation and self-directed learning readiness. Unpublished doctoral dissertation, University of Tennessee, Knoxville.

Woolfolk, A. E. (1998). Educational psychology (7th ed.). Boston: Allyn and Bacon.

Yahya, I. (1998). Willcoxson and Prosser's factor analyses on Kolb's (1985) LSI data: Reflections and re-analyses. British Journal of Educational Psychology, 68, 281-286.

APPENDICES

	<i>Almost never true of me; I hardly ever feel this way.</i>	<i>Not often true of me; I feel this way less than half the time.</i>	<i>Sometimes true of me; I feel this way about half the time.</i>	<i>Usually true of me; I feel this way more than half the time.</i>	<i>Almost always true of me; there are very few times when I don't feel this way</i>
10. If I discover a need for information that I don't have, I know where to go to get it.	1	2	3	4	5
11. I can learn things on my own better than most people.	1	2	3	4	5
12. Even if I have a great idea, I can't seem to develop a plan for making it work.	1	2	3	4	5
13. In a learning experience, I prefer to take part in deciding what will be learned and how.	1	2	3	4	5
14. Difficult study doesn't bother me if I'm interested in something.	1	2	3	4	5
15. No one but me is truly responsible for what I learn.	1	2	3	4	5
16. I can tell whether I'm learning something well or not.	1	2	3	4	5
17. There are so many things I want to learn that I wish that there were more hours in a day.	1	2	3	4	5
18. If there is something I have decided to learn, I can find time for it, no matter how busy I am.	1	2	3	4	5
19. Understanding what I read is a problem for me.	1	2	3	4	5
20. If I don't learn, it's not my fault.	1	2	3	4	5
21. I know when I need to learn more about something.	1	2	3	4	5
22. If I can understand something well enough to get a good grade on a test, it doesn't bother me if I still have questions about it.	1	2	3	4	5
23. I think libraries are boring places.	1	2	3	4	5
24. The people I admire most are always learning new things.	1	2	3	4	5

41. I'm happy with the way I investigate problems.
42. I become a leader in group learning situations.
43. I enjoy discussing ideas.
44. I don't like challenging learning situations.
45. I have a strong desire to learn new things.
46. The more I learn, the more exciting the world becomes.
47. Learning is fun.
48. It's better to stick with the learning methods that we know will work instead of always trying new ones.
49. I want to learn more so that I can keep growing as a person.
50. I am responsible for my learning— no one else is.
51. Learning how to learn is important to me.
52. I will never be too old to learn new things.
53. Constant learning is a bore.
54. Learning is a tool for life.
55. I learn several new things on my own each year.
56. Learning doesn't make any difference in my life.
57. I am an effective learner in the classroom and on my own.
58. Learners are leaders.

Almost never true of me; I hardly ever feel this way.	Not often true of me; I feel this way less than half the time.	Sometimes true of me; I feel this way about half the time.	Usually true of me; I feel this way more than half the time.	Almost always true of me; there are very few times when I don't feel this way.
1	2	3	4	5
1	2	3	4	5
1	2	3	4	5
1	2	3	4	5
1	2	3	4	5
1	2	3	4	5
1	2	3	4	5
1	2	3	4	5
1	2	3	4	5
1	2	3	4	5
1	2	3	4	5
1	2	3	4	5
1	2	3	4	5
1	2	3	4	5
1	2	3	4	5
1	2	3	4	5
1	2	3	4	5
1	2	3	4	5

APPENDIX B

LEARNING STYLE INVENTORY

The Learning-Style Inventory describes the way you learn and how you deal with ideas and day-to-day situations in your life. Below are 12 sentences with a choice of endings. Rank the endings for each sentence according to how well you think each one fits with how you would go about learning something. Try to recall some recent situations where you had to learn something new, perhaps in your job or at school. Then, using the spaces provided, rank a "4" for the sentence ending that describes how you learn *best*, down to "1" for the sentence ending that seems *least* like the way you learn. Be sure to rank all the endings to each sentence unit. Please do not make ties.

Example of completed sentence set:

1. When I learn: 2 I am happy. 1 I am fast. 3 I am logical. 4 I am careful.

Remember: 4 = most like you 3 = second most like you 2 = third most like you 1 = least like you

	A	B	C	D
1. When I learn:	— I like to deal with my feelings	— I like to think about ideas.	— I like to be doing things.	— I like to watch and listen.
3. When I am learning:	— I tend to reason things out.	— I am responsible about things.	— I am quiet and reserved.	— I have strong feelings and reactions.
5. When I learn:	— I am open to new experiences.	— I look at all sides of issues.	— I like to analyze things, break them down into their parts.	— I like to try things out.
7. I learn best from:	— observation.	— personal relationships.	— rational theories.	— a chance to try out and practice.
9. I learn best when:	— I rely on my observations.	— I rely on my feelings.	— I can try things out for myself.	— I rely on my ideas.
11. When I learn:	— I get involved.	— I like to observe.	— I evaluate things.	— I like to be active.
12. I learn best when:	— I analyze things.	— I am responsible and organized.	— I am careful.	— I am practical.

APPENDIX C

DEMOGRAPHIC QUESTIONNAIRE

INSTRUCTIONS: Please answer these questions by checking the blank space or fill in the blank. Select only one response for each item and remember that your answers are confidential and are entirely for research purposes.

1. What is your age? ____
2. What is your ethnic background?
 - ____ Caucasian
 - ____ African American
 - ____ American Indian or Alaskan Native
 - ____ Asian or Pacific Islander
 - ____ Hispanic
 - ____ Other (specify) _____
3. What is your gender?
 - ____ Female
 - ____ Male
4. What is your annual family income?
 - ____ \$10,000 or less
 - ____ \$10,000-\$20,000
 - ____ \$20,000-\$30,000
 - ____ \$30,000-\$40,000
 - ____ \$40,000-\$50,000
 - ____ More than \$50,000
5. What is your current educational level?
 - ____ High school diploma or GED
 - ____ Associate degree
 - ____ Four Year college degree
 - ____ Graduate degree (specify)
 - ____ Other (specify) _____

VITA

James Boyd Canipe was born in Gastonia, North Carolina and attended public schools in Gaston County, North Carolina. In 1972 he received a Bachelor of Science degree in Business Administration from the University of North Carolina, Chapel Hill. He resumed his formal education at East Tennessee State University in Johnson City, Tennessee, where he received a Master of Arts degree in Economics. In December, 2001 he earned the Doctor of Philosophy degree in Education at the University of Tennessee, Knoxville.

Jim has taught economics for over 20 years to community college students, four-year college students, and graduate students. Colleges at which he has taught include University of Virginia's College at Wise in Wise, Virginia, where he was honored as Distinguished Teacher of the Year in 1991 and Southeast Community College in Middlesboro, Kentucky, where he received the Adjunct Teacher of the Year Award in 1996. Additionally, he has taught at other colleges in Tennessee and Kentucky. Jim is currently an Assistant Professor of Adult Education in the Department of Leadership and Secondary Education at Morehead State University in Morehead, Kentucky.

Jim is married to Nealie Canipe, who is an elementary school teacher in Kentucky. They have two children, Jennifer and Cheryl.