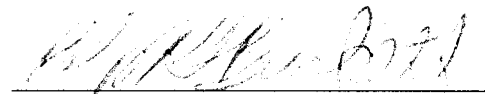
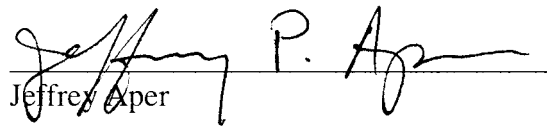


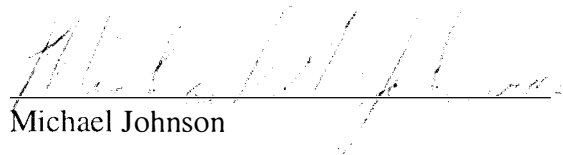
To the Graduate Council:

I am submitting herewith a dissertation written by Barry F. Cox entitled "The Relationship Between Creativity and Self-Directed Learning Among Adult Community College Students." I have examined the final paper 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.


Ralph G. Brockett, Major Professor

We have read this dissertation
and recommend its acceptance:


Jeffrey P. Ager


Michael Johnson


Tricia McClam

Acceptance for the Council:


Vice Provost and Dean of
Graduate Studies

THE RELATIONSHIP BETWEEN CREATIVITY AND SELF-DIRECTED
LEARNING AMONG ADULT COMMUNITY COLLEGE STUDENTS

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

Barry F. Cox
August 2002

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DEDICATION

I would like to dedicate this dissertation posthumously to three close relatives. First, my mother, Lucy Goddard Cox, who still inspires me to keep going. Second, I want to thank my uncle, Howard Goddard, for being a good guy. Lastly, I thank my brother, Danny Cox, who endured a great deal and helped me persevere.

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I would like to thank each of my committee members. Ralph Brockett offered encouragement for me to press forward when things looked their darkest. Jeff Aper offered help with the statistics. Trish McClam influenced me to hang on and finish. Michael Johnson offered to help when others did not.

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I wish to thank my wife, Carolyn, for being patient and considerate in allowing me to complete this process. I want to thank my children, Kevin and Julie, for tolerating those times when I was not there for them. I appreciate Margot and Oreo for tolerating our long walks. Without the support of my family, it would have been impossible to have completed this task.

ABSTRACT

The purpose of this study was to investigate the relationship between creativity and self-directed learning readiness in a sample of adult community college students in Tennessee. A cluster sample of 114 students enrolled in Walters State Community College evening school were participants. Participants were administered the Self-Directed Learning Readiness Scale (SDLRS), the Khatena Torrance Creative Perception Inventory (KTCPI), and a demographic questionnaire.

Demographic information substantiated a preponderance of female students with an average age of 25.5. Students were typically Caucasian and generally held a high school diploma.

A significant moderate positive correlation was found between creativity and self-directed learning readiness. There were also significant positive correlations between self-directed learning readiness and the components of the KTCPI (SAM and WKOPAY?). The SAM and WKOPAY? had a moderate positive correlation. There were significant positive correlations, ranging from moderate to weak, between self-directed learning readiness and seven of the 11 factors of the KTCPI. Multiple regression produced a significant variable in Intellectuality, which explained about 24% of the variability in the SDLRS total score.

Creativity differed by gender with males having higher mean levels of creativity. There were no differences for gender or birth order in self-directed learning readiness. Ethnic background and educational level had insufficient numbers for analysis. There was not a significant correlation between age and creativity or between age and the factors of the KTCPI. There was a weak but significant relationship between age and self-directed learning readiness.

The results suggest that there is a relationship between creativity and self-

directed learning readiness, which reinforces earlier accounts. It is possible that these related attributes, especially if used together, could help the achievement of adult community college students.

Recommendations include the assessment of creativity and self-directed learning and the expansion of these skills at the community college level. Research recommendations include the development of new measures of creativity and self-directed learning, exploration of previous models, and the use of qualitative research. Additional research should continue to investigate demographic variables, experimental studies should be broadened, and related concepts within psychology need to be examined for potential contributions.

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CHAPTER I

Introduction

Creativity is important at the individual and societal levels. On an individual level, creativity is used for solving problems on the job and in daily life. An increase in the degree of creative behavior can also add to the general welfare and mental health of adults (Torrance, 1995a) while a stifling of creative thinking may lead to tension and breakdown. Raising the level of creativity of the average person by a modest amount may have remarkable social consequences in solving problems such as overpopulation and educating people (Guilford, 1968). On a societal level, creativity may lead to new scientific discoveries, original art, and novel inventions. In addition, creativity can help individuals, organizations, and society to adapt to meet changing demands (Sternberg & Lubart, 1999). Though much of the mystery about creativity will remain, the field of creativity studies is moving away from a lethargic period toward rejuvenation. Feldman, Csikszentmihalyi, and Gardner (1994d) have proposed that the study of creativity is the one field that can influence challenging problems of the future.

Guilford (1968) assumes each person has creative potential and unique abilities. The nurturing of creativity is socially important because it is part of continuing to learn for life. Guilford believed that the creative act was the "key to education in its fullest sense and to the solution of mankind's most serious problems" (1968, p.147). In Guilford's view, the ideal way of learning is the active search for information, which leads to creative acts.

Educational institutions are producing many graduates, but the majority are being trained to become conventional thinkers (Cropley, 1997). Many educators see a

primary goal of education as expanding the skills and dispositions needed to promote lifelong, self-directed learning and, thus, also to promote creativity. This goal has been particularly encouraged by those who work with creative students (Torrance & Mourad, 1978a). A growing concern is the stimulation of creativity in college students (Sharpe, 1987), since educational concerns have encouraged a mounting interest in creativity (Cropley, 1997).

This problem is especially acute for educators dealing with creative potential in adults. For example, Murray (1992) has investigated how community colleges, as a whole, could be altered to stimulate creativity among students. The writer considers the development of individual creativity important for the entire community college. In her view, instructors can influence students' self-perceptions of their creativity in a positive way. The more creative students perceived creativity as relying upon one's self and doing things in unique, individual ways with an intrinsic motivational orientation. The aspects of the instructor-student relationship, which stimulate self-determination, were especially important for students who were internally focused (Murray, 1992).

Self-directed learning is an important part of a blended life plan that includes work, education, leisure, and family obligations (Reynolds, 1985). In a study of part-time community college students, Reynolds found that those who were high in self-direction tended to be more concerned with learning for learning's sake. Reynolds proposed that a determination of self-directed readiness and motivational orientation might help in matching student characteristics to suitable courses and programs.

Educational institutions need to place more emphasis on encouraging self-directed learning because students need to cope with cultural change and self-development (Candy & Crebert, 1991). Swift political, social, and technological

changes have rendered much current knowledge obsolete. Personal and career success will increasingly require continuing learning and development. Because of these changes, higher educators increasingly see the advocacy of self-directed lifelong learning as an important goal for higher education (Kreber, 1998). Self-directed learners prefer to express themselves creatively while simultaneously personalizing and directing their learning (Owen, 1999).

“The self-directed learner more often chooses or influences the learning objectives, activities, resources, priorities and levels of energy expenditure than does the other-directed learner” (Guglielmino, 1977, p. 3-4). Furthermore, the multifaceted role of the community college potentially allows learners to have more control over their learning to meet societal demands for increased learning (Closson, 1996). Therefore, the community college appears to be an ideal place for learners to become more self-directed if they have the necessary skills. The availability of the community college to a broad spectrum of society makes it a significant community resource for the acquisition of self-directed learning skills. Closson has remarked on the deficit in self-directed learning research across different socioeconomic levels and noted that community colleges must encourage research on self-directed learning.

Remarkably, there is not much empirical evidence of the relationship between self-directed learning readiness skills and creative thinking. The late 1970s saw some exploration into self-directed learning and creativity, mostly with children, using the Self-Directed Learning Readiness Scale (SDLRS). The SDLRS was designed to gain consensus on the most significant personality characteristics of self-directed learners, and to assess an individual’s readiness for self-directed learning (Guglielmino, 1977) Guglielmino described creativity as one of the eight factors in her study and claimed that the SDLRS is positively correlated with measures of creativity.

The seminal research of Torrance and Mourad (1978a; 1978b) soon followed Guglielmino's and connected readiness for self-directed learning and creativity from a perspective of finding ways to expand creativity. Three measures of originality correlated with scores on the SDLRS at "rather high levels of significance so do both of the personality measures" (Torrance & Mourad, 1978b, p. 1170). Readiness for self-directed learning was associated with the motivations of creative personalities and creative experiences and achievement. Many students identified as gifted and talented become casualties in academic programs that stress self-directed learning, because of a lack of readiness (Torrance & Mourad, 1978b). Failure rates in those educational programs that emphasize self-directed learning may be limited through self-directed readiness screening and the subsequent development of readiness by students and teachers. In 1979, Mourad reported similarities between the self-directed person and the creative student. There have been numerous studies of creativity and many involving self-directed learning. Additional study of the relationship between readiness for self-directed study and creative thinking has been recommended (Torrance & Mourad, 1978a).

Research that is more recent has explored adult aspects of this topic primarily in the business environment, where self-directed learning skills have been related to better job performance. Guglielmino and Roberts (1992), for example, declared, "the creative, entrepreneurial individual is likely to be a highly self-directed learner" (p. 263).

Dacey and Lennon, (1998) remark that "[a]n almost symbiotic relationship exists between self-control, in that one needs creativity in order to envision a plan or visualize a desired outcome" (p.116). The writers define self-control as a set of attitudinal and cognitive skills that may be learned over a lifetime. Self-control seems

similar to self-directed learning and it is plausible to suggest that self-directed learning may also have a comparable symbiotic relationship to creativity. There is evidence for the linking of creative thinking to performance on the SDLRS (Kreber, Cranton & Allen, 2000). The authors also report that the self-directed learning literature clearly implies a relationship between “creative thinking and self-directedness in learning” (p. 110).

Statement of the Problem

A problem persists in the present state of theory and research involving creativity and self-directed learning. The studies of Torrance and Mourad (1978a; 1978b), involving public school students and graduate students, were completed more than 20 years ago. Yet, there have been no comparable studies of creativity and self-directed learning readiness incorporating community college students. Additional research using a similar approach may provide different results or may confirm the initial studies of Torrance and Mourad. A study delving into the relationship between creativity and self-directed learning can offer explanations concerning the degree to which creativity and self-directed in learning are interconnected. The study may contribute to alleviating this discontinuity in knowledge. Therefore, the problem to be addressed in this study is to establish a better understanding of the relationship between self-directed learning and creativity in adults, and specifically, to determine the relationship between creativity and self-directed learning among adult community college students.

Purpose of the Study

Creativity (Altman, 1999; Murray, 1992) and self-directed learning (e.g., Box, 1982; Garstka, 1984, Liberman, 1986; Long & Walsh, 1993; Reynolds, 1985) are important factors in the success of community college students. Ochse (1990) locates “a possibility that the tendency to engage in creative production *may have its roots in independent activity in childhood that builds knowledge and skills*” (p.139). Such self-directed activity offers a sense of personal control and a balance between capability and opportunity (Ochse, 1990). Creative people display a general trait of self-direction and an inclination to depart from social norms when appropriate (Sheldon, 1995). The author suggests that the self-determined person may be more likely to devote time to problems that are of intrinsic interest to them, which results in increased creativity. The creative tend to be self-directed and depend less on others while enjoying and needing freedom in their work (West & Rickards, 1999). Many researchers assume that creativity can be expressed by almost anyone, although this expression may be in distinct ways or in different degrees (Nickerson, 1999). Nickerson also finds enough evidence to conclude that the enhancement of certain types of creativity is possible. Furthermore, Brockett and Hiemstra (1991) contend that there are several ways to amplify self-directed learning skills. They cite nine learning variables that learners can control. In addition, they include strategies of critical reflection, rational thinking, and helping skills that can facilitate self-directed learning.

If these authors are correct in their assumptions, it is reasonable to conclude that essentially everyone has the potential for creativity and self-directed learning, and that these are attributes that may be learned. Therefore, the purpose of this study is to determine the relationship between creativity and self-directed learning readiness

among adult community college students by using quantitative measures of these constructs. This study is intended to clarify the nature of the relationship between creativity and self-directed learning to contribute to a better understanding of student achievement in community colleges.

Research Questions

This study will examine the relationship between creativity and self-directed learning readiness by addressing the following research questions:

1. Is there a significant relationship between self-directed learning readiness and creativity among adult community college students?
2. Is there a significant relationship between self-directed learning readiness and the 11 individual factors of the Khatena Torrance Creative Perception Inventory (KTCPI) among adult community college students?
3. Is self-directed learning readiness predictable from a particular combination of the 11 factors of the KTCPI among adult community college students?
4. Does creativity differ by gender, ethnic background, birth order, and educational level among adult community college students?
5. Does self-directed learning readiness differ by gender, ethnic background, birth order, and educational level among adult community college students?
6. Is age significantly related to creativity and self-directed learning readiness among adult community college students?

Conceptual Framework

Humanism provides a theoretical framework about psychology and learning for this study. Lucas (1996) interprets humanism as a "current of thought affirming the inviolability or sanctity of the individual, people's inherent dignity, the power and worth of human personality, and the self-directed development of an autonomous self" (p. 285). The primary assumptions of humanism are that human nature is inherently good; that individuals are free and autonomous within constraints of heredity, personal history, and environment; that each individual is unique with unlimited potential for growth; that self-concept has a major role in personal growth; that self-actualization and growth are manifested in a desire for achieving potential; that the interpretation of reality is strongly influenced by perception; and that individuals are responsible to themselves and others (Elias & Merriam, 1995).

Rogers and Maslow have perhaps had the greatest influence on humanistic psychology (Brockett, 1997). Their beliefs are typically placed within humanist assumptions that individuals have freedom, autonomy, and a practically unlimited potential for personal growth and development (Brockett & Hiemstra, 1994). Rogers characterizes self-direction as an ideal where "one chooses - and then learns from the consequences" (1961, p. 171). Humanism provides a way of understanding both self-directed learning and creativity and, thus, serves as the conceptual framework for the current study.

Regarding self-directed learning, Brockett and Hiemstra (1994) have claimed that the characteristics of learner self-direction are found mostly in the "basic tenets of humanistic philosophy and psychology" (p. 8). For example, the idea of personal responsibility influencing self-direction in learning is fundamentally a legacy of

humanistic thought. Brockett and Hiemstra (1991) interpret personal responsibility in this way: "learners have choices about the directions they pursue as learners" (p. 28). Most of the work concerning self-directed learning emanates from the humanistic belief that posits personal growth as the goal of adult learning (Caffarella & Merriam, 1999). Understanding how individuals learn on their own and how the attributes of learners influence their learning have been the primary strands of this research.

The humanist concept of "self-initiated learning" also informs this study. In fact, Rogers (1969) described self-initiated learning "as the most lasting and pervasive" form of learning (p.162). Rogers asserts that the expansion of self-evaluation facilitates independence and self-reliance. A principal idea currently incorporated in self-directed learning is a "self-initiated process of learning that stresses the ability of individuals to plan and manage their own learning" (Caffarella, 1993, p.25). Self-initiated learning clearly may be interpreted as a central component of self-directed learning. For instance, self-directed learning has been used to describe the "self-initiated, self-planned activities of such highly self-directed learners as Maslow's self-actualizing individuals" (Guglielmino, 1977, p. 7)

Exactly four decades ago, Torrance, whose primary work has been in the area of creativity, suggested that opportunities should be provided for "self-initiated learning" (1962, p. 57). This suggestion is in keeping with the idea of self-directed learning. Again, Torrance (1995a) cites the need for "encouraging and rewarding self-initiated learning" (p. 22) and advocates "learning on one's own" as a part of "searching for one's self and uniqueness" (Torrance, 1995a, pp. 197-198). It seems plausible to assume that self-initiated learning and self-directed learning refer to the same idea.

Humanism can also serve as a foundation for understanding creativity. Yet

another focus of humanistic psychology is the idea that life's goal should be the achievement of something meaningful (Buhler & Allen, 1972). Many people recognize the importance of personal achievement and this realization often accompanies creative aspirations. Therefore, new creative products are added to the culture in the striving toward personally meaningful goals. Self-expression and creative accomplishment are understood as a basic tendency of life. "The primary role assigned to man's [sic] creativity is perhaps the most central concept of humanistic psychology" (Buhler & Allen, 1972, p. 50). The individual is interpreted as an active mediator of personal existence. Humanists are very concerned with education and the individual's ability to control his/her environment (Houtz, 1994). However, much of the society is intolerant of creative thought. In contrast, humanistic education supports the formation of new ideas.

In the humanist view, creative thinking is important to the acquisition of information and is crucial in applying knowledge to daily problems. Creative talent needs to be identified, developed, and applied (Torrance, 1995a). It is assumed that creative abilities are universal attributes that may be increased through learning. Patterson (1973) considers the sustenance of creativity as a societal obligation.

In examining conditions considered favorable to creativity, humanists hypothesize that creativity is more likely to occur without external control and that creativity is encouraged by a personal drive to fulfill potential (Rogers, 1954). Creativity is encouraged in a context of self-evaluation rather than a context of evaluation by others. Creativity is the expression of a person whose basic needs for food and shelter have been achieved (Maslow, 1968).

A psychologically preferred climate of safety and freedom is one in which the person is valued, external evaluation is rejected, and empathic understanding is

provided (Rogers, 1954). Others have repeated this view, such as MacKinnon (1978), who cites the creative person's courage to be apart from collective thought and to be oneself in the face of opposition. Barron (1997, p. 2) similarly states, "Creativity is a quest for meaning . . . an attempt to penetrate the mystery of the self."

There is widespread agreement among psychologists that the creative personality possesses self-discipline and self-control along with an elevated degree of autonomy and independence. For example, Slabbert (1994) established, "An autonomous learner is someone who can consciously control his/her own learning and who takes responsibility for his/her own learning" (p. 64). Empirical research, according to Sheldon (1995), has confirmed, "original people demonstrate a general trait of self-direction and a willingness to depart from social norms when appropriate" (p. 25). The creative personality develops in those who are self-directed in contrast to other-directed (Helson, 1996). Amabile (1996) reports that environments that stimulate autonomy and self-directed learning might also encourage creativity. Independence of thought and behavior can encourage creativity because individuals will then have the "necessary self-directed and self-motivating skills and attitudes" (Houtz, 1994, p.166) to seek out creative solutions. These observations suggest that self-directed learning and creativity are interrelated, as believed by humanistic psychologists. Creativity and self-directed learning are linked by personality traits of autonomy and independence.

Another major thrust of humanistic education is the interest in developing people's abilities to continue to learn and be open to change (Patterson, 1973). The goal of education is to produce people who can "expand their inner selves, create, and who can continue the process of self-education" (Patterson, 1973, p.22). Such people are likely to be more spontaneous and creative, due to a willingness to take risks and

explore, although creativity is often limited and discouraged by the educational system. Patterson (1973) suggests interdependence between creativity and self-education. Berning (1977), similarly, suggested that the ability to be self-directing and the ability to engage in creative thinking are necessary for lifelong learning. The potential to become self-directing and creative is depicted by Berning as characteristic of adult learning.

Though creativity research and inquiry into self-directed learning have been influenced by a variety of ideas, the impact of humanist thought cannot be overemphasized. Observing the impact of the humanist line of reasoning, Candy (1991) alleges that it is commonly "assumed that in our society adults are involved in some sort of quest for self-improvement, and perhaps even for self-actualization" (p. 128). Candy derives a list of attributes possessed or desirable in self-directed learners, such as being venturesome and creative. These qualities are then linked with successful self-directed learning and the autonomous learner.

Thus, it seems that the personality of the creative adult student is "almost ideally suited to self-instruction" (MacKinnon, 1978, p. 153). MacKinnon (1978) has found that the independence of creative students ordinarily increases in college and with age. He suggests that those interested in fostering creativity need to give more autonomy to these students based on studies with creative architects. MacKinnon saw a need to learn what situations contribute to the encouragement of creativity in individuals.

Therefore, the role of the individual becomes more important and powerful in learning (Torrance, 1962). Nonetheless, the creative individual often needs a teacher as a guide in developing creative ideas. The creative person is consequently encouraged to use his/her own creativity via a reciprocal relationship. Closson (1996)

regarded the humanistic approach to education as stimulating adult learning through collaboration and negotiation. These methods are especially suitable in helping learners move toward their potential.

It is suggested that humanistic thought provides a link between self-directed learning and creativity. This hypothetical linkage has been strengthened by the empirical research of Guglielmino (1977), Torrance and Mourad (1978a; 1978b), Mourad (1979), Roberts (1986), Guglielmino, Guglielmino, and Long (1987), Durr (1992), and Baumgarten (1994) who have corroborated a connection between self-directed learning and creativity. To illustrate the role of humanism, Khatena (1992) regarded the flourishing interest in creativity within psychology as “appropriately and meaningfully subsumed under the heading of humanistic psychology.” Khatena, like many other humanists, described the more creative student as typically more autonomous, self-directed, and growth oriented.

Significance of the Study

Creativity and self-directed learning have been connected in several research studies and in theory. This study is intended to provide more thorough information about the connection between the creativity of the adult community college student and self-directed learning.

Previous research has described the often marginal nature of the creative student although the college culture claims to encourage creative expression. Educating for creativity on the college level may be a commonly held myth (e.g., Heist; 1968, Trent; 1968; MacKinnon, 1978). For example, Heist comments that the education of those characterized as creative has probably received the least attention at

the college level. There has been a prevailing assumption that those with exceptional creative potential perceive and learn the same as other students (Heist; 1968). Trent (1968) advocates the formation of special programs designed to stimulate creativity and if creativity can be nurtured, those conditions that help sustain the different forms of creativity need to be explored. Nonintellectual determinants of creative achievement are neglected in college admissions and there is an over reliance on grades, aptitude measures, and achievement tests (MacKinnon, 1978). If testing is to be used, those traits and motivational dispositions related to creativity correspondingly need to be considered and an educational environment should be designed to develop creative potential (MacKinnon, 1978). There is a dissonance between hypothetical requirements of educational environments (including creativity) and actual requirements that emphasize conformity and rote learning (Candy, 1991). College students tend to conform themselves to an academic context of compliance. Perhaps an academic milieu that truly encouraged creativity would develop more of it. This study is expected to add several facets to the knowledge about creativity and self-directed learning of the adult community college student.

First, this study will add to the knowledge of adult learning and adult education as it relates to creativity and self-directed learning. Examining the nature of relationships between self-directed learning and creativity may allow community colleges to become aware of differences among students and help in the formation of programming to better meet individual needs within an institutional goal of developing students' creativity.

Second, this study will provide insight into how institutions can facilitate the development of "creative flexibility" (p. 38) in adult learners (Owen, 1999). It is possible that students who are considered creative could receive additional attention to

help meet their particular needs. This could include supplementary assistance from instructors in developing creativity. For instance, assisting the student to become more self-directed in their learning may have a positive influence on creative potential. It may also lead to an improvement in academic success, as various researchers have found that academic performance improves when creative abilities are valued (Altman, 1999; Sternberg & Lubart, 1999). If given the opportunity to be creative, students may become more interested in education. There is the possibility that an awareness of creativity levels may suggest alternative career or educational paths. This study may assist in retaining those creative students who have received little attention at the college level. In conclusion, creativity may be enhanced when "wise counsel and support can make the difference between a process that continues on course and one that is distorted or aborted altogether" (Feldman, 1999, p. 175).

Third, a serious consideration of student needs may eventually lead more individuals to become self-directed, creatively self-actualized learners. As a result, these individuals may have a substantial impact on the larger society through their creative contributions. The greater a person's initial creative ability, the more likelihood for further growth (Dacey & Lennon, 1998).

Fourth, the additional information will also add to the data concerning the SDLRS, the KTCPI, self-directed learning, and creativity. Many studies have used the KTCPI in the college setting (e.g., Millar, 1995; Khatena & Torrance, 1998; Plucker & Renzulli, 1999). Nonetheless, Fishkin and Johnson (1998) contended that creativity measures have been blemished by meager evidence of reliability, validity, and inadequate norms. This research will possibly help in reducing these concerns.

Finally, the demographic questionnaire used in this study will include information about age, gender, ethnicity, birth order, and educational level. The

findings may offer insight into how these factors pertain to the relationship between creativity and self-directed learning, thus addressing the concern Long and Walsh (1994) and Closso (1996) have expressed about the ambiguous results of earlier research involving these types of variables.

Assumptions

The following assumptions are made in this study:

1. Students recorded their responses on the two measurements and demographic questionnaire to accurately reflect their personal perceptions.
2. The Self-Directed Learning Readiness Scale (SDLRS) is reliable and valid.
3. The Khatena Torrance Creative Perception Inventory (KTCPI) is reliable and valid. It identifies factors of creativity and creative personality.

Limitations

The main limitations of the study are summarized in the following statements:

1. The sample was limited to adult community college students from one school and a cluster sample was used.
2. There have been suggestions that the SDLRS is not as suitable for those with less than a high school education (Brockett & Hiemstra, 1991). However, there were no students in this study to which this limitation applied.
3. The SDLRS and the KTCPI are self-report instruments with the typical limits of such instruments.

Definitions

Adult community college student. A student attending a community college, whether part-time or full-time, who is attending evening classes.

Creativity. This study adopts Torrance's (1995a) definition: "The process of forming ideas or hypotheses, testing hypotheses, and communicating the results. Implied in this definition is the creation of something new, something that has never been seen or has never existed. It involves adventurous thinking, getting out of the mold. It represents a successful step into the unknown and in the process one thing leads to another. Also included are such things as: invention, discovery, curiosity, imagination, experimentation, exploration, and the like. Creative ideas ultimately become evident in such things as scientific theories, inventions, improved products, novels, poems, designs, paintings, and the like." (Torrance, 1995a, pp. 23-24).

Creativity is operationally defined by the Khatena Torrance Creative Perception Inventory (KTCPI). Torrance (1995a) views creativity as a process definition that could include any combination of the four major aspects traditionally examined in creativity studies, which are person, process, product, and press (context). The definition also includes the creativity of daily living and creativity that is more extraordinary. The notion of creativity as a normally distributed trait is vital to the discussion of educational usage of creativity research (Houtz, 1994).

Learner self-direction. The aspect of personality that focuses on a learner's urge or disposition for taking responsibility for learning (Brockett & Hiemstra, 1991).

Self-direction in learning. The combination of the external attributes of an instructional process (self-directed learning) and the internal characteristics of the learner in which the individual assumes responsibility for learning (learner self-

direction) (Brockett & Hiemstra, 1991).

Self-directed learning. A process in which a learner assumes the principal responsibility for planning, fulfilling, and evaluating learning. There may be an educator or resource facilitating the learning process (Brockett & Hiemstra, 1991).

Self-directed learning readiness. The extent to which individuals perceive themselves to possess the competence and attitudes associated with taking personal responsibility for learning. Self-directed learning readiness is operationally defined by the Self-Directed Learning Readiness Scale (SDLRS) as developed by Guglielmino (1977).

Summary

This study is presented in five chapters. Chapter I has provided the introduction, statement of the problem, purpose of the study, research questions, theoretical framework, and previous research. The significance of the study, assumptions, limitations, definitions, and summary are also included. Chapter II offers a review of the literature concerning creativity and self-directed learning. Both concepts are reviewed by examining definitions, theoretical viewpoints, and previous avenues of research. Chapter III describes the specifics of research method, population and sample, design and analysis, instrumentation of the research, and procedure. Chapter IV presents results from the data analysis. Chapter V combines a summary of the study, conclusions, implications, recommendations for applications, and suggestions for additional research.

CHAPTER II

REVIEW OF THE LITERATURE

The purpose of the study is to examine the relationship between creativity and self-directed learning among adult community college students. Chapter I contained an introduction, a statement of the problem, the purpose of the study, research questions, and the theoretical framework. It also addressed the significance of the study, its assumptions and limitations, and provided definitions for important terms, and a summary. Chapter II summarizes the relevant literature concerning the nature of creativity and the characteristics of self-directed learning as well as the overlap between the concepts of creativity and self-directed learning. Literature pertinent to the demographic questionnaire is also summarized.

The following section about creativity includes a short introduction to creativity and definitions of creativity. Additionally, different approaches to creativity and a review of psychometric methods are included. There is also information regarding the Khatena Torrance Creative Perception Inventory (KTCPI) and a summary of research about creativity.

Creativity

Of all the mental faculties, creativity perhaps attracts the most attention of ordinary people. However, according to Csikszentmihalyi (1994), creativity has been essentially excluded from the vocabulary of psychology due to the behaviorist approach in the United States and the psychophysical approach in Germany. The

widespread devotion of psychologists and educators to the study and measurement of intelligence probably hindered the study of creativity in psychology and in education.

Defining Creativity

In this century, psychologists and educators have developed many theories of creativity, but none of them is comprehensive enough to provide an adequate theoretical explanation of creativity (Treffinger, Isaksen, & Firestien, 1983). Lack of agreement regarding definition is partially related to the many ways in which people can be creative, but is also connected to the many different theoretical models of creative behavior. Yet, in spite of the difficulties in understanding creativity, the topic is very important for understanding the nature of human beings (Csikszentmihalyi, 1994).

The complexity of creativity makes it almost impossible to arrive at a universally accepted definition. Getzels (1975) categorizes the most widely applied definitions of creativity into three types that vary according to the emphasis given to the product, the process, or the creative experience. The creative process is defined by Ghiselin (1952) as a change and development in the psychic life of an individual leading to invention. As an example of a creative product, Getzels cites MacKinnon (1962) as suggesting that creativity is an infrequent response or idea that is adaptive and sustained to completion. The creative experience of Maslow (1963) is conceived as a subjective experience expressed through an inspired moment that does not necessarily lead to a creative product.

When Rhodes (1961) reviewed creativity literature more than four decades ago, he found that there were 40 definitions of the concept, many of them interrelated,

and that the study of creativity had interdisciplinary appeal. He categorized the definitions into four aspects: person, process, press (context or environment) and product. Torrance and many other creativity researchers have since followed this categorization.

Torrance (1995a) has suggested that creativity may be defined in many ways, nearly each definition formulating something new. New is “something that has never been seen or has never existed” (Torrance, p. 23, 1995a). The generation of something new is included in nearly all definitions of creative behavior (Torrance, 1995a) although this raises the question of how new something needs to be and to whom it must be new to be creative. According to Torrance, the creative process is marked by a constructive response to existing or new situations, instead of mere adaptation to them. Creativity, in Torrance’s view, occurs in both daily living and rare creations.

Torrance (1988) contends that the multiplicity of definitions of creativity encourages research into different aspects of the processes, skills, and conditions needed to produce creativity. In his view, while researchers generally focus on only one of the four aspects of creativity, they need to be aware of the possible influence from the other three forces. Torrance prefers a process definition that centers on the traits of personality one must have to engage successfully in creative processes. Nevertheless, he believes it is also important to consider what kind of environment encourages creativity and the development of creative products.

The creativity literature can be bewildering because creativity means different things to different people (Ochse, 1990). With so many different definitions at work, readers of the creativity literature need to be aware of the theoretical perspectives and operational definitions of the studies they are investigating (Barron & Harrington, 1996). Failure to recognize definitional distinctions and variations in emphasis has

caused substantial misinterpretation of the creativity literature (Barron & Harrington, 1981).

For example, some researchers may designate people as creative due to their attitudes, interpersonal talents, and lifestyle. Others may define creativity on the basis of scores on tests of creativity or tasks described as creative. Still others may identify as creative those who have produced something of value to the culture. Researchers also disagree about the distribution of creativity across the human population. Some researchers believe that creativity is comparable to broad qualities such as spontaneity and openness. If this is so, we may then focus exploration on the creativity that exists in everyone. Conversely, if creativity is envisioned as demanding radical change or sweeping newness, then study should be limited to more “remarkable” abilities (Rothenberg & Hausman, 1976).

Nonetheless, there is widespread consensus that the essential components of creative thinking and creativity include a knowledge base, general and domain-specific skills, and metacognitive skills useful in planning, regulating, and evaluating (Feldhusen & Goh, 1995). Also important are personality factors in combination with environmental forces. Thus, both cognitive and noncognitive aspects are fundamental for fostering and accessing creativity. "However, those who search for the essence of creativity in current theory and research are apt to be overwhelmed by the current breadth of conceptions in the field as well as the relative uncertainty of its fundamental components" (Feldhusen & Goh, 1995, p. 232). In sum, many different models of the creative process have been developed, but none of them is completely satisfactory.

Seven Approaches to Creativity

Seven prominent approaches have been used to study creativity: mystical, psychoanalytic, pragmatic, confluence, social-personality, cognitive, and psychometric (Sternberg & Lubart, 1999). While these seven approaches are used to organize this study's literature review about creativity, it must be remembered that some creativity researchers might fit into more than one of these approaches. For example, Torrance's work fits within the psychometric tradition, but he was also heavily influenced by humanism, which is an aspect of the social-personality approach. Thus, these approaches should not be seen as mutually exclusive categories but as useful for understanding different research contributions in a general sense.

Mystical Approaches

Mystical approaches usually presume that creativity involves a spiritual process or divine intervention that does not lend itself to scientific study. Until the late nineteenth century, it was commonly accepted that creative abilities might be attributed to divine intervention (Ochse, 1990). That significant creativity can only occur when people become open to forces outside their conventional selves is still a common belief (Weiner, 2000).

The prevailing understanding that creativity was inspired by supernatural forces may have deterred scholarly research into creativity, which began during the nineteenth century. Creativity, even now, is connected with magic, the demonic, and the divine, even while the search for knowledge about creativity remains a prominent goal of rational inquiry (Rothenberg & Hausman, 1976).

Psychodynamic Approaches

The psychodynamic paradigm is the first important twentieth-century

theoretical approach to the examination of creativity (Sternberg & Lubart, 1999). This view assumes that creativity is produced by the tension between conscious reality and unconscious drives. Freud (1908) proposed that artists and writers create as a method to reveal their unconscious inclinations in a publicly approved manner. However, this approach was disconnected from the emerging scientific psychology, and relied heavily upon case studies of eminent creators.

The belief that creativity provides a way to fulfill unconscious needs or to resolve psychological conflict persists among some theorists (Collins & Amabile, 1999). Nonetheless, the authors propose that the preponderance of recent thought and empirical work suggests that creativity is motivated by a personal satisfaction derived from creative activity. For instance, Gedo (1990), a psychoanalyst, is inclined to define creativity as the healthy enjoyment of a search for novelty, which is the opposite of Freudian psychopathology. Freud's original paradigm of the instinctual motivation behind creativity had slowly collapsed by the 1970s (Gedo, 1997). Freudian theory spurs the literary imagination much more than it contributes to contemporary psychological theory (Stanovich, 2001).

Pragmatic Approaches

Brainstorming was developed by Osborn in 1953 and heralded the beginning of the pragmatic approaches (Sternberg & Lubart, 1999). These approaches have often been commercially successful but have lacked a concern with understanding creativity and have devoted little effort to examining the validity of their ideas (Sternberg & Lubart, 1999). These writers see De Bono as possibly the premier advocate of the pragmatic approach, which is concerned with practice, but neglects theory. Nonetheless, Dacey and Lennon (1998) portrayed De Bono's concepts of lateral thinking (searching for alternative ways of defining or interpreting a problem) as

related to divergent thinking and of tangible value. Torrance (1995a) correspondingly remarked that the Osborn-Parnes Creative Problem Solving Model was the most extensively used and most teachable method of creative problem solving. Yet, these pragmatic approaches do not have a foundation in serious psychological theory and lack empirical evidence to validate them (Sternberg & Lubart, 1999). The pragmatic approaches are still popular and often used in creativity-training programs. However, they continue to lack scientific rigor, in spite of their popular acceptance. These approaches “may be useful” (Sternberg & Lubart, 1999, p. 5) but are too often associated with commercialization of creativity.

Confluence Approaches

The 1980s brought a resurgence of interest in creativity and the development of confluence approaches that typically interpret creativity within systems of social networks, problem domains, and fields of enterprise (Sternberg, 1988). Csikszentmihalyi (1988) proposed a “drastic reconception” of creativity (Feldhusen & Goh, 1995, p. 233). Creativity in this explanation is not solely the result of individual action but is the outcome of three principal shaping forces:

a set of social institutions, or *field*, that selects from the variations produced by individuals those that are worth preserving; a stable cultural *domain* that will preserve and transmit the selected new ideas or forms to the following generations; and finally the *individual*, who brings about some change in the domain, a change that the field will consider to be creative (Csikszentmihalyi, 1988, p. 325).

The confluence approaches grew from the seeds planted by earlier psychometric research into creativity. For instance, Getzels (1975) proposed,

“above the biological, psychological, societal, and group contexts of behavior is a cultural context of characteristic values” (p.340). Getzels also suggested that the most productive work in creativity research would occur across a variety of modes and at an integrated, interdisciplinary level of analysis. Csikszentmihalyi (1988, 1994, 1996, 1999), a student of Getzels, seems to have taken this advice to heart in developing his systems model, which views creativity as the culmination of cultural, social, and psychological events.

The confluence approaches offer the possibility of taking into account diverse aspects of creativity (Sternberg & Lubart, 1999). However, some of the main advocates of these approaches such as Gardner and Csikszentmihalyi prefer to examine the more eminent forms of creativity and, consequently, neglect the role of everyday creativity.

Cognitive Approaches

Research within the cognitive approach to creativity investigates the mental representations and processes essential to creative thought (Sternberg & Lubart, 1999). Typically, this research emphasizes the stages of the creative process and the products of creativity. For example, Sternberg and Lubart cite the efforts of Wallas (1926), who advanced the stages of preparation, incubation, illumination, and verification.

The creative cognition approach rejects the idea that exceptional forms of creativity are the result of minds that are different from the norm. Creative and noncreative thinking can be placed on a continuum with both everyday creativity and extraordinary types of creativity operating through common processes (Ward, Smith, & Finke, 1999). For this approach, it is assumed that the ability to think creatively is the rule rather than the exception in human cognitive function. This approach is based in early twentieth century associationism and Gestalt psychology. Computational

modeling and more recent cognitive theories have built upon these earlier ideas, which provide a “rich base from which to challenge old ideas and build bridges to new interpretations (Dacey & Lennon, 1998).

Social-Personality Approaches

Maturing parallel with the cognitive approach, the social-personality paradigm has emphasized personality and motivational variables and the sociocultural environment as the wellspring of creativity (Sternberg & Lubart, 1999). This approach emerged in the 1950s as part of the general shift in psychology from the Watsonian learning-theory model of a passive organism reacting to the environment to the model of an active organism imposing itself on the environment (Getzels & Csikszentmihalyi, 1975). Weiner (2000) attributes this change in perspective directly to Maslow, who is also regarded as the “founder of humanistic psychology (Dacey & Lennon, 1998, p. 41). In this approach, Amabile, Barron, MacKinnon, and Maslow have noted that certain personality traits frequently describe creative people.

Within Maslow’s hierarchy of needs, the process of achieving the highest level of basic needs is the self-actualization need to achieve one’s complete potential and the aesthetic need to understand one’s purpose in life, which are closely connected to creativity. Self-actualized people are interpreted as independent, autonomous, and self-directed. Maslow suggests that creativity is a general quality that can be found in everyday life. In his view, creativity is marked less by tangible products are less important than by a creative approach to life and an uninhibited lifestyle.

Consequently, Maslow (1959) preferred to focus his investigation of creativity on “that more widespread kind of creativeness which is the universal heritage of every human being that is born, and which co-varies with psychological health” (p. 84). He writes:

I learned to apply the word “creative” . . . not only to products but also to people in a characterological way, and to activities, processes and attitudes. And furthermore, I had come to apply the word “creative” to many products other than the standard and conventionally accepted poems, theories, novels, experiments or paintings (Maslow, 1968, p.137).

Thus, Maslow (1959) disagreed with the all-or-none approach to creativity that he thought inaccurately separated the creative people from the noncreative. In Maslow’s view, as in the cognitive approach, everyone has the capacity to be creative. This perspective has led to the now-commonly held view that creativity is possible in almost any domain of human activity and that “with the proper training, everyone can be original, independent, creative, and self-actualized--in one realm or another” (Weiner, 2000).

Maslow connected his egalitarian perspective on creativity to Rogers’ “openness to experience” (Maslow, 1959, p. 85). Rogers (1959) defined openness to experience thus: “[It means a] lack of rigidity and permeability of boundaries in concepts, beliefs, perceptions and hypotheses. It means a tolerance for ambiguity where ambiguity exists. It means the ability to receive much conflicting information without forcing closure upon the situation” (p. 75). Rogers regards the “internal locus of evaluation” (1959, p. 76) as the most basic condition of creativity.

Rogers (1959) said that the individual “creates primarily because it is satisfying to him, because this behavior is felt to be self-actualizing” (p. 73). Rogers, unlike Maslow, was concerned with a creative product. The value of the creative product was established, not by others, but by creative individuals themselves. In his view, creative individuals do not lack awareness of the opinions of others, but seek the fundamental evaluation within themselves

(Rogers, 1959). Ochse (1990) perceives Rogers as thinking that education might have a negative influence upon creativity because it imposes external standards and evaluation. In addition, “we tend to turn out conformists, stereotypes, individuals whose education is ‘completed,’ rather than freely creative and original thinkers” (Rogers, 1959, p. 69). More recently, Torrance (1965, 1995a) has also questioned whether educational systems lower creativity.

Humanism advocates an egalitarian attitude that almost anyone can be creative, the multicultural attitude that creativity can be found anywhere, and the overwhelmingly positive value we attribute to the word (Weiner, 2000). This humanist terminology and attitude have moved into the vocabulary of the ordinary person (Houtz, 1994). Perhaps the most substantial contribution of humanism to the field of creativity is the explanation of creativity as a type of healthy personality. As teachers and psychologists, Rogers and Torrance believe that a healthy personality and creativity can develop simultaneously and foster each other (Ochse, 1990). Torrance (1995a) concludes that if education were more successful in developing human creativity, there could be an added benefit of an increase in mental health caused by a release of creative impulses. In the humanist approach, with its dominant themes of health, growth, and individual uniqueness (Dacey and Lennon, 1998) creativity emerges as individuals move toward the highest possibilities in life.

Many ideas of the social-personality advocates have achieved widespread acceptance. Nonetheless, Sternberg and Lubart (1999) indicate that broader approaches, which include the knowledge gained in social- personality studies, are necessary to understand creativity more fully.

In education, both the humanist and cognitive approaches encourage a larger role for the learner and an expanded participative role for the teacher. Increased “independence of thought and behavior can be encouraged, so that later, when complex, domain-specific problem solving and creative performance are required, individuals will have the necessary self-directed and self-motivating skills and attitudes” (Houtz, 1994, p.166). Creativity and self-directed abilities are interrelated in this context.

Psychometric Approaches

While social-personality approaches emphasize the processes of creativity in everyday life and normal individuals, psychometric approaches focus on the traits that distinguish creative individuals.

Highly creative people such as Michelangelo and Einstein are uncommon and difficult to study in the psychological laboratory (Sternberg & Lubart, 1999). Claiming that the lack of access to such individuals had limited creativity research, Guilford (1950) advocated the study of creativity by means of a psychometric approach, using paper-and-pencil measures to identify distinctive creative traits in everyday subjects. Using this method, Guilford (1959) suggested several traits for distinguishing among creative individuals. Aptitude traits related to creativity, according to Guilford, include fluency of thinking, flexibility of thinking, originality, sensitivity to problems, redefinition, and elaboration. Personality traits include tolerance of ambiguity as well as convergent and divergent thinking (Guilford, 1959). Guilford’s test items or altered versions of them are still widely used for measuring and predicting creativity. This is largely because such procedures allow the quantification of criteria for creativity (Ochse, 1990).

Many researchers, including Torrance and Getzels, followed Guilford’s advice

of trying to develop tests to measure creative thinking. While relying on these tests has meant that creativity is frequently defined, evaluated, and predicted in terms of test performance, the approach has the advantage of allowing the quantification of criteria for creativity (Ochse, 1990).

Thus, the psychometric tests have allowed researchers to compare people using a standardized scale (Sternberg & Lubart, 1999). Psychometric tests have also provided objectively scorable and easy-to-use assessments that make possible the investigation of creativity in large numbers of everyday people. There are concerns about attempting to measure creativity, especially from those within the confluence viewpoint. Nonetheless, the psychometric tradition does offer a way to attempt to capture creativity, in a society, which is ceaselessly seeking accountability and measurability. A brief review of some of the psychometric methods is in the next section.

Review of Psychometric Methods

As Policastro and Gardner (1999) have noted, the efforts of Guilford (1950), Getzels and Jackson (1962), and Torrance (1962) have initiated a sustained psychological study of creativity. Researchers and educators have used tests of the creative processes extensively for decades. One category of tests quantifies divergent-thinking. In this category, the Torrance Tests of Creative Thinking (TTCT) attempt to evaluate cognitive abilities of creativity by measuring divergency (Davis, 1989). Based largely on Guilford's Structure of the Intellect (SOI) model, the (TTCT) is currently the most commonly used measure of divergent thinking. Scoring involves fluency (number of ideas), flexibility in a variety of perspectives, originality, and

elaboration of ideas.

The TTCT has been extensively evaluated. Torrance (1975) analyzed TTCT research and concluded that there was evidence of a linkage between performance on the test and real-life achievement. Davis (1989) reported interscorer reliabilities as high as .99 and nearly always above .90 for the TTCT. Test-retest reliabilities are typically in the .60 to .80 ranges. Plucker and Renzulli (1999) found that there are fairly convincing reliabilities for the SOI, TTCT, and similar tests. Furthermore, Houtz and Krug (1995) located considerable data to generally support the SOI model but found that it lacks the validity research of the TTCT. However, these authors note that predictive and discriminant validity of these types of divergent-thinking tests has mixed support.

A second category of tests is the personality/biographical inventory, such as the Khatena Torrance Creative Perception Inventory (KTCPI), which examines attitudes, motivations, interests, and histories of creative activity. Davis (1989) remarked that although both personality/biographical inventories and divergent thinking tests work reasonably well, the personality/biographical inventories are considerably more efficient in administration and scoring. The two tests of the KTCPI include (1) What Kind of Person Are You? (WKOPAY?) and (2) Something About Myself (SAM), which were also used in the original study by Torrance and Mourad (1978b) involving the Self-Directed Learning Readiness Scale (SDLRS) and several other creativity measures. The KTCPI has also been used widely to identify creative individuals in school and college settings. According to Khatena and Torrance (1998), it may be used as a diagnostic tool to encourage creative thinking and creative behavior. The KTCPI will be used in this research because it has been used extensively in previous research and was specifically designed to measure creative

self-perception.

Background of the Khatena Torrance Creative Perception Inventory (KTCPI)

Torrance developed the WKOPAY? test in 1963 and Khatena established the SAM test in 1970 (Khatena & Torrance, 1998). These two biographical measures were later combined to create the KTCPI. Responses to the measures are supposed to indicate the degree to which test participants function in creative ways. A creative perception index and factor orientation scores can be obtained for both measures.

WKOPAY? relies on the rationale that an individual has a “psychological self comprised of subselves relative to creative and noncreative ways of behaving” (Khatena & Torrance, 1998, pp 5-6). WKOPAY? consists of 50 paired characteristics allowing a selection of one from each pair. WKOPAY? yields a total score, as well as scores for five factors: acceptance of authority, self-confidence, inquisitiveness, awareness of others, and disciplined imagination.

SAM depends on the rationale that “creative functioning is reflected in the personality characteristics of the individual, in the way he thinks, and in the products that emerge as a result of his creative strivings” (Khatena & Torrance, 1998, p. 21). Test takers select from 50 statements on this test. In addition to a total score, SAM yields six factor scores: environmental sensitivity, initiative, self-strength, intellectuality, individuality, and artistry, in addition to a total score.

WKOPAY? and SAM are thought to measure somewhat different aspects of the creative personality and can be used independently of each other. They should be considered as “separate tests in a battery rather than as subtests within a single test” (Khatena & Torrance, 1998, p.5). However, standard score equivalents of the separate

measures may be added and averaged to produce a single score, if a single index is preferred (Khatena & Torrance, 1998).

Reliability

Interscorer reliability, internal consistency, and repeated test administration are the emphases in reliability for the KTCPI. Interscorer reliability of SAM and WKOPAY? ranges from .97 to .99. Internal consistency is ascertained by using the split half and odd-even methods with results from college students at .75 and above (Khatena & Torrance, 1998). No information is available concerning repeated test administration for WKOPAY?. However, Khatena and Torrance (1998) describe reliability coefficients of .97 and .94 for SAM in repeated test administration by Raina (1975).

Bolton (1989) observed that the reliability of the KTCPI “appears to be satisfactory” (p. 1). He concluded that the KTCPI might be used to predict the performance of respondents in situations that demand creative thinking.

In addition, Davis (1989) claims that although each creative person is unique, there is a complex of common personality and biographical traits among the creative. This characteristics approach to measuring creativity “works effectively, efficiently and with high reliability and good validity with those from a young age to professional adults” (Davis, 1989, pp. 265-266). Callahan (1991) also agrees that few question the reliability of most creativity tests. However, the real area of concern is validity: do these instruments truly measure creativity?

Validity

Kaltsounis (1976) reports that highly creative people, compared with low scorers on SAM, achieved significantly higher means on several aspects of the TTCT. He concludes that SAM shows “some promise as a brief screening device for the

identification of creative people” (p. 222).

Additional evidence of validity is furnished by Khatena and Bellarosa (1978) who report correlations between the SDLRS and the KTCPI for 41 college students of .38 for WKOPAY? ($p < .01$) and .71 for SAM ($p < .001$), as concurrently explained by Torrance and Mourad (1978b). The abilities to form verbal images and creative self-perceptions of 50 college students were also investigated. The scores on a measure of verbal originality developed by Khatena called Onomatopoeia and Images, and SAM correlate at .34 ($p < .01$) while the scores of SAM and WKOPAY? correlate with the same measure at .38 ($p < .01$). Khatena and Bellarosa (1978) claim that these findings support the validity of the components of the KTCPI to a limited degree.

Content validity of WKOPAY? was assessed by a survey of 50 studies of creative persons, in which 10 advanced research students produced 50 characteristics discriminating the creative individual from the less creative. Khatena and Torrance (1998) also reported that the selection of items for SAM is guided by previous research of Khatena, MacKinnon, Taylor, and Torrance. Thus, content validity relies on previous studies of the creative personality and the evaluations of a panel of experts.

Khatena and Torrance (1998) cite considerable research to confirm construct validity, such as The Pupil Ideology Control Form used by Halpin, Goldenberg and Halpin (1973), showing that creativity correlated negatively with pupil control. A factor analysis by Bledsoe and Khatena (1974) of WKOPAY? was completed using 645 college males and females and students from three high schools. The analysis provided 15 factors that accounted for 56% of the total variance. Cartesian coordinates suggested that using five factors would be most appropriate and account for 31% of the variance. To summarize, construct validity of WKOPAY? is determined by using

attitude patterns, personality characteristics, and factor analysis.

According to Khatena and Torrance (1998) criterion-related validity of WKOPAY? is established via such measures as the Kirton Adaptation-Innovation Inventory (Kirton, 1977), Making Up Captions (Townsend, Torrance, and Wu, 1981), and the Khatena-Morse Multitalent Perception Inventory (Khatena & Morse, 1987). Consequently, criterion-related validity of the WKOPAY? is documented by relationships with measures of personality inventories, biographical reports, rating scales, a projective test, and creative thinking.

Content validity of SAM relies on such measures as Sounds and Images (Torrance, Khatena, & Cunningham, 1973), with correlations ranging from .20 to .39 ($p < .05$) as cited by Khatena and Torrance (1998). In essence, the content validity depends on previous research regarding the creative personality, relationship with measures of originality, and suitable sampling.

The construct validity of SAM is realized by using research measures such as Style of Learning and Thinking (Kaltsounis, 1980) and the Group Embedded Figures Test (Parzivand, 1980) as cited by Khatena and Torrance (1998). A factor analysis by Bledsoe and Khatena (1973) of SAM gave evidence of construct validity using 672 male and female college students and students from three high schools. The analysis provided 16 factors that accounted for 52.7% of the total variance. Cartesian coordinates indicated that six factors would be suitable. Essentially, construct validity was achieved in terms of creative levels as they related to originality, attitude patterns, different personality orientations, and factor analysis.

Khatena and Torrance (1998) established criterion-related validity for SAM by again using measures such as the Kirton Adaptation-Innovation Inventory (Kirton, 1977) and the Khatena-Morse Multitalent Perception Inventory (Khatena & Morse,

1987). Fundamentally, experiments and correlation with measures of personal-social and motivational characteristics establish criterion-related validity.

Next, Daniels (1980), in a study of college women and creativity, surveyed six creativity instruments, including the TTCT, and found the validity and reliability data for the SAM more impressive than the other measures. Additionally, Morse and Khatena (1989) investigated the KTCPI and life achievements of creative adults. They found “some evidence for the validity of self-report measures” (1989, p. 64) and said that measures such as the KTCPI had validity as indicators of creative potential. Finally, there were suggestions by Bolton (1989) that the researcher verify validity for a particular situation and only use information derived from the KTCPI as a part of a holistic investigation.

Previous KTCPI Research

The measures developed by Khatena and Torrance have frequently been used to measure of creativity. In particular, the KTCPI and its components have often been used to examine issues of personality related to creativity. For example, Simon (1980) used the KTCPI to assess the levels of creativity of 140 undergraduate and graduate students. Acheson (1981) applied the KTCPI as a measure of creative perceptiveness involving biofeedback training effects in 48 male and female college students. Daniels (1980) studied the attitudes of college women toward their level of creativity as measured by SAM. This research suggested that social pressures might have restricted the development of creativity. Kilgus (1982) employed the KTCPI to measure creativity in a study involving cognitive style of college biology students. Results indicated that it was probably unnecessary to alter the basic organization of a biology

course to support changing cognitive styles. Pesut (1984) used the WKOPAY? to examine creative thinking in the nursing profession. Nurses who participated in a creativity training program perceived themselves to be more creative and generated more original solutions to clinical nursing problems. Leland (1986) formulated an inventory of creative personality and used the KTCPI as part of the validation of the inventory. Clark (1991) studied whether there was a relationship between creative perceptiveness as measured by the KTCPI, teachers' sense of efficacy, and locus of control. No significant relationships were found between teaching efficacy and creative perceptiveness as measured by SAM or WKOPAY?, but a significant combined predictive outcome of locus of control and creative perceptiveness, as measured by SAM, was substantial concerning teaching efficacy (Clark, 1991). In a study by Richard (1992), the KTCPI was used to determine the level of creative thinking ability of female nursing students. Activities to encourage creative thinking in the nursing curriculum were seen as necessary. Mehr (1994) integrated the KTCPI into a composite creativity score to examine creativity and motivation.

In brief, the KTCPI and its two components have been widely used in research studies involving the measurement of creativity. There is considerable support for using the KTCPI in measuring creativity, particularly among college-age individuals. There is widespread agreement that psychologists can get a reasonable estimate of creative potential through creativity testing (Gardner & Wolf, 1994). Nonetheless, there are some limitations to using the KTCPI in research.

Limitations of the KTCPI

Although research has confirmed the reliability of the KTCPI, it is essential to

acknowledge the limitations of using any testing instrument to capture the amorphous and complex nature of creativity. Treffinger (1986) remarked that “creativity is one of the most complex of human functions; [and that] it is unrealistic to expect that there ever will be (or that there should be) a single, easily administered, simply scored test” (p. 16). It is not easy to develop an all-purpose instrument that measures the full range of cognitive abilities and the affective skills needed to think creatively (Davis, 1989). If testing of creativity is not as advanced as intelligence testing, it may be because creativity is a more elusive trait (Feldhusen & Goh, 1995).

Criticism of the KTCPI's validity has come from many sources. Bolton (1989) advocated one factor analysis for both instruments of the KTCPI to better determine their relationship. Cooper (1991) reviewed six creativity assessment tools, including the SOI, TTCT and KTCPI, and claimed that “No one of the available instruments by itself seems to be a satisfactory measure of the elusive construct we call creativity” (p. 231).

Cooper (1991) questioned the content validity of the SAM, remarking that the Intellectuality factor appropriately included analysis, joining complexity and challenge items, but was diluted with risk taking, guessing, imagination, feelings, and nonconformity items. She also described the WKOPAY? as similarly flawed in item construction and factoring group consistency, and further contended that the KTCPI seemed to be looking for a “goody-goody, supremely well adjusted type of creative person” (p. 202) which contrasted with the notion of Barron and Harrington (1981) that many creative people manifest anxiety, depression and flexible boundaries.

Furthermore, Piirto (1992) comments that Morse and Khatena (1989) “rather weakly” (p.80) conclude that the KTCPI has validity as an indicator of

creative potential. Morse (1994) also found that the reliability estimates in the .90s claimed by Khatena and Torrance for the KTCPI were not typical of the values found in actuality. Estimates of reliability for individuals tended to be lower for total scores and considerably lower for factor scores. Nonetheless, Morse affirmed that the estimated reliabilities of group means of total scores were acceptable for groups of about 40 adults.

As these critiques of the KTCPI remind researchers, many mental operations such as cognition, memory, convergent thinking, evaluation, and problem solving play a role in creative thinking. While the advantages of quantifiable measures are many, these critiques indicate that innovators in the field of measurement should “break away from the traditional approach to testing and move in the direction of completing missing test components of the model” (Khatena, 1992, p. 495).

Torrance himself contends that the weakest link in shaping education toward creative growth and accomplishment is the lack of appropriate instruments for assessment. Torrance states, “there is a danger that the exclusive use of a certain type of test may limit learning” (1993, p. 194). He pointed out that the tests developed by him and his colleagues “provide starting points for others” (1993, p.194). This suggests that Torrance regards his work as a dynamic methodology that should be modified if necessary.

The Case for Psychometric Methods

In response to critics, Torrance (1975), insisted that the “problem of assembling a test battery is to sample this universe as well as possible within the constraints of requirements in practical, educational situations” (p. 286). He

writes that the psychometric measures can and should be revised to reflect developments in creativity theory and in how aspects of creative thinking are construed. An essential motivation for the development of measures of creativity, such as the KTCPI, was the practical consideration of providing “one useful basis for making instruction different for different students” (Torrance, 1976, p.218). More important, Torrance was convinced that creative potential must be recognized if creative behavior is to be fostered in educational situations (Torrance, 1976).

Torrance also strongly believed that the scientific study of creativity requires measurement of the factors affecting creative growth. “New instruments will have to be created and developed. Longitudinal studies, statistical and qualitative, will be necessary. Experimental studies will also be needed” (Torrance, 1995b, p. 313).

As can be seen from the above comment, psychometric methods furnish the basis for the way in which creativity is approached in schools and businesses, including creativity problem-solving programs, creativity training, remediation, and talent development models (Plucker & Renzulli, 1999). Psychometric studies of creativity also lay the groundwork for scientific investigations of creativity.

While the study of creativity demands many techniques and approaches, and while, as Torrance himself has stated, the criteria for selecting tests must include relevance to creativity theory and must sample different aspects of creative thinking, psychometric measures of creativity have value as one way to recognize the presence of this nebulous ability. Quantitative measuring provides one way to recognize the presence of creativity and a first step for understanding and fostering it.

Summary of Creativity Research

What general conclusion can be drawn from this survey of the many efforts made to understand this elusive faculty? First, as Cooper has remarked “though pervasive, [the nature of creativity] is illusive and definitionally difficult providing a struggle for test designers hoping to capture and identify its unruly nature”(Cooper, 1991). Second, the inability to produce accepted definitions of creativity should not inhibit efforts to improve the validity of present measures or the development of new measures (Houtz & Krug, 1995). The assessment of creative ability and prediction of creative potential can never be complete but it should not be abandoned (Haensley & Torrance, 1990). The psychometric approach is essential if a scientific understanding of creativity is sought (Runco, 1994) or when “we are thinking of identification as inseparable from its twin, education” (Khatena, 1992, p. 26). Creativity needs to be recognized if it is to be encouraged through education. Khatena (1992) also asserted that understanding creativity-related variables would help in the development of creative adults who will contribute to society’s improvement.

It is reasonable to assume that the psychometric tradition will observe the suggestions of Khatena (1992) and Torrance (1995a, 1995b) and supplement the components of the more traditional measures of creativity with new elements. For example, Feldhusen and Goh (1995) remarked that assessment of a multidimensional concept of creativity demands multiple avenues of measurement including tests and inventories. They also indicated that more research is needed to explain how measures of creativity can be combined to have a suitable composite of creative potential.

New and diverse conceptions of creativity have proliferated since the mid-twentieth century and many measures of process, product, personality, and

environment have been produced by the psychometric approach. These instruments are useful for additional research, norms development, and validation studies.

Finally, posing another question of importance, Guglielmino asks, "What relationships exist between creativity and degree of self-direction in learning?" (1977, p. 79). There have been few clear answers to this question in previous research and yet the question is still relevant. This study will rely upon the psychometric tradition of measuring creativity with the available instruments, as a step toward improving our understanding of the concept. The following section about self-directed learning includes a brief introduction to self-directed learning, definitions and descriptions of self-directed learning, and three distinct research traditions or streams of self-directed learning.

Self-Directed Learning

The realization of self-directed learning abilities is perhaps the most popular expressed aspiration of adult educators (Brookfield, 1986). Self-directed learning has practically achieved a cult status in adult education (Candy, 1991, p. xiii). Percival (1996) says few concepts rival self-directed learning as an influence on adult education. Long (1991a) addressed the vitality of self-directed learning research but believes agreement on the definition and conceptual nature of self-directed learning is in the emerging stage at best. Merriam and Caffarella (1999) also remarked that self-directed learning had caught the attention of many inside and outside the field of adult education. The concept of self-directed learning is having an influence beyond the field of adult education.

Merriam and Caffarella (1999) have asserted that three broad categories of

research into self-directed learning typically reflect the philosophical position of the researcher. The first category is based in humanism, which sees personal growth as the purpose of adult learning, as in Knowles (1975) and Brockett and Hiemstra (1991). The second category claims that transformational learning or an internal change of consciousness, as exemplified by Mezirow (1985) and Brookfield (1985, 1986), is central to self-directed learning. This transformational learning classification became the basis for a third category of self-directed learning, advocating emancipatory learning and social action as proposed by Brookfield (1993) and Collins (1996). The next section will examine some of the definitions and interpretations of self-directed learning.

Definitions and Descriptions of Self-Directed Learning

Researchers haggle over the terminology to describe the phenomenon of self-directed learning (Merriam & Caffarella, 1999). Owen (1996) reports “self-direction in adult learning has been referred to as self-teaching, self-planned learning, independent adult learning, self-directed learning, and self-initiated learning” (p. 47). Other descriptors include learning projects, self-education, autonomous learning, independent study, and open learning (Hiemstra, 1994). These differing terminologies present “a maze of semantic plenitude” (Hiemstra, 1996, p.5) to those unfamiliar with the literature. Synonyms such as self-initiated learning are equivalent to self-directed learning in meaning but other terminology may be based in different theoretical approaches.

Areas of Consensus About Self-Directed Learning

There are several areas of agreement about the situation of self-directed

learning. Hiemstra (1994) identified several ideas that are generally accepted about self-directed learning: (a) individual learners can assume more responsibility for learning; (b) self-direction is best seen as a continuum or characteristic existing to some extent in each learner and learning circumstance; (c) self-direction does not necessarily imply separation from others; (d) self-directed learners seem able to transfer learning of knowledge and skills to other situations; (e) self-directed study can include various activities and resources; (f) teachers play useful roles in self-directed learning of obtaining resources, engaging in dialogue with learners, evaluating results, and stimulating critical thinking; and (g) certain educational institutions support self-directed study through individualized study, open-learning programs, and non-traditional courses.

These ideas, now commonly accepted, were arrived at through several decades of research into the nature of self-directed learning, through a broad range of learning projects research, qualitative studies, and quantitative studies. This implies that extensive research may be needed to produce additional consensus and to discover more about self-directed learning.

Furthermore, Owen (1996) discovered similarities among the definitions offered by Knowles (1975), Guglielmino (1977), Brookfield (1986), Brockett and Hiemstra (1991), and Candy (1991) because each recognized self-directed learning as typical of adulthood. Their definitions describe four aspects of adult learning: learning for cultural adaptation and the transmission of culture, learning for the formation of special knowledge, learning for the improvement of organizations and societies, and learning for personal satisfaction (Owen, 1996). Merriam and Brockett (1997) also located several important trends, which show that self-directed learning is the most frequent way of learning chosen by most adults and that there is a strong association

between self-directed learning and self-concept. Several other personality and social characteristics also appear to have some relationship to self-directed learning (Merriam and Brockett, 1997). For example, it seems “that self-directed learning readiness appears to be linked to such factors as creativity” (Brockett & Hiemstra, 1991, p. 63).

As Carre (2000) has written, the quest for a “universal, catch-all, grail-like definition of self-directed learning has frequently bred new confusions between its different facets” (p.49). Those who wish an in-depth knowledge of self-directed learning must spend some effort in understanding not only the present state of knowledge about the concept but also need its recent history.

The study of self-directed learning can be traced to early research and writings of Houle (1961), Tough (1971, 1979), and Knowles (1975) who provided a general scenario for how adults learn (Merriam & Brockett, 1997). From a humanistic perspective, they suggested a largely linear process in which adults determine their learning needs and then choose the methods to achieve their learning goals. For example, Knowles (1975) described self-directed learning as having six steps: (1) setting the climate, (2) diagnosing learning needs, (3) formulating learning goals, (4) identifying human and material resources for learning, (5) choosing and implementing appropriate learning strategies, and (6) evaluating learning outcomes. The view of Knowles may be the most common in adult education literature (Brockett and Hiemstra, 1991).

Continuing in the humanistic tradition, Guglielmino (1977) has contributed the most commonly used operational definition of self-directed learning (Merriam & Caffarella, 1999). She identifies specific attitudinal and psychological qualities presumably needed for readiness for self-directed learning. Guglielmino claims that

these personal characteristics of the learner determine “whether self-directed learning will take place in a given learning situation. The self-directed learner more often chooses or influences the learning objectives, activities, resources, priorities and levels of energy expenditure than does the other-directed learner” (Guglielmino, 1977, p. 34). Guglielmino suggests that certain characteristics of learners strongly influence the type of learning selected. These characteristics, if known, may offer clues to the process of self-directed learning.

While this conception of the learning process closely mirrors learning in formal settings, other conceptions have given more attention to random elements in the learning process (Merriam & Caffarella, 1999). Others think that these definitions of self-directed learning lack understanding of the internal situation of the learner and the social context of learning (Merriam & Brockett, 1997). Thus, ideas continue to evolve as additional elements are incorporated into the concept of self-directed learning.

For instance, Brockett and Hiemstra (1991) propose a new conceptual framework that considers what they see as a substantial difference between the process of self-directed learning and the idea of self-direction as a personality construct. To explain both of these aspects, they developed the Personal Responsibility Orientation (PRO) model.

In the PRO model, Brockett and Hiemstra (1991) describe a self-directed learning process that is less planned and less linear than the archetype of Tough and Knowles (Merriam & Caffarella, 1999). In their conception, self-direction in learning involves two separate and yet related elements (Brockett & Hiemstra, 1991). The first, self-directed learning, is a process in which a learner assumes primary responsibility for planning, implementing, and evaluating the process of learning, sometimes with

the aid of a facilitating agent or resource. The second, learner self-direction, is an aspect of personality, focusing on learner preference for taking responsibility for learning (Brockett & Hiemstra, 1991). The individual, in this perspective, chooses to take personal responsibility for learning within a social context. For a thorough understanding of self-directed learning, the interface between individual learners, their facilitators or learning resources, and the social dimension of their learning must be acknowledged (Brockett & Hiemstra, 1991). This model helps in understanding self-directed learning and offers a framework for further research.

The use of Brockett and Hiemstra's diverse terminology of self-directed learning, self-direction in learning, and learner self-direction has caused some confusion (Stockdale, Fogerson, & Brockett, 2001). These authors have recently suggested that self-directed learning should be used as a comprehensive term, but should include (1) components of the teaching-learning process, (2) personal attributes of individuals, and (3) the sociopolitical environment. Following their suggestion, this research will employ the term self-directed learning, in this comprehensive sense, where feasible.

Caffarella in Brockett, Caffarella, Cavaliere, Guglielmino, Kasworm, and Long (1994) cites Candy (1991) as offering another scenario of the adult learning process, from a constructivist viewpoint, that emphasizes opportunities found in individual circumstances and chance encounters. Candy (1991) argues that self-direction includes four separate but related phenomena: a personal quality (personal autonomy); the willingness and competence to govern one's education (self-management); a method of managing instruction in formal settings (learner-control); and the independent pursuit of learning apart from formal settings (autodidaxy).

Garrison (1997) has elaborated on Candy's ideas and produced a collaborative

constructivist model in which meaning and knowledge are personally and socially constructed. Garrison also credits the Brockett and Hiemstra (1991) model with being a positive development. However, he suggests that they gave only tangential consideration to the cognitive and metacognitive issues involved in learning although Brockett and Hiemstra supported critical reflection as an important element of learner self-direction. Additionally, Garrison (1997) indicates that self-directed learning has previously emphasized the external management of learning. Thus, he proposes a model combining internal control of learning through metacognition.

In a related contribution, Long (2000) also offers a psychological component of self-directed learning. Although Garrison emphasizes the importance of the social context more than Long, who stresses the psychological component of self-directed learning, there appears to be an area of common ground. Long explains that although there are many definitions of self-directed learning, the most important perspective is the psychological view, which assumes that learners have self-control of cognitive processes. This psychological component, as described by Long, includes elements of motivation, metacognition, and self-regulation that are similar to Garrison's ideas about metacognition.

In summary, the early portrayals of self-directed learning describe it as a linear process with an emphasis on individual skills necessary for learning. Tough and Knowles were not unaware of the importance of social or contextual issues but de-emphasized their importance. Tough (1971, 1979) listed experiences, psychological characteristics, other people, and community and societal factors as influential factors in the learning process. However, he diminished the importance of these factors in his model. Recent models consider how heavily an external environment influences the adult learner. The more recent and complex models of self-directed learning also

involve nonlinear “loops and curves” (Caffarella & Merriam, 1999, p.2). These models have elements of trial and error within intricate contextual environments as earlier proposed by Brockett and Hiemstra (1991) and Garrison (1997).

Although the newer models of self-directed learning have more completely recognized the importance of context and environment, those models that emphasize metacognitive skills, such as Garrison (1997) and Long (2000), reinforce the idea that individuals potentially have considerable self-control over their own metacognitive functions. The role of metacognition is an area that is worthy of additional research within self-directed learning. The newer models of self-directed learning are correct to include the social context as having an important role in self-directed learning, but the role of the individual learner may also prove to be consequential as complex metacognitive elements of self-directed learning are explored. Like Long, Brockett and Hiemstra also see several different research conceptualizations but they divide the research on self-directed learning into three streams of related but separate inquiry (Brockett & Hiemstra, 1991)

Three Streams of Inquiry

Three streams of inquiry in self-directed learning research are learning projects research, quantitative measurement using written instruments, and qualitative procedures (Brockett & Hiemstra, 1991). This conceptualization allows a broad overview of the self-directed learning research agenda while permitting a manageable focus on important studies that have occurred in these three streams.

Learning Projects

Houle, in *The Inquiring Mind* (1961), laid the early foundation for research on

self-directed learning (Brockett & Hiemstra, 1991). The author interviewed 22 adults and categorized them into three subgroups of learners: the *goal-oriented*, who establish clear objectives in learning, the *activity-oriented*, who see learning as an opportunity to meet other people, and the *learning-oriented*, who constantly seek “knowledge for its own sake” (Houle, 1961, p.16). This last group consisted of the kind of learner later studied by Tough, who read *The Inquiring Mind* and some of the transcripts used in Houle’s study (Houle, 1988). Tough saw illustrations of self-directed learning in the individuals studied by Houle and became convinced that a researcher could accurately probe the self-directed learning of an individual (Houle, 1988). Houle (1988) credits Tough’s initial study of learning projects with sparking the expansion of research into self-directed learning.

Tough, in *The Adult’s Learning Projects* (1971, 1979), defined the learning project as a purposeful effort to obtain knowledge, skill, or to change in some way. He further specified the learning project as a series of related episodes adding up to at least seven hours within a six-month period. In each episode, there is a strong desire to acquire specific information, and a search for this information with intent to retain the learning for at least two days.

Tough conducted highly structured interviews with 66 people from seven different populations to check the degree and significance of various adult learning projects. The typical adult learner was involved in an average of 8.3 learning projects in a year. Sixty-eight percent of these learning projects were self-planned and self-realized.

The impetus begun by Tough continued with replication studies, such as those by Coolican (1973), Peters and Gordon (1974), Hiemstra (1975), and Penland (1979), providing comprehensive descriptive evidence that most adults participate in

deliberate learning activities and that most of these projects are self-planned (Brockett, 1985a). For instance, Coolican (1973) ascertained that the 48 mothers in her study participated in an average of 5.8 learning projects during a year with 66% of the projects being self-planned. Peters and Gordon (1974) also documented that their participants completed an average of 3.7 learning projects in a year with 66% of these projects being self-planned. Similar to the learning studied by Tough (1971, 1979) and Coolican (1973), these learning projects were mostly self-planned. Additionally, Hiemstra (1975) studied adults who were at least 55 years old and surmised that 83.5% participated in one or more learning projects in a year with 55% of these projects being self-planned.

The studies of Penland (1977, 1978, 1979) were the most extensive learning projects research to that time (Brockett and Hiemstra, 1991). Penland (1978) demonstrated that almost four out of five adults are involved in a learning project each year and that self-initiating adult learners can be located in all social, educational, and occupational levels. These self-initiated learners are strongly goal-oriented, have individualistic learning patterns, and frequently possess a high level of learning. About 80% of Americans 18 and older consider themselves as continuing learners with 76% involved in self-initiated learning projects (Penland, 1979).

The most important finding emerging from Tough's study is probably who takes responsibility for the planning of learning projects (Brockett and Hiemstra, 1991). It was through Tough's study that the importance of individual planning became clear (Brockett & Hiemstra, 1991). There may be disagreement on the amount and type of self-directed learning within the general population but the authenticity of the independent search for learning has been established (Merriam & Caffarella, 1999).

Tough said that *The Adult's Learning Projects* (1971) was "designed to encourage a great deal of further exploration, for both new practices and better theory are needed in the field of adult learning" (p. 169). Tough's research into self-planned learning or self-directed learning prompted many replication studies and contributed to an expansion of research knowledge about self-directed learning. Those concerned with adult education began to explore new ways to examine self-directed learning by using a variety of qualitative and quantitative techniques. The unknown aspects of self-directed learning that Tough had compared to the mass of an iceberg concealed underwater were beginning to be exposed. Nonetheless, by 1991, Brockett and Hiemstra were suggesting that learning projects research might have reached a saturation point. Furthermore, they argued the stage had been set for a qualitative stream of research.

Qualitative Research

A second stream of research in self-directed learning, using a qualitative approach, has offered a deeper understanding of the context for self-directed learning and the various meanings it may have. For instance, Gibbons, Bailey, Comeau, Schmuck, Seymour, and Wallace (1980), examined biographies of 20 recognized experts without formal training after high school. These authors listed 40 characteristics, including creativity, which they found closely related to self-directed learning. One of their conclusions was that self-directed learners tend to be independent in thought, nonconforming, and original. Brookfield (1982) used open-ended interviewing to study 25 independent learners whose formal education had stopped at the age of 16, but who successfully participated in independent learning projects as judged by peers. Although formal education could have offered some support to such individuals, their learning continued without it. Spear and Mocker

(1984) also used open-ended interviews in a qualitative study of 78 self-directed learners with less than a high school education. The authors perceived that a change in life circumstances often provides a trigger for learning, with learning frequently dictated by an organizing circumstance. In their view, learning is less linear and more heavily influenced by the environment than Tough and Knowles had suggested (Spear and Mocker, 1984).

Similarly, Cavaliere (1992) drew on the previous self-directed learning theories of Tough (1971), Brookfield (1986), and Spear and Mocker (1984) in a case study of the Wright brothers as independent learners. She acknowledged the Wright brothers as: (1) deliberate in gaining knowledge and skill; (2) advancing affectively, cognitively, and psychomotorically; (3) possessing self-determined goals, learning, progress, and evaluation, and (4) receiving no assistance from formal learning systems. The Wright brothers also had the personality traits of curiosity, problem-solving ability, persistence, and innovativeness that are characteristic of successful adult learners (Cavaliere, 1992).

Cavaliere designated four cognitive processes (goal setting, focusing, persevering, and reformulating) that were cycled repeatedly throughout the Wright brothers' stages of inquiring, modeling, experimenting and practicing, theorizing, perfecting, and actualizing (flight). The learning behaviors of the Wrights were nonlinear, and their self-directed learning was strongly influenced by contextual circumstances as suggested earlier by Spear and Mocker (1984). Cavaliere's model is particularly useful because it describes an actual application of the stages and cognitive aspects of the learning process (Merriam & Caffarella, 1999).

Growth in the use of qualitative methodologies has mirrored the expansion in the scope of research on self-directed learning. Stein (1998) used a feminist narrative

approach to support the importance of self-directed learning and to question the effectiveness of formal education. Petricic (1998) conducted in-depth interviews to discover the nature of self-directed learning in doctoral students. Hutchins (2000) used both in-depth interviews and a focus group to discover that self-directed learning could be both an obstacle and an asset to individual progress. Finally, Mathai (2000) used focus groups and concluded that self-directed learning is a viable teaching tool for adults.

It appears that qualitative research will continue to develop as a useful approach to studying self-directed learning. In some circles, qualitative research has taken precedence over quantitative research in examining questions related to adult education. The studies of Gibbons, et al. (1980) and Spear and Mocker (1984), which consisted of adults with lower levels of formal education or no formal training in their area of ability, suggest that less formally educated individuals may respond better to qualitative methods than to standardized instruments with which they have less experience (Brockett & Hiemstra, 1991). It seems reasonable to suggest that in certain situations, a combination of qualitative and quantitative techniques might be used to explore the particular strengths and weaknesses of each kind of research. Various approaches allow knowledge of different things about the world (Glesne & Peshkin, 1992).

While qualitative research offers an improved understanding of the context of self-directed learning, as well as insight into the various meanings of self-directed learning, qualitative approaches have not been as useful in studies focusing on personality dimensions, in part because of questions about the generalizability of qualitative research (Brockett & Hiemstra, 1991). Since the current study addresses personality-related concerns, it is more suited to a quantitative design.

Quantitative Measurement

The third stream of research involves the quantitative measurement of self-directed learning using written instruments. This research addresses questions left unanswered by Tough's learning projects research, about personological variables, such as creativity, which might influence the tendency toward self-direction (Brockett & Hiemstra, 1991). It also addresses questions about the role of self-directed learning in the teaching-learning process. According to Merriam and Caffarella (1999), the most commonly used measure to study self-directed learning, is the Self-Directed Learning Readiness Scale (SDLRS), which will be examined more extensively later. Additionally, the most important quantitative research into self-directed learning has emanated from the development of the SDLRS in 1977. However, there have been other quantitative measures, which have also been used to a lesser extent.

For example, Oddi (1984) described the personality characteristics of the self-directed continuing learner, trying to provide indicators of potential for continuing professional learning. She used a sample of 271 graduate students and declared that the Oddi Continuing Learning Inventory (OCLI) showed an internal consistency of .87 and a test-retest reliability of .89. Oddi used the term 'self-directed continuing learner' to move away from the narrower view of self-directed learning as consisting only of self-instruction. The total score on the OCLI gives a reliable and valid measure of self-directed continuing learning (Oddi, 1984).

The OCLI has not been used as extensively as the SDLRS nor is it a focus of this study. Nonetheless, Oddi's work initiated more research on self-directed learning as an aspect of personality (Caffarella & O'Donnell, 1987). For example, Blackwood (1988) used the OCLI and discovered a positive correlation between high self-directedness and left hemisphericity of the brain. This study contrasts with the results

of Torrance and Mourad (1978b) who used the SDLRS to measure self-directedness and connected right hemisphericity to self-directed learning. Landers (1989) has argued that for measuring self-directedness, the SDLRS is preferable to the OCLI, although Adkins (1996) sees the OCLI as a reliable and valid instrument for use with adult students.

The distinction between process and personality made by Brockett and Hiemstra (1991) was considerably influenced by the ideas of Oddi (Garrison, 1997). There are real concerns with the instrument but it has contributed to the knowledge of self-directed learning (Brockett & Hiemstra, 1991). Furthermore, Ryan (1999) discovered that the SDLRS and OCLI measure different constructs.

Another example of an instrument designed to measure self-directed learning is the Self-Directed Learning Perception Scale (SDLPS) developed by Pilling-Cormick (1996) measures learner experiences and feelings about the process of self-directed learning. However, the test developer has experienced some resistance from instructors in using the SDLPS though its validity has been generally accepted (Nuckles, Kimora, Pilling-Cormick, 2000).

The SDLRS and the OCLI have occupied a primary role in making self-directed learning an extensively studied area in adult education (Brockett & Hiemstra, 1991). However, the SDLRS continues to be the dominant instrument in measuring self-directed learning, or more accurately, self-directed learning readiness.

Self-Directed Learning Readiness Scale (SDLRS). Guglielmino (1977) developed what has emerged as the most commonly used measure of self-directed learning with her SDLRS. She contended “we must develop a means of determining an individual’s readiness for self-directing learning, as well as a device for measuring the efficacy of programs designed to foster the attitudes and skills which are involved in increased

self-direction in learning” (Guglielmino, 1977, p.3). Initially, Guglielmino developed the SDLRS as part of her doctoral dissertation. A three-round Delphi procedure was used to obtain a consensus on characteristics closely related to self-directed learning. Fourteen experts in adult learning, including Houle, Tough, and Knowles participated in the Delphi process (Guglielmino, 1977).

Creativity was identified as one of eight factors connected to self-direction in learning. The scale also produced seven other factors: (1) love of learning; (2) self-concept as an effective, independent learner; (3) tolerance of risk, ambiguity, and complexity in learning; (4) view of learning as a lifelong, beneficial process; (5) initiative in learning; (6) self-understanding; and (7) acceptance of responsibility for one’s own learning (Guglielmino, 1977). However, Guglielmino recently suggested that the factor scores should not be used in statistical analysis (personal communication with R. G. Brockett, February 4, 2000). The scale also produces a total score for self-directed learning readiness.

Research involving the SDLRS may be divided into roughly three periods: early, middle, and late. Examples of the early research involving the SDLRS include studies by Torrance and Mourad (1978a, 1978b), and Mourad (1979), who investigated creativity. Sabbaghian (1980) measured self-concept with adult undergraduates. Hassan (1981) reported that those with higher self-directedness complete more learning projects. Brockett (1982) found a significant, but weak relationship with perceived life satisfaction in older adults. Leeb (1983) reported that those with higher levels of health conducive behavior tended to be more self-directed. These initial studies opened the way for further research connecting self-directed learning readiness to psychosocial factors (Brockett & Hiemstra, 1991).

A middle period of research included the study by McCarthy (1985), who

found older mathematics students to be higher in self-directedness. Reynolds (1985) suggested that self-directed learning readiness might be connected to learning for its own sake. There are also studies by Roberts (1986), Guglielmino, Guglielmino, and Long (1987), and Durr (1992) who refer to the role of creativity in self-directed learning. This middle period was a time of extensive criticism for the SDLRS, when correlational design in the SDLRS research became prominent (Brockett & Hiemstra, 1991). The SDLRS studies of the middle period provided the greatest expansion of the study of self-directed learning (Long, 1991b).

The later research involving the SDLRS includes Owen (1996) who has detected a significant positive relationship between self-directed learning readiness and wellness among graduate students. Barnes (1999) investigated the relationship between curiosity and self-directed learning readiness among baccalaureate nursing students and described a decline in curiosity as educational level increased, but reported a significant positive relationship between self-directed learning readiness and desire for knowledge. Fullerton (1998) studied the relationship between readiness for self-directed learning and placement in Perry's intellectual development format for adult students. The author found that formal educational experience increased SDLRS scores. Ryan (1999) reported that trait anxiety was moderately related to self-directedness among undergraduate and graduate college students. In another health-related study, Nelson (2000) presented significant positive correlations between SDLRS scores and coping with asthma. Chuprina (2001) found significant positive relationships between cross-cultural adaptability and self-directed learning readiness. Canipe (2001) examined Kolb's learning styles and concluded that self-directed learning readiness can be part of all learning styles. Most of these studies used correlational methods. The SDLRS remained the most common quantitative measure

of self-directed learning.

Criticism of the SDLRS. Although most of the studies using the SDLRS have found some relationship between different variables and readiness for self-directed learning, the results need to be cautiously interpreted (Merriam & Caffarella, 1999). Specifically, Brookfield (1984) criticized the emphasis in this research on middle-class adults, the nearly exclusive use of quantitative measures in assessing the extent of learning, the neglect of the social context, and the absence of discussion involving social and political change. The use of instruments such as the SDLRS supposedly has resulted in insufficient consideration of the quality or effectiveness of self-directed learning (Brookfield, 1984). Brockett (1985b) parried the first two criticisms of Brookfield but agreed that the sociopolitical aspects of self-direction had been ignored. Finally, Brockett (1985b) explained that the SDLRS was not a measure of the quantity of self-directedness but a measure of perception of skills and attitudes related to readiness for self-directed learning.

Merriam and Caffarella (1999) note that early warnings about the SDLRS were produced by Brockett (1985a, 1985b) and Caffarella and Caffarella (1986). Brockett (1985a) found “substantial support for the validity and reliability” (p.18) of the SDLRS. He also thought it to be an appropriate instrument for college students and those having at least a high school education. However, Brockett (1985a) discovered that 12 of the 58 SDLRS items did not correlate significantly with the total scale. Reverse-scoring items and the use of double negatives also confused some respondents. Brockett continued that these concerns might be amplified when used with adults of low formal education. He also suggested that schooling may encourage conformity and “stifle creative urges within the individual” (p.22) with self-directed learning then becoming antithetical to schooling. Those with fewer years of formal

education may develop self-directedness in response to negative experiences with formal learning, which may raise questions about the conceptualization of the SDLRS (Brockett, 1985a). In contrast, Caffarella and Caffarella (1986) questioned the use of the SDLRS with those having high levels of schooling, especially those with graduate degrees.

Brookfield (1985) again argued that the SDLRS encouraged researchers to study the self-directed learning of the relatively educationally advantaged and that it was unsuitable to use with working class adults. He suggested more cross-cultural and intracultural studies to determine a broader utility for the SDLRS. Brookfield concurred that he and Brockett were “disturbed at the creeping orthodoxy which threatens to exercise a conceptual stranglehold on research and theoretical speculation in this field” (p.64). He contended that the excessive use of the SDLRS reinforces one way of studying self-directed learning.

The most incisive criticism of the SDLRS came from Field (1989). Field strongly attacked the development of the SDLRS, including the Delphi technique, because of its lack of definitions for readiness and the self-directed learner, its use of negatively phrased items, and its addition of items after validation. It was concluded “the use of the SDLRS as an indicator of readiness for self-directed learning is not justified” (p.138). Field continued to describe the development of the scale as methodologically and conceptually flawed. “The problems inherent in the scale are so substantial that it should not continue to be used” (p.138).

This challenge drew a response from supporters of the SDLRS. Guglielmino (1989) defended the four areas attacked by Field and reiterated that the reliability and validity of the SDLRS were upheld by strong evidence. She asserted that reliability estimates were always high, with reliability at .94 in an analysis from 1988. The

author referred to a meta-analysis of 29 studies using the SDLRS that provided positive associations with self-directed learning activity (McCune, Guglielmino, & Garcia, 1989). Guglielmino acknowledged that there are problems in any scale but expressed a wish for constructive criticism in the vein of Brookfield (1984) and Brockett (1985a). There was contention that “Field’s paper is so filled with errors of omission and commission that it does not merit serious consideration” (Guglielmino, 1977, p. 240).

Furthermore, Long (1989) endorsed the SDLRS by citing the studies of Torrance and Mourad (1978a; 1978b) and Mourad (1979). The study by Mourad analyzed the SDLRS and, using principal component analysis, detected eight factors similar to the ones found by Guglielmino. Torrance and Mourad's findings presumably offered additional support for the validity of the SDLRS. Long complained that Field inappropriately took a quote of Long and Agyekum (1984) out of context and concluded "that Field's study has made a very limited contribution to knowledge concerning SDLRS validity and reliability" (p.242). On the other hand, Long applauded the helpful factor approach of West and Bentley (1989) in analyzing the SDLRS. For instance, West and Bentley decided that the total SDLRS score was more useful than the intercorrelated factor scores.

McCune (1989) characterized the statistical findings of Field as "unreliable and invalid" (p.245), and assailed the use of an altered version of the SDLRS by Field, which seemingly influenced his conclusions. She also worried that Field’s research might discourage using the SDLRS in adult education research and in the field at large.

In his defense, Field (1990) responded by conceding some mistakes in his data analysis but still found “serious flaws in the SDLRS” (p. 102) and expressed doubt

about whether readiness for self-directed learning could be measured by this kind of testing. Returning to the dispute, West & Bentley (1991) questioned the criterion validity of the SDLRS. The authors also thought that the SDLRS should not be used as a screening device for self-directed learning programs.

In another criticism, Candy (1991) wrote that “the conceptual hull of the good ship SDLRS may prove to be dangerously leaky” (p.153) implying that using the SDLRS as a way of measuring self-directed learning might be inherently mistaken. Candy insisted that participation in self-directed learning is shaped by the specific situation and circumstances. He also disputed the common assumption that self-directedness is a generic quality transferable to all situations.

Bonham (1991), following the controversy about the SDLRS, proposed that additional validity studies were needed. The writer suggested that low SDLRS scores might show a dislike for any kind of learning. Bonham also advised that additional construct validity studies should be conducted to determine if the SDLRS might more accurately be called a Learning Readiness Scale. Long (1991b) asserted that, except for Field (1989), the research involving the reliability and validity of the SDLRS had been supportive.

Delahaye and Smith (1995) remarked that Field's dismissal of the SDLRS was extreme. They supported the construct validity of the SDLRS after completing a correlation analysis using another instrument, and argued that the SDLRS should be used cautiously with those under 20 because they may not have settled into a preferred learning style (Delahaye & Smith, 1995). Nevertheless, the Learning Preference Assessment (a newer version of the SDLRS aimed primarily at business applications), when interpreted with the discretion required for any standardized instrument, "can be used with confidence to provide an accurate measurement of readiness for a self-

directed approach to learning" (Delahaye & Smith, 1995, p.170).

Many questions still need to be answered, especially about the validity of the SDLRS. Straka (2000b) reported that the original factors found by Guglielmino (1977) had not been revalidated and that reanalysis by Field (1989) and Straka and Hinz (1996) did not reconstruct the factors. Merriam and Caffarella (1999) concluded that the critiques of West and Bentley (1991) and Straka have not received a formal response. Apparently in response to the extensive criticism of the factor structure of the SDLRS, Guglielmino has since recommended ending the use of the SDLRS factors in data analysis (personal communication with R. G. Brockett, February 4, 2000).

Nevertheless, despite the many substantive and methodological questions, outlined above, the SDLRS has played a very important role in practical efforts to understand self-directed learning (Brockett & Hiemstra, 1991). More than 40,000 adults have taken the SDLRS. It has been translated into more than a dozen languages, and almost 100 doctoral dissertations have used the SDLRS (Guglielmino, 2001).

Brockett and Hiemstra (1991) assert that the SDLRS should be used with discretion, much as any standardized instrument. These writers also proposed that adult education researchers seek improved instruments. Moreover, Hiemstra (1994) considered the criticisms of the SDLRS to be refuted by Guglielmino, Long, and McCune in 1989, although, he remarked that the instrument had limitations in terms of how it may be used and with whom. Additionally, Hiemstra observed that properly used, the SDLRS is an appropriate tool to better understand self-directed learning.

Merriam and Caffarella (1999) cited Brockett and Hiemstra (1991), as offering "one of the most thoughtful commentaries on the use of the SDLRS" (p. 309). For example, Brockett and Hiemstra (1991) suggested that the contributions of the SDLRS

have outweighed inherent limitations of the instrument and that “self-direction in learning should continue to evolve as one of the major research directions in adult education” (p. 221). As well, Garrison (1997) emphasized, "self-direction is seen as a necessary process for achieving worthwhile and meaningful educational outcomes" (p. 31).

One must conclude that the SDLRS is not a perfect instrument. Guglielmino (2000) herself acknowledged serious difficulties with the original factor structure, which had been heavily criticized by Field and others. Perhaps in the end the most important contribution of the SDLRS will be the controversy it has created. This controversy has encouraged discussion of self-directed learning and resulted in the development of other instruments, such as the OCLI and SDLPS that attempt to measure self-directed learning in one way or another. It is not reasonable to expect a measure developed a quarter of a century ago to meet all the needs of the more recent conceptualizations that have occurred in studying self-directed learning. Nonetheless, the SDLRS has been useful as a catalyst for debate about the nature and role of self-directed learning. It will be applied in the current study with recognition that, although it remains a useful tool, it is not a perfect instrument.

Two Decades of Literature on Self-Directed Learning: A Content Analysis by Brockett, Stockdale, Fogerson, Cox, Canipe, Chuprina, Donaghy, and Chadwell (2000) examines the self-directed learning literature in 14 selected adult education journals between 1980 and 1998. The authors find the peak of articles involving self-directed learning between 1983 and 1991 with a decline evident in the 1990s. It must be noted that the period between 1983 and 1991 was the time of controversy over the SDLRS. The most widespread research methodology was a correlational/ex post facto method that included studying variables connected to self-directed learning and

characteristics related to self-directed learning readiness (Brockett et al, 2000). Papers presented at the International Self-directed Learning Symposium on an annual basis have closely examined variables associated with the SDLRS and self-directed learning, with research on such variables as psychological well-being (McCune and Garcia, 1989), curiosity (Barnes, 1999), self-efficacy (Hoban and Sersland, 1999), lifelong learning (McFarlane and Dunlap, 2000), and workplace performance (Guglielmino, Guglielmino, and Choy, 2000).

The previous references introduce the general literature involving the SDLRS and self-directed learning. There is also an extensive literature review in *Self-Direction in Adult Learning* (Brockett and Hiemstra, 1991) covering the important literature until 1991. *Learning in Adulthood: A Comprehensive Guide* (Merriam and Caffarella, 1999) offers a chapter on self-directed learning discussing theoretical models and the building of additional research. There is no further need to examine the general self-directed learning literature. Nevertheless, the self-directed learning literature most closely related to creativity is worthy of additional clarification.

The next portion of the literature review explores several demographic variables often associated with creativity and self-directed learning, self-directed learning research and connections to creativity, and a conclusion.

Demographic Variables of Creativity and Self-Directed Learning

In pursuing the connection between creativity and self-directed learning, it is necessary to identify some of the demographic characteristics associated with community college students. Merriam and Caffarella (1999) asked, “Is there a set of definitive personal attributes or characteristics that typify learners who are self-

directed?” (p. 313). Factors such as class, ethnicity, and gender need to be considered in the learning process because they influence the way we learn and what we learn (Caffarella & Merriam, 1999).

In their review of research on education in the community college setting, Long and Walsh (1993) have found 11 dissertations addressing self-directed learning in community colleges between 1976 and 1993. Long and Walsh have urged additional inquiry into self-directed learning and its potential impact on the community college students, especially research into variables of age, gender, ethnic origin, socioeconomic status, and educational level. They write, “[the] community/junior college research reviewed here reports equivocal findings concerning the relationship between such proposed variables as age and sex” (Long & Walsh, 1993, p. 163).

Demographic Variables Affecting Creativity

Researchers of self-directed learning need to expand sample populations and continue to broaden the research focus beyond educationally advantaged, middle-aged and female populations. Below, selected demographic variables of age, gender, ethnic background, birth order, and educational level possibly involved in creativity are concisely reviewed.

Age

There have been many explorations of how age differences affect creativity (e.g., Goff, 1992; Lindauer, 1993; Simonton, 1988). Generally, researchers have found that the effect of age constrains the development of new ideas. Age also ordinarily supplements the consequences of birth order (Sulloway, 1996).

Gender

Amabile (1996) claimed that her studies of creativity "have occasionally found sex differences" (p.78) with females more creative on some verbal tasks and males more creative on certain artistic tasks. She also found males more frequently at the extremes of creative ability with females more consistent in creative ability. Ochse (1990, 1991) also examined gender differences and found that the female need for social intimacy and the motivation to create were not mutually enhancing. McCracken (1998) found women were more creative in less structured learning environments and preferred working in groups. Pohlman (1996) found that gender roles within the family often negatively influenced creativity for women. Baer (1997, 1998) found a negative impact of external evaluation on females but positive results for males. Mayo and Christenfield (1999) reported that males and females have different performance expectations that limit creativity. Lubart (1999) located gender effects on creativity in a variety of cultures showing mixed results with males outperforming females, females outperforming males, and at times no significant differences.

Ethnic Background

Most creativity research has occurred within ethnocentric boundaries with a lack of universal research validity (Raina, 1993). Harris, Blue, and Griffith (1995) found that racial and ethnic identities have influenced creative expression in many ways.

Birth Order

Leona (1982) established that first borns and only children were more creative on verbal tests of creativity than later borns. First borns were portrayed as likely to get more attention and stimulation from parents, with creative achievers getting more undivided attention from the family (Ochse, 1990). Birth order and gender have an

influence on creativity levels (Green-Gardner & Bull, 1991). Gaynor and Runco (1992) examined birth order, age-interval, sex, and family size and concluded that all these factors interact to influence creativity. Morales (1994) looked at birth order theory and learning. Sulloway (1996) interpreted later borns as tending to be open to innovation until their early sixties. He found that revolutionary scientists and creative writers were likely to be born later (Sulloway, 1996). Simonton (1999) remarked that the relationship of birth order to creativity relies heavily on the specific domain of creative activity.

Educational Level

The continuation of education is important in maintaining and enhancing creative abilities (Alpaugh, Parham, & Cole, 1982). Ochse (1990) concluded that learning is necessary for the development of creativity, but that this typically involves self-instruction rather than strictly following a school curriculum. The most notable creativity has come from outside mainstream educational environments (Simonton, 1999). Being a good student is less important for artistic fields but is more important for the sciences (Feldman, 1999). Weisberg (1999) claims that higher levels of training (graduate school) have a negative affect on creativity and Kerka (1999) agrees that education often inhibits the transformation of early forms of creativity into adult creativity. Nearly all research regarding the impact of educational environment on creativity has focused on young children (Amabile, 1996). Finding the “extent to which specific educational practices stifle creativity is an objective that deserves much attention” (Nickerson, 1999, p.411).

Demographic Variables of Self-Directed Learning

The broadening of the research focus involves the same variables as the previous section. The demographic variables of age, gender, ethnic background, birth order, and educational level possibly involved in self-directed learning are briefly reviewed.

Age

Sabbaghian (1979) alleged that older college students had higher scores on the SDLRS. Box (1982) found no significant difference in relationship between self-directed learning readiness and age. Long and Agyekum (1983) claimed that increasing age was significantly related to higher scores on the SDLRS. However, Finestone (1984) found no significant relationship between self-directed learning readiness and age. Blackwood (1988), using the OCLI, found positive correlations between high self-directedness and older ages. Long (1991c) again reported that higher SDLRS scores were found among older college students. Guglielmino and Roberts (1992) also revealed that older respondents tended to have higher SDLRS scores except those over the age of 56. Jones (1993) argued that older university art students could be expected to be more self-directed. Adkins (1996), with the OCLI, found older community college students scored higher on self-directedness than younger students.

Gender

Box (1982) found no significant difference in relationship between self-directed learning readiness and gender. Similarly, male and female college students were equally self-directed in learning (Young, 1985). On the other hand, successful males in a telecourse program made higher scores on the SDLRS than females

(Harriman, 1990). Guglielmino and Roberts (1992) encountered slightly higher SDLRS scores for U. S. women but no significant difference between Hong Kong men and women. Adams (1992) found that gender revealed no significant relationship to self-directed learning readiness.

Ethnic Background

Long and Agyekum (1983) informed that black college students made higher SDLRS scores than white college students. In contrast, the white students received higher instructor ratings on self-directedness. It can be risky “to explain differences in performance between two cultural or racial groups” (Long & Agyekum, 1983, p. 85). According to Young (1985), black and white college students were equivalently self-directed in their learning. Brockett and Hiemstra (1991) advocated taking a closer look at self-directed learning among groups conventionally less involved in formal adult education. Guglielmino and Roberts (1992) saw no significant difference in SDLRS scores between blacks in the U. S. and the Hong Kong sample nor between whites and blacks in the U. S. Different cultural experiences may affect the formation of self-directed learning readiness (Guglielmino & Roberts, 1992).

Birth Order

No studies were encountered involving birth order and self-directed learning. However, since birth order has been an emphasis in creativity studies, the results of this study will provide additional information to creativity research and offer another perspective on self-directed learning.

Educational Level

Hassan (1981) claimed that readiness for self-direction in learning increases with advanced education. Box (1982) found a significant correlation between self-directed learning readiness scores and cumulative grade point averages in an associate

degree nursing program. Brockett (1982) suggested that the link between self-directedness and life satisfaction might be connected with prior formal education. Young (1985) alleged that a student's degree of self-directed learning had a positive relationship to academic achievement in a community college. U. S. and Hong Kong respondents with the highest academic degrees had the highest SDLRS scores, perhaps due to an influence of formalized educational processes (Guglielmino & Roberts, 1992). Adams (1992) explained that educational level revealed no significant relationship to self-directed learning readiness. Barnes (1999) found a moderate positive association between self-directed learning readiness and subject-matter interest. Wood (1994) reported as personal priority for involvement in higher education increased, so did SDLRS scores. Fullerton (1998) said that formal educational experience had a significant main effect on SDLRS scores.

No studies have been located involving possible differences between the creativity or self-directedness of those with a GED or regular high school diploma. GED students do as well as regular diploma students in community colleges (Scales, 1990). Aspinwall (1999) reported that the only areas of educational performance showing significant differences between GED and high school diploma students were on the reading portion of an entrance exam and total number of credit hours earned at six technical institutes.

Self-Directed Learning Research and Connections to Creativity

The SDLRS has been used primarily to investigate relationships between self-directed readiness and personological variables and as a diagnostic instrument to assess readiness for self-directed learning (Brockett & Hiemstra, 1991). After

Guglielmino, the first study to use the SDLRS with adults was by Torrance and Mourad (1978b), incorporating several measures of creativity. The subjects of this study were 41 graduate students in a creative thinking course (Torrance & Mourad, 1978b). Readiness for self-directed learning was associated with originality of thinking skills, an ability to produce analogies, motivations of creative personalities, creative experiences, creative achievements, and a right hemisphere style of learning and thinking. A weak but statistically significant positive correlation was discovered between SDLRS scores and scores on the creativity testing, which included the SAM and WKOPAY? among the measures of creativity. Construct validity of the SDLRS was also supported (Torrance & Mourad, 1978b).

In another early study, Torrance and Mourad (1978a) suggested that an important goal of many educators is the expansion of skills and attitudes needed for lifelong, self-directed learning. They remarked that there had not been adequate research to establish the relationship between self-directed learning readiness skills and creative thinking. Their research used an abbreviated version of the SDLRS with items mostly drawn from the creativity factor, and found that gifted students in elementary, middle, and high school were typically high in evaluating their self-directed learning skills. There also appeared to be developmental trends with gifted students becoming more self-directed in learning with age. Torrance and Mourad (1978a) suggested that the SDLRS be widely used in assessing the self-directed learning readiness of gifted students. An additional recommendation encouraged pursuit of the relationship between readiness for self-directed study and creative thinking (Torrance & Mourad, 1978a).

In a related study, Mourad (1979) investigated the validity of the SDLRS by administering the SDLRS and creativity measures to gifted public school students and

to college faculty. Mourad reported that significant relationships were found between teacher ratings of self-directedness and seven of the eight factors of the SDLRS. There were also significant differences of SDLRS scores according to grade level and between males and females. Thus, Guglielmino (1977), Torrance and Mourad (1978a; 1978b), and Mourad (1979) described connections between self-directed learning skills and creativity. Additional SDLRS research offers more evidence of a connection. For example, Roberts (1986) reported that those with high SDLRS scores in less creative-demanding environments tend to perform less satisfactorily on the job. Guglielmino, Guglielmino, and Long (1987) found a positive association between SDLRS scores and creativity level on the job. The authors upheld the use of a measure of self-directed learning readiness in the selection process for those who will occupy creative jobs. In another study, those workers who claimed their jobs required a very high degree of creativity had the highest mean SDLRS scores (Durr, 1992). Durr believed that these results were consistent with Guglielmino and Guglielmino's (1981) study and Roberts' (1986) research.

There is tangible quantitative research on self-directed learning showing that outstanding performers in jobs requiring high levels of creativity also tend to have high levels of self-directed learning readiness as measured by the SDLRS (Guglielmino, Guglielmino, & Choy, 2000). Characteristics of self-directed learners involving independence, creativity, and risk tolerance have been specifically related to attributes needed in the workplace: it seems that people work in jobs that are appropriate to their levels of readiness for self-directed learning because this readiness is connected to the degree of creativity needed for certain jobs (Guglielmino, Guglielmino, & Choy, 2000).

Recent quantitative research reiterates that it is important to find out how self-

directed learning readiness is related to learner characteristics (Kreber, Cranton, & Allen, 2000). These writers believe that, conceptually, self-directed learning readiness is connected to creative thinking. However, they found no significant relationship between creative thinking, using the Torrance Tests of Creative Thinking (TTCT), and the SDLRS.

In spite of this, the SDLRS research generally provides support for claiming that self-directed learning is linked to creativity. Additional research and thought also support the relationship between creativity and self-directed learning. While the possible relationship between creativity and self-directed learning has also been agreed upon in more recent research and conjecture, clearly there are many different interpretations and definitions of self-directed learning and creativity. These explanations are generally connected to discrete philosophical and research traditions. The research into creativity is very broad with attention currently emphasizing confluence approaches and interdisciplinary efforts (Lindauer, 1998). For instance, Csikszentmihalyi (1988) asserted that the systems approach to creativity requires the skills of more than one discipline. In addition, an important challenge for creativity research is the development of a lucid definition of creativity and the use of a combination of research methodologies to “move the field from speculation to specification” (Mayer, 1999, p 459).

For example, Isaksen (1983) proposed a model for creative problem solving that encouraged self-initiated projects and letting individuals control their learning activities. Simonton (1984) argued that many creative people are heavily involved in their “own programs of self-education” (p. 74) and it “will have been largely self-directed” (p.166). Brookfield (1985) claimed:

Self-directed adults perceive the world as open and malleable, not fixed and

immutable. A realization of the culturally constructed nature of knowledge, values, beliefs, and behaviors results in adults acting on the basis of that realization to re-create their personal and social worlds (pp. 63-64).

The self-directed learner, in Brookfield's perspective, understands that aspects of the world can be altered in a creative way. His interpretation of the self-directed adult lends itself to consideration of the role of creativity in self-directed learning. The processes of learning that Cavaliere (1992) laid out to describe the "self-planned, self-directed adult learning project" (p.51) of the Wright brothers share some commonalties with the stages of creativity as portrayed by Wallas (1926). The statements alone associate the self-directed learner with creativity. Similarly, researchers on creative individuals have emphasized self-direction as an aspect of creativity.

Ochse (1990), in examining life experiences and personal characteristics of creative people said "independent learning is one of their most favoured and effective pursuits" (p. 179). These creative achievers need basic knowledge and discipline and then freedom to work independently (Ochse, 1990). Baumgarten (1994) found that upper grade elementary school students produced more aesthetically creative art projects in a self-directed setting. Her research implied that creativity was enhanced by self-direction, which provided more freedom to elaborate on individual ideas.

It also seems that creativity and a development of self-direction work together to promote learning. Worthington (1994) examined the context of earning a Ph.D. degree. Among the conditions that promote learning, she thinks, is a nurturing of creativity and curiosity. The development of self-direction, self-reliance, and initiative are characterized as necessary in advancing learning. Similarly, Bouchard (1996) checked the causes of self-directed learning among eight professionals with high

levels of attainment. He observed that successful self-directed learning is established by a combination of certain personality traits (including creativity, curiosity, and a high capacity for learning) and environmental factors.

On the other hand, the conclusion of Kreber, Cranton, and Allen (2000) shows that the relationship between creativity and self-directed learning may be more tenuous than some earlier research suggests. One can also surmise that different measures of creativity and self-directed learning are measuring separate constructs or that distinct populations exhibit creativity or self-directed learning in dissimilar ways. Perhaps there are flaws in the instruments, such as the SDLRS or the measures of creativity, which produce dissonant results.

Regardless of the problems associated with defining and measuring creativity and self-directed learning, it is important to continue to probe further into these concepts. Because the answers do not come easily verifies that efforts should be redoubled to achieve more adequate methods of defining, measuring, and analyzing the two concepts. Apparently, there is some agreement about particular aspects of creativity and self-directed learning and yet the precise nature of their relationship is not adequately understood.

Long, in Brockett et al. (1994) reported that there is continuing mystification over the definition and conceptualization of self-directed learning. "Until we come to agreement upon what is the sufficient explanation (or cause) for self-direction in learning, we will continue to encounter a variety of difficulties in communication, practice, and research" (Long, 1994). This statement shows that self-directed learning is likely to be an area of turmoil and active interest for the foreseeable future. Self-directed learning, as a pillar of adult learning theory, will continue to generate debate, discussion, and research, thereby improving the understanding of adult learning

(Merriam, 2001).

It is important to pursue the nature of the relationship between self-directed learning and creativity because if the relationship is better understood, perhaps creativity and self-directed learning can be encouraged in a more consistent way. There are no known studies involving this linkage between self-directed learning and creativity with community college students.

Conclusion

Prior research and speculation about self-directed learning suggests that there is a relationship between self-directed learning and creativity. Creative individuals are involved in shaping their learning environments. Of course, this linkage may vary in different situations. It is often affirmed that self-directed learning and creativity are positive attributes. It seems vital to understand more precisely the nature of this relationship, as a first step toward fostering self-directed learning and creativity more cohesively among adult community college students. The current research involving the KTCPI and the SDLRS could add to the knowledge about self-directed learning and creativity. The SDLRS has been successfully used in previous research involving self-directed learning and creativity, as has the KTCPI. The results of this research may confirm the prior connections or may lead to different conclusions about these relationships. The influences of demographic variables on creativity and self-directed learning are contradictory and confusing. Accordingly, there is a need to use these demographic variables in an attempt to further clarify the role of each variable.

Chapter III will describe the method for the current research, based on the introduction and the literature review. This will include population and sample, design

and data analysis, and the instrumentation of the study. Data collection and procedures of statistical analysis will also be noted.

CHAPTER III

METHOD

Chapter III will describe the population and sample, research design, instrumentation, procedure, and research questions and data analysis. A summary will also be included.

Population and Sample

The population for this study was comprised of evening school students at Walters State Community College. Walters State has a main campus based in Morristown, Tennessee, and three branch campuses in Greeneville, New Tazewell, and Sevierville. The different campuses have some diversity in the population of students. For example, the area around Sevierville is influenced by tourism and may have a more transient student population than the other areas. New Tazewell is a more rural area than the others while Morristown has a population of around 21,000 with some students traveling from the urban area of Knoxville. Greeneville has a comparable population to Morristown but has a less diverse group of students. However, the students as a whole are quite homogeneous.

Walters State is a comprehensive community college serving 10 predominantly rural counties in East Tennessee with a student population of around 6000. Information obtained from Walters State indicated that the population of students attending evening classes was about 1200 (J. M. Harper, personal communication, May, 2000).

Cluster sampling was used as the participants were selected from groups of students who were enrolled in classes to earn a degree or certification from Walters State or who were taking non-degree classes. The cluster sample was obtained from classes at the main campus in Morristown and at the branch campuses in Greeneville, New Tazewell, and Sevierville. From the various required classes offered in the evening school enough intact classes were drawn at random to meet the necessary size for the sample.

Cluster sampling is especially useful when the researcher needs to collect on site data (Morgan & Harmon, 1999). The customary technique is to select a several clusters/sites randomly and then choose potential participants from the selected clusters. Pedhazur and Schmelkin (1991) claimed that the judicious use of cluster sampling relied on a balance of less precision with an increase in convenience and economy.

Additionally, there is rarely justification in behavioral research for a sample size of less than 30 or more than 500 (Roscoe, 1975). Roscoe recommended a sample size of about 10% of the total population. Alreck and Settle (1995) also contend that it is generally not necessary to sample more than 10% of a population. Nevertheless, at least 30 subjects are required to establish a relationship in correlational research (Gay & Diehl, 1992).

Thus, the proposed sample size was 120, which met the number required with the rationale of 10% of the estimated total population. This sample size also surpassed the minimum size of 100 advocated by Kerlinger and Pedhazur (1973) for using multiple regression. However, the final sample consisted of 114 students because some participants did not complete all the items on the instruments.

Research Design

A correlational/ex post facto design was used. The study was correlational because it examined the association or degree of relationship among the variables. Correlational studies include those research projects that attempt to discover or explain relationships by using correlation coefficients (Borg & Gall, 1989). The purpose of the correlation coefficient is to signify in mathematical terms the degree of relationship between any two variables. Correlation coefficients were not used to detect cause and effect relationships, but to explore or predict relationships between two variables. A correlation coefficient is expressed from -1.00 to +1.00. This correlation coefficient is a precise method of stating the degree to which one variable is related to another. The specific purpose of this research was to determine the relationship between creativity and self-directed learning.

Gay (1992) acknowledged that in a study intended to explore relationships, a correlation coefficient is interpreted in terms of its statistical significance. This statistical significance concerns the likelihood of the coefficient being different from zero and reflecting a true relationship and not a chance relationship. Thus, the decision involving statistical significance is made for a given level of probability. Essentially, “you cannot determine positively whether there is or is not a true relationship between the variables, but you can say there probably is or probably is not such a relationship” (Gay, 1992, p. 267). It is also useful to remember that statistical significance does not necessarily verify practical significance (Vogt, 1993). For most studies, a significance level of .05 is a reasonable probability level (Gay, 1992). A .05 level of significance means that such a result would occur by chance no more than five times in 100 trials (Kerlinger & Lee, 2000). Accordingly, this study used the .05 significance level as a

minimum requirement but will also report the .01 level of significance where this more stringent standard is met.

Furthermore, a coefficient of determination or r^2 is the proportion of variation of one variable that can be attributed to the variation in another variable (Anastas, 1999). It is obtained by squaring a correlation coefficient. The researcher squared correlation coefficients in this manner as necessary to more closely examine certain relationships. A coefficient of determination produced by squaring the correlation coefficient was used to help explain the variance. The strength of statistically significant relationships was also interpreted.

To summarize, demographic characteristics of the participants were categorized by using frequencies and percentages. Means, standard deviations, and ranges were used to portray the general scores obtained on the KTCPI and the SDLRS. Coefficient of determination, Cronbach's alpha reliability coefficient, Pearson's product-moment correlation coefficient, multiple linear regression, Analysis of Variance (ANOVA), and Multivariate Analysis of Variance (MANOVA) were used in data analysis where appropriate. The specific uses of these statistics will be explained more fully in the research questions and data analysis section that will further delineate the data analysis related to the research questions.

Instrumentation

Three instruments were used to obtain information from the participants. These were the SDLRS, KTCPI, and the Demographic Questionnaire. These instruments are described in the subsequent section.

Self-Directed Learning Readiness Scale (SDLRS)

Lucy Guglielmino (1977) constructed the SDLRS as part of her doctoral dissertation at the University of Georgia (Appendix A). Fourteen experts on self-directed learning used the Delphi process to help in the content development of the SDLRS. From the Delphi technique of obtaining consensus, a self-report questionnaire format was designed to collect information on learning preferences and attitudes toward learning. The original instrument subdivided 58 items into eight factors. A five-point Likert scale produces scores for self-directed learning readiness.

Creativity was initially seen as one of the eight factors of self-directed learning readiness. The other seven factors were openness to learning opportunities, self-concept as an effective learner, initiative and independence in learning, informed acceptance for one's own learning, love of learning, future orientation, and ability to use basic study skills and problem solving skills. However, these factors are no longer interpreted by Guglielmino (personal communication with R. G. Brockett, 2000) as integral to using the SDLRS as a measure of self-directed learning readiness. There were two reasons for ending the use of the factors. The SDLRS total score is reliable, but some factors have a small number of items that load onto them and, consequently, produce diminished reliability.

Borg (1987) regards the evaluation of test reliability concerning subscores as an area to be approached with care. The author suggests that reliability coefficients of subscores may vary considerably, with some as reliable as the total test score and others having such low reliability that they add little to research findings. Because reliability is a function of test length, the reliability of a particular subtest is typically lower than total test reliability (Gay, 1992). Guglielmino (personal communication

with R. G. Brockett, February 4, 2000) also noted that subscores produced from factors of the SDLRS might have reduced reliability because of the relatively small number of items that load on to some of the factors. Factor analysis changes in different samples with such analysis being best with each new sample, which is not practical in most research (personal communication with R. G. Brockett, 2000). Notwithstanding, the SDLRS still produces a total score that may be used in analysis and, thus, only the total SDLRS score will be used in the current study.

As well, the SDLRS has been frequently used for research in self-directed learning and in prediction and diagnosis as displayed at Guglielmino's website of <http://www.guglielmino734.com/> which displays a selected bibliography of research that has used the SDLRS. It has also been employed as a screening device in independent study and for the gifted. Earlier research has defended the reliability of the SDLRS. For instance, Guglielmino (1977) estimated a reliability of .87. Reliability of the SDLRS has remained high with the Pearson split-half reliability estimate at .94 (Guglielmino, 1989). Most studies on samples over the age of 20 have reported reliabilities of .72-.92 and a sample of 3,151 individuals produced a reliability of .94 (Guglielmino & Knudson, 2000). The present study revealed a Cronbach alpha reliability coefficient of .94 as well.

Despite the existence of substantive and methodological issues (e.g. Brockett, 1985b; Bonham, 1991; Field, 1989), which were discussed in Chapter II, the SDLRS offers "a most important contribution to present understanding of the self-directed learning phenomenon by generating considerable research, controversy, and dialogue" (Brockett & Hiemstra, 1991, p. 74). There are many questions that need to be answered especially about the validity of the scale. Brockett and Hiemstra specified that the SDLRS should be used with discretion, much like any standardized

instrument. They also proposed that adult education researchers seek improved instruments.

A major way the SDLRS has been used is in the exploration of relationships between self-directed learning readiness and personological variables through correlational, experimental, and quasi-experimental research designs (Brockett & Hiemstra, 1991). Studies that support the validity of the SDLRS include Torrance and Mourad (1978a; 1978b), Mourad (1979), Sabbaghian (1979), Long and Agyekum (1983; 1984; 1988), and Landers (1989).

Previous research confirmed the reliability of the SDLRS (Owen, 1996). The research of Long and Agyekum (1983), Finestone (1984), and Reynolds (1985) provided additional support for the SDLRS. Even Field (1989), a major critic of the SDLRS, found the reliability of the SDLRS to be .89 and concluded that the SDLRS measured a reasonably homogeneous construct. Many other researchers have described the validity of the SDLRS. For example, the SDLRS is a reliable and valid instrument when used with graduate students (Owen, 1996). In addition, Long and Walsh (1993) remarked that the SDLRS was the most widely used instrument in quantitative studies of self-directed learning involving community colleges. The SDLRS was used in this study because of its widespread use and a general applicability to research of this nature, especially within the community college setting.

Khatena Torrance Creative Perception Inventory (KTCPI)

The KTCPI has been used extensively in the confirmation of creative individuals, particularly in college settings, and widely utilized for research or

placement purposes (Khatena & Torrance, 1998). It has also been used in business environments to identify those with innovative ideas and to increase the creative functioning of such people (the KTCPI cannot be placed in the Appendix due to copyright restrictions). In educational settings the KTCPI is useful in identification of creative students but can also be used diagnostically to help the expansion of creative thinking and creative behavior (Khatena & Torrance, 1998).

There is substantial evidence to uphold the use of an autobiographical instrument as a way to screen for creativity (Khatena, 1992; Khatena & Torrance, 1998). An autobiographical instrument is a self-report measure that examines affective behavior. An individual's self-perception may be efficiently measured through the KTCPI (Khatena & Torrance, 1998). This instrument consists of two measures: (1) What Kind of Person Are You? (WKOPAY?) and (2) Something About Myself (SAM).

WKOPAY? is grounded in the rationale that the individual has a psychological self with creative and noncreative characteristics of behaving. The measure presents verbal stimuli to activate sub selves that produce an index of the person's inclination or motivation to act in creative ways.

There are 50 items of paired characteristics randomly organized in a forced-choice format so the respondent chooses between a creative and a noncreative characteristic. A creative index is obtained by counting the correct responses. Accompanying the creative perception index are five factors or orientations. These factors are (I) acceptance of authority, (II) self-confidence, (III) inquisitiveness, (IV) awareness of others, and (V) disciplined imagination. The meanings of the five factors of the WKOPAY? are:

(I) *Acceptance of Authority* relates to being obedient, respectful and polite, and

to following rules and accepting others in power.

(II) *Self-Confidence* relates to being sure of oneself and full of energy, getting along well with others, wanting to learn or know, finishing the task at hand, and remembering well.

(III) *Inquisitiveness* relates to always asking questions, feeling strong emotions, talking a lot, demanding recognition and insisting on rights, and being obedient.

(IV) *Awareness of Others* relates to being respectful and polite, popular or well-liked and caring, getting along well with others, and preferring to work in a group.

(V) *Disciplined Imagination* relates to being full of energy, imaginative and never bored, trying difficult tasks, preferring tasks that challenge, not giving up easily, finishing the task at hand, working hard, and seeking adventure.

(Khatena & Torrance, 1998, p. 14).

Factor analysis indicated that Factor I has a noncreative orientation and Factor V has a creative orientation. The less creative person would be expected to score high on Factor I and low on Factor V, with the reverse expected of the more creative person (Khatena & Torrance, 1998). For example, in looking at Factor I, a typical creative person is expected to be less obedient, respectful and to follow the rules less than the noncreative person because these traits are frequently associated with creativity. The other three factors have creative and noncreative elements.

Factor II has creative elements of being sure of oneself, wanting to learn or know, and remembering well and noncreative elements of getting along well with others and finishing the task at hand. The creative elements of Factor III are always asking questions, demanding recognition and insisting on rights, and feeling strong

emotions while the noncreative elements are talking a lot and being obedient.

Content, construct, and criterion validity was established by comparison studies with a variety of attitude pattern studies, personality characteristic studies, factor analysis, and biographical inventory rating scales. There is ample evidence of construct validity. Lang (1989) regarded the construct validity of the KTCPI as adequately defended with correlational studies, factor analysis, and cross-validation studies. Forty-five of the 50 items of the WKOPAY? had communalities between .15 and .50 and factor loadings between .30 and .71. Three of the remaining items did not load as high as .30 and were not used in the five factors (Khatena & Torrance, 1998). The authors suggest that items need to load at .30 or above to be used in the factors, which resulted in the 5 factors presented earlier.

SAM operates on the rationale that creativity is illustrated in the personality characteristics of individuals, the type of thinking tactics they use, and in the creative products of their efforts. The measure's purpose is to get an index of a person's creativity according to the number of positive choices made proportional to the items in the three preceding categories. SAM produces six factors: (I) environmental sensitivity, (II) initiative, (III) self-strength, (IV) intellectuality, (V) individuality, and (VI) artistry. The meanings of these six factors of SAM are:

(I) *Environmental Sensitivity*: The variables with high loading are Openness to ideas of others; Relating ideas to what can be see, touched, or heard; Interest in beautiful and humorous aspects of experiences; and Sensitivity to meaningful relations.

(II) *Initiative*: The most important variables in this factor are Directing and/or playing leads in plays; Producing new formulas or new products; and Bringing about changes in rules or ways things are done.

(III) *Self-Strength*: Highest loadings in this factor indicate a sureness of own talents; Always finding a way to do something; Talented in many ways; Risk taking; Desire to do better; and Organizational ability.

(IV) *Intellectuality*: Variables loading on this factor are Intellectual curiosity, Enjoyment of challenging tasks; Imagination; Preference for adventure over routine; Liking for reconstruction of things and ideas to form something different; and Dislike for doing things in the way others require.

(V) *Individuality*: Among the variables specific for this factor are Preference for working by oneself rather than in a group; Starting and continuing projects on own interest; Considered different by others; Finding fault in others to help them improve; Thinking for oneself; Working for long periods without getting tired.

(VI) *Artistry*: The variables loading on this factor stress Production of arts and crafts; Creating a new dance or song; Winning prizes or having exhibits of works; Production of stories or poems. (Khatena & Torrance, 1998, p. 26).

Forty-three of the 50 items of the SAM had communalities between .30 and .61, with 7 items failing to load as high as .30 (Khatena & Torrance, 1998).

Therefore, the six factors only contain 43 out of 50 items.

The status of internal reliability of the Khatena Torrance Creative Perception Inventory (KTCPI) and Self-Directed learning Readiness Scale (SDLRS) was answered using Cronbach's alpha reliability coefficient. Cronbach's alpha furnishes a measure of internal reliability and is the most common estimate of internal consistency of items in a scale (Garson, 2000). Additionally, besides estimating internal consistency or reliability, the alpha formula considers the number of items based on the idea that the more items, the more reliable a scale should be.

The KTCPI has "very good reliability estimates" for an instrument designed to measure an aspect of creativity (Lang, 1989, p. 2). Lang suggested that the KTCPI might be useful in research, general screening, and self-awareness purposes with an emphasis on creativity. There is also previous research that supports the reliability and validity of the KTCPI, as Torrance attested that 135 studies have used the KTCPI (Millar, 1995).

Numerous research studies have used one or both components of the KTCPI (Khatena & Torrance, 1998). To illustrate, Hart (1980) studied anxiety and decisions in simulated nursing situations and Pesut (1984) explored self-instructional creativity programs and nurses' creative perceptions using the WKOPAY?. Daniels (1980) employed the SAM in investigating student and teacher perceptions of student creativity and Truan (1987) studied the relationship of personality traits and thinking style to the acceptance level of locosophic responses. Huestis (1983) used the KTCPI in examining the influence of modeling on the creative performance of college students and it was also used by Feinberg (1984) in studying creativity in mid-life planning.

Instruments designed to measure creativity should be assessed according to the standards of existing creativity measures as opposed to the standards of intelligence tests or achievement tests (Fishkin & Johnson, 1998). Fishkin and Johnson (1998) also revealed that self-report instruments are very subjective and rely heavily on the perceptions of respondents. The KTCPI was used in this study because of its established reliability, validity, and expected general utility with relatively large groups of adults within a community college.

The WKOPAY? and SAM, the constituents of the KTCPI, used raw scores that were converted into standard stanine scores. For a single index, the WKOPAY? and

SAM standard score equivalents were added and averaged to produce a KTCPI total standard score. There are also scoring keys for the WKOPAY? and SAM for the total scales and the factor orientations. The scores related to the factors form a total of 11 factor orientations for the KTCPI.

Demographic Questionnaire

Long & Walsh (1993) encouraged gathering more precise information about sample characteristics in self-directed learning research. They mentioned that Caffarella (1993) endorsed the identification of demographic variables of age, gender, ethnic origin, socioeconomic status, and educational level. Long and Walsh commented that some subjects might not provide this type of information and that requesting it may create a problem for those conducting research into self-directed learning in community colleges. Therefore, information was obtained from the sample concerning age, birth order, ethnicity, gender, and educational level using a demographic questionnaire as previously discussed in Chapter I (Appendix B). Socioeconomic status was not determined because this can be a sensitive issue in some situations and it could create some difficulties as suggested by Long & Walsh (1993). Information from the demographic questionnaire was used to develop a profile of the participants and to answer the research questions involving these variables.

Procedure

Participants were selected by using a cluster sample at Walters State Community College. These participants complied with requirements of the University

of Tennessee for study participation and were at least 18 years of age. Approval of the proposed research was obtained from the community college and the necessary procedures for a review of the proposed research were completed at Walters State.

A “Form A” for human subjects research at the University of Tennessee was completed by the researcher and research approval obtained. Written informed consent from participants was waived because the information returned by participants was not linked to them except by number. This number was used for purposes of research record keeping and data analysis but was not associated with identifying information. Therefore, a completed informed consent document would unnecessarily connect participants to the research and was not needed.

Permission to gain access to students was achieved after meeting the requirements of Walters State Community College for conducting research. Consent from instructors and students was also obtained to use part of their class time. Fifteen out of 20 instructors initially agreed to help with the study, however, due to a range of circumstances, a total of 11 instructors actually assisted in the study.

A brief orientation preceded the distribution of test materials. Participants were told they could learn some ways they are creative and have information on their readiness for self-directed learning. Students were then given an information letter, the KTCPI (WKOPAY? and SAM), the SDLRS and the demographic questionnaire, in a large manila envelope, with numbers pre-written on each measure and envelope. The information letter further explained the purpose and general format of the research to the participants (Appendix C). The instruments were given only to those students who tacitly agreed to complete them. If the participants completed the three instruments an implied consent to use the data for research purposes occurred. Students were allowed to stop the testing any time, if they so chose, without any type of penalty. Some

students chose not to become participants and were not penalized in any way. Those who had questions about the research had their questions answered at this time. The participants were told that the researcher would return the following week to gather the completed instruments in the envelopes and they were thanked for their participation in the research.

WKOPAY? and SAM are considered as separate tests in the KTCPI and are intended to measure relatively distinct aspects of the creative personality. A typical time to complete the entire KTCPI is about 20 to 45 minutes. The SDLRS can ordinarily be completed in 10 to 20 minutes with the demographic questionnaire taking less than five minutes. Walters State research procedures allowed the researcher about 10 minutes to introduce the nature and scope of the research to the evening school students. Nevertheless, the actual completion of the instruments took place on the participants' own time and did not seem to substantially change the ordinary procedures of the community college classes. There were no participants who later contacted the researcher for additional information regarding the instruments or the results of the research.

Research Questions and Data Analysis

The researcher initially asked six research questions in Chapter I to find the relationship between creativity and self-directed learning. The following six research questions were offered.

Research Question 1. Is there a significant relationship between self-directed learning readiness and creativity?

Pearson's product-moment correlation coefficient, ordinarily expressed as r ,

shows the degree of linear relationship between two variables measured on interval or ratio scales. Pearson's correlation is often used and it is commonly assumed that correlation specifically refers to it (Vogt, 1993). Thomas (1998) explained that it is ordinarily acceptable to use Pearson's r where variables consist of test scores or involve ratings of performance. The Likert scale used by the SDLRS produces ordinal results but a Likert scale is commonly interpreted as producing interval data. Standard scores of the KTCPI are also construed as producing interval data.

Pearson product-moment correlations were performed to find the relationship between the SDLRS total score (self-directed learning readiness) and the KTCPI total score (creativity). Pearson product-moment correlations were also used to determine the relationship between the SDLRS total score and the 11 individual factors of the KTCPI (Acceptance of Authority, Self-Confidence, Inquisitiveness, Awareness of Others, Disciplined Imagination, Environmental Sensitivity, Initiative, Self-Strength, Intellectuality, Individuality, and Artistry).

Research Question 2. Is there a significant relationship between self-directed learning readiness and the 11 individual factors of the KTCPI among adult community college students?

This question was answered using Pearson's product moment correlation and the determination coefficient derived from the Pearson correlation. Each of the 11 KTCPI factors was correlated with the SDLRS total score. The strength of statistically significant relationships was also interpreted.

Research Question 3. Is self-directed learning readiness predictable from a particular combination of the 11 factors of the KTCPI among adult community college students?

Multiple linear regression is a type of analysis that applies more than one

predictor variable to predict a single criterion variable. Multiple regression can offer evidence to shed light on how much each independent variable relates to or explains the dependent variable (Kerlinger & Lee, 2000). A coefficient of a predictor variable is an estimate of that variable's effect while maintaining constant the effects of other predictor variables (Vogt, 1993). R ranges in value between zero and one. A value of zero means there is no linear relationship between predicted scores and the criterion scores while a value of one indicates that the linear combination of the predictor variables perfectly predicts the criterion variable. R may also be squared and multiplied by 100 to achieve a percent of variance (Vogt, 1993).

Interval data are theoretically required, at a minimum for multiple regression, although it is fairly common to use ordinal data (Garson, 2000). Lea (1997) reiterated that an ordinal scale is usually good enough unless the number of levels is small. Five-point Likert scales, like the SDLRS scale, are frequently interpreted as producing interval data (Garson, 2000).

Clark-Carter (1997) considered stepwise regression as the safest procedure involving multiple regression. Nonetheless, a researcher may not always know what subset of variables is a good model. On the other hand, stepwise regression is the most commonly used, particularly if there are correlations among the independent variables (SPSS, 1997).

Still, Tabachnick and Fidell (1989) observed that stepwise regression is somewhat controversial. A computer, instead of the researcher, establishes the order of predictor variables. There is not an underlying logical or theoretical rationale for variable entry (Polit, 1996). The entry of a particular variable may rely on comparatively minor differences between remaining variables with the differences reflecting sample error. However, the problem is less contentious in exploratory

research or simple prediction (Tabachnick & Fidell, 1989; Garson, 2000).

Nonetheless, Cone and Foster (1993) said that results may not be replicated in a second sample and that irregular rules of entering and removing predictor variables may produce misleading results. There may also be an avoidance of thinking through logical relationships among predictors and the criterion variable. SPSS (1997) verified that stepwise selection is the most commonly used method but that none of the selection procedures will necessarily “provide the *best* subset in an absolute sense” (p. 184). Clark-Carter (1997) also suggested that the use of stepwise regression is only suitable when exploring data rather than testing a particular model. Then again, stepwise regression was described as safer than forward selection and backward deletion. Therefore, stepwise regression was employed in the current research with an awareness of its inherent limitations.

SPSS allows the testing of variables in the model for removal. Variables were selected and eliminated until none remained to be removed. The total score of the SDLRS (self-directed learning readiness) was the dependent variable. The 11 factors (independent variables) of the KTCPI are Acceptance of Authority, Self-Confidence, Inquisitiveness, Awareness of Others, Disciplined Imagination, Environmental Sensitivity, Initiative, Self-Strength, Intellectuality, Individuality, and Artistry.

A R^2 was computed at each step that explains whether the entered variable would add significantly to the amount of the variance predicted by the variables already entered. A value of one implies that the linear combination of the predictor variables perfectly predicts the criterion variable. Values between zero and one show a relationship while a value of zero means there is no relationship between predicted scores. An F test was used to test the significance of R^2 . An ANOVA table, stepwise multiple regression model summary, and regression coefficients were produced.

Research Question 4. Does creativity differ by gender, ethnic background, birth order, and educational level among adult community college students?

This question was answered using Multivariate Analysis of Variance (MANOVA) to test if any of the 11 factors of the KTCPI (creativity) differ for each demographic variable of gender, ethnicity, birth order, and educational level. MANOVA also produces descriptive statistics. Wilks' lambda is a multivariate test statistic with a value ranging between zero and one. It is used to decide if group means are different or not. If a one-way MANOVA is significant, the most common follow-up is to conduct multiple ANOVAs for each dependent variable (Green, Salkind, & Akey, 1997).

If the MANOVA was found to be significant, individual ANOVAs were completed to establish which factors were related to the significance. Borg & Gall (1989) state that ANOVA produces an *F* value that, if statistically significant, shows that the means are likely to have come from different populations. A (4 x 1) simple ANOVA will be run for the demographic variables (gender, ethnic background, birth order, and educational level). ANOVA tests the "statistical significance of the differences among the mean scores of two or more groups on one or more variables or factors" (Vogt, 1993, p. 7). Then Tukey post hoc analysis of the significant ANOVAs will be completed if appropriate.

Research Question 5. Does self-directed learning readiness differ by gender, ethnic background, birth order, and educational level among adult community college students?

MANOVA was also used to answer this question. Similar procedures were followed to answer the question as in research question four. However, for this question there will only be the SDLRS total score (self-directed learning readiness) as

the dependent variable with gender, ethnic background, birth order, and educational level serving as the independent variables in ANOVAs.

Research Question 6. Is age significantly related to creativity and self-directed learning readiness among adult community college students?

Pearson's product-moment correlation was used to find possible correlations between age and creativity (KTCPI total score) and potential correlations among the 11 factors of the KTCPI and age. Determination coefficients were also obtained for significant correlations.

Summary

One hundred fourteen evening school students enrolled for the winter and summer semesters of 2001 at Walters State Community College comprised the sample for the study. A cluster sample was used and those in the sample were asked to complete the Self-Directed Learning Readiness Scale (SDLRS), the Khatena Torrance Creative Perception Inventory (KTCPI), and a demographic questionnaire.

The study was based on correlational techniques and investigated the relationship between self-directed learning and creativity. It must be understood that correlation refers to a relationship only and not a cause-effect relationship. "A significant correlation coefficient may *suggest* a cause-effect relationship but does not establish one" (Gay, 1992, p. 269).

The instruments used to collect data and the statistical procedures for analyzing the data obtained from the participants were profiled. Chapter IV will further explain the statistical procedures, present the analysis of the data, and answer the six research questions.

CHAPTER IV

RESULTS

Chapter III presented information concerning the population and sample, research design, instrumentation, research questions, procedure, and statistical analysis. Chapter IV will present the results of the data analysis. First, demographic information concerning participant characteristics is presented. This demographic information includes age, gender, ethnic background, birth order, and educational level. Second, descriptive information concerning the instruments used in the research is presented. These instruments include the Khatena Torrance Creative Perception Inventory (KTCPI), which consists of two scales: (a) Something About Myself (SAM) and (b) What Kind of Person Are You? (WKOPAY?), and the Self-Directed Learning Readiness Scale (SDLRS). Third, the research questions are presented and answered using the results of the statistical analysis. Finally, a summary reviews the salient points of the chapter and sets the stage for Chapter V.

The population for the study consisted of approximately 1200 evening school students enrolled at Walters State Community College in the winter and summer semesters of 2001. A cluster sample of 114 students from Walters State voluntarily participated in this study. Participants had to be at least 18 years old and were drawn from a variety of classes on Walters State campuses at Greeneville, Morristown, New Tazewell, and Sevierville. The classes included art history, biology, computer science, English, history, mathematics, and psychology. These are basic courses typically

required for a student to receive a degree or a certification from Walters State. The typical participant was working on an associate degree. However, others were pursuing certification or were enrolled in classes on a non-degree basis. A cluster sample of 114 participants was used to obtain demographic information, information about self-directed learning readiness, and creativity-related data from the instruments.

Demographic Information

A demographic questionnaire was used to gather demographic information from each participant. Participants were asked about their age, gender, ethnic background, birth order, and educational level. This information allowed the formation of a general configuration of the participants regarding these demographic elements.

Age

The mean age reported by participants was 25.5. There was a range in age from 18 to 56. The standard deviation was 8.3. Slightly more than half of the participants (50.9%) were 21 and younger. The largest age grouping was found in the 20-year-old group of students. Fewer than 12% of the participants were over 40. The oldest student was 56 and was the only student over the age of 50. Ages, frequencies of ages, and age percentages are shown in Table 4.1.

Gender

The 114 participants included 88 females and 26 males. This was a ratio of more than three to one. There were 77.2 % females and 22.8 % males.

Table 4.1. Frequencies and Percentages for Age

Age	Frequency	Percent	Cumulative Percent
18	13	11.4	11.4
19	18	15.8	27.2
20	22	19.3	46.5
21	5	4.4	50.9
22	5	4.4	55.3
23	4	3.5	58.8
24	3	2.6	61.4
25	1	.9	62.3
26	1	.9	63.2
27	4	3.5	66.7
28	3	2.6	69.3
29	4	3.5	72.8
30	4	3.5	76.3
31	1	.9	77.2
32	4	3.5	80.7
33	3	2.6	83.3
35	6	5.3	88.6
38	1	.9	89.5
40	2	1.8	91.2
41	3	2.6	93.9
42	3	2.6	96.5
44	1	.9	97.4
45	1	.9	98.2
49	1	.9	99.1
56	1	.9	100.0
TOTAL	114	100.0*	

* Total does not equal 100 due to rounding.

Ethnic Background

The participants in this study were overwhelmingly Caucasian (94.7%; N=107). There were three African American participants comprising 2.6% of the sample. One American Indian or Alaskan Native, one Asian or Pacific Islander, and one Hispanic each comprised .9% of the participants. The sample was very homogeneous regarding ethnic background. One person did not report ethnic background. Additional details concerning ethnic background are reported in Table 4.2.

Table 4.2. Frequencies and Percentages for Ethnic Background

Ethnic Background	Frequency	Percent	Cumulative Percent
Caucasian	107	93.9	94.7
African American	3	2.6	97.3
American Indian or Alaskan Native	1	.9	98.2
Asian or Pacific Islander	1	.9	99.1
Hispanic	1	.9	100.0
Total	113	99.1	
Missing	1	.9	
TOTAL	114	100.0*	

* Total does not equal 100 due to rounding.

Birth Order

Participants were asked to specify the number of siblings, and whether they were younger or older. Birth order was established using three categories: number of older siblings, number of younger siblings, and number of twins. One participant self-identified as a twin. Information concerning birth order was then recoded for statistical analysis. Between-subjects factors were subdivided into groups of oldest siblings, middle siblings, youngest siblings, and only child. Tests of between-subjects effects analyzed these birth order groupings in an ANOVA that will be further described later in the chapter. Most of the participants had at least one sibling. Frequencies, percentages, and cumulative percentages for birth order are presented in Table 4.3.

Most participants had at least one older sibling with four participants having five older siblings. Frequencies, percentages, and cumulative percentages for the number of older siblings are presented in Table 4.4.

Table 4.3. Frequencies and Percentages for Birth Order*

Birth Order	Frequency	Percent	Cumulative Percent
Oldest	35	30.7	31.3
Middle	27	23.7	55.4
Youngest	30	26.3	82.1
Only child	20	17.5	100.0
Total	112	98.2	
Missing	2	1.8	
TOTAL	114	100.0	

* U. S. A. percentage of births by birth order to total number of live births for 1975-First-42.0, Second-31.4, Third-14.0, Fourth or higher 11.4 (United Nations, 2001).

Table 4.4. Frequencies and Percentages for Number of Older Siblings

Older Siblings	Frequency	Percent	Cumulative Percent
0	55	48.2	48.7
1	31	27.2	76.1
2	16	14.0	90.3
3	4	3.5	93.8
4	3	2.6	96.5
5	4	3.5	100.0
Total	113	99.1	
Missing	1	.9	
TOTAL	114	100.0*	

* Total does not equal 100 due to rounding.

A majority of the participants had at least one younger sibling. Frequencies, percentages, and cumulative percentages for the number of younger siblings are displayed in Table 4.5.

Educational Level

The three choices for identifying educational level were high school diploma, GED (General Equivalency Diploma), and other. Eighty-five participants (74.6%) reported having a high school diploma and three participants (2.6%) held a GED. Thirteen participants (11.4%) entered solely a post-high school credential (e.g., associate degree, certificate, LPN, bachelors' degree) and 13 (11.4%) did not select an educational level. Educational levels are included in Table 4.6.

Summary of Demographic Information. The majority of the participants were female with a mean age of 25.5. Nearly all participants were Caucasian. Most of the sample had at least one older sibling and a majority had at least one younger sibling. Most of the students providing educational level held a high school diploma.

Table 4.5. Frequencies and Percentages for Number of Younger Siblings

Younger Siblings	Frequency	Percent	Cumulative Percent
0	50	43.9	44.6
1	36	31.6	76.8
2	15	13.2	90.2
3	7	6.1	96.4
4	4	3.5	100.0
Total	112	98.2	
Missing	2	1.8	
TOTAL	114	100.0*	

* Total does not equal 100 due to rounding.

Table 4.6. Frequencies and Percentages for Educational Level

Educational Level	Frequency	Percent	Cumulative Percent
High School Diploma	85	74.6	96.6
GED	3	2.6	100.0
Other	13	11.4	
Missing	13	11.4	
TOTAL	114	100.0	

Instrumentation and Sample Characteristics

The Self-Directed Learning Readiness Scale (SDLRS) and the Khatena Torrance Creative Perception Inventory (KTCPI) were the instruments used to gather data in this study. The KTCPI is divided into two scales: (a) Something About Myself (SAM) and (b) What Kind of Person Are You? (WKOPAY?). The SAM and WKOPAY? measure different facets of the creative personality and can be used separately. These two creativity scales should be regarded as “separate tests within a battery rather than as subtests within a single test” (Khatena & Torrance, 1998, p. 1).

The scores produced by the SAM and WKOPAY? result in a creative perception index for each person. There is not a formal procedure for combining the scores of these two scales. However, Khatena and Torrance (1998) recommend combining standard score equivalents by adding and averaging them to obtain a single index if necessary. This procedure was followed to obtain the KTCPI total standard score, which was also interpreted as encompassing the variable of creativity.

Self-Directed Learning Readiness Scale (SDLRS). An SDLRS total score between 58-176 is low, between 177-201 is below average, between 202-226 is

average, between 227-251 is above average, and a score between 252-290 is high (Guglielmino, 1999). The national mean score of the general adult learner is 214 with a standard deviation of 25.59 (Guglielmino, 1999). Reynolds (1985) confirmed a mean of 228.10 with a sample of part-time adult community college students and a standard deviation of 24.90. McCune, Guglielmino, and Garcia (1989) found a mean of 227.70 in a meta-analysis of different adult populations who had completed the SDLRS.

One hundred fourteen participants completed the SDLRS in this study. The mean participant score was 219.87 with a standard deviation of 26.16. The low score was 166, and the high score was 276, resulting in a range of 110. Therefore, the typical participant in this study scored in the average range. Mean, standard deviation, minimum scores, and maximum scores for the total scores of the SDLRS are presented in Table 4.7.

Cronbach's alpha reliability coefficient, often called "the reliability coefficient" (Garson, 2000, p. 5), is the most frequently used estimate of internal consistency of scale items. The alpha measures the degree to which item responses correlate with each other.

In this study, reliability, according to Cronbach's alpha coefficient, was .94 for the SDLRS, which surpassed the criterion of Gay (1992) for the reliability of any test. This was higher than the alpha of .87 in Guglielmino's original study and was the same alpha obtained by Guglielmino and Knudson (2000) with a sample of 3,151.

Something about Myself (SAM). An initial analysis of 1,277 adult college students using the SAM recorded a mean of 28.77 and a standard deviation of 7.42

(Khatena & Torrance, 1998). A revised analysis of 1,809 college students produced a mean of 33.80 with a standard deviation of 6.67 (Khatena & Torrance, 1998).

In the present study, there were 114 participants who finished the SAM. The mean score was 26.08 with a standard deviation of 7.99. The low score on SAM was 7, and the high score was 44 with a range of 37. The previous analysis by Khatena and Torrance (1998) of the six factor scores of the SAM involving 1,277 college age adults resulted in the following means: (a) Environmental Sensitivity (4.84), (b) Initiative (1.41), (c) Self-Strength (2.15), (d) Intellectuality (2.13), (e) Individuality 1.28, and (f) Artistry (1.39).

In the present study, the factor of Environmental Sensitivity produced a mean of 4.41 and a range of 0 to 6. For Initiative, the mean was 1.59 and the range was 0 to 6. Intellectuality had a mean of 4.89 with a range of 0 to 10. Self-Strength had a mean of 5.89 with a range of 0 to 10. The mean for Individuality was 3.26 with a range of 0 to 6. Artistry had a mean of 1.89 with a range of 0 to 5. Mean, standard deviation, minimum scores, and maximum scores for the SAM and its factor scores are presented in Table 4.8.

Table 4.7. SDLRS Scores

	N	Mean	Standard Deviation	Minimum	Maximum
SDLRS	114	219.87	26.16	166.00	276.00

Table 4.8. SAM Total Scores and Factor Scores

	N	Mean	Standard Deviation	Minimum	Maximum
Total SAM	114	26.08	7.99	7.00	44.00
Environmental Sensitivity	114	4.41	1.39	.00	6.00
Initiative	114	1.59	1.28	.00	6.00
Self-Strength	114	5.89	2.10	.00	10.00
Intellectuality	114	4.89	2.25	.00	10.00
Individuality	114	3.26	1.38	.00	6.00
Artistry	114	1.89	1.89	.00	5.00

Reliability using Cronbach's alpha for the SAM total was .86. This alpha level is acceptable according to Gay (1992) although the individual factors have lower reliabilities. The factor alphas do not have the reliability of the total score perhaps due to a lower number of items in the factors. The SAM factors included these reliability coefficients: Environmental Sensitivity = .55, Initiative = .44, Self-Strength = .61, Intellectuality = .63, Individuality = .42, and Artistry = .53. The SAM factors are defined in Chapter III. The data for the Cronbach's alpha for SAM are in Table 4.9.

What Kind of Person Are You? (WKOPAY?). An analysis of 2,169 college students using the WKOPAY? produced a mean of 26.59 and a standard deviation of 5 (Khatena & Torrance, 1998). A revised analysis of 1,792 college students resulted in mean scores of 26.38 with a standard deviation of 6.86 (Khatena & Torrance, 1998).

One hundred fourteen participants completed the WKOPAY? in the present study. The mean of participant scores was 26.25 with a standard deviation of 5.36. The mean, standard deviation, minimum scores, and maximum scores for the WKOPAY? total scores and factor scores are reported in Table 4.10.

Table 4.9. Cronbach's Alpha Coefficients for SAM

Instrument	Score	Instrument Items	Alpha Coefficient
Total SAM		50	.86
SAM Factors	Environmental Sensitivity	6	.55
	Initiative	6	.44
	Self-Strength	10	.61
	Intellectuality	10	.63
	Individuality	6	.42
	Artistry	5	.53

Table 4.10. WKOPAY? Total Scores and Factor Scores

	N	Mean	Standard Deviation	Minimum	Maximum
Total WKOPAY?	114	26.25	5.36	14.00	40.00
Acceptance of Authority	114	3.26	1.65	.00	6.00
Self-Confidence	114	6.25	2.00	1.00	11.00
Inquisitiveness	114	3.09	1.70	.00	6.00
Awareness of Others	114	6.70	1.58	2.00	10.00
Disciplined Imagination	114	4.98	2.06	1.00	9.00

An analysis by Khatena and Torrance (1998) of the five factor scores of the WKOPAY? involving 645 college age adults produced the following means: (a) Acceptance of Authority (4.27), (b) Self-Confidence (7.01), (c) Inquisitiveness (3.62), (d) Awareness of Others (4.93), and (e) Disciplined Imagination (4.64). These factors were defined in Chapter III.

The current study shows the factor Acceptance of Authority with a mean of 3.26 and a range of 0 to 6. Self-Confidence had a mean of 6.25 with a range of 1 to 11. Inquisitiveness produced a mean of 3.09 and a range of 0 to 6. Awareness of Others had a mean of 6.70 and a range of 2 to 10. Disciplined Imagination had a mean of 4.98 with a range of 1 to 9. The lowest score on WKOPAY? was 14 and the highest score was 40, resulting in a range of 26.

Cronbach's alpha for the WKOPAY? total was .64, which is on the low end of acceptable levels of reliability. This is especially true if the .70 rule is used. Garson (2000) reiterates that the .70 alpha is widely accepted in the social sciences if a set of items is to be considered a scale although some use an alpha coefficient as high as .75 or .80. The determination of an acceptable level of reliability is influenced by the type of test (Gay, 1992). Measures of personality do not usually report reliabilities as high as .90 and one should be satisfied with reliability in the eighties or perhaps accept reliability in the seventies (Gay, 1992). Clark-Carter (1997) cites Pedhazur and Schmelkin (1991) as suggesting that the user of a measure needs to determine the reliability of a test depending on the particular circumstances of the study.

The closer a correlation is to 1, the better the reliability (Garson, 2000). If the alpha is .70 or below, the standard error of measurement will exceed half a standard deviation (Garson, 2000).

In any case, this figure suggests that any results derived from the WKOPAY? should be interpreted with a degree of caution. The total score of the WKOPAY? demonstrates a higher reliability than the factor scores but the alphas for the two factors with the highest number of items (Self-Confidence and Awareness of Others) have lower reliabilities than those factors with fewer items.

The factors of WKOPAY? produced these reliability coefficients: Acceptance of Authority = .52, Self-Confidence = .40, Inquisitiveness = .61, Awareness of Others = .44, and Disciplined Imagination = .60. Reliability data for WKOPAY? are presented in Table 4.11.

Table 4.11. Cronbach's Alpha Coefficients for WKOPAY?

Instrument	Score	Instrument Items	Alpha Coefficient
Total WKOPAY?		50	.64
WKOPAY? Factors	Acceptance of Authority	7	.52
	Self-Confidence	12	.40
	Inquisitiveness	6	.61
	Awareness of Others	11	.44
	Disciplined Imagination	9	.60

Research Questions

Six research questions were addressed in this study. The questions were designed to determine the relationships between creativity and self-directed learning among adult community college students and to consider possible links between these variables and selected demographic variables.

Research Question 1. Is there a significant relationship between self-directed learning readiness and creativity?

Pearson product-moment correlations were calculated to determine the relationship between the total SDLRS scores (self-directed learning readiness) and the total KTCPI standard scores (creativity). A correlation coefficient running from -1 to $+1$ indicates either a negative or positive relationship between variables. A statistically significant positive correlation ($r = .52, p < .01$) was found between the SDLRS total score and the total score of the KTCPI.

In addition, an elaboration of the Pearson r is the coefficient of determination (Anastas, 1999). Thus, determination coefficients were obtained by squaring the r value to produce an r^2 . The r^2 of .27 explained approximately 27% of the variance between the SDLRS total score and the KTCPI total score. This is a moderate relationship.

According to Anastas (1999), r values of .00-.20 and an r^2 up to .04 indicate a very weak relationship. An r of .21-.40 and an r^2 from .04 to .16 indicate a weak relationship while an r value of .41-.60 and an r^2 from .16 to .36 indicate a moderate

relationship (Anastas, 1999). Therefore, the correlation of .52 was a moderate relationship. The interpretation of Anastas is also used in other analyses below.

Statistically significant positive correlations at the .01 level were also found between the SDLRS total score and the total scores of both SAM and WKOPAY?. The SDLRS total score and the SAM total score have a correlation of .51, which indicates a moderate relationship. The SDLRS total score and the WKOPAY? total score exhibited a correlation of .34 showing a weak but statistically significant relationship. Perhaps this weak relationship is connected to the low reliability of the WKOPAY?. The WKOPAY? total score and the SAM total score had a correlation of .42, indicating a moderate relationship.

Additional statistical analysis showed a determination coefficient of .26 for the SDLRS total score and the SAM total score, indicating a moderate relationship. A determination coefficient, strictly speaking, shows how much the variance in one variable is associated with variance in the other variable (Vogt, 1993). Thus, 26% of the variability in the SDLRS total score can be explained by the variability in the SAM total score.

The WKOPAY? total score and the SAM total score have a determination coefficient of .17, also indicating a moderate relationship. Therefore, 17% of the variability in the WKOPAY? total score can be associated with the variability in the SAM total score. The SDLRS total score and the WKOPAY? total score presented a determination coefficient of .12, which indicates a weak relationship. This coefficient

of determination indicates that 12% of the variability in the SDLRS total score can be explained by the variability in the WKOPAY? total score.

Research Question 2. Is there a significant relationship between self-directed learning readiness and the 11 individual factors of the KTCPI among adult community college students?

Pearson product-moment correlations were computed to explore possible relationships between the SDLRS total score and the 11 factors of the KTCPI. The KTCPI is divided into SAM (Environmental Sensitivity, Initiative, Self-Strength, Intellectuality, Individuality, and Artistry, and WKOPAY? (Acceptance of Authority, Self-Confidence, Inquisitiveness, Awareness of Others, and Disciplined Imagination).

Positive correlations for all six of the SAM factors and the SDLRS total score were statistically significant at the .01 level. Intellectuality had the highest correlation ($r = .49$) with Self-Strength second ($r = .41$). Other correlations in descending order were Individuality ($r = .36$), Initiative ($r = .34$), Environmental Sensitivity ($r = .33$), and Artistry ($r = .27$). Correlations for the factors of Intellectuality and Self-Strength were moderate in the strength of relationship. Correlations for the factors of Individuality, Initiative, Environmental Sensitivity, and Artistry showed significant though weak relationships. The only factor of WKOPAY? with a correlation significant at the .05 level was Disciplined Imagination ($r = .21$), which was also a weak relationship. Data for these correlations are displayed in Table 4.12.

The determination coefficient of Intellectuality can be interpreted as explaining 24% of the variability within the SDLRS total score. Similarly, Self-Strength

explained 17% of the variance, and Individuality explained 13% of the variance. Each of the factors of Initiative and Environmental Sensitivity explained 11% of the variance. Additionally, Artistry explained 7% of the variance. Finally, the determination coefficient of Disciplined Imagination explained 4% of the variance.

Determination coefficients for Intellectuality ($r^2 = .24$) and Self-Strength ($r^2 = .17$) indicated moderate relationships. Determination coefficients of Individuality ($r^2 = .13$), Initiative ($r^2 = .11$), Environmental Sensitivity ($r^2 = .11$), Artistry ($r^2 = .07$), and Disciplined Imagination ($r^2 = .04$) suggested weak relationships. Data for the determination coefficients resulting from statistically significant correlations are presented in Table 4.12.

Table 4.12. Correlations and Coefficients of KTCPI Factors and SDLRS

	SDLRS		
	Pearson Correlation	Sig. (2-tailed)	Determination Coefficient
Environmental Sensitivity	.33**	.000	.11
Initiative	.34**	.000	.11
Self-Strength	.41**	.000	.17
Intellectuality	.49**	.000	.24
Individuality	.36**	.000	.13
Artistry	.27**	.003	.07
Acceptance of Authority	-.12	.188	
Self-Confidence	.08	.416	
Inquisitiveness	-.08	.404	
Awareness of Others	-.01	.958	
Disciplined Imagination	.21*	.025	.04

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

Research Question 3. Is self-directed learning readiness predictable from a particular combination of the 11 factors of the KTCPI among adult community college students?

In the stepwise model produced by multiple regression, the SDLRS total score was the dependent variable with the 11 factors of the KTCPI (SAM and WKOPAY?) serving as independent variables. SPSS allowed the testing of variables in the model for removal, with variables selected and eliminated until none remained. The ANOVA table indicated that F for the regression was statistically significant, $F(1, 112) = 35.27, p < .001$. The ANOVA table is shown in Table 4.13.

The only statistically significant variable in the stepwise regression model was Intellectuality, which is one of the factors of SAM. None of the other 10 variables (SAM and WKOPAY? factors) were included in the final model.

Table 4.13. ANOVA^b Table for the Stepwise Multiple Regression Model

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	18522.97	1	18522.97	35.27	.000 ^a
	Residual	58818.06	112	525.16		
	Total	77341.03	113			

a. Predictors: (Constant), Intellectuality

b. Dependent Variable: SDLRS Total Score

The multiple regression model summary is located in Table 4.14 and indicates an R of .49 and an R Square of .24. Garson (2000) views R square as multiple correlations indicating the percent of variance in the dependent variable explained collectively by all the independent variables. However, since there was only one predictor in this situation, r and R are equivalent. R square was more useful in explaining variance. The R square or coefficient of determination showed that 24% of the observed variability in the SDLRS total score was explained by the variable of Intellectuality. There was also an adjusted R square of .23 designed to compensate for the optimistic bias of R Square. Adjusted R square adapted to the number of independent variables in the multiple regression model and the size of the sample.

Table 4.15 presents the unstandardized coefficients, standardized coefficients, t values, and significance. *Beta* coefficients or beta weights are a ratio of predictive importance of the independent variables. Beta weights help in assessing the relative importance of the independent variables relative to the regression model (Garson, 2000). In this instance, the Beta coefficient for Intellectuality was .49.

Table 4.14. Stepwise Multiple Regression Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.49 ^a	.24	.23	22.92

a. Predictors: (Constant), Intellectuality

Table 4.15. Regression Coefficients^a of SDLRS Total Score and Intellectuality

		Unstandardized Coefficients		Stan. Coeff.	t	Sig.
Model		B	Std. Error	Beta		
1	(Constant)	191.98	5.16		37.19	.000
	Intellectuality	5.70	.96	.49	5.94	.000

^a. Dependent Variable: SDLRS Total Score

The *t* statistics indicate the importance of the variable in the regression model. SPSS (1997) suggests looking for *t* values considerably below -2 or above +2. In this model, the *t* value was (5.94, $p < .001$) so the suggested guideline was met.

In conclusion, Intellectuality, explained about 24% of self-directed learning readiness. This was the only factor to have predictive value, and it was moderate in the strength of relationship. Intellectuality consists of “Intellectual curiosity, Enjoyment of challenging tasks; Imagination; Preference for adventure over routine; Liking for reconstruction of things and ideas to form something different; and Dislike for doing things in the way others require” (Khatena & Torrance, 1998, p. 26). The factor of Intellectuality is considered further in Chapter V.

Research Question 4. Does creativity differ by gender, ethnic background, birth order, and educational level among adult community college students?

Gender

An ANOVA was also used to examine the dependent variable of creativity (KTCPI total standard score) and the independent variable of gender. Gender and

creativity exhibited significant differences, $F(1, 112) = 4.56$, $p = .035$ as shown in Table 4.16. For creativity, the mean for females was 45.87 and the mean for males was 50.02. Males scored significantly higher than females. A bar graph of the means is presented in Figure 4.1. The graph shows that the male participants have higher average levels of creativity than the female participants as measured by the KTCPI total standard score. This suggests that gender differences are present in this sample. Although the results are statistically significant there may not be a practical significance as the means are close to each other and the p value is close to .05

Only recently have social scientists postulated that the lack of female creative productivity in the past may result more from the female role than from biological differences (Dacey & Lennon, 1998). Nonetheless, creative people of either sex “are self-directed, as opposed to other-directed” (Dacey and Lennon, 1998, p. 110) as cited in research by Wink (1991) and Helson (1996) with this quality more accepted in men.

Table 4.16. Tests of Between-Subjects Effects for Creativity and Gender

Dependent Variable: Creativity					
Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	345.64 ^a	1	345.64	4.56	.035
Intercept	184537.51	1	184537.51	2436.57	.000
GENDER	345.64	1	345.64	4.56*	.035
Error	8482.49	112	75.74		
Total	258684.00	114			
Corrected Total	8828.13	113			

a. R Squared = .039 (Adjusted R Squared = .031)

* . Significant at the .05 level.

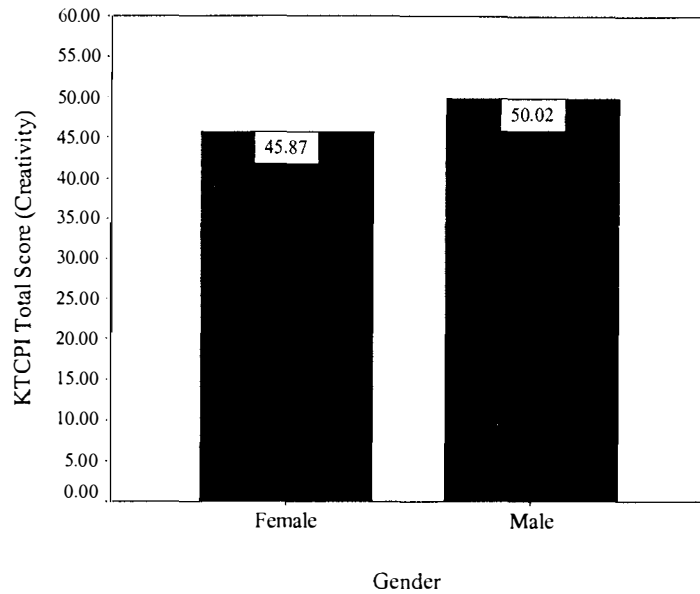


Figure 4.1. Mean KTCPI Total Score (Creativity) By Gender

Many women who want to be creative have substantial difficulty in building a life that supports their creativity and yet allows them to fulfill such roles as wife and mother (Gruber & Wallace, 1999). Some researchers propose that many women have a different perception of the creative experience, influenced by their dissimilar ways of learning and their divergent experiences from males (Reis, 1999).

Ethnic Background

There were insufficient numbers of participants to perform meaningful statistical analysis regarding ethnic background. As reported in Table 4.2, only six participants were non-Caucasian. Thus, ethnic background was excluded from the statistical analysis.

For this study, birth order was obtained by categorizing those with siblings into oldest child, middle child, or youngest child. ANOVA was used to see if creativity (KTCPI total standard score) differed for the demographic variable of birth order. The source or independent variable of birth order and the dependent variable of creativity displayed no significant differences, $F(3, 108) = .71, p = .551$ as shown in Table 4.17.

Birth position within the family provides structure to family relationships (Olszewski, Kulieke, & Buescher, 1987). Birth order is an important correlate of personality differences that may affect creative achievement (Sulloway, 1999). Birth order is a surrogate for genuine causes that are behind sibling differences in personality, which include disparities in age, power, size, and status within the family (Sulloway, 1999). The writer concludes that firstborns and laterborns are not distinct in creativity levels but are likely to solve problems with dissimilar creative methods.

Table 4.17. Tests of Between-Subjects Effects for Creativity and Birth Order

Dependent Variable: Creativity					
Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	166.99 ^a	3	55.66	.71	.551
Intercept	234891.61	1	234891.61	2976.30	.000
BIRTH ORDER	166.99	3	55.66	.71	.551
Error	8523.43	108	78.92		
Total	253754.00	112			
Corrected Total	8690.42	111			

^a. R Squared = .019 (Adjusted R Squared = -.008)

Educational Level

There were inadequate numbers to perform useful statistical analysis regarding educational level. As noted in Table 4.5, only three participants had the GED. Consequently, educational level was excluded from the statistical analysis.

Creativity (KTCPI) Factors

The KTCPI uses eleven individual factors to measure creativity. MANOVA is an expansion of ANOVA methods to multiple dependent variables, which permits a concurrent examination of two or more related variables while allowing for the correlations among the variables (Vogt, 1993). MANOVA was used to determine which of the 11 KTCPI factors exhibited significant gender differences. Additionally, Wilks' lambda is a frequently used aspect of MANOVA that varies between 0 and 1. Wilks' lambda is a multivariate F value based on a comparison of the error variance/covariance matrix and the effect variance/covariance matrix (French & Poulsen (2001). Huck, Cormier, and Wilson (1974) claim that the Wilks' lambda is the most commonly used and the oldest such procedure used with MANOVA. French and Poulsen (2001) corroborate that the Wilks' lambda is the most commonly used and reported MANOVA test statistic. Small lambda values show that group means differ (SPSS, 1997) and a smaller lambda value indicates greater differences (Garson, 2000). The F test of Wilks' lambda shows which of the variables make significant contributions (French & Poulsen, 2001). The Wilks' lambda of .70 was significant for gender, $F(11, 102) = 3.93, p < .001$, suggesting that gender differences are present.

After finding gender differences, individual ANOVAs were run for the 11 KTCPI factors to determine which of the factors were significantly different with regard to gender. The 11 factors were dependent variables, with gender as the source (independent variable). ANOVAs confirmed that significant differences were present for the KTCPI factors of Intellectuality, Individuality, Inquisitiveness, and Disciplined Imagination. Definitions for the factors are in Chapter III.

There were significant differences for the SAM factors of Intellectuality ($p = .030$) and Individuality ($p = .048$) at the .05 level of significance. There were also significant differences for the WKOPAY? factors of Inquisitiveness ($p = < .001$) and Disciplined Imagination ($p = .005$) at the .05 level of significance. Self-Confidence, a WKOPAY? factor, was almost statistically significant ($p = .052$) and, consequently will be discussed further in Chapter V. These results are shown in Table 4.18.

Table 4.18. ANOVA Testing for Gender Differences Within KTCPI Factors

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Gender	Environmental Sensitivity	.69	1	.69	.35	.554
	Initiative	1.63	1	1.63	.99	.321
	Self-Strength	1.77	1	1.77	.40	.528
	Intellectuality	23.54	1	23.54	4.82	.030*
	Individuality	7.37	1	7.37	3.99	.048*
	Artistry	.91	1	.91	.53	.466
	Acceptance of Authority	.74	1	.74	.27	.605
	Self-Confidence	15.06	1	15.06	3.85	.052
	Inquisitiveness	34.41	1	34.41	13.17	.000*
	Awareness of Others	4.26	1	4.26	1.72	.193
	Disciplined Imagination	32.29	1	32.29	8.08	.005*

*. Significant at the .05 level.

Females exhibited a mean of 4.65 and the males displayed a mean of 5.73 on Intellectuality. Males scored significantly higher than females on the factor of Intellectuality. A bar graph of the means in Figure 4.2 shows that the male participants have higher average levels of Intellectuality than the female participants as measured with the KTCPI total standard score.

Females produced a mean of 3.13 and the males possessed a mean of 3.73 on the factor of Individuality. Males scored significantly higher than females on this factor. A bar graph of the means in Figure 4.3 demonstrates that the male participants have higher average levels of Individuality than the female participants as calculated using the KTCPI total standard score.

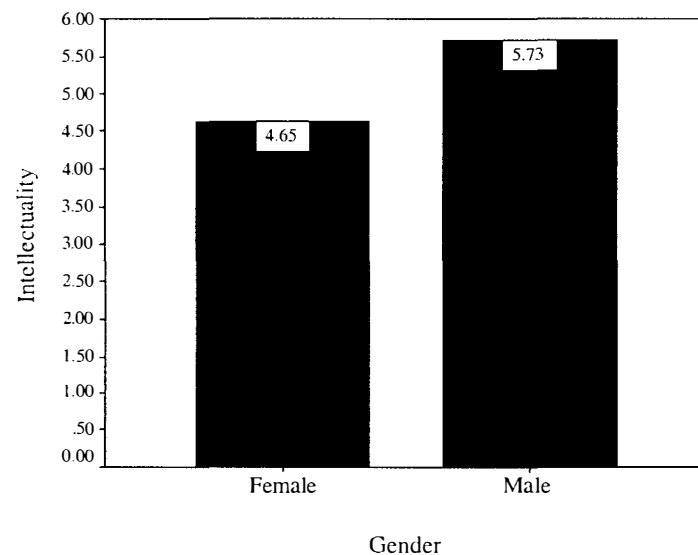


Figure 4.2. Means of Intellectuality by Gender

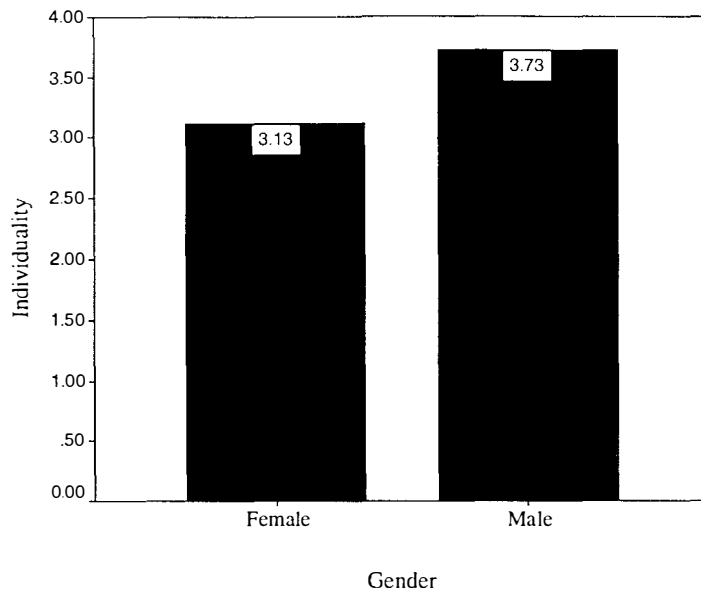


Figure 4.3. Means of Individuality by Gender

On the factor of Disciplined Imagination, females achieved a mean of 4.69 males attained a mean of 5.96. Males scored significantly higher than females on this factor. A bar graph of the means in Figure 4.4 illustrates that the male participants have higher average levels of Disciplined Imagination than the female participants as determined by the KTCPI total standard score.

On the factor of Inquisitiveness, the mean for females was 3.39 and the mean for males was 2.08. Females scored significantly higher than males on this factor. A bar graph of the means in Figure 4.5 indicates that the female participants have higher average levels of Inquisitiveness than the male participants as established by the KTCPI total standard score.

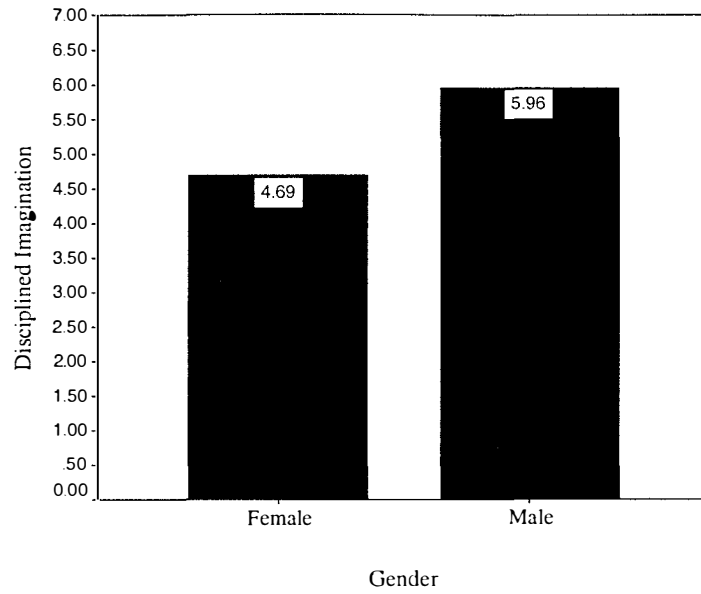


Figure 4.4. Means of Disciplined Imagination by Gender

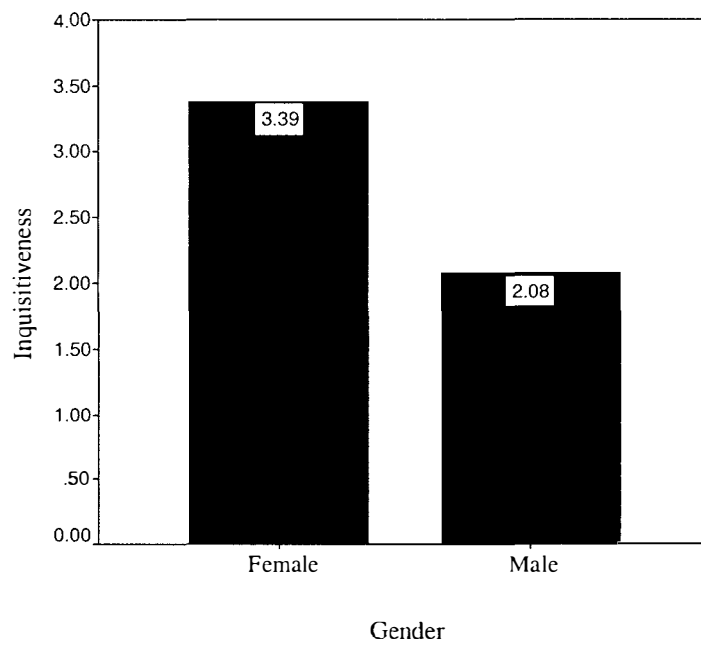


Figure 4.5. Means of Inquisitiveness by Gender

In summary, males showed higher mean levels of creativity. Males also had higher mean scores for Intellectuality, Individuality, and Disciplined Imagination. In contrast, females had higher mean scores for Inquisitiveness.

Research Question 5. Does self-directed learning readiness differ by gender, ethnic background, birth order, and educational level among adult community college students?

As previously stated, the number of participants with diverse ethnic backgrounds and educational levels was too small to complete statistical analysis. The ANOVA for gender and the dependent variable of the SDLRS total score produced no significant difference, $F(1, 112) = .149, p = .700$. Furthermore, the ANOVA for birth order and the dependent variable of the SDLRS total score resulted in no significant difference, $F(3, 108) = 1.54, p = .209$.

Research Question 6. Is age significantly related to creativity and self-directed learning readiness among adult community college students?

Pearson's product-moment correlation was used to determine if there was a significant correlation between age and creativity. There was no significant correlation between age and creativity.

Pearson's product moment correlation was also used to determine if there were correlations between the individual factors of the KTCPI and age. There was no significant correlation between age and the individual factors of the KTCPI.

In addition, Pearson's product-moment correlation was used to determine the relationship between SDLRS total scores and age. There was a statistically significant positive correlation between age and self-directed learning readiness at the .01 level ($r = .27$). This correlation suggests as age increases, self-directed learning readiness increases. The correlation indicated a weak relationship but it was statistically significant. A determination coefficient of .07 explained 7% of the variance and, therefore, indicated a weak relationship.

It is possible that a statistically significant correlation as low as .20 can be important because it may point to the need for more research (Kerlinger &, Lee 2000). Therefore, the correlation of .27 can be useful if it leads to future research. Specifically, Long and Agyekum (1983) found that increasing age was significantly related to a higher SDLRS score in a sample of 136 college students. In a study of 183 undergraduate students, older college students also scored significantly higher on the SDLRS than younger college students (McCarthy, 1985). Future research could further explore the relationships between self-directed learning readiness and age-related characteristics.

Summary

The purpose of the chapter was to analyze the data obtained from the sample of 114 adult students taking evening school classes at Walters State Community College during the spring and summer semesters of 2001. Females greatly outnumbered males,

with the typical student about 25 years old. Students generally had a Caucasian ethnic background. Nearly all of the students held a high school diploma.

A cluster sample was used to gather demographic information and data from the KTCPI and the SDLRS. This information was used to answer the six research questions that initiated the study.

Research Question 1. Is there a significant relationship between self-directed learning readiness and creativity among adult community college students? A significant moderate positive correlation was found between self-directed learning readiness and creativity. In addition, there was a significant moderate positive correlation between self-directed learning readiness and SAM. There was also a significant weak positive correlation between self-directed learning readiness and the WKOPAY? total score. A significant moderate positive correlation was found between WKOPAY? and SAM. Determination coefficients also fluctuated from moderate to weak.

Research Question 2. Is there a significant relationship between self-directed learning readiness and the 11 individual factors of the KTCPI among adult community college students? There were significant positive correlations between self-directed learning readiness and seven of the 11 individual factors of the KTCPI. Correlations varied from moderate to weak. Determination coefficients also ranged from moderate to weak.

Research Question 3. Is self-directed learning readiness predictable from a particular combination of the 11 factors of the KTCPI among adult community

college students? Intellectuality, a SAM factor, explained roughly 24% of self-directed learning readiness. The 10 other KTCPI factors were eliminated from the model and did not have predictive value.

Research Question 4. Does creativity differ by gender, ethnic background, birth order, and educational level among adult community college students?

Creativity, as measured by the KTCPI, does differ by gender but does not differ with birth order. Effects of ethnic background and educational level were not measurable due to insufficient numbers for analysis. Males had higher mean levels of creativity and, specifically, scored higher on means of Intellectuality, Disciplined Imagination, and Individuality. On the other hand, females had higher means on Inquisitiveness. In addition, the WKOPAY? factor of Self-Confidence came close to being statistically significant.

Research Question 5. Does self-directed learning readiness differ by gender, ethnic background, birth order, and educational level among adult community college students? No differences were found for gender or birth order in self-directed learning readiness. The influence of ethnic background and educational level were not measurable due to inadequate numbers for analysis.

Research Question 6. Is age significantly related to creativity and self-directed learning readiness among adult community college students? There was no statistically significant correlation between age and creativity. There was a significant, but weak correlation between age and self-directed learning readiness.

Finally, the determination coefficient determined a weak relationship between age and self-directed learning readiness.

Chapter V reviews the results presented in Chapter IV, and discusses the findings. Conclusions and recommendations for possible research in the future are presented as well as implications for research and practice.

CHAPTER V

Summary and Conclusions

Creativity is one of the more important human attributes. It is highly likely that virtually everyone has some ability to be creative and that creativity operates on a continuum with some having relatively low levels of creativity while others offer dazzling displays of creative products in art or literature, which may alter the culture they inhabit.

The role of learning undoubtedly has an important place in the development of creativity. Self-directed learning, in one form or another, places the individual learner in basic control of what they will learn and how they will learn. This does not mean that the individual does not learn in formal settings, but that the individual assumes a greater role in determining the nature of the learning situation. Self-directed learning is thought to play an especially important role in the development of creativity, especially for adults.

It has been repeatedly asserted that creativity and self-directed learning have a close relationship. The theoretical framework and literature review, presented in Chapters I and II, offer justification for making this assumption. The main purpose of this research was to explore the relationship between self-directed learning readiness and its relationship to creativity. The Self-Directed Learning Readiness Scale (SDLRS) and the Khatena Torrance Creative Perception Inventory (KTCPI) were used

to operationalize and examine this relationship using a sample of adult students in a community college. These measures had previously established relationships between self-directed learning readiness and creativity in earlier studies with public school students and graduate students. Nonetheless, these studies took place about 25 years ago and have apparently not been replicated with community college students. The earlier studies have been repeatedly cited in literature pertaining to self-directed learning and creativity. Perhaps the previous studies accurately reflect the relationships between creativity and self-directed learning readiness or possibly these studies are a relic of research in a few isolated situations, which lack a broader applicability.

The typical community college student is commonly thought to lack the learning skills of those who attend four-year colleges and institutions. The current study is based in the notion that gaining stronger self-directed learning skills and developing higher levels of creativity may be of benefit to these students. If relationships are found between self-directed learning readiness and creativity, it may be possible to offer educational programs that strengthen these attributes in a more comprehensive way.

Procedure

One hundred fourteen community college students voluntarily participated in this research. The participants were all evening school students who were taking

required courses necessary to receive an associate degree, obtain certification, or were enrolled on a non-degree basis. The participants were from four different campuses of Walters State Community College in east Tennessee. Administrators in the community college assisted in getting the cooperation of instructors and student participants.

Three instruments were used to gather data from the study participants. These were the Self-Directed Learning Readiness Scale (SDLRS), the Khatena Torrance Creative Perception Inventory (KTCPI), and a demographic questionnaire.

Participants completed the three instruments in their own time after a brief introduction to the nature and scope of the research. The next section will present a summary of findings that will include a demographic summary, summaries of the research questions, a discussion of findings, implications for practice, research recommendations, and a conclusion.

Summary of Findings

The mean age of the 114 participants was 25.5 with an approximate ratio of three females to each male. Ethnic background was mainly Caucasian with most participants an older or middle sibling. The majority of participants held a high school diploma. The following is a summary of the major findings.

Research Questions

Question 1. Is there a significant relationship between self-directed learning readiness and creativity?

A statistically significant positive relationship at the .01 level was found between the SDLRS total score (self-directed learning readiness) and the total score of the KTCPI (creativity). Additionally, statistically significant positive relationships at the .01 level were found between the SDLRS total scores and the total scores of both WKOPAY? and SAM. A statistically significant positive relationship at the .01 level also was found between the WKOPAY? total score and the total score of SAM.

The correlational relationship between the SDLRS total score and the total score of the KTCPI and the coefficient of determination showed moderate relationships. In addition, the correlation between the SDLRS and the total score of the SAM and the coefficient of determination indicated moderate relationships. However, the correlation between the SDLRS and the WKOPAY? total score and the determination coefficient produced a weak relationship.

Therefore, it can be concluded that there is a relationship between self-directed learning readiness and creativity. It is a moderate relationship but offers confirmation of the idea that these two concepts are linked. Furthermore, there is also a moderate relationship between self-directed learning readiness and SAM but only a weak relationship between self-directed learning readiness and WKOPAY?

Question 2. Is there a significant relationship between self-directed

learning readiness and the 11 individual factors of the KTCPI among adult community college students?

Statistically significant positive relationships at the .01 level were found between the SDLRS total score (self-directed learning readiness) and the six SAM factors. Intellectuality and Self-Strength demonstrated moderate relationships with self-directed learning readiness. Individuality, Initiative, Environmental Sensitivity, and Artistry had weak relationships with self-directed learning readiness. Disciplined Imagination, a WKOPAY? factor, revealed a weak relationship at the .05 level of significance.

Determination coefficients for the SAM factors of Intellectuality and Self-Strength indicated moderate relationships with the SDLRS. The SAM factors of Individuality, Initiative, Environmental Sensitivity, and Artistry indicated weak relationships with the SDLRS.

Question 3. Is self-directed learning readiness predictable from a particular combination of the 11 factors of the KTCPI among adult community college students?

The single statistically significant factor produced by the stepwise regression model was the SAM factor of Intellectuality. Intellectuality explained approximately 24% of self-directed learning readiness. It was the only factor of the KTCPI that had predictive value in the model and it was moderate in the strength of relationship.

Question 4. Does creativity differ by gender, ethnic background, birth order, and educational level among adult community college students?

An ANOVA found that gender and creativity (KTCPI total score) exhibited significant differences at the .05 level. Male participants had higher average levels of creativity when compared to the female participants.

Ethnic background was omitted from statistical analysis because of insufficient numbers. An ANOVA indicated that birth order and creativity displayed no significant differences. Educational level was eliminated from statistical analysis due to inadequate numbers.

MANOVA was used to find which of the 11 KTCPI factors exhibited significant gender differences. Gender differences were found, as suggested by Wilks' lambda. Individual ANOVAs were completed, which corroborated that significant differences were present for the SAM factors of Intellectuality and Individuality at the .05 level of significance. Significant differences were also manifested for the WKOPAY? factors of Inquisitiveness and Disciplined Imagination at the .05 level of significance.

The setting of statistical significance at a particular level such as .05 is somewhat arbitrary. For example, the WKOPAY? factor of Self-Confidence had a value of ($p = .052$), which may indicate as much practical significance as the four factors that were found to be statistically significant. However, the level of significance was set at .05 for the purposes of this study with a cutoff necessary at some specific point for research purposes.

Males had higher mean scores for the factors of Intellectuality, Individuality, and Disciplined Imagination. On the other hand, females had higher mean scores for

the factor of Inquisitiveness.

Question 5. Does self-directed learning readiness differ by gender, ethnic background, birth order, and educational level among adult community college students?

As established earlier, the number of participants with dissimilar ethnic backgrounds and educational levels was inadequate for useful statistical analysis. The ANOVA for gender and the SDLRS total score produced no significant difference. Similarly, the ANOVA for birth order and the SDLRS total score yielded no significant difference.

Question 6. Is age significantly related to creativity and self-directed learning readiness among adult community college students?

Pearson's product-moment correlation was used to determine whether there were significant correlations between age and creativity. There was no significant correlation between age and creativity.

Next, Pearson's product-moment correlation was also applied to find if there were correlations between the factors of the KTCPI and age. There was no significant correlation between age and the KTCPI factors.

Finally, Pearson's product-moment correlation was used to determine whether there were significant correlations between age and SDLRS total scores. A positive correlation statistically significant at the .01 level ($r = .27$) was found. The correlation indicated a weak relationship but suggests that as age increases, self-directed learning readiness increases. The determination coefficient explained 7% of the variance and

indicated a weak relationship.

The subsequent section is a discussion. This discussion includes sections on humanism and revisiting the research of Torrance and Mourad with subsections about creative thinking, self-directed learning, and KTCPI reliability.

Discussion

The main purpose of this research was to explore the relationship between self-directed learning readiness and creativity. The humanist philosophical position has often insisted that there is a relationship between self-directed learning and creativity.

Humanism

The present research reconfirms the findings of Torrance and Mourad (1978b) that there is a relationship between self-directed learning readiness and creativity. It also lends support to the humanistic ideas of Rogers and Maslow that there is a connection between self-directed learning and creativity. Maslow, an exemplar of humanistic psychology, is interpreted by Pearson and Podeschi (1997) as having four intertwining assumptions: the idea of an autonomous self, a capacity for growth, being responsible for what one becomes, and having an ability to shape social progress. The focus of learning from the humanistic perspective is on individual self-development, with the learner expected to take primary responsibility for learning (Merriam, 1993). Many humanists (e.g., Maslow, 1968; Rogers, 1969; Patterson, 1973) have portrayed the more creative individual as more autonomous, self-directed, and growth oriented.

These reflections seem credible but the skeptic may ask what real evidence is there for making these suppositions. There have been qualitative studies that have supported the existence of a link between creativity and self-directed learning. There is additional evidence in the formation and use of the SDLRS. The development of the SDLRS led to creativity being selected as one of the eight factors of the

measure. The SDLRS has been frequently used and has repeatedly produced relationships between self-directed learning readiness and creativity.

Revisiting the Research of Torrance and Mourad

Torrance and Mourad (1978b) offered initial support for the humanistic beliefs in a relationship between self-directedness and creativity. It is a good idea to return to their research to recollect what they explored.

Creative Thinking. The research of Torrance and Mourad (1978b) involved 41 graduate students in Torrance's class in creative thinking. The study found a significant positive correlation ($r = .38, p < .01$) between WKOPAY? total scores and SDLRS total scores. A significant positive relationship ($r = .71, p < .001$) was also established between SAM total scores and SDLRS total scores, which can be seen as a strong relationship. Consequently, Torrance and Mourad (1978b) claimed that self-directed learning readiness is associated with "skills in originality of thinking, the ability to produce analogies, motivations of creative personalities [WKOPAY?], creative experiences and achievements [SAM], and a right hemisphere style of learning and thinking" (Torrance & Mourad, 1978b, p. 1171).

The present study reported similar significant positive correlations ($r = .34, p < .01$) between WKOPAY? and the SDLRS and ($r = .51, p < .01$) between SAM and the SDLRS, which lends support to the original results of Torrance and Mourad (1978b). It must be noted that the current study dealt with community college students in a class environment of required courses, as opposed to a class of graduate students with more than a passing interest in creativity. The average age of the community college

students was 25.5 and, it is likely that the typical community college student was somewhat younger than most of the doctoral students in the graduate class. Graduate students have probably had different sorts of educational experiences from the community college students, which may have affected the results.

Perhaps the most important result of comparing the research is that current research reaffirms the idea of a connection between self-directed learning readiness and creativity. Confirmation of this connection leads one to wonder about the seemingly contradictory results of Kreber, Cranton, and Allen (2000). A group of eighty-seven undergraduate educational psychology and philosophy students did not confirm a significant relationship between creative thinking and SDLRS scores. Kreber, Cranton, and Allen expected to find strong relationships between self-directed learning readiness and creative thinking as measured by the Torrance Tests of Creative Thinking (TTCT).

However, Kreber, Cranton, and Allen (2000) suggested that the TTCT may not be measuring the type of creativity one anticipates finding in a self-directed learner. The writers see the limitations of the TTCT as being in the expression of ideas in the form of pictures and the time pressure of the tests. Kreber, Cranton, and Allen imply that the TTCT is only measuring a certain type of creativity to the neglect of other varieties of creativity. The KTCPI and the TTCT appear to be measuring different constructs of creativity. This may explain why the Torrance and Mourad (1978b) study and the current study found relationships between creativity as measured by the KTCPI and why Kreber, Cranton, and Allen did not. This should not be especially

surprising to those who are familiar with the difficulties of defining and measuring creativity. The figural form of the TTCT used by Kreber, Cranton, and Allen claims to measure the characteristics of fluency, originality, elaboration, abstractness of titles, and resistance to premature closure. On the other hand, the KTCPI attempts to measure creative personality characteristics. The relationship of self-directed learning readiness to creativity may depend to a considerable extent upon the particular measure of creativity that is used and what facets of creativity are being measured.

There have been changes in creativity research, which need to be reflected in trying to tap into creativity. Cooper (1991) thinks that creativity test makers formulate tests out of their knowledge of research combined with their interpretations or their metacognition of their inner creative processes.

It is necessary to understand that creativity means different things to different people. There is likely to be divergence in research results on different types of creativity and it is unreasonable to assume that specific conclusions apply to all types of creativity (Ochse, 1990). Therefore, the caution remains that one should be careful in assuming that creativity has the same meaning in different situations.

Self-directed learning. Over time the meaning of self-directed learning has undergone changes. For example, Tough (1971, 1979) and Knowles (1975) encouraged self-directed learning largely within the context of an orderly design of learning activities (Merriam & Brockett, 1997). Other theorists began suggesting that self-directed learning is more complex and must consider the internal state of the learner and the social context of learning (Merriam & Brockett, 1997). Merriam and

Brockett contended that knowledge of self-directed learning had undergone systematic development over the past two decades. This means that substantial changes in thinking about self-directed learning have occurred in the 25 years since the SDLRS was developed and, yet, these changes have not been replicated in the SDLRS. An establishment of all aspects of a phenomenon is a standard that is needed to firmly establish theory (Brookfield, 1992). Merriam and Brockett urged new perspectives on self-directed learning; however, the SDLRS is an old-fashioned tool that lacks these newer perspectives.

Kreber, Cranton, and Allen (2000) previously noted that self-directed learning might involve more attributes than are found within the SDLRS. The SDLRS construed creativity as including risk-taking, the ability to arrive at unusual solutions, and the ability to think of various approaches to the topic. It also included tolerance of ambiguity, a preference for open learning, and curiosity.

These ideas do not seem to convey a sense of the broad conceptualizations mentioned by Kreber, Cranton, and Allen (2000). These writers credit the SDLRS with covering many important facets of self-directed learning. Nonetheless, they advocate a broader conceptualization of self-directed learning that could better detect relationships between self-directed learning and creativity.

Guglielmino's view of self-directed learning was strongly influenced by the then fresh ideas of Tough (1971) and Knowles (1975). On the other hand, there have been numerous models and additions to self-directed learning since that time. For example, the PRO model of Brockett and Hiemstra (1991) built on a humanistic

perspective emphasizing personal responsibility. Furthermore, Cavaliere (1992) examined stages and processes of learning and Garrison (1997) integrated self-management, self-monitoring, and motivational forces from a collaborative constructivist perspective. However, Merriam and Caffarella (1999) could not find studies that had tested these models. Kreber, Cranton, and Allen (2000) distinguish three crucial issues involving empirical research on self-directed learning and its relationship to other variables: first, the kind of task underlying the completion of the instruments used in the study; second, the nature of the assessment (whether the score is a subjective self-report or perception of ability or an unbiased appraisal of ability); and third, the particular definition or construct the instrument is attempting to measure.

It is interesting to find that the more prominent instruments used to measure aspects of self-directed learning have emerged from dissertation research. Instrument developers seem to have a proprietary interest in their individual conception. Perhaps more useful measures could be formulated to re-conceptualize self-directed learning if instrument developers could co-operate in a unified effort.

Merriam and Caffarella (1999) found three basic reasons for the slow evolution of a richer self-directed learning research agenda. The authors cited: (1) a lack of dialogue and neglect of the theory and models that have been conceived, (2) inattention to the recommendations of previous researchers, and (3) excessive use of quantitative studies. Merriam and Caffarella recommend reviewing the models that have been developed to gather what is useful.

KTCPI Reliability. Morse (1994) concluded that the reliability estimates in the .90s claimed by Khatena and Torrance in 1976 were quite different from the values he found in 31 different samples of 2,503 adults. Morse said that the information presented by Khatena and Torrance (1976) concerning the KTCPI may mislead users of the instrument for three reasons: (a) the presented reliability estimate seems to be much higher, especially for the WKOPAY?, than that found in use, (b) Khatena and Torrance emphasize factor scores and do not present internal consistency reliabilities of the factor scores, (c) reliability estimates are not associated to reliability of group means which may be useful in studies involving enhancement of creative potential or creative production where group results are investigated, even though this complaint is not peculiar to the KTCPI. Reliabilities for individuals tended to be lower for total scores and markedly lower for factor scores (Morse, 1994). The judgment of Morse that WKOPAY? reliability scores may be lower than suggested by Khatena and Torrance is supported by findings of the current study.

Additionally, one needs to remember that the SAM factor of Intellectuality explained about 24% of self-directed learning readiness in the regression model. Intellectuality properly included analysis, connecting complexity, and challenge but the factor incorrectly included items involving, feelings, guessing, imagination, nonconformity and risk taking (Cooper, 1991). Therefore, it seems that one must pay close attention to factor items. In conclusion, it appears that one should be wary in using and interpreting factor scores of either measure of the KTCPI, especially the WKOPAY?.

Implications for Practice

Creativity may allow people to become more self-directed in their learning or higher levels of self-directed learning may foster creativity. Another possibility is that creativity and self-directed learning are each associated with another trait or combination of traits. For instance, the trait of autonomy may allow individuals to increase creativity and self-directed learning.

Nonetheless, it has been repeatedly asserted in numerous studies of creativity that those who are more creative tend to have higher levels of knowledge about the areas in which they are creative. It seems that the previous research and conjecture that self-directed learning and creativity are related is strengthened by the findings of this study.

Ochse (1990) remarks that the more creative person focuses on the subject that interests them and engages in self-instruction. They value teachers who let them follow interests and let them work autonomously (Ochse, 1990). Ochse also notes that the more creative tend to reject external regulation and are likely to prefer “self-directed intellectual activity” (p. 167). “To be creative, a person must first understand the domain” (Csikszentmihalyi, 1996, p. 340). Creativity, from this perspective, may be increased with adequate learning, which allows an increased understanding of a particular domain with a heightened potentiality of making creative changes in the domain. Csikszentmihalyi claims that there is no single way to learn about a domain but the creative person is very aware of cultural traditions. Thus, becoming familiar

with cultural tradition requires a way of learning about the conventions of a specific system. Acquiring knowledge about a domain or culture demands that one learn about a domain in some way.

There is a considerable amount of research pertaining to the importance of self-directed learning in the community college. For instance, those community college students who have higher levels of self-directed learning skills have superior achievement and tend to remain in school (Long & Walsh, 1993). The writers also remarked that self-directed learning skills might not be easy to achieve.

Closson (1996) cites Pratt (1988) that often “adults would prefer to be *taught*, not *facilitated*” (p.9). According to Closson, Pratt sees three variables controlling learner self-directedness and facilitation: situation, learner, and teacher. There is no evidence that adults become self-directed because they reach a certain age (Closson, 1996). In spite of this possible learner hesitance, Long and Walsh (1993) advocate a strong effort to develop self-directed learning skills in core courses and general education courses within the community college. Experimental programs, especially designed to develop self-directed learning attitudes and skills should be encouraged, with faculty using self-directed learning techniques (Long & Walsh, 1993).

Unfortunately, there is still an overemphasis in the community college class on lecture and teacher-directed methods. An awareness of self-directed learning may mean that more learner involvement can result in more effective learning (Adkins, 1996).

McConnell (2000), after reviewing studies from 1982 to 1999 of first-

generation college students, finds that colleges, particularly community colleges, need to focus on developing learning communities. If better methods can be used to strengthen learning in the classroom, students may need less time to master coursework, which could make it easier for them to learn. It seems that self-directed learning skills are very useful to the community college student.

There are relationships between creativity and self-directed learning readiness. However, one does not have to assume that creativity fosters self-directed learning or vice versa in order to promote each. Each within itself is worthy of attention at the community college level because both are useful. Creativity and self-directed learning can be valuable tools to improve the learning of the community college student.

The development of creativity and self-directed learning are both valuable skills that could be of use to the community college student and the facilitators of their learning. There are two recommendations, which could lead to improved levels of self-directed learning and creativity.

Recommendation #1. Levels of creativity and self-directed learning should be assessed in the community college.

Recent research has emphasized a broader view of creativity, which implies a combination of personal, social, cognitive, and environmental factors (Houtz & Krug, 1995). Houtz and Krug suggest a menu of assessment instruments to measure creativity which could include: (a) standardized cognitive measures such as the Torrance tests; (b) an interest inventory or self-report assessment of personality characteristics or creative activities; (c) instruments that use other sensory modalities

of thinking and responding, such as Khatena and Torrance's *Sounds and Images* or *Onomatopoeia and Images*; (d) a teacher, parent, or peer assessment of an individual's creative habits or accomplishments; (e) independent experts' judgments of actual creative accomplishments.

The information gathered from assessments of creativity could be used to determine if creativity levels are thought to be adequate to deal with the learning demands of the community college. If creativity skills can be learned, then those with an apparent lack of skills could be offered programs to help develop their creativity. Those with higher levels of creativity could be offered programs that encourage more complete expression of their creativity.

Newer measures of creativity can be more sensitive to the complexity of creativity and more responsive to the possibility that there are many different types of creativity, which a single measure of creativity has difficulty in capturing. Recent theory on intelligence, motivation, personality, and learning styles shows that individuals have a broad scope of abilities and attitudes (Plucker & Runco, 1999). This variety appears to be an important element of creativity. Perhaps newer measures of creativity will offer a more individualized profile. There may also be more of a subjective picture that moves beyond a purely quantitative result.

The SDLRS can be useful to measure learning readiness. Other instruments such as the Oddi Continuing Learning Inventory (1986) or the Self-Directed Learning Perception Scale (Pilling-Cormick, 1996) may also be useful in certain circumstances. It is also possible that newer instruments will more accurately reflect changes in the

conceptualization of self-directed leaning that have occurred since the development of the SDLRS.

Data from the SDLRS or similar measures of self-directed learning could be used to determine if students with low readiness for self-directed learning should become involved in programs to increase self-directed learning skills. Those with adequate skills should be encouraged to continue developing their self-directed learning skills and to become more independent.

The community college can help individual learners to become more self-directed in their learning regardless of the current status of this ability. The learner recognizes that learning can continue although a particular learning experience may end.

If it proves to be impossible to assess creativity and self-directed learning on a formal basis, it may behoove instructors to attempt more informal assessments as determined by class performance. Instructors may observe the ability of students on independent assignments or make a mental note of novel ideas and creative products. It might be possible to involve these students in group learning to help other students further develop the creative and self-directed learning abilities that they have.

Recommendation #2. The development of creativity and self-directed learning skills should be part of the community college learning experience.

There have been several learning programs developed to encourage creativity and self-directed learning, especially in working with gifted primary and secondary students. However, there has been little attention at the community college level to a

union of these concepts. It seems that, in general, there is a considerable concern for fostering creativity in the young but somehow it becomes less important for the post-high school student. There has also been an emphasis on the gifted when self-directed learning and creativity may be even more necessary for others.

Perhaps some of the ideas of advocates of the gifted student could be modified to fit the needs of adult students within the community college setting. For example, Betts and Neihart (1986) developed the sequential Autonomous Learner Model to encourage the development of skills for individualized learning, training in feeling and thinking, and allowing for individual interests and learning styles. In the model, there are guidelines for the development of lifelong, self-directed learning and the use of analytic, creative, and evaluative thinking. Additionally, the learner is included in decision-making processes while the instructor becomes more of a facilitator of learning.

Another model is based on Grow's model of staged self-directed learning at Broome Community College in New York. This model has four sequential stages of learner ability: (a) dependent; (b) interested; (c) involved; and (d) self-directed (Beston, Fellows, & Culver, 2001). The model is being successfully used in developing the self-directed learning skills of engineering students as they create computer and graphic designs.

Stuart (1990) investigated the teacher's phenomenological experience of becoming a person in the classroom and identified the need for teacher training programs intended to stress self-knowledge as a reference point for facilitating

effective learning in the classroom. Educational policies need restructuring for learners to move from conformity to autonomy and from role-directed learning to self-directed learning.

In an example of connecting creativity to self-directed learning, Karsten (1999) designed a holistic, arts-based approach to facilitate a college computer applications course. Drama games, storytelling, collaboration, creative problem-solving tasks, log keeping, team-projects, and individual self-directed projects were among the methods used in a constructivist learning environment. Learners reflected on their goals and enhanced their creativity.

Renzulli and Reis (2001) propose an Enrichment Triad Model to promote creativity. This model operates on four principles: (a) Each learner is unique, and thus, learning experiences need to consider the abilities, interests, creative potential, and learning styles of the learner; (b) learning should involve enjoyment; (c) learning is more meaningful when content (knowledge); and (d) process (thinking skills and methods of inquiry) are learned within the context of a learner-selected problem. The model's goal is to supplant dependent learning with independent learning, provide opportunity for creativity, and allow the pursuit of individual interests (Renzulli and Reis).

These models and studies indicate that creativity and self-directed learning can be used in the community college to reinforce each other. Nonetheless, additional research is needed to examine more closely the relationships between self-directed learning and creativity.

There are many issues involving creativity but one of the more important that may affect the community college is the supporting of creativity within women. The overwhelming majority of students surveyed for this study were women with lower levels of creativity as measured by the KTCPI. The community college could be at the forefront of efforts to shape individual self-confidence by teaching acceptance of individual success.

Women, in particular, should be encouraged to interact with creative role models of both genders, creativity should be bolstered by activities designed to encourage different types of creativity, and efforts at eliminating gender stereotypes about creativity need to be established (Schwartz, 2001). The author also advocates a reduction in conformity and reducing resistance to creativity on the part of women, which may involve more assertiveness and an increased willingness to explore a wider range of interests.

Women inventors prefer to be self-directed in their learning and also like to work in cooperative environments (McCracken, 1998). This less structured environment permits flexibility for working alone or in collaboration with others. *The Incubation Model of Teaching* of Torrance and Safter (1990) is advocated as a non gender-biased curriculum for encouraging creativity in both sexes. Piirto (2000) thinks that the more creative males and females are very similar in their personality, except for a reduced commitment and intensity to creativity on the part of females with educators needing to concentrate on developing intensity and commitment from both sexes.

Educational intervention for females that is compatible with cognitive development and learning styles may consist of independent projects, small group learning, and the use of assessments other than tests (Reis, 2001). Reis also supports development of independence and intellectual risk taking in addition to reducing sex-role stereotyping and increasing awareness cultural traditions that may be restrictive. It seems that the development of self-directed learning skills could allow women and men to become more independent, successful in group projects, and simultaneously more creative.

Research Recommendations

The next section has specific research recommendations. These are areas that may offer additional insight into creativity and self-directed learning.

1. Creativity has been measured using the KTCPI and the TTCT with contradictory results. There could be additional study with these measures or other measures of creativity to see if the conflicting results occur with different samples. Newer measures of creativity could be used with the SDLRS and other measures of self-directed learning to determine relationships.

2. Models of self-directed learning that have not been fully implemented need to be explored for usefulness. The models of Candy (1991), Brockett and Hiemstra (1991), and Garrison (1997) should be investigated further. Brockett (2000) recommends considering the development of new measures that convey changes in

self-directed learning theory.

3. The WKOPAY? was developed in 1963 and SAM was developed in 1970.

Newer measures or tests of creativity need to be developed that are more comprehensive than most of the older measures. This could include batteries of tests, which may offer a more comprehensive and discerning picture of creativity.

4. It may also be possible to compare the creative processes of the more eminent creators with the everyday creator to find similarities and differences in quantitative and qualitative studies. It would be valuable to combine quantitative measures and qualitative techniques to determine if results have some similarity with the same sample of individuals.

5. There may also be other ways of measuring or assessing creative processes, such as the consensual assessment techniques of Amabile (1996), which focus on a determination by experts about the creativity of products. However, Gardner (1993) notes that awareness that one will be judged on a criterion for creativity may reduce the scope of what one produces which can lead to conventional products. The author also suggested that the absence of evaluation seems to liberate creativity.

6. The use of qualitative methods as promoted by Gardner (1993) and Csikszentmihalyi (1996) has been used with eminent creators. However, it seems that some of their techniques could also be employed with everyday forms of creativity. For instance, Gardner (1993) had organizing themes of relations between the child and adult creator, relations between the creator and others, and relations between the creator and creative work. A developmental life-course perspective was used with

interactions observed on an individual (cognitive, personality, motivation, social-psychological, and life patterns), domain (symbol systems, activities, and paradigms) and field (relation to others, political factors, and hierarchy) level. Csikszentmihalyi (1996) also used a systems format with videotaped interviews to discover the nature of creative people, how the creative process works, and what conditions encourage or limit the creative process.

7. Age, gender, ethnic, and learning factors of creativity should be examined in more detail. Simonton (1990) depicts creativity driven by an organization of self over the lifespan, which involves a gradual transformation in cognitive structure from disorganized intuitive mode to a more efficient analytical mode. These transformations may be thought of as age-related exchanges of creativity for wisdom and may parallel age distributions of fluid and crystallized intelligence (Simonton, 1990). Kastenbaum (2001) reports that those who are creative when they were young are more likely to remain creative and that a renaissance of creativity may occur later in life as the perspectives and challenges of aging stimulate creative activities. Future research should examine the ways in which wisdom and creativity become more closely integrated during the aging process. If creativity takes on new forms in later life, then new ways of measuring the changes need to be formulated.

There is a lack of understanding of creativity in women and minorities while theories on creativity have been theories about male creativity (Reis, 2001). Reis contends that women are not less creative than men but that female creativity may be expressed in different ways and that new perspectives need to be developed to

properly evaluate female creativity.

Weisberg (1999) points out that we do not know what the relationship is between knowledge in particular fields and creativity. The writer suggests that formal education and knowledge can be independent of each other and may not be directly related. This indicates that additional research is needed to gather more information about this issue.

8. This study found relationships between creativity and self-directed learning readiness but it seems possible that experimental study could probe further into the causal relationships of self-directed learning and creativity. The users of experimental methods have concentrated on the cognitive processes in solving creativity problems (Mayer, 1999). Experimental methods permit enough control to permit valid inferences about causality although the results may lack external validity that can be generalized to real creative thinking (Mayer, 1999). Experimental creativity research has covered a decent range of components but certainly much more needs to be done (Runco & Sakamoto, 1999).

9. Those apparently related areas within psychology such as self-control, self-determination, self-efficacy, and self-regulated learning may need to be examined more closely for ideas possibly relevant to creativity and self-directed learning. For example, Dacey and Lennon (1998) present a model of self-control involving biological, psychological, and social components, which provides an individual with disciplinary and analytical tools that contribute to the creative process

Conclusion

Connections between self-directed learning and creativity have been reconfirmed in this study. “Creative activity could be described as a type of learning process where the teacher and pupil are located in the same individual” (Koestler, 1964). This insightful observation was made by a novelist and essayist, neither an educator nor psychologist, and yet affirms the importance of the connection between self-directed learning and creativity. The statement reiterates the importance of learning to the creative person.

From this perspective, learning is connected to the ability to create. The statement also indicates that the learner is doing self-directed learning. In this view, the creative person is involved in a dual role of deciding what is to be learned and how it is to be learned. There is a sense of control over self, which the more creative person tends to possess to a greater degree. This is a desire to have control over one’s own creative ability and to be able to express one’s own ideas in a creative way. A creative person is more likely to want to shape their own learning because this sort of control gives them a greater degree of freedom to create what they choose.

Progress has occurred in research examining self-directed learning and creativity. The area of creativity is sometimes seen as neglected by the larger field of psychology. However, there have been some steps forward although many questions remain unanswered. The study of creativity has seen a new impetus with the systems approach emphasized by Gardner (1993) and Csikszentmihalyi (1996) and is expected

to continue a synthesis of the many different concepts of creativity.

In contrast, self-directed learning, however conceived, once held a more prominent place within adult education. The most popular measure of self-directed learning readiness is 25 years old and is based upon ideas that are even older. The more recent models developed in the 1990s have not been completely researched or thoroughly fleshed out. There have been recent efforts to categorize earlier research but the future of self-directed learning as a research interest is uncertain. Perhaps more vigorous quantitative methods and an infusion of qualitative techniques can rejuvenate self-directed learning as a research topic.

Conceivably the early explorers of self-directed learning were mistaken in placing self-directed learning in an important position or, as may be more likely, those who have an interest in self-directed learning have allowed the research area to become stagnant because of too many trips to the SDLRS well and a decline in applying more creative approaches. Csikszentmihalyi (1996) claims that creativity within a field can be enhanced if the field is more sensitive and supportive of new ideas. If this advice is sound, new ideas about self-directed learning need to be developed and more completely articulated for self-directed learning as an area of study to flourish. Interest in self-directed learning is still alive but more influential issues such as feminism and critical theory, which seem to be more contemporary and vital within adult education, have overwhelmed its place.

In closing, the creative self and the learning self are intertwined. This interconnection may lead to greater creativity and better learning if allowed to develop

more fully or may be neglected and begin to wither. Both creativity and self-directed learning are important research topics and, hopefully, the relationship between the two will be imaginatively pursued in the future.

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APPENDICES

Appendix A

Self-Directed Learning Readiness Scale (SDLRS)

Name _____ Sex _____ Birthdate _____
 Date of Testing _____ Location of Testing _____

QUESTIONNAIRE

INSTRUCTIONS: This is a questionnaire designed to gather data on learning preferences and attitudes towards learning. After reading each item, please indicate the degree to which you feel that statement is true of you. Please read each choice carefully and circle the number of the response which best expresses your feeling.

There is no time limit for the questionnaire. Try not to spend too much time on any one item, however. Your first reaction to the question will usually be the most accurate.

RESPONSES

ITEMS:

	<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>
1. I'm looking forward to learning as long as I'm living.	1	2	3	4	5
2. I know what I want to learn.	1	2	3	4	5
3. When I see something that I don't understand, I stay away from it.	1	2	3	4	5
4. If there is something I want to learn, I can figure out a way to learn it.	1	2	3	4	5
5. I love to learn.	1	2	3	4	5
6. It takes me a while to get started on new projects.	1	2	3	4	5
7. In a classroom, I expect the teacher to tell all class members exactly what to do at all times.	1	2	3	4	5
8. I believe that thinking about who you are, where you are, and where you are going should be a major part of every person's education.	1	2	3	4	5
9. I don't work very well on my own.	1	2	3	4	5

	<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

	<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>
25. I can think of many different ways to learn about a new topic.	1	2	3	4	5
26. I try to relate what I am learning to my long-term goals.	1	2	3	4	5
27. I am capable of learning for myself almost anything I might need to know.	1	2	3	4	5
28. I really enjoy tracking down the answer to a question.	1	2	3	4	5
29. I don't like dealing with questions where there is not one right answer.	1	2	3	4	5
30. I have a lot of curiosity about things.	1	2	3	4	5
31. I'll be glad when I'm finished learning.	1	2	3	4	5
32. I'm not as interested in learning as some other people seem to be.	1	2	3	4	5
33. I don't have any problem with basic study skills.	1	2	3	4	5
34. I like to try new things, even if I'm not sure how they will turn out.	1	2	3	4	5
35. I don't like it when people who really know what they're doing point out mistakes that I am making.	1	2	3	4	5
36. I'm good at thinking of unusual ways to do things.	1	2	3	4	5
37. I like to think about the future.	1	2	3	4	5
38. I'm better than most people are at trying to find out the things I need to know.	1	2	3	4	5
39. I think of problems as challenges, not stopsigns.	1	2	3	4	5
40. I can make myself do what I think I should.	1	2	3	4	5

	<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>
41. I'm happy with the way I investigate problems.	1	2	3	4	5
42. I become a leader in group learning situations.	1	2	3	4	5
43. I enjoy discussing ideas.	1	2	3	4	5
44. I don't like challenging learning situations.	1	2	3	4	5
45. I have a strong desire to learn new things.	1	2	3	4	5
46. The more I learn, the more exciting the world becomes.	1	2	3	4	5
47. Learning is fun.	1	2	3	4	5
48. It's better to stick with the learning methods that we know will work instead of always trying new ones.	1	2	3	4	5
49. I want to learn more so that I can keep growing as a person.	1	2	3	4	5
50. I am responsible for my learning — no one else is.	1	2	3	4	5
51. Learning how to learn is important to me.	1	2	3	4	5
52. I will never be too old to learn new things.	1	2	3	4	5
53. Constant learning is a bore.	1	2	3	4	5
54. Learning is a tool for life.	1	2	3	4	5
55. I learn several new things on my own each year.	1	2	3	4	5
56. Learning doesn't make any difference in my life.	1	2	3	4	5
57. I am an effective learner in the classroom and on my own.	1	2	3	4	5
58. Learners are leaders.	1	2	3	4	5

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Appendix B

Demographic Questionnaire

DEMOGRAPHIC QUESTIONNAIRE

INSTRUCTIONS: Please answer these questions. 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 gender?
☐ Female
☐ Male
3. What is your ethnic background?
☐ Caucasian
☐ African American
☐ American Indian or Alaskan Native
☐ Asian or Pacific Islander
☐ Hispanic
☐ Other (specify) _____
4. How many brothers or sisters are older than you? _____
5. How many brothers or sisters are younger than you? _____
6. Are you a twin? _____
7. What is your current educational level?
☐ High school diploma
☐ GED
☐ Other (specify) _____

Appendix C

Information Letter

INFORMATION LETTER

2001

Dear Student,

You have been selected to participate in a research study on adult learning. Your involvement will include the completion of three instruments: the Khatena Torrance Creative Perception Inventory, the Self-Directed Learning Readiness Scale, and a Demographic Information Questionnaire. Please follow instructions carefully on these instruments and mark the answers according to how you feel they apply to you now. Please do not place your name or any other identifying information on the instruments. The amount of your time required for the entire study will be approximately 45-60 minutes.

There is no known risk to you in completing these instruments because your responses will be used only for research purposes. All information will be numbered and kept strictly confidential. Possible benefits include awareness of your own creativity and levels of self-directed learning readiness. The information gathered from your research participation will contribute to improving the body of knowledge of adult learning and contribute to partial fulfillment of my doctoral dissertation requirements at the University of Tennessee.

Information derived from the study will be kept confidential. Data will be available only to me and a statistical consultant. Data will be stored in a locked file cabinet. No reference will be made in oral or written reports, which could link individual participants to the study. Only grouped data will be reported.

If you have questions at any time about the study or the procedures, you may contact me, [Barry F. Cox], at [5921 Clearbrook Drive, Knoxville, TN 37918], or [Home Phone Number (865) 688-5227] or through E-mail at [barryl@utkux.utcc.utk.edu]. You may also contact my faculty advisor, Dr. Ralph Brockett, at (865) 974-2227. If you have questions about your rights as a participant, contact the Compliance Section of the University of Tennessee at (865) 974-3466.

Your participation in this study is voluntary and you may decline to participate without penalty. You may also withdraw from the study at anytime without penalty. If you withdraw from the study before data collection is completed your data will be returned to you or destroyed. Return of the three completed instruments constitutes your consent to participate in the research study. I would like to thank you for your participation in this study.

Sincerely,

Barry F. Cox
5921 Clearbrook Drive
Knoxville, TN 37918

VITA

I received a Bachelor of Arts degree in history in 1969 and a Master of Arts degree in history in 1972 from The University of Tennessee. I returned to school in the mid-1970s to obtain teacher certification and was then employed in several different public schools in Tennessee for a period of 18 years during which time I earned a Master of Science in special education at The University of Tennessee. I reentered The University of Tennessee in 1996 to begin work on a doctorate in adult education. I have found life to be full of unexpected twists and turns, which have sometimes been enjoyable and, at other times, painful. I have followed Yogi Berra's advice and taken the fork in the road, not always because I wanted to, but because I occasionally had no other viable choice. I find myself at another fork in the road, which must be followed.