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I am submitting herewith a dissertation written by Susan L. Stockdale entitled "Development of an Instrument to Measure Self-Directedness." 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.

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DEVELOPMENT OF AN INSTRUMENT TO MEASURE SELF-DIRECTEDNESS

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

Susan L. Stockdale
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DEDICATION

I would like to dedicate this dissertation to Christa, Chaz, Lauren, and David.
You are very, very special just the way you are.

ACKNOWLEDGMENTS

I would like to sincerely thank each of my committee members. Ralph Brockett and I have taken a wonderful four-year journey guided by a PRO. Bob Williams has modeled a standard of excellence I will attempt to emulate throughout my professional career. John Lounsbury supported my psychometric analyses with humor and scholarship. Loida Velaquez has simply supported "me." I thank you all.

I would also like to thank my mother, father, brother, and sister for their support and faith. Finally, H.O.B., your patience and consideration have made this possible.

ABSTRACT

The purpose of this study was to develop a reliable and valid instrument to measure self-directedness in learning within the framework of the teaching-learning (TL) and learner characteristics (LC) components of the Personal Responsibility Orientation (PRO) Model of Self-Direction (Brockett & Hiemstra, 1991) among college students. Accomplishing this purpose involved two stages: (a) the identification and operationization of reliable scale items that validly reflected the two components of the PRO model, and (b) the validation of the developed scale items with other related measures of self-direction.

The resultant 35-item Personal Responsibility Orientation to Self-Direction in Learning Scale (PRO-SDLS) was a highly reliable (coefficient alpha = .92) instrument in the selected sample ($N = 219$) of graduate and undergraduate education students. Both TL and LC items were highly correlated with the scale total. The scores from the PRO-SDLS were significantly related to criterion variables thought to demonstrate self-direction. However, PRO-SDLS scores were not significantly related to professor-ratings of students' self-direction. Additionally, scores from the PRO-SDLS were significantly related ($r = .76, p < .01$) to a known instrument of self-direction (SDLRS) and accounted for additional variance beyond the SDLRS in predicting age, GPA, and class performance. Experts who examined the content of items on the PRO-SDLS rated 31 out of the 35 items appearing on the final version of the PRO-SDLS as representative of the PRO model.

Recommendations for further research in the on-going process of scale validation are provided as well as strategies to promote self-direction. These latter strategies include (a) allowing learner control over the TL process, (b) modeling effective learning strategies, and (c) using encouragement to support a student's proximal goals.

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CHAPTER I

INTRODUCTION TO THE STUDY

In the field of adult education, self-direction has long been recognized as an important component in adults' learning activities. However, almost without exception, the same adult educators who cite the centrality of this concept to adult learning suggest that confusion and controversy exist with the nature and application of the concept. Indeed, it has been suggested that self-directed learning maintains "an almost cult-like quality" (Caffarella, 1993, p. 25) without a clearly defined research agenda. In an attempt to more clearly conceptualize and define self-direction, various authors (such as Brockett & Hiemstra, 1991; Caffarella, 1993; Garrison, 1997; Long, 1998; Merriam & Caffarella, 1999) reviewed and categorized the large number of publications dealing with this concept. Consistent across these sources are separate conceptualizations of self-direction as a process of learning in which people take the primary responsibility or initiative in the learning experience, and self-direction as a personal attribute of the learner.

However, when Brockett and Hiemstra (1991) proposed the Personal Responsibility Orientation (PRO) Model of Self-Direction in Learning they conceptualized these views as complementary and related. Within their model, self-direction in learning is viewed both as "instructional method processes (self-directed learning) and personality characteristics of the individual learner (learner self-direction)" (p. 26). Both components, operating within the learner's social

environment, contribute to the outcome of self-direction in learning. To date, no studies have been conducted to test Brockett and Hiemstra's conceptualization. Albeit, limited reviews of the model, while generally supportive, do question the model's extensive focus on the individual (Flannery, 1993) and the incomplete development of cognitive and metacognitive issues related to self-directed learning (Garrison, 1997).

Statement of the Problem

Merriam and Caffarella (1999) suggest that one reason for the slow development of a rich research agenda in self-directed learning is the lack of data-based studies and critical discussion about recently developed conceptual models of self-directed learning. Compounding this lack of empirical confirmation about recent conceptual models (such as the PRO model) is the reliance of most quantitative investigators upon an unrevised instrument developed in 1977: L. M. Guglielmino's (1977) Self-Directed Learning Readiness Scale (SDLRS). A debate beginning in the 1980s (e.g., Bonham, 1991; Brockett, 1985a; Field, 1989) centering on the validity of this scale remains largely unresolved today. The problem to be addressed in this study, therefore, is the need to empirically validate new ways of studying self-direction that are informed by more recent conceptualizations of self-direction, such as the PRO Model of Self-Direction in Learning (Brockett & Hiemstra, 1991).

Purpose

The purpose of this study is to develop a reliable and valid instrument to measure self-directedness in learning within the framework of the process and learner characteristics components of the Personal Responsibility Orientation (PRO) Model of Self-Direction in Learning (Brockett & Hiemstra, 1991) among college students. Accomplishing this purpose involves two stages: (a) the identification and operationization of scale items that conceptually reflect the process and learner components of the PRO Model of Self-Direction in Learning as described by Brockett and Hiemstra, and (b) the validation of the developed scale items with other related measures of self-direction.

Research Objectives

There are six research objectives addressed by this study:

1. A reliable measure of self-directedness will be developed. For purposes of this study, the new scale will subsequently be identified as the Personal Responsibility Orientation to Self-Direction in Learning Scale (PRO-SDLS). It is expected that this scale will comprise one factor and will achieve an internal consistency of at least .80, using Cronbach's alpha.
2. Content validation will be established using a panel of experts with positive agreement and high inter-rater reliability as to the representativeness of item samples, appropriateness of item content, and appropriateness of item format.

3. To explore the congruent validity of the measure of self-directedness, the relationship between scores from the Self-Directed Learning Readiness Scale (SDLRS; L. M. Guglielmino, 1977) the PRO-SDLS will be examined. The PRO-SDLS total scores are expected to produce moderately significant congruent validity coefficients with scores from the SDLRS, an established measure of self-directedness.
4. Construct validity will be informed by examining the relationship between scores on self-directedness and logically related concurrent behavioral criteria, including optional web-site use of supplementary materials, age, gender, GPA, course performance, and educational attainment.
5. Convergent validity will be evaluated by examining the relationship between scores on self-directedness and ratings by professors on the self-directedness of their students who have completed the scale.
6. Incremental validity statistics will demonstrate that the new scale scores (PRO-SDLS) add significant unique variance to the prediction of self-direction above and beyond scores from the SDLRS.

Theoretical Background

This section first presents, chronologically, the progression of the general theoretical background of self-direction in learning. Specifically, early perspectives of this construct revolved around the seminal works of Knowles (1975) and

Tough (1971/1979). However, beginning in the 1980s, self-direction in learning also was conceptualized to include cognitive, attributional, and constructivist frameworks. These will be reviewed in the analysis that follows. The final portion of this section is a description of the PRO Model of Self-Direction in Learning (Brockett & Hiemstra, 1991) highlighting the theoretical influences Brockett and Hiemstra cite as critical to their model's development.

Early Perspectives

The process orientation of self-directed learning in which the learner plans or initiates the learning process was the conceptual framework of the early literature on self-direction (Knowles, 1975; Tough, 1971/1979). Even today, a recent citation analysis (Donaghy, Robinson, Wallace, Walker, & Brockett, 2002) revealed these two authors remain ranked in the top three of most frequently cited authors in adult education literature on this topic. Both authors adopt a behaviorist perspective when they address issues of planning, diagnosing, formulating goals, and evaluating learner outcomes. However, beginning in the 1980s this behaviorist conceptualization of self-directed learning expanded to become more inclusive of other perspectives.

A Cognitive Framework

Kasworm (1982) suggested that research in self-directed learning needs to be considered through a cognitive developmental lens. She further stated that current theoretical discussions do not include the "complexity and independence of cognitive

and personality correlates" (p. 31). Her three-tiered developmental model includes levels of behaviors, levels of cognitive complexity, and levels of affective/value orientations.

An Attributional Framework

In 1985, Fellenz stated that two approaches can be taken in analyzing self-direction; "the concept can be examined either as a role adopted during the process of learning or as a psychological state attained by an individual" (p. 164). When discussing the later method, he postulates that such factors as autonomy, inner-directedness, locus-of-control, and field dependence may influence the outcome of self-directed learning.

Long (1990) also insists the critical and often overlooked component in self-directed learning is the psychological variable of active control over the learning process. Drawing on Kasworm's (1982) writings describing a "learner . . . consciously accepting the responsibility" (as cited in Long, p. 334) and a definition of the psychological dimension of control Long, terms proficiency, "therefore covers not only the learning skills and ability, but motivation and confidence to persist and succeed" (p. 334).

A Constructivist Framework

Candy (1991) in a text published the same year as Brockett and Hiemstra (1991) presented the PRO model, placed self-direction within a framework of four

distinct yet related dimensions: a personal attribute, a self-management skill, a manner of organizing learning in a formal setting, and a manner of pursuing learning in non-institutional, natural settings. A constructivist view of knowledge–the view that learners use their personal representations "to fit rather than match this external world" (p. 278), Candy argues, "is particularly compatible with the notion of self-direction, since it emphasizes the combined characteristics of active inquiry, independence, and individuality in a learning task" (p. 278).

The PRO Model of Self-Direction

The Personal Responsibility Orientation (PRO) Model of Self-Direction in Learning (Brockett & Hiemstra, 1991) is an umbrella concept that provides a definitional foundation for understanding and recognizing differences and similarities between "Self-Directed Learning" as a teaching and learning transaction external to the individual and "Learner Self-Direction" as a personal orientation internal to the individual that predisposes one toward personal empowerment and accepting responsibility for such learning. Brockett and Hiemstra conceptualize this model graphically in Figure 1.1 on the following page. (In this model the personal responsibility of learners in both their actions and thoughts is paramount in determining their level of self-directedness.)

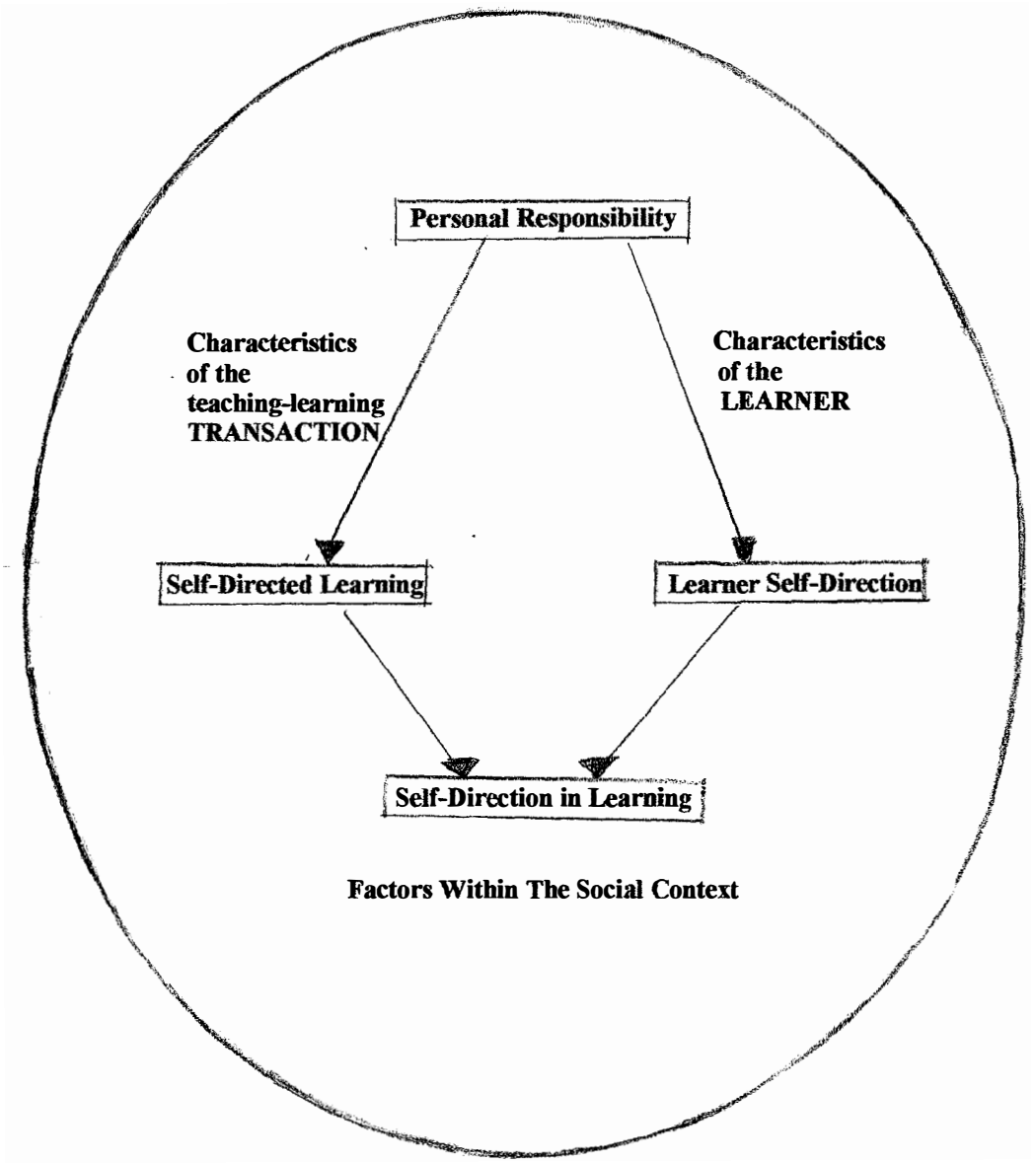


Figure 1.1. Personal Responsibility Orientation (PRO) Model (Brockett & Hiemstra, 1991, p. 25)

Personal Responsibility: The Overarching Concept

Brockett and Hiemstra (1991) stress personal responsibility as the connection or central concept for understanding self-direction as it is represented and described in their model. They state that "by personal responsibility we mean that individuals assume ownership for their thoughts and actions" (p. 26). The authors stress this does not necessarily mean control over all life's circumstances, but rather, an adult's willingness to control their response to a situation.

When applied to a learning circumstance, Brockett and Hiemstra (1991) suggest "it is the ability and/or willingness of individuals to take control of their own learning that determines their potential for self-direction" (p. 26). They noted the following four elaborations of the construct of personal responsibility.

1. The degree of willingness to accept personal responsibility exits on a continuum.
2. The idea of personal responsibility is "the point of departure for understanding learning lies within the individual" (p. 27).
3. The social dimension of the learning must also be examined to assess its impact.
4. The willingness to assume personal responsibility implies that the learner is also willing to take responsibility for the consequences of these actions.

The authors' conceptualization of personal responsibility is the connection or link between the following two dimensions of self-direction in learning: the learning-teaching process and the personal belief/attitude orientation. Hiemstra and Brockett

(1994) in a later publication suggest the concept of personal ownership can "also be thought of as the personal values we attach to making decisions, taking control, or accepting responsibility for our beliefs and actions" (p. 2).

Self-Directed Learning (Process Orientation)

Brockett and Hiemstra (1991) define the self-directed learning component as a "process in which a learner assumes primary responsibility for planning, implementing, and evaluating the learning process. An education agent or resource often plays a facilitating role in the process" (p. 24). This process dimension focuses on external factors or characteristics of the teaching-learning experience and a learner's willingness to accept personal responsibility for the learning transaction.

Brockett and Hiemstra (1991) cite Knowles' development of the process characteristics of self-directed learning as influential in their development of this component. The definition of self-directed learning proposed by Knowles (1975) is very similar: "a process in which individuals take the initiative, with or without the help of others, in diagnosing their learning needs, formulating learning goals, identifying human and material resources for learning, choosing and implementing appropriate learning strategies and evaluating learning outcomes" (p. 18). The major difference between the two definitions seems to center on Brockett and Hiemstra's term *personal responsibility* versus Knowles' term *initiative*. However, Brockett and Hiemstra also emphasize the proactive nature of personal responsibility, which seems to point to a behavior very similar to initiative.

Learner Self-Direction (Personal Orientation)

Brockett and Hiemstra (1991) offer the following definition of the learner self-direction component of their model: "An individual's beliefs and attitudes that predispose one toward taking primary responsibility for their learning" (p. 29) or " a learner's desire or preference for assuming responsibility for learning" (p. 24). They suggest this dimension is an internal state, and that "the focus is on what is going on within the person and is best understood in terms of personality" (p.122).

Conceptually, Brockett and Hiemstra (1991) draw from the humanistic writings of Abraham Maslow (1970) and Carl Rogers (1961). Specifically, Brockett and Hiemstra link their concept of learner self-direction and Maslow's concept of self-actualization as follows:

> Self-actualizers, then are people who have a great deal of self-understanding and insight. They are creative individuals who are not afraid to deal with unstructured situations or march to the beat of the proverbial different drummer. Self-actualized individuals are consistently working toward higher levels of personal growth, and, in doing so, are able to utilize existing resources to their greatest potential. In essence, self-actualization, and the people who demonstrate high levels of this characteristic, epitomize personal responsibility– as we have used this term within the context of the PRO model. (p. 126)

Brockett and Hiemstra (1991) cite two other reasons for the inclusion of personality in their model. First, after reviewing the quantitative research in self-direction, the authors suggest the findings support a strong link between self-direction

and self-concept. Second, studies into the reasons adults choose not to participate in educational opportunities emphasize attitudinal factors (i.e., lack of confidence, fear/uncertainty, feeling too old).

Theoretical Influences

Brockett and Hiemstra (1991) also cite three philosophical schools that influenced their work: humanism, behaviorism, and transformative learning. Each will be discussed in this section.

Humanism

A cornerstone idea to Brockett and Hiemstra's (1991) model is the concept of personal responsibility, which the authors suggest draws its foundations from humanistic psychology. Utilizing the work of Elias and Merriam (1980), Brockett and Hiemstra suggest that the following seven assumptions underlie humanistic philosophy: the inherent goodness of human nature, the free and autonomous nature of individuals, the unlimited growth potential of individuals, the importance of self-concept in an individual's growth, the individual's inclination toward self-actualization, the individual's definitions of realities, and the individual's sense of responsibilities to themselves and others.

The seminal work of the humanistic psychologist Abraham Maslow (1970) outlining a hierarchical structure for needs is "potentially a key to understanding learner self-direction" (Brockett & Hiemstra, 1991, p. 126). As previously mentioned, Brockett and Hiemstra suggest Maslow's final stage, "self-actualization, and the

people who demonstrate high levels of this characteristic, epitomize personal responsibility–as we have used this term within the context of the PRO model" (p. 126). The authors suggest these individuals are creative, and unafraid of unstructured situations. They are consistently striving toward personal growth, and they effectively use existing resources to support this growth.

Carl Rogers (1961) also addressed the idea of personal responsibility in his client-centered humanistic therapy. Brockett and Hiemstra (1991, p. 126) note that "the essence if what we mean by the term personal responsibility . . . that learners retain control over their learning processes, and are subsequently responsible for the consequences of their learning" is based on Rogers' therapeutic principles.

Behaviorism

Brockett and Hiemstra (1991) also cite the influence of behaviorist and neobehaviorist writings to the development of the PRO Model of Self-Direction in Learning. This literature traditionally appears in human resource development publications and highlights a schism that seems to exist between adult educators teaching and practicing in academia and those involved in human resource development (HRD) activities. Many HRD adult educators are employed in organizations utilizing education approaches guided by behaviorist assumptions of learning. However, Hiemstra and Brockett (1994) note business and industry trainers are increasingly reliant upon self-directed employee activities. Yet, rather than dichotomize the strategies employed in these two areas of adult education, the authors

suggest the behaviorist and humanist paradigms offer several shared elements crucial to self-direction:

1. Learning should focus on practical problem solving.
2. Learners enter a teaching-learning setting with a wide range of skills, abilities, and attitudes, and these need to be considered in the instructional planning process.
3. The learning environment should allow each learner to proceed at a pace best suited to the individual.
4. It is important to help learners continuously assess their progress and make feedback a part of the learning process.
5. The learner's previous experience is an invaluable resource for future learning and thus enhancing the value of advanced organizers or making clear the role for mastery of necessary prerequisites. (p. 71)

Brockett and Hiemstra (1991) further note the importance behaviorists and neobehaviorists (such as Penland, 1981; Watson & Tharp, 1985) place on how the interaction between the environment and self "provides the strongest support for the behaviorist influence on self-direction" (p. 128). Whereas, a humanistic view of self-direction emphasizes factors internal to an individual, a behavioristic view emphasizes the role the environment plays in self-direction. For example, certain situations (e.g., learning new content, having limited learning opportunities due to an organization's make-up) may indeed limit the personal responsibility the learner may effect.

Transformative Learning

Finally, the social context of the self-directed learning activity, a vital component of the PRO Model of Self-Direction in Learning (Brockett & Hiemstra, 1991), was greatly influenced by the work of Jack Mezirow (1975, 1981, 1990). Mezirow's body of work is termed transformational learning theory and is based on a view of humankind that emphasizes the personal development of the individual. Critical steps for adulthood include the development of a sense of autonomy, responsibility, and agency over our environment and self. Knowledge is viewed as personally constructed, and this knowledge is validated through human communication and consensus. Mezirow also links this emanicipatory process to empowering individuals, which can then be translated into social action (e.g., the women's movement). Mezirow (1981) suggests an individual's perspective transformation is rooted in his or her ability to employ self-directed learning:

> Enhancing the learner's ability for self-direction in learning as a foundation for a distinctive philosophy of adult education has breadth and power. It represents the mode of learning characteristic of adulthood. (p. 21)

Both Brockett and Hiemstra (1991) and Mezirow (1990) note the importance self-reflection plays in transformative and self-directed learning. Brockett and Hiemstra (1991) suggest "one strategy for enhancing self-directedness involves helping learners develop an ability to critically reflect on their experiences to help them use the knowledge that has been gained in future actions" (p. 134). Mezirow (1990) states that "by far the most significant learning experiences in

adulthood involve critical self-reflection - reassessing the way we have posed problems and reassessing our own orientation to perceiving, knowing, believing, feeling, and acting" (p.13). Mezirow (1997) further suggests adult educators are responsible for helping learners transform child-like frames of reference by explicitly including learning objectives aimed at fostering autonomous and critical thinking.

Significance of the Study

As mentioned in the problem statement of this study, the lack of empirical research-driven investigations supporting various models of self-direction in learning have limited their usefulness to theoretical discussions. In addition, those studies that do include quantitative investigations of self-direction have generally employed an instrument that was developed in the mid-1970s, the content of which does not necessarily fit current conceptualizations. These two factors limit further investigation of self-direction in learning.

This study will contribute empirical evidence supporting the reliability of a scale developed to measure the two components (learner self-direction and self-direction learning) of the PRO Model of Self-Direction in Learning (Brockett & Hiemstra, 1991); hereby known as the Personal Responsibility Orientation to Self-Direction in Learning Scale (PRO-SDLS). It will then offer empirical evidence to validate the more recent conceptualization of self-direction proposed in Brockett and Hiemstra's (1991) model.

Assumptions

The following assumptions underlie this investigation:

1. Self-direction in learning occurs on a continuum and there are certain behaviors and learner characteristics that distinguish highly self-directed learners from less self- directed learners.
2. Learners participating in this research will respond truthfully and thoughtfully.

Delimitations

The following delimitations are noted for this study:

1. The sample will be drawn from the population of undergraduate and graduate students attending a large, southeast, public institution; and, as such, the research findings are applicable to self-direction in formal educational settings.
2. The majority of participants will be drawn from students enrolled in education classes.

Limitations

The following limitations underlie this investigation:

1. Due to the enrollment at the participating institution, the sample will not reflect national ethnic, gender, and cultural demographics.
2. Participants will be intact groups not selected on a random basis.

Definitions

The Personal Responsibility Orientation (PRO) Model of Self-Direction in Learning is Brockett and Hiemstra's (1991) conceptual model that recognizes differences and similarities between self-direction as a teaching and learning transaction and as a personal orientation internal to the individual. In this model the "personal responsibility of the learner in both actions and thoughts is paramount in determining their level of self-directedness" (Brockett & Hiemstra, 1991, p. 27). For purposes of this study, the two investigated components of the PRO model are defined as follows:

> Self-Directed Learning Component is a teaching and learning transaction in which the learner expresses agreement with actions that demonstrate proactively assuming primary responsibility for planning, implementing, and evaluating the learning process. For purposes of this study, the self-directed learning dimension will hereby be identified as the teaching-learning (TL) component.
>
> Learner Self-Direction Component is an individual's characteristics, beliefs, and attitudes that predispose one toward taking primary responsibility for their learning, defined for purposes of this study as a student's perception of high self-efficacy for self-directed learning and intrinsic motivation for the learning activity. This dimension will hereby be known as the learner characteristic (LC) component.

Validity, according to the 1999 *Standards for Educational and Psychological Testing* (American Educational Research Association, American Psychological Association, & National Council on Measurement in Education, 1999), refers to "the degree to which

empirical evidence and theory support the interpretation of test scores entailed by proposed uses of the test" (p. 9).

Content validity is evaluated by showing how well the content of a test samples a specified class of situations or subject matter. It is usually assessed in terms of expert opinion.

Construct validity is evaluated by investigating what qualities a test measures, that is, by determining the degree to which certain explanatory concepts or constructs account for performance on the test.

Convergent validity is evaluated by the degree to which different, independent methods of measuring a construct are related and produce similar results.

Incremental validity refers to the degree to which a construct significantly adds unique variance to the prediction of some other construct or criterion.

Coefficient alpha is an estimated reliability coefficient of the internal consistency of a scale. Nunnally and Bernstein (1994) state that coefficient alpha "should be applied to all new measurement methods even if other estimates of reliability are also necessary" (pp. 251-252). However, the retest method should "generally not be used to estimate reliability" due to the influence of memory on the retest and the possibility that a test stable over time does not adequately sample the domain (p. 255).

Personal Responsibility Orientation to Self-Direction in Learning Scale (PRO-SDLS) refers to the newly developed instrument presented in this investigation based on Brockett and Hiemstra's (1991) PRO Model of Self-Direction in Learning.

Outline of the Study

The remaining body of this dissertation will be divided into four chapters. Chapter II will review the early descriptive research on self-direction occurring in the 1970s, the empirical instrumental work occurring largely in the 1980s, the qualitative work occurring in the 1980s and 1990s, and the later models of self-direction developed in the 1990s. Chapter II will also include a review of recent attributional and motivational theories of learning that may further illuminate possible dimensions of the LC component of the PRO model (Brockett & Hiemstra, 1991). Chapter III will describe in detail the procedure used in the development of the PRO-SDLS, and will outline the statistical procedures followed to ascertain the reliability and validity of the newly developed scale. Chapter IV will present the results of the investigation. Chapter V will include a summary, as well as discussion of the implications and applications of the results.

CHAPTER II

REVIEW OF THE LITERATURE

The purpose of this study is to develop a reliable and valid instrument to measure self-directedness in learning based on an operationalization of the process and learner characteristic components of the Personal Responsibility Orientation (PRO) Model of Self-Direction in Learning (Brockett & Hiemstra, 1991) among college students. Chapter I included an introduction, purpose, and explanation of the problem. Also discussed were the research objectives, theoretical background, and various delimitations, assumptions, and a limitation of the study, as well as pertinent definitions.

Chapter II, which is presented in four sections, is a review of the selected literature relevant to the purpose of this study. The first section reviews the early descriptive and conceptual literature appearing in North American adult education publications in the 1960s and 1970s. The second section of this chapter examines instrumental research findings based almost exclusively on measurement scores of self-direction obtained from L. M. Guglielmino's (1977) Self-Directed Learning Readiness Scale (SDLRS) and the Oddi Continuing Learning Inventory (OCLI; Oddi, 1986). This empirical research reached a zenith in the adult education literature of the 1980s. The third section describes recent non-linear models of self-direction applicable to formal learning situations that appeared in the adult education literature in the 1990s. The final section of this chapter integrates adult education literature with

complementary research appearing in the psychology and educational psychology literature, specifically self-efficacy and motivation, which may further illuminate learner characteristics associated with a self-directed learner. A summary concludes the chapter.

Early Descriptive and Conceptual Literature

The investigation by North American adult educators into the self-directed nature of adult learning is often viewed as beginning with Houle's (1961/1988) publication of *The Inquiring Mind*. Houle identified and interviewed 22 adult learning participants. From the information obtained in the interviews, he proposed three categories or learning orientations to explain why students participate in continuing education opportunities: (a) goal-oriented learners pursue educational opportunities as a means to another goal, (b) activity-oriented learners participate in the opportunity for the social interactions that take place within the activity, and (c) learning-oriented learners engage in educational activities for the sake of learning in and of itself.

Allen Tough, building on the findings in *The Inquiring Mind* (Houle, 1961/1988), as well as the content of some of the original interview transcripts, was interested in those learners Houle described as participating in continuing education opportunities for the sake of learning itself (learning-oriented). Tough's (1965) dissertation (as cited in Brockett & Hiemstra, 1991) examined adults' self-teaching and the discovery that these self-teachers did not learn in isolation.

In a later study, Tough (1971/1979) chose to investigate the exact extent of adult's self-planning, when compared to all of an individual's learning activities. Kasworm (1992b), noting Tough's shift in terminology from self-teaching to self-planning, suggested the change was a deliberate attempt to broaden the scope of investigated learning activities (specifically, conventional classroom learning necessary to complete learning projects). In his later study, Tough interviewed sixty-six participants from diverse backgrounds about their involvement in self-planned learning projects over the last year. His results, which are reported in *The Adult's Learning Projects* (Tough, 1971/1979), indicate that adults do engage yearly in a number ($M = 8$) of deliberate, self-planned learning projects. The most frequently cited reason for undertaking these projects involved the learner's anticipated application of the new knowledge. However, it is in another finding that Tough's research has had a lasting impact.

Brockett and Hiemstra (1991) suggest that the most important finding to emerge from Tough's (1971/1979) study "pertains to the question of who assumes responsibility for planning the learning projects . . . the majority of projects identified in the Tough study (68 percent) were planned primarily by the individual learners themselves" (p. 43). A number of studies (e.g., Hiemstra, 1975; Peters & Gordon, 1974; Penland, 1977, 1979) replicated Tough's results in different populations (rural and urban adults; older adults; a U. S. national sample). A complete review of these replication studies is available in Brockett and Hiemstra (1991). And, after their own review of the numerous studies spawned by Tough's seminal work, Merriam and

Caffarella (1999) state "without reservation that the existence of the independent pursuit of learning in naturalistic settings has been established" (p. 295).

In 1975, Malcolm Knowles expanded self-direction in learning to adults in formal learning situations with the publication of the seminal text, *Self-Directed Learning: A Guide for Learners and Teachers*. Knowles defined self-direction "as a process in which individuals take the initiative, with or without the help of others, in diagnosing their learning needs, formulating learning goals, identifying human and material resources for learning, choosing and implementing appropriate learning strategies and evaluating learning outcomes" (p. 18). Knowles presented a step-by-step linear process of how adults learn in a self-directed manner in formal educational situations. A key component of this process involves greater individual control of the learning plans. Knowles' work is cited as foundational to the development of the self-directed learning component of the PRO Model of Self-Direction in Learning (Brockett & Hiemstra, 1991).

In conclusion, Houle (1961/1988) and Tough (1971/1979) established the existence and frequency of self-direction in adult's learning projects, while Knowles (1975) proposed a linear process describing the activity. Hence, efforts to quantify and measure self-direction began in earnest. The next section of this review is devoted to research findings in self-direction derived from various instruments designed to measure the construct. Although two scales are reviewed in this section, Stockdale and Brockett (2000) found that approximately 70% of the published articles involving the measurement of self-direction employed L. M. Guglielmino's (1977) Self-Directed

Learning Readiness Scale (SDLRS). It is hard to underestimate the importance this scale played in the attempt to quantify and measure self-direction. In fact, Redding and Aagaard (1992) suggest the construct of self-direction has in many ways been "operationized" by this scale.

Measures of Self-Direction: Selected Research Findings

Pilling-Cormick (1995), in her review of existing instruments to measure self-direction, located 12 self-assessment scales. Four additional instruments became available after her review. However, this review will focus on the two assessment scales that have been utilized most frequently to assess a student's perception of their readiness or degree of self-direction during the 1980s. As mentioned previously, Stockdale and Brockett (2000) presented data that suggested the SDLRS (L. M. Guglielmino, 1977) was the instrument of choice in 70% of research studies investigating self-direction. The second scale, the OCLI (Oddi, 1986) was utilized in only 4% of research studies, yet by focusing exclusively on salient personality characteristics, Oddi added a valuable dimension to the measurement of self-direction in adult learners. Scales such as Pilling-Cormick's (1996) Self-Directed Learning Perception Scale (SDLPS) are not included in this review since, as the instrument's author has stated, results from scale administration focus on environmental factors supporting specific self-directed learning situations and are not intended to generalize to other populations.

As mentioned above, this section will be devoted largely to an examination of research findings involving the use of the SDLRS (L. M. Guglielmino, 1977). However, since the SDLRS is utilized in this investigation, problematic issues concerning SDLRS reliability and validity will also be presented.

Self-Directed Learning Readiness Scale (SDLRS)

As her dissertation study, L. M. Guglielmino (1977) sought to "obtain consensus from a panel of experts on the most important personality characteristics of highly self-directed learners and to develop an instrument for assessing an individual's readiness for self-direction in learning" (pp. 3-4). Fourteen adult education experts, through a three-round Delphi survey, identified three necessary characteristics of a self-directed learner: initiative, persistence, and independence. Five additional characteristics fell on a continuum between necessary and desirable: a tendency to view problems as challenges, self-discipline, a high degree of curiosity, a sense of responsibility for learning, and a strong desire to learn or change. An additional 25 characteristics were rated as desirable and brought to 33 the number of defining characteristics L. M. Guglielmino used in her item constructions. However, "one-to-one correspondence between SDLRS items and characteristics selected by the Delphi survey was not possible, since situational and attitudinal items were desired" (L. M. Guglielmino, 1977, p. 38). The result was a 58-item scale to which students respond with Likert choices ranging from one (almost never true of me; I hardly ever feel this way) to five (almost always true of me; there are very few times when I don't feel this

way). This instrument has 38 items that are positively worded and scored. Seven items are positively worded and reversed scored. Three items are worded negatively yet scored positively. The remaining ten items are negatively worded and reverse scored. A total of 290 points are possible.

Validity Findings

In her dissertation, L. M. Guglielmino (1977) asked, "Are there relationships between age, sex, educational level, grade point average or other factors and degree of self-direction?" (p.79). Over the years, a number of authors have attempted to answer these questions utilizing results from the SDLRS (L. M. Guglielmino, 1977) as a measurement of self-direction. The data presented in Table 2.1 (on pages 28–30) suggest the answers are mixed. (It should be noted that the synthesized findings located in the table include only published journal and symposia results; however, pertinent dissertation findings are included in the text of this dissertation.)

Demographic criterion validity. Of the 16 studies located that looked at a possible association between age and SDLRS scores, approximately one-half show a significant positive association between increased age and SDLRS responses (Table 2.1). This positive relationship was most apparent in studies utilizing undergraduate students as the sample. Age was not a significant factor in studies utilizing SDLRS scores from older adults.

Sixteen studies examined the differences between gender and SDLRS scores (Table 2.1). In four of the studies (Bitterman, 1989; P. J. Guglielmino,

Table 2.1. Self-Directed Learning Readiness Scale: Demographic Criterion Validity

Year	Author(s)	Independent Variable	*r*	*N*	Sample Descriptor	Mean Age	% female	% Race
1983	Long & Agyekum	Race Gender Ed. Att. Age	0.17* ns ns 0.16*	136	Undergraduate	--	52	46 Black 51 White
1984	Long & Agyekum	Race Gender Ed. Att. Age	0.07 ns 0.01 ns 0.12 ns 0.21*	92	Undergraduate	26	--	45 Black 55 White
1985b	Brockett	Ed. Att. Age	0.29 * ns	64	Older Adults	79	77	--
1987	Guglielmino, P.J., Guglielmino,L.M., & Long	Gender Age Race	( ) *** ( ) * ns	753	Workplace-Employees	Majority = 25 - 35	60	21 Black 76 White 2 Nat. Amer.
1989	Bitterman	Gender Age Ed. Att.	( )*** ( )*** ( ) ***	300	Non-formal Education stds.	44	--	--
1991	West & Bentley	Gender Age	F=16.5 * ns	773	K – 12 School employees	41	79	10 Black 88 White

Table 2.1. Continued.

Year	Author(s)	Independent Variable	*r*	*N*	Sample Descriptor	Mean Age	% female	% Race
1991	Long	Ed. Att GPA	ns 0.22 *	93	Undergraduate & Graduate Stds.	26	--	--
1991	Adenuga	Nationality Ed. Att. Age Gender Major Work Experience	-0.33 ** 0.20** ns ns ns ns	178	Graduate Stds.	29	57	--
1992	Jones	Age Gender Ed. Att	( )* ns ns	149	College Art Stds.	35	77	94 White 6 Other
1992	Price, Kudrna, & Flegal	GPA	0.30*	92	Architecture Std.	--	34	--
1992	Guglielmino, P. J., & Roberts	Gender Race Ed. Att	ns ns ( ) *	753	Workplace	--	--	--
1994	Guglielmino, P.J. & Klatt	Age	ns	166	Entrepreneurs	--	6	--
1995	Bryan & Schulz	Age Gender Ed. Att GPA	ns ns 0.25 * 0.30 *	65	Distance Ed. Stds.	26 - 44	Majority	89 White 11 Other
1996	Wood	Age Race Gender	ns ns ns	103	Continuing Higher Ed. Stds.	37	33	95 White

Table 2.1. Continued.

1996	Wall, Sersland, & Hoban	GPA Gender	ns ns	83	Undergraduate	33	47	61 White 16 Hispanic
1996	Long & Morris	Gender Age GGPA UGPA	( ) * ( ) ** ( ) * ns	157	Modular Masters Stds.	37	39	89 White
1996	Guglielmino, L.	Age Education	ns ns	28	Women Executives	35 - 55	100	100 White
1996	Durr, Guglielmino, L. & Guglielmino, P.	Gender (male) Ed. Att.	(t=4.22)*** ns	600	Workplace	--	31	--
1999	Hoban & Sersland	Gender Age	ns ns	86	Non-traditional College Stds.	--	75	65 White 4 Hispanic
2000	Hoban & Sersland	Age Gender	0.31 * ns	70	Undergraduates	36	--	--
2000	Barnes & Morris	Age	ns	100	Nursing Stds.	29	80	--
2000	Gugielmino, L. & Knutson	Gender	ns	247	K – 12 Employees	--	90	61 White 6 Black

*** p. < 0.05 ,**p. <0.01, ***p.<0.001, ns = not significant, ( ) = r not listed; only significance level, -- = information not given**

L. M. Guglielmino, & Long, 1987; Long & Morris, 1996; West & Bentley, 1991), gender (female) was associated with significantly higher SDLRS scores; in one study (Durr, L. M. Guglielmino, & P. J. Guglielmino, 1996), gender (male) was associated with significantly higher SDLRS scores. In 11 studies the association was not significant. The significant correlations were noted in scores drawn from workplace or non-traditional education respondents.

These same mixed results were noted for level of educational attainment (see Table 2.1). Of the five studies that found no significant relationship between educational attainment and SDLRS responses, four were from undergraduate respondents (Jones, 1992; Long, 1991; Long & Agyekum, 1983; Long & Agyekum, 1984). However, significant relationships were noted between SDLRS scores and educational attainment when the participants are drawn from the workplace (P. J. Guglielmino & Roberts, 1992), older adults (Brockett, 1985b), graduate school (Adenuga, 1991), and non-formal education settings (Bitterman, 1989).

Five studies explored a possible relationship between SDLRS scores and self-reported GPA (Table 2.1). The majority of studies located that examined the relationship between grade point average and SDLRS scores calculated a significant positive association (Bryan & Schulz, 1995; Long, 1991; Long & Morris, 1996; Price, Kudrna, & Flegal, 1992).

A reasonable interpretation of the reviewed results suggests an undergraduate's age and GPA may impact their SDLRS scores, while gender and educational attainment are not significant predictors of SDLRS scores. However, in the

workplace, in non-formal education experiences, and among older adults, educational attainment and gender may influence SDLRS scores to a greater degree than age.

Other criterion variables. Nine studies (reviewed below) were located that hypothesized a relationship between SDLRS scores and scores from concurrently reported criterion variables such as job performance ratings, participation and hours spent in self-directed learning activities, enrollment and thesis completion times, and persistence in passing the California Basic Education Standards Test.

In two studies conducted in the workplace, a significant association is noted between employee job performance ratings and SDLRS scores (Durr, L. M. Guglielmino, & P. J. Guglielmino, 1994; P. J. Guglielmino, L. M. Guglielmino, & Long, 1987). However, when teachers (West & Bentley, 1991) or nurses (Dixon, 1988) were asked to quantify the number of self-directed learning projects or the number of hours they spend in self-directed activities, there was little correlation with SDLRS scores. No significant relationship was noted between SDLRS scores and attempts by non-traditional students to pass the California Basic Education Standards Test for teacher certification (Hoban & Sersland, 1999). Also students' responses from the SDLRS did not correlate significantly with their enrollment or completion times in a graduate education program (Long & Morris, 1996).

However, Brockett and Hiemstra (1991) reviewed three dissertations completed in the 1980s that noted a significant positive correlation between SDLRS scores and (a) number of learning projects (Hassan, 1981); (b) number of self-planned

projects (Hall-Johnsen, 1986); and (c) number of hours devoted to self-directed learning activities (Skaggs, 1981).

Construct validity. The majority of quantitative studies chose to examine the validity of the SDLRS scores with constructs such as learning style, psychological type, life satisfaction, wellness, creativity, self-confidence, problem-solving ability, critical thinking, locus-of-control, and curiosity. A summary of these results is presented in Table 2.2 (on pages 34-36).

The most highly significant correlations between constructs are noted between SDLRS scores and Personal Empowerment through Type (PET) Checklist Scores (Kreber, 1998; Kreber, Cranston, & Allen, 2000). This self-report 80-item instrument assesses psychological type preferences based on a conceptualization of personality type derived from Jung's (1953) typology (as cited in Kreber, 1998). A significant positive relationship exists between scores on the extroverted intuitive dimension of psychological type and scores on the SDLRS. Kreber, Cranston, and Allen suggest intuitives are "basically future oriented, creative, independent, compelled to search for new opportunities, and drawn to novelty" (p. 98). However, the authors offer the following caveat: "Whether or not intuitives indeed have a greater 'readiness' for self-directed learning, however, is a different question. The SDLRS may not measure readiness for self-directed learning in general but only those aspects of self-directed learning that naturally appeal to intuitive types" (p. 112). This caution is offered in part due to a lack of correlation between SDLRS scores and scores from other

Table 2.2. Self-Directed Learning Readiness Scale: Concurrent Construct Validity

Year	Author(s)	Independent Variable	*r*	*N*	Sample Descriptor	Mean Age	% female	% Race
1978	Torrance & Mourad	Creativity Originality Sounds, Images Future Similes Fluency Creative Personality Photonalogies Right Hemisphere	 0.52*** 0.38** 0.52*** ns 0.38** 0.48*** 0.43**	41	Graduate Stds.	--	83	--
1982	Wiley	Preference for Structure	ns	104	Nursing Stds.	20 -21	98	85 White
1985b	Brockett	Life Satisfaction Scale	0.29 *	64	Older Adults	79	77	--
1987	Guglielmino,P.,J., Gugleilmino, L. M., & Long	Self-Reported Job Requirements of Creativity Change Problem Solving	 ( ) * ( ) ** ( ) *	75	Workplace	Majority 25 - 35	60	21 Black 76 White
1989	Bitterman	Achieveing Styles Inventory (Instrinsic-direct) (Power-direct) Embedded Figures Test	 ( ) *** ( ) *** ns	300	Non-formal	44	--	--
1991	Adenuga	Kolb's Learning Style AC -- CE AE – RO	 0.15* 0.25**	--	Graduate Stds.	29	57	--

Table 2.2. Continued.

Year	Author(s)	Independent Variable	*r*	*N*	Sample Descriptor	Mean Age	% female	% Race
1992	Price, Kudrna, & Flegal	Embedded Figures Test (Field Independence)	ns	92	Architecture Stds.	--	33	--
1992	Jones	Self-Esteem Art Self-Efficacy Art Attitude	0.39** 0.58** 0.60**	276	Community College and College Art Stds.	35	77	94 White
1995	Kitson, Lekan, &Guglielmino, P.J.	California Psychological Inventory Subscales Task assertiveness Self-confidence Good Impression Achievement via independence	 ( )** ( ) * 0.29* ns	55	Management Level Career Transition Employees	41	14	--
1995	Delahaye & Smith	Student Orientation Questionnaire (Andragogy)	0.35**	200	Business Education Stds.	Majority < 24	46	--
1996	Johnson & Hill	Cohort Learning Inventory	6 items > 0.50	37	University cohort	--	--	--
1996	Wall, Sersland, & Hoban	Self-Efficacy Math	ns	83	Adult undergraduates	33	47	White

Table 2.2. Continued.

Year	Author(s)	Independent Variable	*r*	*N*	Sample Descriptor	Mean Age	% female	% Race
1998	Kreber	PET Type Checklist 1. Extraverted/ Intuitive 2. Extraverted/ Thinking Critical Thinking 1. Evaluate argument 2. Weigh evidence 3. Unstated assumptions	 0.61*** 0.35*** ns 0.32*** 0.33***	142	Undergraduates	--	--	--
1999	Owen	Test-Well	0.45***	185	Graduate Stds.	25 -44	63	4 Black 7 Asian 89 White
1999	Barnes	Rossing's Curiousity Subscales: 1. Desire Knowledge 2. Perceived Value	 0.21 ** 0.23 **	170	Nursing Stds.	28	89	89
2000	Kreber, Cranston, & Allen	Psychological Type (Extraverted/Intuitive) Creativity Kolb's Learning Style	0.62*** ns ns	87	University Stds.	--	--	--

*** p. < 0.05 ,**p. <0.01, ***p.<0.001, ns = not significant, ( ) = r not listed; only significance level, -- = information not given**

constructs the authors hypothesized are important in self-directed learning (i.e., preferred learning style, logical reasoning ability, and creativity).

Three authors cite significant correlations between SDLRS scores and measures of creativity. Both Torrance and Mourad (1978) and Cox (in his 2002 dissertation) calculate *r*-values around .50 for the relationship between measurements of creativity and self-direction. P. J. Guglielmino, L. M. Guglielmino, and Long (1987) note a significant ($p < .05$), but unspecified, *r*-value between the variable scores.

Three authors also examined the relationship between scores measuring self-concept or self-esteem and SDLRS scores (Table 2.2). Jones (1992) noted a weak, yet positive significant relationship between the two sets of scale scores in community college art students. Kitson, Lekan, and P. J. Guglielmino (1995) also calculated a weak, yet significant correlation between SDLRS scores and the California Psychological Inventory self-confidence subscale. Sabbaghian (1980), in her dissertation study, compared scores from the SDLRS with scores from the Tennessee Self-Concept Scale (Fitts, 1965). She concluded that "there is a strong positive relationship between the self-image of adult students and their self-directedness in learning" (as cited in Brockett & Hiemstra, 1991, p. 59).

Other authors noted a consistent significant relationship between SDLRS scores and measures of life satisfaction or health-conducive lifestyles. Brockett (1985b) noted a weak significant correlation between life satisfaction scores in the elderly and SDLRS scores. Leeb (in her 1985 dissertation) investigated the

relationship between SDLRS scores and the tendency to practice positive health behaviors and concluded that "people who demonstrate positive health behaviors can be described as highly self-directed" (p. 159). Owen (1999) noted a stronger positive correlation ($r = .45, p < .001$) between SDLRS scores and wellness scores in graduate students. Finally, Nelson (2000) concluded from his dissertation findings that positive significant correlations exist between SDLRS scores and subscale scores from an instrument designed to measure coping in asthma patients.

However, other constructs such as critical thinking, internal/external locus-of-control, field independence/dependence and learning style, do not consistently demonstrate the expected correlations with self-direction (Table 2.2).

Predictive validity. Only two journal articles were located that employed SDLRS responses to predict future performance in self-directed learning activities. Crook (1985) found SDLRS scores from 70 nursing students taken at the beginning of their program were not predictive of their self-directed performance at the end of the first and second year of the nursing program. Bryan and Schulz (1995) were also unsuccessful in their attempt to use SDLRS scores to predict successful completion of distance education courses.

Convergent validity. Three studies were located that chose to compare an independent method of measuring self-direction (faculty ratings) with their SDLRS scores. None of these studies (Barnes & Morris, 2000; Long & Agyekum, 1983; Long & Agyekum, 1984) demonstrated a significant association between faculty ratings of students' self-directedness and their SDLRS scores. In an attempt to explore their

finding, Barnes and Morris noted that higher faculty ratings of students' self-direction are significantly correlated to how well the instructor felt they knew the student. Therefore, the authors speculate that personality characteristics, such as friendliness, may be intervening variables.

Divergent validity. Three studies and one dissertation were located that examined the ability of SDLRS scores to discriminate between divergent construct measurements. In two studies, Long and Agyekum (1983, 1984) found weak negative or insignificant correlations between SDLRS scores and scores from agreement response sets and dogmatism scores. Wood (1996) found two subscale scores (lack of confidence and low priority) from Darkenwald and Valentine's (1985) Deterrents to Participation Scale-General (DTP-G) significantly negatively related, rs = -.36 and -.38, ps <.001, to SDLRS scale scores. In this same vein, Reynold's (1986) dissertation work found a significant negative correlation between SDLRS scores and scores from DTP-G items sampling external motivation.

Known-group validation. A number of studies looked for significant SDLRS score differences between groups purported to function in a highly self-directed manner and members of the general population. Groups of individuals who are labeled female executives (L. M. Guglielmino, 1996), entrepreneurs (P. J. Guglielmino & Klatt, 1994), teachers (L. M. Guglielmino & Nowocien, 1998), and managers (Durr, L. M. Guglielmino, & P. J. Guglielmino, 1996) score significantly higher than members of the general population on the SDLRS.

Psychometric and Methodological Issues

In a previously cited content analysis, Stockdale and Brockett (2000) documented that L. M. Guglielmino's (1977) SDLRS is the scale used as the standard for assessing readiness for self-direction in 76 of 105 research articles. Yet, another 23 articles in these same publications are devoted to methodological and psychometric concerns surrounding the use of this scale.

Reliability. Nunnelly and Bernstein (1994) state that "at least two types of reliability coefficients should be computed and reported for any test . . . coefficient alpha and correlations among alternate forms" (p. 256). L. M. Guglielmino (1977) reported an initial coefficient alpha of .87 for the SDLRS. Numerous subsequent authors also report high coefficient alphas for SDLRS scores (e.g., r = .87, Brockett, 1985b; r = .88, West & Bentley, 1991; and r = .92, Owen, 1999).

Several alternative forms of this test are available. The Learner Preference Assessment (LPA) developed by P. J. Guglielmino and L. M. Guglielmino (1991) was designed to be scored by the student. As such, a minor change was made to one item and the scoring system made more user friendly. However the LPA is basically an equivalent form of the SDLRS. Delahaye and Smith (1995) investigated the internal reliability of this instrument in 200 undergraduate and graduate business students. An alpha coefficient of .67 was calculated for the total group scores. Removal of the younger students' scores increased coefficient alpha to .72. Delahaye and Smith suggested that "the under 20 has not yet settled into a preferred

learning style and that care should be taken when using any instrument measuring learning preferences with this younger group" (p. 168).

Content validity and reliability. Nunnally and Bernstein (1994) state, "although content validity primarily rests on rational rather than empirical grounds, an item analysis is extremely useful if not essential" (1994, p. 301). Several authors (e. g., Brockett, 1985b; Field, 1989; Leeb, 1985), while acknowledging the high estimates of internal consistency obtained in their research on the SDLRS, question the use of negatively worded items. Interestingly enough, L. M. Guglielmino (1977) initially raised this concern when discussing factor analysis of her data:

> One factor was composed entirely of reverse items (factor 1). This observation suggested that avoidance of negative response (or acquiescence, its reverse) was a factor in the responses to the SDLRS. Consideration was given to the possibility of rewriting all reverse items to obviate this factor; however, it was decided that the reverse items were necessary to avoid the more common problem of a response set to answer all items in a similar way, either high or low. (p. 71)

Initially, certain populations seemed especially vulnerable to the syntax or semantic wording in some items of the SDLRS. Brockett (1983, 1985a) first raised this concern in his study of the relationship between SDLRS scores and life satisfaction scores in an older adult sample. Brockett noted 12 of the 58 SDLRS item scores were not correlated with the score totals (Items 7, 9, 11, 12, 20, 22, 23, 29, 33, 35, 42, 48). Nine of these items were negatively worded. Brockett hypothesized that

the reverse-scored items and the two-part Likert choices were confusing and frustrating for older adults of low formal educational attainment. Yet, as Brockett's discussion suggests, age may not be the significant factor; the low formal educational level of the participants and the confusing nature of some items seemed a more likely cause.

Leeb (1985) also examined item-total SDLRS (L. M. Guglielmino, 1977) correlations in her investigation of self-directed learning in individuals who demonstrate positive health behaviors. Although the individuals in her sample were younger and better educated, Leeb noted eight of the twelve non-correlating items identified by Brockett (1983) were also non-correlating in her study (Items 7, 20, 22, 23, 29, 33, 35, 48). Three of the items (22, 29, 35) were written in a negative form, and one (20) was written as a double negative. All items except one (33) are scored in reverse. Leeb suggested that her "population represents a comparatively high education level which would appear to rule out the education factor as the major source of difficulty on the eight items found not to correlate in either study" (p. 224). She postulated item construction difficulties or items that may not be universally valid measures of self-direction may be possible explanations for the low correlations.

Field (1989) also expressed concerns about particular items in this scale. After initially calculating Pearson product-moment correlations between total and individual item values, Field identified those items with high or low correlations. The items that had the highest item-total correlations, Field interpreted as associated with the notion that learning is exciting, challenging, and something very enjoyable (Items 5, 45, 47,

46, 39). However he noted 12 items failed to achieve a minimum item-total correlation of .30 (Items 2, 3, 7, 10, 13, 16, 12, 22, 23, 29, 35, 56). Eight of these items are negatively phrased.

Field (1989) also voiced serious reservations about L. M. Guglielmino's use of a Delphi panel to provide after-the-fact definitions for self-direction and self-directed learning readiness, and finally suggested her addition of 17 items after initial scale validation flawed the psychometric analyses. He concluded that "the problems inherent in the scale are so substantial that it should not continue to be used" (p. 138).

L. M. Guglielmino (1989) in her response to Field (1989) stated that his paper "is so filled with errors of omission and commission that it does not merit serious consideration" (p. 240). She suggested her own analysis based on more than 3,000 respondents found only one item (Item 20: If I don't learn, it's not my fault.) with an item-total correlation below .30. Responding to Field's query about the addition of items after reporting validity coefficients, L. M. Guglielmino (1989) stated, "the 17 additional items were added after the initial field test, not after validation of the scale" (p. 238). Two other authors also critiqued Field's conclusions: McCune (1989b) questioned his statistical procedures, and Long (1989) criticized Field's use of misleading, out-of-context quotations. Field (1990) responded to these criticisms by acknowledging that McCune's (1989b) statistic suggestions had merit, but he still noted "serious flaws in the SDLRS" (p.102).

Rational validity. Bonham (1991) examined the content validity of the SDLRS (L. M. Guglielmino, 1977) by examining the meaning of low scores on the instrument.

She wanted to know if a low score represented a preference for other-directed learning or did it represent a dislike of learning in general? If it was the former, the construct validity of this scale is enhanced. On the other hand, if a low score represented a dislike for learning in general then Field's (1989) hypothesis that this scale measures a construct more accurately called "love of learning" was enhanced.

Bonham (1991) examined L. M. Guglielmino's research design, item content, studies linking SDLRS scores and formal educational attainment, and two experimental studies and stated that "the weight of the evidence points toward dislike for learning in general as the cause of low SDLRS scores" (p. 92).

In summary, the SDLRS (L. M. Guglielmino, 1977) and the student-scored equivalent LPA (P. J. Guglielmino & L. M. Guglielmino, 1991) are the instruments of choice in the majority of research conducted to assess a learner's readiness for self-directed learning (Stockdale & Brockett, 2000). Most reliability estimates are consistently reported as greater than .80. L. M. Guglielmino (2002) further asserts the scale has been used internationally with more than 40,000 adults and "can be used with acceptable confidence to provide an accurate measurement of readiness for self-directed learning" (para 5). However, queries have been raised concerning methodological and validity issues. Albeit, Brockett and Hiemstra (1991) concluded that "the SDLRS has made a most important contribution to present understanding of the self-directed learning phenomenon by generating considerable research, controversy, and dialogue. We think that this contribution ultimately outweighs the limitations that seem to be inherent within the instrument" (pp. 74–75). However, it

should noted that this scale remains identical to the original version published in 1977. As such, Brockett and Hiemstra's call in 1991 for new or improved instruments to measure more recent conceptualizations of self-direction remains unanswered.

Oddi Continuing Learning Inventory (OCLI)

Although the vast majority of quantitative research aimed at identifying learner's readiness for self-direction employed the SDLRS (L. M. Guglielmino, 1977), in 1986 Oddi introduced a 24-item self-report instrument also directed at identifying self-directed learners. Oddi designed her instrument as a measurement of the "personality construct, self-directedness in learning . . . developed about three theoretical formulations describing the motivational, affective, and cognitive attributes of the self-directed learner's personality." (Oddi, Ellis, & Roberson, 1990, p. 139).

Oddi (1984, 1986) suggested her extensive research located the following three theoretical clusters of behaviors:

Dimension 1: Proactive Drive versus Reactive Drive. This dimension conceptualizes a continuum of behaviors from proactive -"initiating and persisting in learning without immediate or obvious reinforcement" (Oddi, 1986, p. 99) to reactive - relying on "extrinsic forces to stimulate learning, a tendency to discontinue activity on encountering obstacles in learning to meet lower order needs, and low self-esteem" (p.99).

Dimension 2: Cognitive Openness versus Defensiveness. Within this dimension, self-directed learner characteristics include openness to new ideas,

adaptiveness, and tolerance of ambiguity. At the other end of the continuum are learners with attributes of rigidity, fear of failure, and avoidance of new activities.

Dimension 3: Commitment to Learning versus Apathy or Aversion to Learning. Oddi suggested personality characteristics of a self-directed learner within this dimension include a positive attitude toward varying learning activities and a preference for leisure activities that are thought-provoking. At the opposite end of the spectrum are learners with characteristics that include hostile attitudes toward learning and non-engagement in learning activities.

Oddi's (1984, 1986) original reliability and validity data and her subsequent construct validation work (Oddi et al., 1990) seem to support the psychometric properties of her instrument. In her 1984 dissertation research, Oddi demonstrated a full-scale internal consistency coefficient alpha of .88 and a test/retest coefficient of .90. Total scale scores (based on the final 24-item, seven Likert-choice scale) correlate significantly with participation in learning activities ($r = .36, p < .05$), and with 3 subscales from an instrument designed to measure self-confidence ($r = .55, p < .01$), adaptiveness ($r = .26, p < .05$), and productivity ($r = .33, p < .05$). No significant correlation was demonstrated between OCLI scores and measurements of locus-of-control or intelligence. In a subsequent construct validity investigation, Oddi et al. (1990) cite weak, but significant correlations between OCLI scores and total scores on the Job Activity Survey (Bevis, 1986; as cited in Oddi, Ellis, & Roberson). No

significant correlation is noted by the authors between total OCLI scores and voluntary attendance at continuing education programs.

In contrast, Landers (1990) raised issues related to the internal reliability of the OCLI (Oddi, 1986): five item scores (out of 24) did not correlate significantly with scale totals. Landers concluded the SDLRS (L. M. Guglielmino, 1977) is a more appropriate instrument for use in measuring the concept of self-direction. He based this conclusion on (a) the above reliability issues, (b) a high correlation (r= .61) between the SDLRS and OCLI scale totals, and (c) the better discriminant validity of the SDLRS.

In support of Oddi's (1986) original factor analysis, Six (1989) investigated the generalizability of Oddi's three factors to other study populations. Six reported the original dimensions did not break down into new factors. He also noted the presence of one dominant factor that reflected a positive attitude toward self-directed learning.

Subsequently, Straka (1996) suggested that a more careful scrutiny of Oddi's (1986, 1990) descriptions of her factor solutions, when combined with his own construct validation work did not yield the same factors cited by Oddi (1986) and Six (1989). Straka analyzed the potential meaning of items loading on each of his factors and describes the factors as (a) self-awareness of autonomy and self-efficacy in conjunction with reading behavior, (b) the ability to evaluate personal achievement, and (c) reading avidity and the social dimension in self-directed learning.

West and Bentley (1991) investigated the use of OCLI (Oddi, 1986) scores as predictors of self-reports of participation in self-directed learning activities in over 700

teachers and administrators in public schools participating in a Tennessee administrative development program. Their results suggest the OCLI was not very useful in explaining participation in self-directed learning activities: "only 3% of the variability in total participation could be predicted by the OCLI" (p. 87). West and Bentley also requested respondents complete the SDLRS (L. M. Guglielmino, 1977). After examining the relationship between the two sets of scale scores, the authors conclude that "even given the conceptual distinctions between the instruments, as defined by those who developed them, the total group correlation of $r = .38$ suggested the measures did not have a great deal in common" (p. 88). They further concluded that "given these findings of a weak relationship between the OCLI and SDLRS, coupled with the inability to predict criterion variables, it is not recommended that either of these instruments be used as screening tools for self-directed learning programs" (p. 90).

In conclusion, this section of the literature review summarized the empirical and psychometric findings surrounding the measurement of self-direction in adult learning that reached its zenith in the 1980s. Two scales, L. M. Guglielmino's (1977) SDLRS and Oddi's (1986) OCLI were utilized for the vast majority of this research. A fair summary of all results suggest a consistent link between measurements of self-direction and measurements of self-confidence, personality type, creativity, life satisfaction, wellness, and in some types of concurrent participation in educational activities. Neither instrument is able to consistently predict future performance on a criterion variable thought to represent self-directed learning. A comparison of test

scores and demographic variables suggest age, GPA, and gender may impact measures of self-direction in college undergraduate settings, but not in workplace or informal learning situations.

The next section of this review moves beyond the empirical research of the 1980s to the recent models of self-direction developed in the 1990s. A brief summary of the qualitative research that may have served as a foundation for some of these models introduces the section.

Recent Qualitative Research Findings and Models of Self-Direction

Due to the nature of the proposed dissertation investigation, the majority of the relevant research located on self-direction fell into the category of quantitative research. Yet, Brockett and Hiemstra (1991) suggest that qualitative research must also inform any conceptualization of self-direction. Therefore, the introductory portion of this section of the literature review will begin with a summary of important research findings based on naturalistic inquiry. However, for purposes of this review, it is important to note that Stockdale and Brockett (2000), when comparing quantitative and qualitative research on self-direction published within the last twenty years located an important difference: quantitative research studies drew heavily on students from formal learning situations (applicable to this dissertation project), whereas qualitative research studies drew predominately from participants in non-formal learning situations.

Therefore, although the contributions of authors such as Brookfield (1981), Leean and Sisco (1981), Smith (1990), and others have made important contributions to the knowledge base surrounding self-direction, they are not included in this review. Of the 49 qualitative research publications located by Stockdale and Brockett (2000), only three involved students in formal learning situations analogous to the study setting for this investigation. After a brief discussion of these qualitative findings, the section will continue with a review of models for self-direction presented in the 1990s.

Qualitative Findings

Three authors investigated students' perceptions of self-direction within traditional formal institutions of learning. Kasworm (1992a) and Blowers (1993) chose to interview adult students (25 years-of-age or older) enrolled in traditional private or university settings. One author (Loving, 1992) chose to interview traditional-aged students involved in a traditional nursing education program.

Kasworm (1992a) invited adult undergraduate students to participate in semi-structured interviews to probe perceptions of their self-directed learning experiences within a formal classroom setting. She suggested students do engage in self-directed learning in formal learning situations, but the outcome of these self-directed experiences may manifest themselves in four distinct ways. Her inductive analysis identified student patterns of (a) *conflict* between their self-defined pursuits and the institution, (b) *transformation* grounded in the classroom but enhanced by their own efforts, (c) *accommodation* and acceptance of the curriculum and the instructor's

expertise, or (d) *withdrawal.* Kasworm concluded that "any theory of adult self-direction should be anchored within the learner's internal acts of reference, action, and meaning making" (p. 243).

Blowers (1993) in semi-structured interviews of adult learners attending a private university also probed for students' perceptions of their self-planned and self-directed learning experiences. She noted four emergent themes. First, adults chose formal education as a means of meeting long-term goals. Second, adult students chose active participation over rote learning as the means of meeting the goals. Third, adult students were able to prioritize the importance of their learning goals within larger contexts (e.g., family commitments). Finally, undergraduate students who chose not to control their own learning did so because they simply did not know enough about the subject matter to do so. This last finding may suggest a situational specificity in self-directed learning activities.

Loving (1992) investigated the relationship between a student's perceived competence, flexibility, motivational orientation, and the educational evaluation process. Loving concluded that more traditional methods of student evaluation decrease students' perceptions of competence and control, whereas more learner-centered interactions support students' intrinsically motivated efforts. The author concluded, "through reflective interactions with trusted role models, students can learn to independently identify the information necessary to solve problems, and thus to be self-directed in learning from their experiences" (p. 284).

As mentioned previously, the nature of qualitative research and the very limited number of publications that present themes relevant to the higher education context of this dissertation make generalizability difficult. However, it is interesting to note that the qualitative research involved learner's perceptions of relevant affective, cognitive, and behavioral events in their lives. This is congruent with the conceptual models of self-direction appearing in the 1990s. These later models suggest other dimensions of student learning such as self-confidence, motivation, and control may also contribute to a student's self-direction.

Recent Models of Self-Directed Learning

In the 1990s, two additional comprehensive models of self-direction were published. The bulk of this section will focus on these two models since both are applicable within educational institutions. However, this section will begin with a review of a recent theory of self-direction, which reframed the construct for many adult educators and set the stage for Garrison's (1997) later model.

Phillip Candy's (1991) text, *Self-Direction for Lifelong Learning*, coincided with the publication of the Brockett and Hiemstra's (1991) PRO model; and, although not explicitly presenting a model of self-directed learning, offered an influential conception of self-direction based on a constructivist view of learning. Candy argued that all learning must take place within each individual's unique frames-of-reference. As such, all learning is psychologically self-directed, the result of interactions between the person and the situation. Therefore, a person may be highly self-directed in one

situation, but not in others. Important factors that may affect the level of self-direction are the nature of the learning situation, the nature of the knowledge, and the social context.

Candy (1991) further proposed that a learner's capacity for self-direction rests on three prerequisite competencies. The first he termed self-management competencies such as research skills, time management skills, goal setting abilities, and critical thinking skills. The second competency, which the author suggested is often ignored by educators, is the learner's adequate familiarity with the subject matter to be able to self-direct the learning. The third (and the most difficult to define) is a sense of learning competence or that "quiet assurance that one is able to exercise control effectively in a certain situations" (p.xix). These ideas set the stage for Garrison's (1997) model. However, concurrent with the publication of the PRO model (Brockett & Hiemstra, 1991) was the publication of Grow's (1991) learning model.

The Staged Self-Directed Learning Model

In 1991, Grow proposed that learners in educational settings might be classified into one of four stages that describe their readiness level for self-direction in a classroom. Grow argued that students have "varying abilities to respond to teaching that requires them to be self-directed" (p. 126). He further noted his stage model is based on the premise that readiness for self-direction is situational and perhaps task specific. Recognition of a learner's stage in self-direction is critical in determining the appropriate activities and support.

In Stage 1, learners are classified as dependent. Grow (1991) describes these learners as needing an expert authority figure to explicitly direct learning. Grow cites reasons for this teacher dependency as a lack of relevant knowledge, motivation, or self-confidence. In Stage 2, learners are interestable: willing to do relevant assignments, confident, but lacking a deep foundation of the subject matter. Stage 3 learners have both the skills and knowledge to actively participate in their own learning; however, they still require a guide, and these learners "need to develop a deeper self-concept, more confidence, more sense of direction, and a greater ability to work with (and learn from) others" (p. 133). In Stage 4, learners take responsibility and set their own goal and achievement standards. These students possess skills in time and project management, self-evaluation and monitoring, and effective identification and use of resources.

Tennant (1992), in a response to Grow's article (1991), raised a question (among others) as to how a diagnosis of a learner's stage is to be made. Who serves as the judge? Grow (1994) responded that he "has a working faith that a teacher can reasonably estimate a student's learning stage from classroom behavior and work submitted" (p. 111). He further stated he was "suspicious of concepts that draw major conclusions from simple quantitative measurements" (p. 111). However, if such a quantitative measurement was required, this model seems to suggest an assessment instrument that samples levels of students' self-confidence, motivation, subject knowledge, and skills in management and metacognition.

Garrison's Comprehensive Theoretical Model

Garrison (1997) based the development of his model of self-directed learning on a collaborative constructivist perspective, which "has the individual taking responsibility for constructing meaning while including the participation of others in confirming worthwhile knowledge" (p. 19). Garrison then accepted the challenge of integrating the contextual (management), cognitive (monitoring), and conative (motivational) perspectives of self-directed learning in educational settings into a comprehensive model.

Three overlapping dimensions are represented in this model (Garrison, 1997). The first Garrison terms self-management: specific external task control issues that are directed to the "social and behavioral implementations of learning intention" (p. 22). The learner's degree of task or management control is "determined by balancing the factors of proficiency [abilities and skills of the facilitator and learner], resources [support and assistance available], and interdependence [institutional or subject norms and learner integrity and choice]" (p. 23). Garrison states this dimension is closely related to the traditional transactional aspect of self-directed learning.

His next dimension, self-monitoring, is "synonymous with responsibility to construct meaning" (Garrison, 1997, p. 24). Both cognitive and metacognitive processes are called into play during self-monitoring. Foremost is cognitive ability, which suggests that "learners will not succeed and persist in their learning without cognitive abilities and available strategies" (p. 250). Garrison calls the reader's attention to the work of Bandura (1977) and others who suggest the importance of

self-observation, self-judgment, and self-reaction. Garrison also stresses the importance of metacognitive proficiency, "the ability to be reflective and think critically" (p. 25). The teacher's role is to provide feedback to support this self-monitoring.

However, Garrison (1997) sees motivation as the pivotal and pervasive dimension in his model. He differentiates motivation into entering motivation (the decision to participate) and task motivation (staying on task and persisting). Entering motivation will be higher if learners "perceive that learning goals will meet their needs and are achievable" (p. 27). Factors that determine valance and expectancy are values, preferences, attitudes toward self (e.g., self-esteem), and perceptions of competency (self-efficacy) and contingency (perceived institution hindrances or support). Garrison suggests instructors can strengthen the entering motivational state by offering students choices about educational objectives.

Task motivation is directly tied to task control, self-management, and directly linked to volition (sustaining intentional effort or diligence). Volition is a viewed as an important aptitude for self-directed learning and "its function is metamotivational in directing and sustaining effort toward learning goals" (Garrison, 1997, p. 29).

Garrison (1997) also discusses the effects of intrinsic and extrinsic motivation on self-direction. He notes that externally directed tasks might reduce a learner's willingness to assume responsibility for their learning. However, he suggests the "challenge is to have students internalize external goals and rewards which are often

more dominant during the entering stages of learning" (p. 29). Garrison concludes with the following observation:

> Motivation and responsibility are reciprocally related and both are facilitated by collaborative control of the educational transaction. Issues of motivation, responsibility, and control are central to a comprehensive concept of self-directed learning. Moreover, it is also suggested that self-direction may be the only approach to facilitate "deep" or meaningful learning outcomes. Learners are intrinsically motivated to assume responsibility for constructing meaning and understanding when they have some control over the learning experience. In terms of long-range educational goals, self-directed learning is also a necessity if students are to learn how to learn and become continuous learners. (p. 29)

Garrison (1997), when comparing Brockett and Hiemstra's (1991) PRO Model of Self-Direction in Learning to his comprehensive model suggests Brockett and Hiemstra's psychological dimension is limited to "only a personality factor or disposition to be self-directed" (p. 20). Within his comprehensive model, previously discussed cognitive and metacognitive processes are identified and integrated into the comprehensive model.

In summary, this portion of the literature review presented two recently developed models of self-direction. When comparing these models to the PRO Model of Self-Direction in Learning (Brockett & Hiemstra, 1991), certain similarities are noted. For instance, both Grow (1991) and Garrison (1997) acknowledge the

importance of the learner-teacher transaction, and both discuss the importance of students' perceptions of motivation and control. The next section of this review discusses and integrates with adult education literature, the contributions educational psychology and psychology research makes to understanding students' perceptions of motivation and control, which may further illuminate the learner characteristic component of the PRO Model of Self-Direction in Learning.

Interdisciplinary Research Findings

Almost all adult education writings discussing the psychological components of self-direction include the centrality of the construct of control. Long (1990) terms psychological control "the necessary and sufficient cause for self-directed learning" (p. 333); Garrison (1997) argues "that responsibility and control issues are fundamental" (p. 136); and Brockett and Hiemstra (1991) suggest "it is the ability and/or willingness of individuals to take control of their own learning that determines their potential for self-direction" (p. 26).

Concurrently, in the field of psychology, Haidt and Rodin (1999) suggest that "the construct of control has played a major role" in modern psychology (p. 317). Yet the authors suggest this popularity has also in some ways hampered understanding of the construct. That is, since psychological control is viewed as relevant to so many areas of psychology, a reader is often lost without a global understanding of the origins of the various control constructs.

To deal with this confusion, Haidt and Rodin (1999) provide a succinct framework for the various control constructs by rooting them in motivational or cognitive theories of learning. Motivational theories of learning were born from a perceived need to explain behavioral changes not well accounted for by behavioral or psychodymanic drive theories. White (as cited in Haidt & Rodin, 1999) described this unaccounted for ingredient as an intrinsic motivation to explore, interact, and affect their environment. More recently, the Rochester Human Motivation Research Group has taken White's motivational approach and developed a theory of intrinsic motivation that includes the innate needs of competence, autonomy, and relatedness (Deci & Ryan, 1985; 2000a). The next section of this review will discuss the relationship between control located within a motivational theory of learning and self-direction. Following this section will be a discussion of control, cognitively framed as an expectancy attribute of a self-directed learner. Both sections will attempt to integrate relevant literature from adult education and psychology writings.

Intrinsic Motivation and Self-Direction

Although many adult education scholars cite a theoretical relationship between self-directed learning and intrinsic motivation, surprisingly only two quantitative research studies (Bitterman, 1989; Delahaye & Smith, 1995) were located that examined this relationship.

Research Findings from Adult Education Literature

Both research studies utilized the SDLRS (L. M. Guglielmino, 1977). Bitterman (1989) investigated the relationship between achieving style (direct, instrumental, or relational) and readiness for self-directed learning in a sample drawn randomly from the adult population. The results from a multiple regression analysis noted the Intrinsic-Direct subscale totals explained the most variance (45%) in self-directed learning preference and possessed about four times the explanatory power of measurements of cognitive style. An intrinsic direct learner is one "who attacks a task and receives satisfaction from learning according to an internal standard" (p. 33).

Delahaye and Smith (1995) utilized the Learner Preference Assessment (LPA), the user-scored version of the SDLRS (P. J. Guglielmino & L. M. Guglielmino, 1991) in college students to examine a possible relationship between self-directed learning readiness scores and scores from a author-designed orientation for andragogy questionnaire. Delahaye and Smith noted a significant positive correlation, $r = .35$, $p < .001$, between scale scores.

The limited empirical evidence appearing in adult education literature seems to support the contention that students possessing readiness for self-directed learning also possess indicators of intrinsic motivation. However, literature appearing in psychology publications, specifically literature drawing from writings on self-determination theory and intrinsic motivation may further illuminate this relationship. Deci and Ryan (1985, 2000a) suggest self-determination theory developed inductively, using an empirical process that identified the three psychological needs of

competence, relatedness, and autonomy as paramount for optimal natural growth and integration in human beings.

Self-Determination Theory and Self-Direction

In an article exploring the meaning of self in self-direction, Deci and Ryan (2000b) suggest findings from recent motivational research "guided by self-determination theory" (p.75) may be a more "psychologically meaningful way of defining self-directed learning for purposes of predicting academic achievement, classwork adjustment, and well being" (p. 75).

In discussing the self in self-directed learning, Deci and Ryan (2000b) formulate a basis for discussing learner self-direction that requires conceptualizing motivation orientations as self-determined/self-controlled (SD) or other determined/other controlled (OD). Deci and Ryan suggest self-direction in learning takes place when the motivation for learning is intrinsic or extrinsically motivated but freely chosen. Other extrinsically motivated behaviors may be experienced as coerced or controlled by outside forces and are considered other-directed. Therefore, the authors place motivational behaviors on a continuum ranging from intrinsic to amotivational. They more clearly define these types of motivation as follows:

Intrinsic motivation is present when behaviors are performed out of interest or enjoyment in the activity itself and are identified as self-directed.

Identified extrinsic motivation is present when the behaviors are performed because the individual has adopted the behavior as personally important or valuable to self, often to meet a more distal goal. An example presented by the authors

(Deci & Ryan, 2000b) is the high school student who dislikes math, but completes algebra to meet his or her personal goal of attending college. The motivation for this behavior is also seen as self-directed.

External introjected motivation is present when behaviors are performed because internal pressures such as self-esteem are present, or when people complete an activity because they think they should or feel guilty if they do not. The authors (Deci & Ryan, 2000b) state that such actions are controlled by internal contingencies that are external to self and, therefore, are other-directed.

External motivation is present and identified with behaviors that are performed for the reward or avoidance of punishment. The motivation for this behavior is seen as other-directed.

Amotivation is present when the learner is unclear why she/he is performing the activity and is non-directed.

Numerous research findings are presented in this article (Deci & Ryan, 2000b) that suggest both the quality and performance of learning are positively affected when students are intrinsically motivated or autonomously self-regulated. Literature from these same authors based on adult learners (e.g., Ryan, Plant, & O'Malley, 1995; Williams, Grow, Freedman, Ryan, & Deci, 1996) also support these findings. However, it should be noted that these studies do not directly assess self-direction, and no measurement instrument based on the previous definitions of self-directed motivations was provided.

However, Guay, Vallerand, and Blancard (2000) recently presented developmental and validation work for the Situation Intrinsic Motivation Scale (SIMS). The SIMS was designed to "assess the constructs of intrinsic motivation, identified regulation, external regulation and amotivation (E. L. Deci & R. M. Ryan, 1985, 1991) in field and laboratory settings" (p. 175). A major reason for the development of this scale was the introduction of a valid measure of state motivation to replace the traditional, yet problematic, free-choice measure of intrinsic motivation. As such, the authors present extensive research documenting that scores from the SIMS are operative at the situational level and are related to an individual's perceptions of competence, autonomy, and relatedness (Deci & Ryan, 2000a). This scale draws heavily on the definitions provided by Deci and Ryan (2000b) for four of the five types of motivation the authors tie to self-direction. Guay, Vallerand, and Blancard chose not to include items relating to Deci and Ryan's external introjected motivation type. Finally, it should be noted that this scale became available after item construction for the Personal Responsibility Orientation to Self-Direction in Learning Scale (PRO-SDLS) was begun, and, as such, was not directly incorporated into the current investigation.

In conclusion, the proposed relationship appearing in adult education literature between intrinsic motivation and self-direction in learning is more clearly described and documented in psychology literature as a relationship between motivation that is intrinsic or externally motivated but freely chosen. Deci and Ryan's (2000b) descriptors of types of motivation provide operationalized definitions of motivations

that may be utilized in item constructions for the learning characteristics (LC) component of the PRO-SDLS.

The next section of this review examines the relationship between control located within a cognitive theory of learning and control as a personality characteristic of a self-directed learner. The findings presented will draw from the fields of psychology and adult education.

Social Cognitive Learning Theory and Self-Direction

Beginning in the late 1970s, Haidt and Robin (1999) note a shift from motivational explanations of control to a social cognitive learning explanation emphasizing an individual's beliefs about control and agency as they relate to beliefs about the self. Scholars from the adult education field framed these beliefs as self-confidence; scholars from the field of psychology framed these beliefs as self-efficacy.

Self-Confidence and Self-Direction

A theme common to the PRO Model of Self-Direction in Learning (Brockett & Hiemstra, 1991) and other writings on self-direction is the learner's self-confidence in self-directed activities. Early studies explored the relationship between self-confidence, self-esteem, and students' self-directed readiness utilizing the SDLRS (L. M. Guglielmino, 1977) scores. McCune (1989a), in her meta-analytic review of the relationship between self-directed learning and other variables, noted a significant mean effect size ($d = .230$) in the twelve studies that investigated the relationship with self-confidence. Jones (1992) noted a significant positive correlation

($r = .39, p < 0.01$) between self-esteem scores and scores from the SDLRS. In this same study, scores from an author designed art self-confidence scale produced a moderate positive correlation ($r = .58, p < 0.01$) with SDLRS scores. Kitson, Lekan, and P. J. Guglielmino (1995) also noted a positive correlation ($r = .30, p < .05$) between scores from the SDLRS and the self-confidence subscale of the California Psychological Inventory. However, none of these studies investigated the relationship between self-directed learning performance, self-confidence, and SDLRS (L. M. Guglielmino, 1977) scores.

However, in 1994, Jones suggested the construct self-confidence should be more precisely defined in adult education literature as self-efficacy based on Bandura's (1977) social-cognitive learning theories. Murphy and Alexander (2000) concurred, and in their review of motivational constructs and academic achievement, cite self-efficacy as the more useful (in terms of its association with academic achievement) and more clearly defined construct.

Self-Efficacy and Self-Direction

Bandura (1977) defined self-efficacy as "people's judgments of their capacities to organize and execute courses of action required to attain designated types of performances" (p. 391). Efficacy expectations are domain and situation specific, unlike outcome expectations (e.g., locus-of-control), which seem to have little use in predicting specific behaviors.

Zimmerman (2000), in his review of 20 years of research assessing the role of self-efficacy in academic motivation, cites evidence that self-efficacy beliefs are

positively associated with student effort (increased rates of performance and expenditure of energy), choice of activities (more difficult and challenging), decreased emotional reactions (stress, anxiety, and depression), and the use of self-regulatory processes (goal setting, self-monitoring, self-evaluation, and learning strategy selection). Multon, Brown and Lent (as cited in Zimmerman) in their 1986 meta-analysis of self-efficacy and academic performance cite a significant overall effect size ($d = .38$) across a variety of samples, designs, and criterion measures.

One scale was located that attempts to measure the possible relationship between self-efficacy and self-direction. The ten-item Self-Efficacy for Self-Directed Learning Questionnaire (SESDLQ) was developed by Hoban and Sersland in 1998 to assess a student's potential performance in instructional delivery systems requiring a high degree of learner self-direction. In an article summarizing the results of their previous research, Hoban and Sersland (2000) traced findings that noted a linkage between adult learner performance in specific academic areas, SDLRS (L. M. Guglielmino, 1977) scores, and SESDLQ scores. Hoban and Sersland (2000) then report the results of additional studies to validate the connection and predictive potential of the two measurement instruments.

The results note a significant correlation between the SDLRS score totals and the SESDLQ score totals ($r = .62, p < .001$). They also present findings that suggest their scale, rather than the SDLRS, is a better predictor of actual academic performance. Hoban and Sersland (1998) suggest their 10-item Likert-scored scale yields a total scale score from 0 to 100. The items are written to reflect Bandura's

(1977) definition of self-efficacy. The authors have chosen not to publish the content of their scale items, but report an internal consistency measure of reliability using Cronbach's alpha of .89. Thus, this scale was not available for use in the present study.

In conclusion, although the more global construct of self-confidence is often cited as an important learner characteristic of a self-directed learner in adult education literature, a more predictive indicator of actual self-directed learning may be a student's self-efficacy regarding competence to perform self-directed learning activities. Only one scale, the SESDLQ (Hoban & Sersland, 1998), was located that linked item content relevant to Bandura's (1977) definition of self-efficacy with self-directed learning performance. The content of the scale items remains unpublished. However, evidence appears to suggest items assessing a student's perception of their self-efficacy for self-direction may be a valuable addition to the PRO-SDLS.

Summary

In this chapter, five relevant areas of research devoted to self-direction in learning were examined. Discussion of the early descriptive results established the existence of self-directed learning activities within formal learning situations. Findings from subsequent quantitative research described attempts to measure and further describe a student's perceptions of this type learning. The SDLRS (L. M. Guglielmino, 1977) played a major role in the quantification of learner readiness for self-direction. Qualitative research and recent conceptual models of self-direction

more fully flushed-out various characteristics associated with a self-directed learner. Based on findings from psychology and adult education literature, two characteristics, intrinsic motivation and self-efficacy, are identified as particularly relevant for the LC component of the PRO Model of Self-Direction in Learning proposed by Brockett and Hiemstra (1991). Therefore, Chapter III will describe a method to develop a reliable and valid measurement of college students' self-direction, based on a conceptualization of self-direction described by Brockett and Hiemstra (1991).

CHAPTER III

METHOD

Chapter I served as an introduction to this investigation, presenting information concerning the study's problem, purpose, research issues, and relevant theoretical influences. Chapter II reviewed the pertinent research. Chapter III will present descriptions of the population and sample, information concerning sample size, psychometric and descriptive information about other instruments and questionnaires employed in this study, a description of the procedure, and a discussion of the chosen statistical procedures utilized to address the previously outlined research objectives. The chapter will conclude with a brief summary.

Population and Sample

The population for this study was day and evening school students attending The University of Tennessee, Knoxville. The University of Tennessee, Knoxville is the largest state university in Tennessee. Enrollment figures obtained from the university's home website (http:web.utk.edu/~oira/facts) list a total student population of about 25,000 students; approximately 80% are undergraduates and the remainder are graduate students. Approximately 80% of the students are residents of the state of Tennessee. Queries about race, gender, and age yielded the following information:

1. Of the total enrollment, 87% of the students list their race as white, 6% as black, and 7% list their race as hispanic, Asian, or International.

2. Enrollment figures by gender suggest an almost equal distribution of males and females.
3. Sixty-two percent of the students fall within the age range of 18-22. Another 25% fall within the age range of 23-30. Students between the ages of 31-40 comprise another 6% of the population, and 5% of the students list their age as over 40.

Convenience sampling was used to obtain the sample for this study. All students were drawn from various sections of an undergraduate educational psychology course in human development and from a graduate course in adult learning. The undergraduate course is a requirement for teacher certification and, as such, students possess diverse academic interests, with enrollees including adult graduate students returning to school to obtain teacher certification.

Although Gall, Gall, and Borg (2003) suggested that random sampling is generally identified as a superior sampling method to convenience sampling, "researchers often need to select a convenience sample or face the possibility that they will be unable to do the study" (p. 175). However, these same authors also noted that clearly identifying the population to which the results may generalize is paramount. Therefore, it is postulated that the demographic information from this sample adequately reflects the general population of students from the University of Tennessee and other large land grant universities in the United States. However, it should be noted that the sample participants were all drawn from students enrolled in

courses offered through the College of Education, which may limit the generalizability of these results.

Sample Size

Sample size was based on Crocker and Algina's (1986) review of guidelines for doctoral students developing an instrument for research. They stated, "at the minimum, 20 items and 100 subjects should probably be used" (p. 322). However, they also cited Nunnally's (1967) rule of five to ten times as many subjects as scale items, and they finally concluded that psychometric stability can probably be established with 200 examinees. Thus, the sample size for the three studies was 178, 184, and 219.

Research Design

The purpose of this study was the development of a reliable and valid instrument to measure self-directedness in learning among college students based on an operationalization of the process and learner characteristics components of the PRO Model of Self-Direction in Learning (Brockett & Hiemstra, 1991). As such, this research was a methodological investigation into the psychometric properties of the proposed scale involving correlational analyses. The correlational analyses were employed to explore relationships between variables in this study (i.e., item-test scores, test-test scores, criterion-predictor variable scores).

Instrumentation

The researcher employed one established instrument to measure self-direction: L. M. Guglielmino's (1977) Self-Directed Learning Readiness Scale (SDLRS); and three author-designed questionnaires to (a) gather demographic information, (b) solicit professor ratings of students' self-directedness, and (c) survey expert opinion as to the appropriateness of the newly developed Personal Responsibility Orientation to Self-Direction in Learning Scale (PRO-SDLS) items. The SDLRS and the three questionnaires are reviewed in the following subsections.

Self-Directed Learning Readiness Scale (SDLRS)

The author presented an extensive review of the SDLRS (L. M. Guglielmino, 1977) in Chapter II. To summarize, the SDLRS is a 58-item Likert-formatted scale that asks respondents to rate their degree of agreement or disagreement with items relating to their perception of their readiness for self-directed learning.
L. M. Guglielmino developed the items based on characteristics of a self-directed learner identified by a 13-member Delphi panel as necessary or desirable. The estimates of the scale's internal reliability have consistently been above .85. However, as was noted in Chapter II, various authors (e.g., Bonham, 1991; Brockett, 1985a; Field, 1989) have raised issues relating to item content and the generalizability of scale interpretations to some populations.

A brief summary of inferences made from SDLRS scores suggests that scale totals seem to differentiate groups identified as high in self-direction from groups

identified as low in self-direction. However, the predictive capacity of the scale scores appears to be low. The evidence appears generally supportive regarding the relationship between scores from the SDLRS and scores from other criterion variables such as age, educational attainment, and GPA. Studies that investigated relationships between SDLRS scores and other related constructs, such as self-esteem, field independence, creativity, and critical thinking, have again presented mixed results. However, a consistent significant relationship has been noted between scores from measures of self-confidence, health-conducive behaviors, and life satisfaction (Brockett, 1985b; McCune, 1989a; Nelson, 2000; Owen, 1999) and SDLRS scores.

Demographic Questionnaire

A demographic questionnaire was also administered in order to gather information regarding a student's age, educational attainment, gender, college GPA, and ACT/SAT results. Although ethnicity is certainly an under-investigated area in the study of self-direction, the homogeneous composition of students at the University of Tennessee did not permit this analysis. Students completed the demographic information when completing the initial portion of the PRO-SDLS. A copy of this questionnaire is available in Appendix A.

Questionnaire of Professor Ratings of Students' Self-Directed Learning

The author also requested that one professor of a small graduate course rate, on a scale of one to ten, the students' degree of self-direction based on the construct

described in the PRO Model of Self-Direction in Learning (Brockett & Hiemstra, 1991). A copy of this rating survey is presented in Appendix B.

Questionnaire Regarding PRO–SDLS Item Content

Six identified experts with the PRO Model of Self-Direction in Learning (Brockett & Hiemstra, 1991) were queried as to the item construction of the PRO-SDLS: specifically, representativeness of the items to the domain, appropriateness of the items' content, and appropriateness of the item format. Two of the experts were the authors of the PRO model (Ralph Brockett and Roger Hiemstra), and the remaining four experts were those identified by the model's authors as highly knowledgeable of the construct. The experts were asked to rate each item for content and representativeness on a scale from 1 (strongly disagree) to 5 (strongly agree). The experts also were asked to indicate their degree of agreement with the format chosen for the scale. A copy of the questionnaire and accompanying cover letter are available in Appendix C.

Research Procedure

Crocker and Algina (1986) present a systematic process of test development, which will serve as the structure for the research procedure to be followed in this investigation. Each step will be discussed in the following subsections, and each subsection also will include a brief discussion of the appropriate statistical techniques

associated with that step. However, specific statistical procedures employed in this study are presented under the data analysis section.

Steps in Scale Construction

Crocker and Algina (1986) noted that "the goal of most measurement in education and the social sciences is the location of individuals on a quantitative continuum with respect to a particular psychological construct" (p. 66). This is known as subject-centered measurement. The following subsections: identifying a basic purpose, identifying appropriate behaviors, delineating test specifics, selecting an item format, writing the items, reviewing the items, and field testing describe appropriate steps in the systematic process of test construction.

Identifying Basic Purposes of Test Score Use

Clearly identifying the purposes and priorities of a scale's use increases the probability that the final version of the scale will be appropriate for its intended use (Crocker & Algina, 1986). The major purposes of the PRO–SDLS test scores were identified as two-fold: providing empirical support for the PRO Model of Self-Direction in Learning (Brockett & Hiemstra, 1991) among college students and the identification of those individuals possessing the characteristics of a self-directed learner described in the model.

Identifying Behaviors to Represent the Construct

Most authors on test construction (e.g., Nunnally & Bernstein, 1994) suggest a thorough review of research and expert opinion to identify the appropriate content of

test items. The test items for this scale were written to reflect the two components of the PRO Model of Self-Direction in Learning (Brockett & Hiemstra, 1991), previously defined as:

1. a teaching-learning (TL) transaction in which the learner demonstrates proactive personal responsibility for planning, implementing, and evaluating the learning process; and,
2. a learner's characteristics (LC), defined for purposes of this study, as a degree of self-efficacy and motivation that predispose one toward taking primary responsibility for learning.

Preparing Test Specifications

This step involved delineating a plan that noted the relative importance of the competencies identified in Step 2. However, no differential weighting was given to any one component or subcomponent in the Brockett and Hiemstra (1991) model; therefore, initial item construction reflected an approximate equal distribution of items.

Selecting an Appropriate Item Format

A Likert-format was chosen as the format that best reflected student's degree of agreement or disagreement with statements pertaining to their perceptions of their actions and beliefs in self-directed learning opportunities. A Likert method of scaling uses a collection of statements, each clearly positive or negative with respect to the construct under study. No neutral statements were included. Students were asked to respond on a graded continuum from 1 = strongly disagree to 5 = strongly agree.

Items that were considered negative with respect to the construct were reverse scored. Nunnally and Bernstein (1994) suggested that including reverse scored items avoids "confounding the measure of the trait with individual differences in willingness to say yes (acquiescence)" (p. 314).

Total scale scores derived from Likert-scored items are traditionally treated as interval data. However, for researchers who question this assumption, Crocker and Algina (1986) stated that the reliability and validity standards established for scale construction will not be met if the Likert scores do not approximate equally ordered units. Therefore, scale scores from the PRO-SDLS were treated as interval data.

Writing the Items

Nunnally and Bernstein (1994) suggested that "although there are some rules for writing good items, writing test items is an art few people master. Nearly everything can be summed up by the word 'clarity'" (p. 297). Crocker and Algina (1986, p. 80) further summarized these rules as follows:

1. Put statements in the present tense.
2. Do not use statements that are factual.
3. Avoid statements that have more than one interpretation.
4. Avoid statements that are likely to be endorsed by almost everyone or no one.
5. Try to have an equal number or positive and negative statements.
6. Statements should rarely exceed 20 words.
7. Statements should be proper grammatical sentences.

8. Statements containing universals should be avoided.

9. Avoid the use of indefinite qualifiers.

10. Whenever possible, statements should be in simple sentences.

11. Use vocabulary that can be understood by the respondents.

12. Avoid use of negatives (e.g., not).

Reviewing the Items

The next step involved "asking qualified colleagues to review them [test items] informally for accuracy, wording, ambiguity, and other technical flaws" (Crocker & Algina, 1986, p.81). To meet this requirement, an expert in scale construction and a panel of graduate students attending an advanced seminar in scale construction reviewed the initial item bank. The test items also were tried out informally on a small sample of students as part of a course requirement for an applied seminar in scale construction. Although the informal statistical results were used to supplement the expert review of items, none of these data were used in any further analysis.

Items also need to be reviewed by experts as to the appropriateness of the content as a sample of the domain. However, Crocker and Algina (1986) stated that "if results of the item review are to be reported as evidence of the content validity, it is especially important for the review panel to examine items in their final form" (p. 82). Therefore, the expert panel review was conducted when items were in their final form.

The Next Steps: Field Testing

After the prototype items were revised, the scale was administered to a large sample of students representative of the target population. Statistical properties such as reliability and validity of the scale were examined at this time. The PRO-SDLS was administered at three different periods, which allowed for revisions or additions of the items as warranted. A brief outline of the administration timetable is presented in Table 3.1.

Studies 1 and 2 addressed the purpose of developing a reliable measure of self-direction in learning in a college population based on Brockett and Hiemstra's (1991) PRO model conceptualization. Gall, Gall, and Borg (2003) succinctly state that "reliability is essential to validity" (p. 196). In classical test theory, the reliability of test scores refers to the amount of measurement error present in the test score. Numerous procedures (e.g., alternate forms, test-retest, internal consistency) have been developed to estimate true scores and measurement errors based on a domain-sampling model; all involve the computation of a reliability coefficient.

Table 3.1. Timetable for Field Development Testing

Semester	Study Number	Scale Composition	Administration Purpose
I	Study 1	Items sampling the TL component	Reliability
II	Study 2	1. Revised items sampling TL component 2. Items sampling LC component	Reliability
III	Study 3	All revised items sampling TL and LC components	Reliability Validity

Cronbach's coefficient alpha provides the basic estimate of reliability (Nunnally & Bernstein, 1994). The authors explain that coefficient alpha "is basically the ratio of the sum of the covariance among the components of the linear combinations (items), which estimates true variance, to the sum of elements in the variance-covariance matrix of measures, which equals the observed variance" (p. 212).

The primary purpose of Study 3 was to assess the validity of the PRO–SDLS. The 1999 *Standards for Educational and Psychological Testing* state that validity is the "degree to which evidence and theory support the interpretation of test scores entailed by the proposed uses" (American Educational Research Association, American Psychological Association, & National Council on Measurement in Education, 1999, p. 9). When discussing the construction of specific tests, Nunnally and Bernstein (1994) suggest that tests may be designed and evaluated by standards of content validation, construct validation, or predictive validation. Construct validation is the most applicable to this investigation in that the measure under study (self-direction) is defined from a theory or model that suggested or defined the properties of the measure. Nunnally and Bernstein (1994) further remind us that this "validation simultaneously tests the theory at the same time that it tests the measure, a difficult process of 'bootstrapping'" (p. 311). Construct validation is "evaluated by investigating what qualities a test measures, that is, by determining the degree to which certain explanatory constructs account for an individual's performance on a test" (Lounsbury, personal communication, 2001). Many types of validity can therefore be subsumed under construct validity. As previously described, this

investigation will address issues of congruent, convergent, and incremental construct validity.

Informed Consent Procedures

Three "Form D" amendments were submitted to the previously approved Form B. IRB No. 5544B for assessing cognitive and behavioral predictors of success in college students. The first amendment noted the inclusion of this writer as a co-investigator, and the addition of the "Learning Experiences Questionnaire" to the other assessment measures previously approved as research activities in this course. It should be added that the PRO-SDLS scale was retitled the "Learning Experiences Questionnaire" to avoid student bias in responding. The second "Form D" noted the revisions to the items of the Learning Experiences Questionnaire (PRO-SDLS items). The final "Form D" outlined the revisions to PRO-SDLS items, the addition of the SDLRS (L. M. Guglielmino, 1977) assessment instrument, and the addition of students enrolled in a graduate course in adult learning.

The appropriate informed consent forms also were drafted and submitted for approval. To allow matching performance records with scale and demographic information, the last four digits of a student's social security number identified all research activities. No names were entered in the data file. Students could decline participation without penalty. Students enrolled in the undergraduate courses received less than 3% of their total class points for participation in the study, and they were offered the opportunity to decline participation and choose to receive these points for

an alternative activity. Students in the graduate course were offered no points for their participation.

At the beginning of the research activities, students received two copies of the informed consent outlining their voluntary participation. One signed consent was returned to the instructor. A master copy of each informed consent is available in Appendix D at the end of this dissertation.

Scale Administration Procedure

This author presented a brief explanation of the nature of the research before students were handed the questionnaire(s) to complete. When more than one questionnaire was administered the order of completion was left up to the student. Printed administration instructions (Appendix A) for students also were located at the top of the questionnaire, following the request for demographic information. There was no time limit for completion of the SDLRS or the PRO-SDLS. All research activities were conducted early in each semester during class time.

Research Issues and Data Analysis

The researcher initially composed the research objectives presented in Chapter I to assess the reliability and validity of a scale operationalized from a conceptualization of self-direction in college students' learning based on Brockett and Hiemstra's (1991) PRO Model of Self-Direction in Learning. Six objectives were identified as relevant.

Research Objective #1

A reliable measure of self-directedness will be developed. For purposes of this study, the new scale will subsequently be identified as the Personal Responsibility Orientation to Self-Direction in Learning Scale (PRO-SDLS). It is expected that this scale will comprise one factor and will achieve an internal consistency of at least .80, using Cronbach's alpha.

Cronbach's alpha, an estimate of internal consistency, was utilized to assess the reliability of the PRO-SDLS in Studies 1, 2, and 3. Corrected item-total correlations, were also computed. Nunnally and Bernstein (1994) suggested the use of corrected item-total correlations removes a "spurious source" (p. 303) of item-total correlation; that is, the item score in question is no longer part of the total score for correlation purposes. Study 1 and Study 2 results from these procedures were utilized to revise the Study 3 scale content. Scale item and total scores from Study 3 underwent the same statistical analyzes. Additionally, descriptive statistics were generated for the scale.

Research Objective #2

Content validation will be established using a panel of experts with positive agreement and high inter-rater reliability as to the representativeness of item samples, appropriateness of item content, and appropriateness of item format.

As stated previously, the authors of this model of self-direction (Brockett & Hiemstra, 1991), plus four other experts the authors designated were sent a questionnaire (Appendix D) listing the final items of the PRO-SDLS (Study 3). Each expert was asked to rate anonymously on a 5-point scale the strength of their agreement (5 = strongly agree) or disagreement (1 = strongly disagree) with the following features of the scale: (a) item representativeness, (b) item format, and (c) item appropriateness. A descriptive table was produced from these data noting the item content, the percentage of inter-item agreement, the mean rating level, and percentage of expert/author component agreement.

Research Objective #3

To explore the congruent validity of the measure of self-directedness, the relationship between scores from the Self-Directed Learning Readiness Scale (SDLRS; L. M. Guglielmino, 1977) and the PRO-SDLS will be examined. The PRO-SDLS total scores are expected to produce moderately significant congruent validity coefficients with scores from the SDLRS, an established measure of self-directedness.

This question was answered utilizing a Pearson product-moment correlations (r). The strength of any statically significant relationship (p) also was interpreted, and the proportion of variance (r-squared) in the SDLRS accounted for by the PRO-SDLS was calculated. The relationship and amount of explained variance between the PRO-

SDLS components (TL and LC) were also examined utilizing Pearson product moment correlations (*r*s) and *r*-squared values.

Research Objective #4

Construct validity will be informed by examining the relationship between scores on self-directedness and logically related behavioral criteria including optional web-site use of supplementary materials, age, gender, GPA, course performance, and educational attainment.

Pearson correlation coefficients (*r*s), significances (*p*s), and amounts of explained variance (*r*-squares) were calculated between scores from the PRO-SDLS and measurements of web-site hits, GPA, ACT, educational attainment and course performance if the distributions of the criterion variables were normal. If the assumption of normal distribution was not met (e.g., age), a Spearman *rho* correlation coefficient was calculated. An independent t-test examined the difference and possible significance of PRO-SDLS scores based on gender. It should be noted that previous research utilizing scores from the SDLRS (L. M. Guglielmino, 1977) has presented some evidence for a relationship between age, gender, GPA, and educational attainment and self-direction.

Research Objective #5

Convergent validity will be evaluated by examining the relationship between scores on self-directedness and ratings by professors of the self-directedness of their students who have completed the scale.

This objective asked for an examination of the relationship between two independent measures of self-directedness: the PRO-SDLS scale totals and a single ordinal rating by a professor with more than four categories. Spearman's *rho* correlations examined the relationship between these variables.

Research Objective #6

Incremental validity statistics will demonstrate the new scale scores (PRO-SDLS) add significant unique variance to the prediction of self-direction above and beyond scores from the SDLRS.

A series of hierarchical multiple regression analyses were conducted to investigate this objective. Criterion variables included age, GPA, and previously completed semester hours. In an hierarchical process, predictor variables are entered in a set order. The SDLRS (Guglielmino, 1977) scores served as a covariant for the 2nd entered variable, PRO-SDLS scores. Nunnally and Bernstein (1994) summarized this procedure: "Hierarchical selection, therefore, is not concerned with what a predictor tells us about the criterion, but what it adds to what is already known based on successive partialling" (p. 196). The unique variance contributed by the PRO-SDLS was designated by the squared semi-partial correlation coefficient.

Summary

Approximately two hundred students enrolled at the University of Tennessee, Knoxville served as the convenience sample for two separate administrations of the PRO-SDLS to establish the reliability of this scale. An additional two hundred students from the same population comprised the final sample. To provide evidence of scale validity, students were asked to complete the SDLRS (Guglielmino, 1977), the PRO–SDLS, and provide other demographic and course performance data. In a selected subsample (graduate course enrollees), the professor was asked to independently rate a student's level of self-direction in learning based on the conceptualization of self-direction presented by Brockett and Hiemstra (1991). To examine the content validity of the scale items, experts in the conceptulization provided by Brockett and Hiemstra examined and rated the content of the scale items. The data were analyzed based on correlational and descriptive techniques. Chapter IV will present the analyses of data and apply the obtained results to the six research objectives.

CHAPTER IV

RESULTS

Chapter III presented information concerning the study population, sample, research design, instrumentation, research objectives, and appropriate statistical procedures. Chapter IV presents the results of the data analyses conducted utilizing the SPSS statistical package version 11.0 (SPSS, 2002). Inasmuch as data were collected on three occasions, study descriptives and results are organized around date of data collection and are identified as *Study 1 Results, Study 2 Results,* and *Study 3 Results*. Studies 1 and 2 were primarily designed as preliminary field tests to assess the reliability of items written to represent the teaching-learning (TL) component and/or the learner characteristics (LC) component of the PRO Model of Self-Direction in Learning (Brockett & Hiemstra, 1991). These preliminary analyses were utilized to guide final item selection for the Personal Responsibility Model of Self-Direction in Learning Scale (PRO-SDLS) administered in Study 3.

Results presented from Studies 1 and 2 include descriptions of the participants and their academic performance and preliminary reliability findings from the Personal Responsibility Orientation to Self-Direction In Learning Scale (PRO-SDLS). Also presented are preliminary validity findings obtained from examining relationships between PRO-SDLS scores and data from variables previously noted in this study to be associated with self-direction. A summary concludes both Study 1 and Study 2 findings.

The results section for Study 3 initially presents descriptive information concerning the participants and their academic performance, followed by the psychometric scale data obtained from L. M. Guglielmino's (1977) Self-Directed Learning Readiness Scale (SDLRS). The research objectives are then presented and discussed based on the statistical analyses of data obtained from Study 3. Finally, a summary reviews the strengths and weaknesses of the results and introduces the issues discussed in Chapter V.

The population for all studies were students enrolled in undergraduate or graduate education classes at The University of Tennessee during three consecutive semesters: Spring, 2001 (Study 1), Fall, 2001 (Study 2), and Spring, 2002 (Study 3). A convenience sample of approximately 200 students was selected to participate voluntarily in each study.

Study 1 Results

A convenience sample of 178 students participated voluntarily in Study 1 after reading and signing a copy of the informed consent available in Appendix D. All participants were drawn from four sections of a College of Education required course for undergraduates offered through the Educational Psychology Department. Enrollees typically were undergraduates; however, it should be noted that this course also enrolled graduate students returning to school to obtain teacher certification.

Demographic Information

A demographic questionnaire was presented as an introduction to the scale administration (Appendix A). Participants were asked to supply general information (age, gender) and information concerning previous academic performance (grade point average [GPA], American College Testing Assessment Test [ACT] score, and previously completed semester hours). Concurrent course performance data also were recorded and will be described in this section.

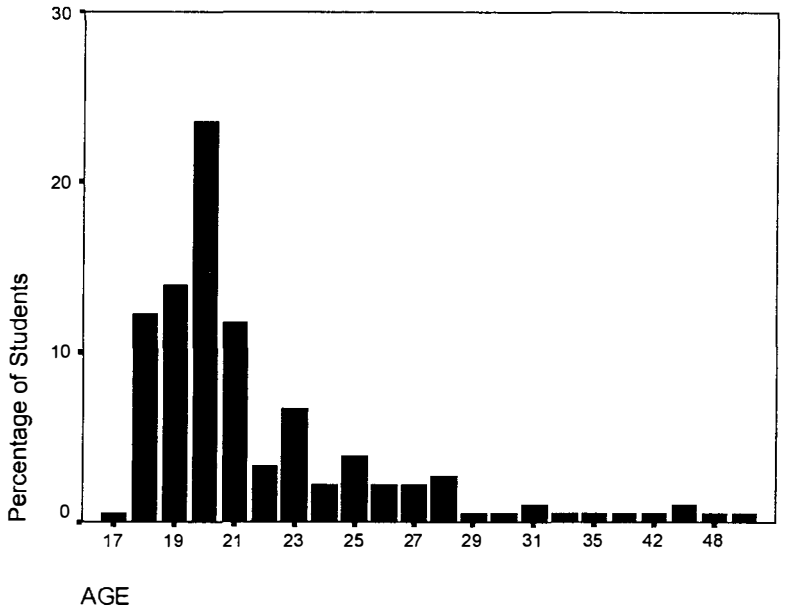
Age

The mean age reported by the participants was 22.16 ($SD = 5.54$). Ages ranged from 17 (emancipated minor) to 53. Other measurements of central tendency found the most frequently cited age was 20 (24% of the sample); however, 15% of the students listed their age as 25 or older. Examining measures of deviation from normality yielded an extreme positive kurtosis (11.06), suggesting a distribution where more of the age-values are in the tails of the distribution than around the mean. Figure 4.1 on the following page graphically presents the frequencies and percentages for age.

Gender

Forty-six (26%) of the participants were male, 117 participants (66%) were female, and 15 students (8%) left this query blank. This was a ratio of about three females to one male.

Figure 4.1. Frequencies and Percentages for Age (Study 1)



Previous Academic Performance

Students' self-reported GPAs resulted in a mean GPA of 2.93 (*SD* = 0.64). Scores ranged from 0.63-4.00. The mean number of previously completed semester hours was 62.90 (*SD* = 42.05). However, some students (4%) had previously completed less than a semester of coursework, and 12% of the sample had previously completed more than 120 semester hours. Students also self-reported ACT scores. The mean reported ACT score was 23.77 (*SD* = 3.82), and scores ranged from 15-34. The minimum and maximum score, mean, and standard deviation for each variable summarized above are presented in Table 4.1. Measures of deviation from normality (skew and kurtosis) were all between –1 and +1.

Table 4.1. Descriptive Statistics for GPA, Previous Semester Hours, and ACT Scores (Study1)

	N	Minimum	Maximum	Mean	Std. Deviation
GPA	147	.63	4.00	2.93	.64
Previous Semester Hours	151	3.00	200.00	62.90	42.05
ACT	133	15.00	34.00	23.77	3.82

Table 4.2. Descriptive Statistics for Classroom Performance Scores (Study 1)

	N	Minimum	Maximum	Mean	Std. Deviation
Total Course Points	167	171.00	375.00	300.80	38.23

Concurrent Course Performance

The classroom performance of each participant was also recorded. Students could earn approximately 400 points in the course. Points were earned for performance on multiple-choice exams, essay quizzes, a paper, research participation, and article/workshop reviews. The grade scale was as follows: A = 90-100%, B = 80-89%, C = 70-79%, D = 60-69%, F = below 60%. As Table 4.2 documents, the mean total points for the participants was 300.80 (*SD* = 38.23). The scores were normally distributed.

Psychometric Properties of the PRO-SDLS (Study 1)

The PRO-SDLS (Study 1) included 24 items written to sample participant's level of agreement with characteristics of the TL component relevant to Brockett and Hiemstra's (1991) description of a self-directed learner. One hundred and fifty-seven

(88%) of the targeted students completed the scale. This section of the findings will present item content and scale reliability data, descriptive scale statistics, and preliminary validity results utilizing PRO-SDLS (Study 1) score totals derived from retained items.

Reliability

Cronbach's coefficient alpha (a measure of internal consistency) was selected as the reliability statistic for this exploratory analysis. Coefficient alpha is measured on the same scale as a Pearson product moment coefficient (*r*) and typically varies between 0 and 1 (Gay & Airasian, 1996). The closer the coefficient is to 1, the greater the internal consistency of the scale. Entering all item scores from the PRO-SDLS (Study 1) yielded an initial coefficient alpha of .86. The deletion of five items (5, 10, 13, 14, 18; located in Table 4.3) to maximize the estimated value of internal consistency raised the coefficient alpha to .87, meeting the commonly used criterion (>.70) for acceptable reliability (Gay & Airasian, 1996). However, as Nunnally and Bernstein (1994) note, variables should not be automatically dropped to maximize reliability if theoretical reasons support their inclusion in the measurement instrument. This may be an especially pertinent statement given the exploratory nature of Study 1 and the acceptable coefficient alpha (.86) obtained with the inclusion of all 24 items. The item content and corrected item-total correlations for both the 24- and 19-item scales are displayed in Table 4.3 on the following page. All corrected item-total correlations for the 19-item scales are above .30, the "best" *r*-value for inclusion of an

Table 4.3. PRO-SLRS (Study 1) Items and Item-Total Scale Correlations for 24-Item and 19-Item Scales

Item	Item-Total Correlation		Item	Item-Total Correlation	
	24-item scale	19-item scale		24-item scale	19-item scale
1. I never had a problem carrying out my study plans.	.54	.59	13. Without the instructor's help, I always have a problem knowing what changes I need to make to improve my learning.	.33	
2. I frequently do extra work in a course just because I am interested in the answers.	.59	.59	14. I usually find a way to relate my research projects for a course to my own interests.	.32	
3. I always view problems I encounter in my learning as "personal challenges" that I can overcome.	.38	.36	15. I always effectively take responsibility for my own learning.	.50	.52
4. I consistently motivate myself to do well in any course I take.	.51	.57	16. I am very successful at prioritizing my learning goals	.60	.63
5. I usually do better in courses when the instructor tells me exactly what I need to learn rather then when I choose my own topics for learning.	.27		17. The instructor is always in control of what I learn about a topic.	.36	.31
6. If I'm not doing as well as I would like in a course, I always independently make the changes necessary for improvement.	.40	.44	18. I have taken elective courses simply because they were personally useful.	.23	
7. I always feel in control of the learning process.	.32	.32	19. I often use materials I've found on my own to help me in a course.	.43	.42
8. I usually struggle in classes if the professor allows me to set my own timetable for work completion.	.41	.41	20. I always effectively organize my study time.	.50	.56
9. I would rather take the initiative to learn new things in a course rather than wait for the instructor to foster new learning.	.41	.39	21. I always assume personal responsibility for my learning.	.42	.43
10. I always depend on the instructor to make sense of things I don't understand.	.33		22. I often have a problem motivating myself to learn.	.58	.57
11. I often collect additional information about interesting topics even after the course has ended.	.53	.50	23. I always rely on the instructor to tell me what I need to do in a course to succeed.	.37	.32
12. If there is something I don't understand in a class, I always try to find a way to learn it on my own.	.39	.41	24. Even after a course is over, I often continue to spend time learning about the topic.	.54	.51

item in the final version of a scale (Nunnally & Bernstein, p. 305). If all 24 items are retained, two items (5,8) do not meet Nunnally and Bernstein's standard.

Scale Descriptive Statistics

The PRO-SDLS (Study 1) descriptive statistics suggest that both the 24- and 19-item scale scores are normally distributed. As presented in Table 4.4, the 24-item PRO-SDLS has a mean of 79.74 ($SD = 9.96$); the 19-item PRO-SDLS a mean of 63.24 ($SD = 8.46$).

Validity

Inasmuch as acceptable reliability was obtained for both versions of the PRO-SDLS (Study 1) and data were available to address validity issues, exploratory analyses were conducted to assess the relationship between scale scores and age, GPA, ACT scores, previously completed semester hours, and course performance. Due to the distribution of the ages, Spearman's *rho* statistic was employed to examine the relationship between PRO-SDLS scores and age. The relationship with all other variables was examined using the Pearson *r* correlation coefficient.

As documented in Tables 4.5 and 4.6, significant relationships were present between the 24-item PRO-SDLS (Study 1) scale scores and age, ACT, GPA, previous

Table 4.4. Descriptive Statistics for 24-Item and 19-Item PRO-SDLS (Study 1) Totals

	N	Minimum	Maximum	Mean	Std. Deviation
PRO-SDLS Total (19 items)	156	42.00	87.00	63.24	8.46
PRO-SDLS Total (24 items)	155	55.00	107.00	79.74	9.96

Table 4.5. Correlations Between PRO-SDLS (Study 1) Scores and Age

			PRO-SDLS Total (19 items)	PRO-SDLS Total (24 items)
Spearman's rho	AGE	Correlation Coefficient	.236**	.274**
		Sig. (2-tailed)	.003	.001
		N	156	155

**. Correlation is significant at the .01 level (2-tailed).

Table 4.6. Correlations Between PRO-SDLS (Study 1) Scores and ACT, GPA, Previous Semester Hours, Class Performance Points

		PRO-SDLS Total (19 items)	PRO-SDLS Total (24 items)
ACT	Pearson Correlation	.122	.177*
	Sig. (2-tailed)	.175	.048
	N	125	125
GPA	Pearson Correlation	.401**	.403**
	Sig. (2-tailed)	.000	.000
	N	141	140
Previous Semester Hours	Pearson Correlation	.225**	.263**
	Sig. (2-tailed)	.007	.002
	N	142	141
Class Performance Points	Pearson Correlation	.295**	.327**
	Sig. (2-tailed)	.000	.000
	N	146	145

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

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

semester hours, and total class performance points. Similar relationships are noted for the 19-item PRO-SDLS (Study1) scale scores, with the exception of a non-significant relationship between PRO-SDLS (19-item) totals and ACT scores.

Utilizing a coefficient of determination (*r*-squared) further describes the proportion of variance in one variable that is "determined" by another (Nunnally & Bernstein, 1994). The correlation between GPA and PRO-SDLS (Study 1) scores suggest that 16% of the variance in GPA was accounted for by PRO-SDLS (Study 1) scores; the other significant PRO-SDLS (Study 1) scores account for less than 11% of the variance in the other variables.

Two independent t-tests located no significant differences in PRO-SDLS (19- and 24-item) score means based on gender. However, males reported 24-item PRO-SDLS scores ($M = 77.20$, $SD = 9.80$) that approached significantly lower scores than those reported by females ($M = 80.51$, $SD = 9.89$), $t(151) = -1.63$, $p = .07$.

In summary, the initial estimate of internal consistency of the 24-item scale assessing the TL component of self-direction was high. Maximizing the reliability through the deletion of five items also reduced the relationship with variables found to be previously associated with self-direction. Therefore, for purposes of the final scale administration, all 24 items will be included. However, for Study 2, only the 20 strongest items will be included, as the stated purpose of Study 2 is the development of items that may reflect the LC component of the PRO model.

Study 2 Results

A convenience sample of 184 students participated in Study 2. Again, all participants attended one of four sections of a required teacher preparation course offered through the College of Education, Educational Psychology Department.

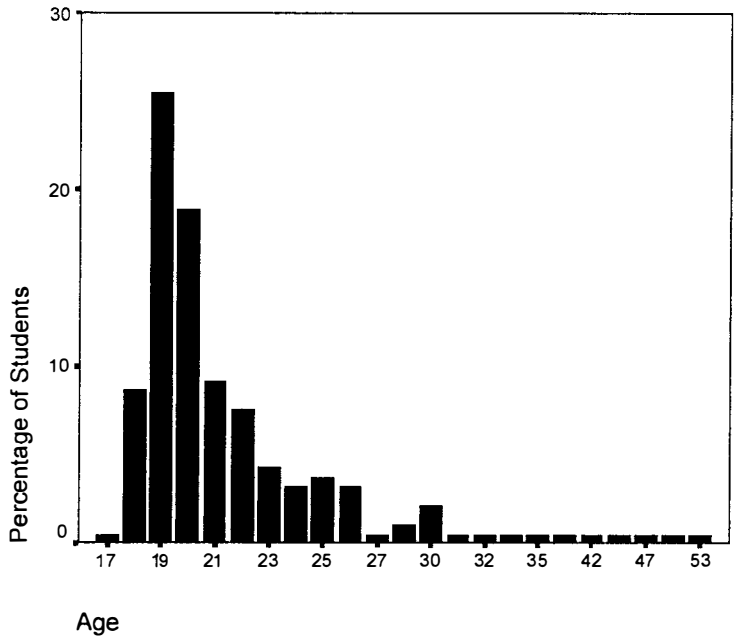
Demographic Information

After completing a copy of the informed consent located in Appendix D, the demographic questionnaire (Appendix A) was again presented as an introduction to scale administration. Participants self-reported information concerning their age, gender, and previous academic performance. As in Study 1, concurrent course performance was also recorded. In addition, survey information regarding students' self-reported use of supplemental web materials was available and tabulated.

Age

Analysis of measurements of central tendency for age produced a mean score of 22.03 (SD = 5.61). Ages ranged from 17-53, and the most frequently cited age was 19 (26% of the sample). Thirteen percent of the sample listed their age as 25 or older. Again, measures of deviation from normality for age yielded an extremely positive kurtosis (11.70) suggesting a non-normal distribution around the mean. The ages and frequencies of ages by percentage of occurrence are presented in Figure 4.2 on the following page.

Figure 4.2. Frequencies and Percentages for Age (Study 2)



Gender

Thirty percent (n = 56) of the students were male, 64% (n = 118) were female, and 6% (n= 10) of the students left this query blank. This was a ratio of approximately two females to one male.

Previous Academic Performance

The students' self-reported mean GPA was 3.06 (SD = 0.53). The mean reported ACT score was 23.98, with a standard deviation of 3.57. Measures of deviation from normality suggested a normal distribution for both variables. The mean number of previously reported semester hours was 64.01 (SD = 41.85). The derived kurtosis value of 5.34 suggested a distribution shape flatter than normal. The maximum and minimum scores, means, and standard deviations are presented in Table 4.7.

Table 4.7. Descriptive Statistics for GPA, ACT, and Previous Semester Hours (Study 2)

	N	Minimum	Maximum	Mean	Std. Deviation
GPA	156	1.60	4.00	3.06	.53
ACT	151	17.00	32.00	23.98	3.57
Previous Semester Hours	154	3.00	300.00	64.01	41.85

Table 4.8. Descriptive Statistics for Class Performance Points (Study 2)

	N	Minimum	Maximum	Mean	Std. Deviation
Class Performance Points	176	97	412	337.34	45.61

Concurrent Classroom Performance

In a manner similar to Study 1, the classroom performance of each participant was recorded. Points were earned based on the performance criteria described in Study 1. However, an additional 35 points were available for article reviews and class participation bringing total possible points to 435. As the data presented in Table 4.8 documents, the mean total points obtained by the participants was 337.34 (SD = 45.61). A calculated kurtosis value of 3.94 suggested a distribution curve significantly flatter than normal.

In addition to performance points, all students were queried as to their concurrent use of supplemental class materials available on the course web site (Appendix E). Students were asked to rate whether and when they used the optional supplements. These materials included copies of transparencies employed as in-class overheads, copies of instructor lecture notes, and copies of practice questions

for the exams. These practice questions were also presented and discussed in class. Although this instructor-designed survey was initially intended to examine the relationship between class performance and supplemental materials use, it also seemed reasonable to examine the relationship between PRO-SDLS scores and scores from the supplemental materials use survey inasmuch as usage of these supplemental materials may indicate a component of self-direction. That is, even though all materials could be obtained via instructor presentation, accessing and reviewing these same materials allowed the student a degree of self-direction not controlled by the instructor. The estimate of internal consistency (coefficient alpha) of the applicable eleven items in the supplementary survey was .75. Descriptive information derived from total survey scores is presented in Table 4.9. The survey scores were normally distributed within a range of 7-31. The participants' mean score was 17.20 (*SD* = 5.20).

Psychometric Properties of the PRO-SDLS (Study 2)

The revised items for the PRO–SDLS (Study 2) included the previously designated 19 items reflecting the TL component of the PRO Model of Self-Direction in Learning (Brockett & Hiemstra, 1991) and 8 new items reflecting the LC component of the model. One hundred and seventy-two students (93% of the sample) completed the scale. This section of the study presents item and scale reliability analyses, descriptive data for the derived scale, and preliminary validity results utilizing PRO-SDLS (Study 2) score totals.

Table 4.9. Descriptive Statistics for Supplemental Survey Total Scores

	N	Minimum	Maximum	Mean	Std. Deviation
Supplemental Materials Survey Total	134	7.00	31.00	17.20	5.20

Reliability

The initial estimate of internal consistency for all items yielded a coefficient alpha value of .84. However, the elimination of 4 items with item-total correlations less than .25 raised this reliability estimate to .86. This figure exceeds the acceptable test reliability of .70 cited by Gay and Airasian (1996). Unfortunately, these four omitted items constituted 50% of the items relating to the LC component of the PRO model. Table 4.10 presents the content of the items and the corrected item-total correlations. The coefficient alpha for the 19 items composing the TL component was recalculated for this sample (Study 2). The coefficient alpha value obtained was .85, very similar to the value obtained in Study 1.

Scale Descriptive Statistics

Table 4.11 presents the descriptive information for the 23-item PRO-SDLS (Study 2) scores, which ranged from 57-102, with a mean score of 79.55 (SD = 9.68). The skew and kurtosis values suggest the scores are normally distributed.

Validity

The acceptable reliability of the PRO-SDLS (Study 2) scores and availability of variables possibly associated with self-direction (previous semester hours, age,

Table 4.10. PRO-SDLS (Study 2) Items and Item-Total Correlations (23 items)

Item	Corrected Item-Total Correlation	Item (continued)	Corrected Item-Total Correlation
1. I never had a problem carrying out my study plans.	.40	13. I always effectively take responsibility for my own learning.	.55
2. I frequently do extra work in a course just because I am interested in the answers.	.47	14. I am very successful at prioritizing my learning goals	.54
3. I always view problems I encounter in my learning as "personal challenges" that I can overcome.	.47	15. I often use materials I've found on my own to help me in a course.	.47
4. I consistently motivate myself to do well in any course I take.	.47	16. I always effectively organize my study time.	.42
5. If I'm not doing as well as I would like in a course, I always independently make the changes necessary for improvement.	.45	17. I often have a problem motivating myself to learn.	.56
6. I always feel in control of the learning process.	.47	18. I always rely on the instructor to tell me what I need to do in a course to succeed.	.38
7. I usually struggle in classes if the professor allows me to set my own timetable for work completion.	.25	19. Even after a course is over, I often continue to spend time learning about the topic.	.58
8. I would rather take the initiative to learn new things in a course rather than wait for the instructor to foster new learning.	.34	***20. I see a connection between the content of this course and what I want to do with my life.***	.31
9. I always depend on the instructor to make sense of things I don't understand.	.25	***21. I have the ability to successfully complete the readings required for this course.***	.46
10. I often collect additional information about interesting topics even after the course has ended.	.46	***22. I have the ability to take detailed lecture notes required for this course.***	.44
11. If there is something I don't understand in a class, I always try to find a way to learn it on my own.	.47	***23. I have had work experiences related to the content of this course.***	.31
12. Without the instructor's help, I always have a problem knowing what changes I need to make to improve my learning.	.31		

Note: Bolded italicized font indicates new items representing the LC component.

Table 4.11. Descriptive Information for PRO-SDLS (Study 2) Scores

	N	Minimum	Maximum	Mean	Std. Deviation
PRO-SDLS 23-item	172	57.00	102.00	79.55	9.68

GPA, classroom performance) prompted analyses of the relationships between the variables. As data distribution dictated, the relationships are examined in Table 4.12 as Pearson product moment correlation coefficients (*r*s) and in Table 4.13 as Spearman *rho* coefficients. In both tables, correlation coefficients are displayed for 19-item scale (representing the TL component), and for the 23-item scale (representing both the TL and LC components). Significant relationships were obtained between both scale scores and scores representing GPA, age, and previous semester hours. There were also significant relationships between PRO-SDLS (Study 2) scores and scores from the supplemental materials survey and total course points. The relationships seemed to be enhanced by the addition of the four items representing the LC component of the PRO model, with the exception of GPA. However, the coefficients of determination (*r*s-squared) remain low (<13%) suggesting PRO-SDLS (Study 2) scores do not explain a high percentage of variance in the other variables.

The relationship between PRO-SDLS (Study 2) scores and gender was examined by conducting two independent *t*-tests (one for the 19-item scale, another for the 23-item scale). No significant mean differences were noted.

Table 4.12. Correlations Between PRO-SDLS (Study 2) Scores and ACT, GPA, Supplemental Materials

		PRO-SDLS 19-item Total	PRO-SDLS 23-item Total
ACT	Pearson Correlation	.099	.113
	Sig. (2-tailed)	.229	.171
	N	150	149
GPA	Pearson Correlation	.236**	.231**
	Sig. (2-tailed)	.003	.004
	N	155	154
Supplemental Materials Survey Total	Pearson Correlation	.347**	.385**
	Sig. (2-tailed)	.000	.000
	N	129	129

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

Table 4.13. Correlations Between PRO-SDLS (Study 2) Scores and Age, Previous Semester Hours, Total Course Points

			PRO-SDLS 19-item Total	PRO-SDLS 23-item Total
Spearman's rho	AGE	Correlation Coefficient	.332**	.374**
		Sig. (2-tailed)	.000	.000
		N	173	172
	Previous Semester Hours	Correlation Coefficient	.235**	.254**
		Sig. (2-tailed)	.003	.002
		N	153	152
	Total Course Points	Correlation Coefficient	.228**	.273**
		Sig. (2-tailed)	.003	.000
		N	167	166

**. Correlation is significant at the .01 level (2-tailed).

In summary, the internal consistency estimate of the 23 items comprising the PRO-SDLS (Study 2) remained high (.86). However, the number of items (4) representing the LC component of the PRO model were inadequate to represent thedomain. Examining the construct validity of both versions (with and without the items related to learner characteristics) demonstrated significant relationships with variables previously associated with self-direction, as well as a significant relationship with the supplemental survey scores. The addition of the four items related to learner characteristics appeared to strengthen these correlations. Therefore, 15 additional items were written reflecting the LC component of the PRO model. These items were reviewed and edited by an expert in scale construction and were added to the version of the PRO-SDLS administered in Study 3.

Study 3 Results

A convenience sample of 219 students drawn from two College of Education educational psychology courses voluntarily participated in Study 3 after signing a copy of the informed consent found in Appendix D. The majority of students (n = 197) were enrolled in four sections of a required teacher education undergraduate course, the remaining students (n = 22) were drawn from a graduate course on adult learning. All participants were asked to volunteer traditional demographic information (age and gender), and information about previous academic performance (ACT, GPA, previous semester hours). Additionally, all students were asked to complete the standard assessment of self-direction (SDLRS), as well as the proposed instrument

(PRO-SDLS). In the undergraduate course, class performance and the date and number of web site "hits" of supplemental materials were also recorded. Neither class performance nor web accesses were monitored for students enrolled in the graduate class; however, the professor did globally rate these students' levels of self-directedness based on the PRO Model of Self-Direction in Learning (Brockett & Hiemstra, 1991).

Demographic Information

Age

The mean age reported by participants (N = 196) was 22.73 with a standard deviation of 7.60. The most frequently occurring age was 19. However, the addition of students enrolled in the graduate course increased the percentage of enrollees over 25 to 17%. Examination of the distribution of ages suggests the values are not normally distributed (skew = 2.62, kurtosis = 6.55). Ages, frequencies of ages, and age percentages are shown in Figure 4.3.

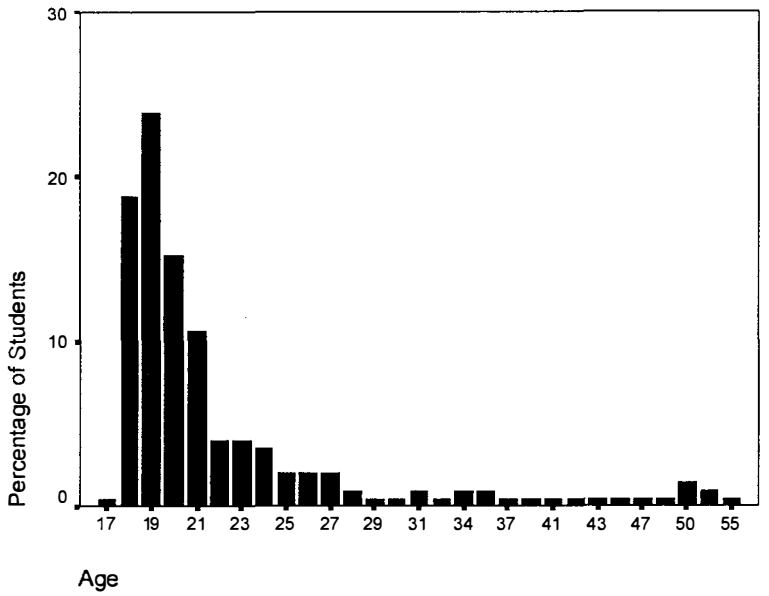
Gender

One hundred and twenty-eight participants (58%) were female, 67 participants (31%) were male, and 19 (11%) of the participants left this query blank. This was a ratio of approximately two females to one male.

Previous Academic Performance

Data concerning students' self-reported GPAs yielded a mean score of 2.96 (SD = 0.66). The scores were normally distributed within the range of 0.90-4.00.

Figure 4.3. Frequencies and Percentages for Age (Study 3)



Unfortunately, a number of students (n = 35) left this inquiry blank. Table 4.14 displays these descriptive data, as well as the descriptive data for previously completed semester hours and self-reported college admission scores. Ninety percent of the students who reported undergraduate admission scores (n = 126) reported an ACT score. Ten percent of the students reported a SAT score. The SAT scores were converted to ACT scores utilizing a standard admissions conversion table (www.avesonline.org/counselorcorner-/ACTSSAT%conversion.htm.) The resultant mean ACT score was 23.80 (SD = 3.79). Scores ranged from 16 to 34 and were normally distributed.

A total of 180 students completed the question concerning previously completed semester hours. The scores ranged from 0-220 with a mean score of

Table 4.14. Descriptive Statistics for Previous Academic Performance (Study 3)

	N	Minimum	Maximum	Mean	Std. Deviation
GPA	184	.90	4.00	2.96	.66
ACT	140	16.00	34.00	23.80	3.79
Previous Semester Hours	180	.00	220.00	58.07	51.36

58.07 (*SD* = 51.36). Again, these scores were normally distributed and displayed in Table 4.14.

Concurrent Classroom Performance

Data concerning course performance were available for the undergraduate course participants. In a manner similar to Studies 1 and 2, students earned up to 435 points for course activities. The mean score of the 177 students who completed the course was 324.32 (*SD* = 41. 69). Scores ranged from 166-401. The kurtosis of the distribution curve (2.07) minimally met requirements for normality (George & Mallery, 2000). The data are presented in Table 4.15.

Monitoring students' web accesses is an instructor option available on the Blackboard-CourseInfo v. 4.0 online class for the undergraduate course. Tracked materials for this study included student access to practice questions and copies of lecture material, which also were presented in class. As discussed earlier, accessing these materials may represent a self-directed behavior. Students received no credit for utilizing these supplemental materials, which could be monitored by date of access. In compiling the data, more credit for self-direction was given for earlier web-site access.

Table 4.15. Descriptive Statistics for Course Performance Points

	N	Minimum	Maximum	Mean	Std. Deviation
Course Performance Points	177	166	401	324.32	41.69

That is, a student accessing copies of practice questions before or on the date they were reviewed in class was given more credit than a student who accessed these questions the night before the exam. It should be noted that the practice questions were not reviewed in class before Day 2 of the unit. Therefore, four points were assigned if the student accessed the information on or before Day 2, three points if the information was obtained after Day 2 but before or on Day 3, two points for information obtained after Day 3 but before or on Day 4, one point if the information was obtained after Day 4 but before or on Day 5 (exam day), and no points if the information was not accessed. If a student accessed the material on more than one occasion, the scores were averaged. Under this system, the maximum score a student could obtain was a 4, indicating they had accessed all materials on or before the day the materials were utilized.

Unfortunately, the "tracking" component of Blackboard-CourseInfo v. 4.0 Online was discovered to be cumulative, although the system was not established with this intent. That is, all access to lecture notes and practice questions for Unit A also were also carried over to access to practice questions and lecture notes for Unit B. Therefore, it was decided to limit the data analysis in Table 4.16 to mean web-hits for the Unit A practice exam and supplemental notes.

Table 4.16. Descriptive Statistics for Supplemental Materials Access (Study 3)

	N	Minimum	Maximum	Mean	Std. Deviation
Supplemental Materials Access	136	.00	4.00	2.88	.94

Table 4.17. Descriptive Statistics for Professor Ratings of Self-Direction

	N	Minimum	Maximum	Mean	Std. Deviation
Professor Rating	22	3.00	7.00	5.18	1.30

The mean score by date of access was 2.88 (*SD* = 0.94). This can be roughly interpreted to mean the average student accessed the practice questions and supplemental notes between the second and the third day of lecture. The scores ranged from 0-4 and were normally distributed.

For students enrolled in the graduate course (*n* = 22), the professor independently rated the students' level of self-directedness as described in the PRO-Model of Self-Direction in Learning (Brockett & Hiemstra, 1991). The global rating choices ranged from 0-10. As displayed in Table 4.17, the mean professor rating was 5.18 (*SD* = 1.30). Ratings ranged from 3-7 and were normally distributed. A copy of this rating form is available in Appendix B.

In summary, the "typical" participant in this study was a 19-year-old female who had completed 60 semester credit hours with a 3.00 GPA. For students in the undergraduate course (*n* = 197), the typical student completed the course with 325 points, and accessed supplemental materials after the second, but before, the third day

of class. For students enrolled in the graduate course (n = 22), the professor independently rated the average student's level of self-directedness as a 5.

Sample Properties and Instrumentation

L. M. Guglielmino's (1977) Self-Directed Learning Readiness Scale (SDLRS) was the standard measure of a student's self-direction employed in this study. L. M. Guglielmino (1999) cites a national mean average score for the general adult learner of 214 (SD = 25.59), a mean score for preservice or new teachers between 235-240, and a mean SDLRS score of 249.26 for mentor teachers. She further suggests SDLRS scores between 58-176 are low, between 177-201 are below average, between 202-226 are average, between 227-251 are above average, and scores between 252-290 are high.

One hundred ninety-six participants completed the SDLRS in Study 3. The mean score obtained for all participants was 220.56 (SD = 26.12). According to L. M. Guglielmino (1999), this places the typical participant in the average range. Scores formed a normal distribution curve ranging from a low score of 136 to a high score of 289. The descriptive statistics for the SDLRS (Study 3) scores are presented in Table 4.18.

Cronbach's alpha reliability coefficient was employed as an estimate of internal consistency for this scale. The obtained coefficient alpha was .95. This estimate is consistent with reliability coefficients reported in recent studies employing the SDLRS (e.g., Cox, 2001) in college students. Examining scores at an item level located no items that produced an item-total correlation less than .20. However, four

Table 4.18. Descriptive Statistics for SDLRS Scores

	N	Minimum	Maximum	Mean	Std. Deviation
SDLRS Total	194	132.00	289.00	220.56	26.12

items (16, 19, 20, 48) produced correlations with the corrected total scores of less than .25. An additional three items (2, 29, 35) produced corrected item-total correlations between .25 and .29. Brockett (1983, 1985a) noted low item-total correlations with four of the same items (20, 29, 35, 48). It is also interesting to note that five of the seven items identified in this study as problematic due to low item-total correlations (19, 20, 29, 35, 48) are reverse scored. Both Brockett (1985a) and Field (1989) voiced concern with reverse-scored items in their item analyses of the SDLRS. However, the high alpha coefficient (.93) for scale scores in students aged 19 or younger ($n = 81$) does seem to alleve a concern raised by Delahaye and Smith (1995) as to the reliability of this scale in younger college students.

Research Objectives

The purpose of this study was to develop a reliable and valid instrument to measure self-directedness in learning based on an operationalization of the TL and LC components of the Personal Responsibility Orientation (PRO) Model of Self-Direction in Learning (Brockett & Hiemstra, 1991) among college students. Accomplishing this purpose involved two stages. The first was the identification and operationization of scale items that reliably reflected the two components of the PRO model as described by Brockett and Hiemstra. The second stage of this study involved validation of the

developed scale scores with other measures of self-direction. This section provides data and analyses to address the reliability and validity objectives outlined in Chapter I.

Research Objective #1

A reliable measure of self-directedness will be developed. For purposes of this study, the new scale will subsequently be identified as the Personal Responsibility Orientation to Self-Direction in Learning Scale (PRO-SDLS). It is expected that this scale will comprise one factor and will achieve an internal consistency of at least .80, using Cronbach's alpha.

A total of 190 students (89%) completed the PRO-SDLS (Study 3). Item revisions and additions, based on reliability analyses from Studies 1 and 2, brought the total number of PRO-SDLS (Study 3) items to 41. Twenty-three of these items represented the TL component of the PRO Model of Self-Direction (Brockett & Hiemstra, 1991), and 18 items represented the LC component. From the initial total of 41 items, 35 items, all producing corrected item-total correlation greater than .30 were retained. The resulting coefficient alpha (a measure of internal consistency) for these 35 items was .92, meeting a commonly used criterion (>.70) for reliability (Gay & Airasian, 1996).

Both dimensions of the PRO model were well represented. The TL component included the 19 items in Table 4.19 that are reproduced in regular font, the 16 italicized items represented the LC component. The high coefficient alpha (.92) indicated that self-direction as measured here can be regarded as a unitary construct.

Table 4.19. PRO-SDLS Item Content and Item-Total Correlations

Item	Corrected Item-Total Correlation (Item *M, SD*)	Item	Corrected Item-Total Correlation (Item *M, SD*)
1. I frequently do extra work in a course just because I am interested in the answers.	.52 (2.60, 0.86)	19. I always rely on the instructor to tell me what I need to do in a course to succeed.	.50 (3.14, 0.90)
2. I always view problems I encounter in my learning as "personal challenges" that I can overcome.	.39 (3.40, 0.82)	20. Even after a course is over, I often continue to spend time learning about the topic.	.47 (2.91, 0.90)
3. I consistently motivate myself to do well in any course I take.	.41 (3.78, 0.85)	***21. I don't see any connection between the work I do for my courses and my personal goals and interests.***	.58 (3.97, 0.79)
4. I usually do better in courses when the instructor tells me exactly what I need to learn rather then when I choose my own topics for learning.	.39 (2.33, 1.05)	***22. I am very confident in my ability to independently prioritize my learning goals.***	.62 (3.50, 0.85)
5. If I'm not doing as well as I would like in a course, I always independently make the changes necessary for improvement.	.38 (3.66, 0.80)	***23. I am confident in my ability to consistently motivate myself.***	.54 (3.34, 0.88)
6. I always feel in control of the learning process.	.41 (3.11, 0.86)	***24. I have a lot of doubts about my ability to effectively direct my own learning.***	.55 (3.66, 0.83)
7. I usually struggle in classes if the professor allows me to set my own timetable for work completion.	.51 (3.27, 1.03)	***25. I complete most of my college activities because I WANT to, not because I HAVE to.***	.53 (3.21, 1.05)
8. I would rather take the initiative to learn new things in a course rather than wait for the instructor to foster new learning.	.48 (2.88, 0.84)	***26. I am unsure about my ability to independently find needed outside materials for courses.***	.49 (3.55, 0.88)
9. I often collect additional information about interesting topics even after the course has ended.	.57 (2.96, 0.96)	***27. For most of my classes, I really don't know why I complete the work I do.***	.50 (3.95, 0.78)

Note: ***Bolded Italicized print indicates items written to reflect LC component.***

Table 4. 19. Continued.

Item Content	Corrected Item-Total Correlation (Item *M, SD*)	Item Content	Corrected Item-Total Correlation (Item *M, SD*)
10. Without the instructor's help, I always have a problem knowing what changes I need to make to improve my learning.	.38 (3.40, 0.94)	***28. I am very certain I have the capacity to take primary responsibility for my learning.***	.52 (3.78, 0.81)
11. I usually find a way to relate my research projects for a course to my own interests.	.36 (3.82, 0.84)	***29. I am really uncertain about my capacity to effectively organize my study time on my own,***	.51 (3.85, 0.85)
12. I always effectively take responsibility for my own learning.	.48 (3.78, 0.69)	***30. Most of the work I do for my college courses is personally enjoyable or seems relevant to my reasons for attending college.***	.57 (3.58, 0.93)
13. I am very successful at prioritizing my learning goals	.63 (3.38, 0.70)	***31. The main reason I do the course work activities I do is to avoid feeling guilty or getting a bad grade.***	.49 (2.94, 1.13)
14. The instructor is always in control of what I learn about a topic.	.40 (3.51, 0.85)	***32. I am uncertain about my ability to make sense of classroom material on my own.***	.45 (3.80, 0.84)
15. I often use materials I've found on my own to help me in a course.	.47 (3.28, 0.93)	***33. Most of the activities I complete for my college classes are NOT really personally useful or interesting.***	.62 (3.65, 0.95)
16. I always effectively organize my study time.	.42 (2.92, 0.95)	***34. I am very convinced I have the ability to take personal control of my learning.***	.50 (3.97, 0.78)
17. I always assume personal responsibility for my learning.	.48 (3.82, 0.76)	***35. I don't have much confidence in my ability to independently carry out my study plans.***	.60 (3.85, 0.82)
18. I often have a problem motivating myself to learn.	.55 (3.22, 0.97)		

NOTE: ***Bolded italicized print indicates items written to reflect LC component.***

However, the reliabilities of both types of scale items were also calculated separately. For the 19 items representing the TL component, a coefficient alpha of .86 was obtained. All items correlated above .30 with the corrected component total. For the 16 items representing the LC component, a coefficient alpha of .88 was calculated. Again, all items correlated with the corrected total component scores above .30.

Data displayed in Table 4.20 indicate that scores from items drawn from the TL component account for 90% of the variance in the total scale score, and scores from the LC component account for 89% of the variance in the total scale score. This offers further support for the unity of the construct.

The descriptive statistics for the 35-item PRO-SDLS scores are presented in Table 4.21. The normally distributed scores ranged from 71 to 168. The mean score for this sample was 119.88, with a standard deviation of 16.51. Therefore, for

Table 4.20. Correlations Between PRO-SDLS Total and Component Scores

		PRO-SDLS Total	PRO-SDLS TL Component	PRO-SDLS LC Component
PRO-SDLS Total	Pearson Correlation	1	.947**	.942**
	Sig. (2-tailed)	.	.000	.000
	N	190	190	190
PRO-SDLS TL Component	Pearson Correlation	.947**	1	.784**
	Sig. (2-tailed)	.000	.	.000
	N	190	193	190
PRO-SDLS LC Component	Pearson Correlation	.942**	.784**	1
	Sig. (2-tailed)	.000	.000	.
	N	190	190	196

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

Table 4.21. Descriptive Statistics for the PRO-SDLS Scores

	N	Minimum	Maximum	Mean	Std. Deviation
PRO-SDLS Total	190	71.00	168.00	119.88	16.51

purposes of this investigation, it can be concluded that a reliable scale, comprising one factor, with an internal consistency greater than .80 has been developed.

Research Objective #2

Content validation will be established using a panel of experts with positive agreement and high inter-rater reliability as to the representativeness of item samples, appropriateness of item content, and appropriateness of item format.

Six identified experts in self-direction, familiar with the PRO model (Brockett & Hiemstra, 1991), were sent a cover letter and survey form (Appendix C) requesting their input as to item representativeness and appropriateness. Five experts returned the survey. The initial analysis calculated the inter-rater agreement for each item rating. This agreement was calculated by assigning the most cited rating 1.00 point per citation; divergent ratings were then assigned 0.75, 0.50., 0.25, or 0 points depending on the absolute distance from the majority rating. The points were then summed and divided by 5. Only one item (5) in Table 4.22 was scored at the same level by all five judges. Seventeen items (1, 6, 7, 17, 18, 21, 22, 23, 1a, 3a, 5a, 9a, 11a, 13a, 14a, 15a, 16a) demonstrated inter-item agreement at or above 90%.

The mean item level score was then calculated. Judges rated items on a scale of 1 (strongly disagree that the item is representative) to 5 (strongly agree that the item

Table 4.22. PRO-SDLS (Study 3) Items: Item-Total Correlations and Expert Opinion Statistics

Item Content	Corrected Item-Total Correlation (*r*)	Mean Rating	Inter-Rater Agreement	Author/ Expert LC/TC Agreement (%)
1. I never have a problem carrying out my study plans.	**.29***	4.0	.75	30
2. I frequently do extra work in a course just because I am interested in the answers.	.56	4.0	.90	0
3. I always view problems I encounter in my learning as "personal challenges" I can overcome.	40	4.4	.90	10
4. I consistently motivate myself to do well in any course I take.	.40	4.2	.95	0
5. I usually do better in courses when the instructor tells me exactly what I need to learn rather then when I chose my own topics for learning.	.38	5.0	1.00	33
6. If I'm not doing as well as I would like in a course I always independently make the changes necessary for improvement.	.38	**3.4+**	.85	60
7. I always feel in control of the learning process.	.41	4.0	.80	66
8. I usually struggle in classes if the professor allows me to set my own timetable for work completion.	.50	4.4	.90	50
9. I would rather take the initiative to learn new things in a course rather than wait for the instructor to foster new learning,	.47	4.8	.95	15
10. I always depend on the instructor to make sense of things I don't understand.	**.29***	**3.4+**	.90	50
11. I often collect additional information about interesting topics even after the course has ended.	.56	4.6	.90	25
12. If there is something I don't understand in a class, I always try to find a way to learn it on my own.	**.23***	4.4	.90	25
13. Without the instructor's help, I always have a problem knowing what changes I need to make to improve my learning.	.37	4.0	.90	100
14. I usually find a way to relate my research projects for a course to my own interests.	.36	4.2	.95	25
15. I always effectively take responsibility for my own learning.	.48	4.0	.90	25
16. I am very successful at prioritizing my own learning.	.62	4.6	.90	50
17. The instructor is always in control of what I learn about a topic.	.40	4.4	.85	75
18. I have taken elective courses simply because they were personally useful.	**.23***	**3.2+**	.80	.50
19. I often use materials I've found on my own to help me in a course.	.47	4.4	.90	.75

Table 4.22. Continued.

Item Content	Corrected Item-Total Correlation (r)	Mean Rating	Inter-rater Agreement	Author/ Expert LC/TC Agreement (%)
20. I always effectively organize my study time	.42	4.4	.90	50
21. I always assume personal responsibility for my learning.	.47	4.4	.85	10
22. I often have a problem motivating myself to learn.	.53	3.8	.85	16
23. I always rely on the instructor to tell me what I need to do in a course to succeed.	.51	4.0	.80	100
24. Even after a course is over, I often continue to spend time learning about the topic.	.46	4.2	.95	0
1a. I don't see any connection between the work I do for my courses and my personal goals and interests.	.58	3.8	.85	--
2a. I am very confident in my ability to independently prioritize my learning goals.	.61	4.6	.90	100
3a. The primary reason I complete course requirements is to obtain the grade that is expected of me.	**.29***	3.8	.70	--
4a. I am confident in my ability to consistently motivate myself.	.57	4.2	.95	100
5a. When I complete course work activities that aren't personally interesting, I do so because I know they will be valuable to me in later life.	**.27***	**3.2+**	.85	100
6a. I have a lot of doubts about my ability to direct my own learning	.54	4.4	.90	85
7a. I complete most of my college activities because I WANT to, not because I HAVE to.	.54	3.8	.95	100
8a. I am unsure about my ability to independently find outside materials for my courses.	.50	3.8	.95	70
9a. For most of my classes, I really don't know why I complete the work I do.	.51	4.0	.80	0
10a. I am very certain I have the capacity to effectively organize my study time on my own.	.51	3.8	.95	35
11a. I am really uncertain about my capacity to take primary responsibility for my learning.	.49	4.4	.85	50
12a. Most of t he work I do for my college courses is personally enjoyable or seems relevant to my reasons for attending college.	.57	4.0	.90	66
13a. The main reason I do the course work activities I do is to avoid feeling guilty or getting a bad grade.	.51	**3.2+**	.70	--
14a. I am uncertain about my ability to make sense of classroom material on my own.	.47	**3.4+**	.85	50
15a. Most of the activities I complete for my college classes are NOT really personally useful or interesting.	.64	**3.4+**	.80	.75
16a. I am very convinced I have the ability to take personal control of my learning.	.56	4.4	.85	75
17a. I don't have much confidence in my ability to independently carry out my study plans.	.60	3.8	.95	50

Note: * = low item-total correlations; + = low mean expert rating

is representative). Item means ranged from 3.20-5.00. The item content, corrected item-total correlations, mean ratings, inter-rater agreement, and author/expert component agreement are presented in Table 4.22. Seven items (6, 10, 18, 5a, 13a, 14a, 15a) produced mean expert opinion ratings that most closely corresponded to "unsure that the item represents either component of the PRO model of self-direction." All other rounded item means indicated agreement or strong agreement with the representativeness of the item to a component of the PRO model. When comparing experts' ratings with the psychometric data for each item, three items (10, 18, 5a) were both psychometrically unsound (low item-total correlations) and received low expert ratings. They were not included in the final version of the PRO-SDLS (Study 3). Four items (6, 13a, 14a, 15a) received a neutral expert rating, but the items correlated well (>.30) with the total scale score. These items were included the in the final version of the PRO-SDLS. Three items (1, 12, 3a) received a positive rating from the experts, but did not display item-total correlations greater than .30. These items were not included in the final version of the PRO-SDLS.

Experts were also asked to decide if each item represented the TL or LC component of the PRO model. Some experts chose not to rate every item or suggested the item could reflect both components. As Table 4.22 displays, only six items (13, 23, 2a, 4a, 5a, 7a) received a rating of 100% agreement between the author-designated component and the experts-designated component. The remaining items' agreement percentages ranged from 0-85%. However, it is important to recall that high correlations (*r*s >.89) exist between scale components (as defined by the author) and

total scale scores, which suggest that placing an item in a different component will make little overall difference.

Only one expert answered the question as to the appropriateness of the item format. The response was positive. Therefore, it can be concluded that although high inter-rater agreement was not achieved for all items, experts agreed that the majority of items (31 out of the final 35 items) were representative of one or both components of the model.

Research Objective #3

To explore the congruent validity of the measure of self-directedness, the relationship between scores from the Self-Directed Learning Readiness Scale (SDLRS; L. M. Guglielmino, 1977) and the PRO-SDLS will be examined. The PRO-SDLS total scores are expected to produce moderately significant congruent validity coefficients with scores from the SDLRS, an established measure of self-directedness.

The relationship between the SDLRS and PRO-SDLS scores was explored utilizing a Pearson product moment correlation coefficient (r). The obtained r-value from the 184 participants who completed both instruments was .76 ($p < .001$) indicating a shared variance (r-squared) of 58%. These relationships are presented in Table 4.23, which also presents similar results (rs > .70; r-squared ~ 49%) for the relationships between both PRO-SDLS component scores and SDLRS (L. M. Gugleilmino, 1977) scores. Therefore, it can be concluded that this research objective has been met.

Table 4.23. Correlations between Total and Component PRO-SDLS and SDLRS Scores

		SDLRS Total
PRO-SDLS Total	Pearson Correlation	.758**
	Sig. (2-tailed)	.000
	N	184
PRO-SDLS TL Component	Pearson Correlation	.705**
	Sig. (2-tailed)	.000
	N	186
PRO-SDLS LC Component	Pearson Correlation	.725**
	Sig. (2-tailed)	.000
	N	188

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

Research Objective #4

Construct validity will be informed by examining the relationship between scores on self-directedness and logically related behavioral criteria, including optional web-site use of supplementary materials, age, gender, GPA, course performance, and previously completed semester hours.

Two correlation coefficients were employed to explore this objective. Due to data deviations from normality for age, Spearman's *rho* was utilized to examine the relationship between age and assessment scores for self-direction (Table 4.24). The remaining variables were treated as interval data, and Pearson product moment correlation coefficients (*r*s) were produced for the analyses (Table 4.25). Significant (*p*s <. 01) relationships were found between PRO-SDLS (Study 3) scores and age, self reported GPA, previously completed semester hours, class performance and PRO-SDLS scores. The proportion of variance (*r*-squared) in the interval criterion variables

Table 4.24. Correlations Between Measures of Self-Direction and Age

			Age
Spearman's rho	PRO-SDLS Total	Correlation Coefficient	.296**
		Sig. (2-tailed)	.000
		N	187
	PRO-SDLS TL Component	Correlation Coefficient	.255**
		Sig. (2-tailed)	.000
		N	190
	PRO-SDLS LC Component	Correlation Coefficient	.303**
		Sig. (2-tailed)	.000
		N	193
	SDLRS Total	Correlation Coefficient	.334**
		Sig. (2-tailed)	.000
		N	187

**. Correlation is significant at the .01 level (2-tailed).

Table 4.25. Correlations Between Self-Report Measures of Self-Direction and ACT, GPA, Semester Hours, Class Performance, Mean Web Access

		PRO-SDLS Total	PRO-SDLS TL Component	PRO-SDLS LC Component	SDLRS Total
ACT	Pearson Correlation	.156	.167	.155	.187*
	Sig. (2-tailed)	.072	.051	.070	.031
	N	134	136	138	133
GPA	Pearson Correlation	.461**	.470**	.395**	.275**
	Sig. (2-tailed)	.000	.000	.000	.000
	N	176	179	181	176
Previous Semester Hours	Pearson Correlation	.448**	.397**	.431**	.445**
	Sig. (2-tailed)	.000	.000	.000	.000
	N	172	175	177	171
Total Points	Pearson Correlation	.234**	.204**	.245**	.214**
	Sig. (2-tailed)	.003	.010	.002	.006
	N	157	158	162	161
Supplemental Materials Access	Pearson Correlation	.160	.167	.138	.115
	Sig. (2-tailed)	.075	.064	.121	.211
	N	124	124	127	.010

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

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

accounted for by PRO-SDLS (Study 3) total scores ranged from 21% for GPA to 5% for course performance. No significant correlations were found between self-reported ACT scores and PRO-SDLS scores. Initial examination of the relationships between mean web access and PRO-SDLS scores suggest non-significant relationships. However, when this relationship was further analyzed by grouping students as traditional-aged (17-21) or non-traditional aged students (>21), a significant relationship ($r = .203, p < .05$) emerged between mean web access and PRO-SDLS scores for tradition-aged students. This association was not present for non-traditional aged students. These analyses are presented in Tables 4.26 and 4.27.

Table 4.26. Correlations Between Measures of Self-Direction and Mean Web Access for Traditional-Aged Students (<22 years old)

		PRO-SDLS Total	PRO-SDLS TL Component	PRO-SDLS LC Component	SDLRS Total
Supplemental Materials Access	Pearson Correlation	.203*	.223*	.164	.117
	Sig. (2-tailed)	.049	.031	.111	.274
	N	94	94	96	90

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

Table 4.27. Correlations Between Measures of Self-Direction and Mean Web Access for Non-Traditional-Aged Students (>21 years old)

		PRO-SDLS Total	PRO-SDLS TL Component	PRO-SDLS LC Component	SDLRS Total
Supplemental Materials Access	Pearson Correlation	.081	.064	.096	.154
	Sig. (2-tailed)	.676	.740	.615	.426
	N	29	29	30	29

In conclusion, construct validity coefficients established significant relationships between PRO-SDLS scores and related behavioral criteria for self-direction, therefore meeting the research objective.

Research Objective #5

Convergent validity will be evaluated by examining the relationship between scores on self-directedness and ratings by professors on the self-directedness of their students who have completed the scale.

Nineteen students attending a graduate adult learning course completed both self-direction instruments and were rated by the professor as to their degree of self-directedness based on Brockett and Hiemstra's (1991) PRO Model of Self-Direction in Learning. The survey instrument is available in Appendix B. As Table 4.28 documents, no significant relationships were noted between professor ratings and self-reports of self-direction based on PRO-SDLS or SDLRS scores. Therefore, convergent validity between professor ratings and scores from the PRO-SDLS was not established.

Research Objective #6

Incremental validity statistics will demonstrate the new scale scores (PRO-SDLS) add significant unique variance to the prediction of self-direction above and beyond scores from the SDLRS.

This research objective proposed that PRO-SDLS scores would add unique variance in accounting for predictors of self-direction above that accounted for by

Table 4.28. Correlations Between PRO-SDLS, SDLRS Scores and Professor Ratings

		Professor Rating
SDLRS Total	Pearson Correlation	.360
	Sig. (2-tailed)	.130
	N	19
PRO-SDLS Total	Pearson Correlation	.151
	Sig. (2-tailed)	.536
	N	19
PRO-SDLS TC Component	Pearson Correlation	.087
	Sig. (2-tailed)	.723
	N	19
PRO-SDLS LC Component	Pearson Correlation	.212
	Sig. (2-tailed)	.385
	N	19

SDLRS scores. The amount of unique variance contributed by a variable is represented by the squared semi-partial correlation coefficient (Nunnally & Bernstein, 1994). Three hierarchical multiple regression analyses were conducted with SDLRS scores entered first and PRO-SDLS scores entered second. When this procedure was used to determine if PRO-SDLS scores improved upon the prediction of GPA, age, and course performance afforded by SDLRS scores, a significant change was demonstrated in the squared multiple correlations for age (squared semi-partial r =.027, p <.05), GPA (squared semi-partial r = .137, p <.01), and course performance points (squared semi-partial r = .026, p <.05). These changes are documented in Table 4.29. Furthermore, when SDLRS scores were entered after

Table 4. 29. Results of Hierarchical Multiple Regression for SDLRS and PRO-SDLS when Accounting for Variance in Age, GPA, and Course Performance

Dependent Variable: Age

Step	Variable	Multiple R	R-Squared	R-Squared Change	Squared Semi-Partial Correlation
1	SDLRS	.375	.141	.141**	.01
2	PRO-	.409	.167	.027*	.03*

Step	Variable	Multiple R	R-Squared	R-Squared Change	Squared Semi-Partial Correlation
1	PRO	.391	.153	.153**	--
2	SDLRS	.409	.167	.014	--

Dependent Variable: GPA

Step	Variable	Multiple R	R-Squared	R-Squared Change	Squared Semi-Partial Correlation
1	SDLRS	.283	.080	.080**	.01
2	PRO	.466	.217	.137**	.14**

Step	Variable	Multiple R	R-Squared	R-Squared Change	Squared Semi-Partial Correlation
1	PRO	.458	.209	.209**	--
2	SDLRS	.466	.217	.008	--

Dependent Variable: Course Performance Points

Step	Variable	Multiple R	R-Squared	R-Squared Change	Squared Semi-Partial Correlation
1	SDLRS	.187	.035	.035*	.00
2	PRO	.247	.061	.026*	.03*

Step	Variable	Multiple R	R-Squared	R-Squared Change	Squared Semi-Partial Correlation
1	PRO	.245	.060	.060**	--
2	SDLRS	.247	.061	.001	--

*p < .05 **p < .01

PRO-SDLS scores to predict the dependent variables, SDLRS scores did not account for any significant unique variance.

Summary

The 35-item PRO-SDLS was a highly reliable (coefficient alpha = .92) instrument in the selected sample (N = 219) of graduate and undergraduate education students. Both TL and LC items were highly correlated with the scale total. The scores from the PRO-SDLS were significantly related to criterion variables thought to demonstrate self-direction. However, PRO-SDLS scores were not significantly related to professor-ratings of students' self-direction. Scores from the PRO-SDLS were significantly related ($r = .76$, $p < .01$) to an established instrument of self-direction (SDLRS) and accounted for additional variance beyond the SDLRS in predicting age, GPA, and class performance. Experts examining the representativeness of items to the PRO Model of Self-Direction in Learning (Brockett & Hiemstra, 1991) rated 31 out of the 35 items appearing on the final version of the PRO-SDLS as representative. Therefore, five of the six research objectives have been met.

CHAPTER V

CONCLUSIONS AND DISCUSSION

The final chapter of this dissertation includes a review of the study and a discussion of the findings and implications. The former section (Review of the Study) summarizes the purpose, procedure, and findings from the study. The latter section (Discussion) reflects on issues germane to the process of scale construction, the product of the construction (PRO-SDLS), and concludes with recommendations for practice and research. A brief reflection is offered at the end of this dissertation.

Review of the Study

Although self-direction in learning is often cited as foundational for adult learning, confusion and controversy exist regarding the nature and application of the construct. Most frequently, authors offer conceptualizations of self-direction as (a) a process of learning in which people take the primary responsibility or initiative in the learning experience, or (b) self-direction as a personal attribute of the learner. Brockett and Hiemstra (1991) conceptualize these views as complementary and related. Within their Personal Responsibility Orientation (PRO) model, self-direction in learning is viewed both as a teaching-learning transaction (TL) and as a personality characteristic (LC). Both components, operating within the learner's social environment, contribute to the outcome of self-direction in learning. Yet to date, no studies have been conducted to test Brockett and Hiemstra's conceptualization.

Compounding this lack of empirical confirmation is the reliance of most quantitative investigators upon an unrevised instrument developed in 1977: L. M. Guglielmino's (1977) Self-Directed Learning Readiness Scale (SDLRS). Therefore, the focus of this study was to empirically validate a new way of measuring self-direction that was informed by a more recent conceptualization.

Purpose of the Study

The purpose of this study was to develop a reliable and valid instrument to measure self-direction in learning based on descriptions of the TL and LC components of the PRO Model of Self-Direction in Learning (Brockett & Hiemstra, 1991) among college students.

Procedure

A total of 518 college students, the vast majority drawn from an undergraduate educational psychology course, voluntarily participated in this study over a three-semester period. This investigation was comprised of three research studies, the first two of which served as pilots for the main study. In Studies 1 and 2, students completed the demographic questionnaire and a preliminary form of the PRO-SDLS. Course performance data were also compiled for these groups. In Study 3, students completed the demographic questionnaire, the SDLRS, and the revised PRO-SDLS. Additionally, a professor independently rated the self-direction of a small sub-sample of students, and the web access to optional supplemental materials was recorded for a larger sub-sample.

Summary of Findings

This section provides a summary of the statistical findings produced in Chapter IV. This will be accomplished by presenting a summary of the sample demographic statistics, a summary of the results from the preliminary studies, and a summary of the findings drawn from Study 3.

Summary of Demographic Data

Identical demographic data were gathered each semester about the participants. The sample was remarkably homogeneous with respect to age, gender, and previous academic achievement. The following data describe the limited range of means across the three studies for selected demographic variables:

Age	22.03-22.73 years
GPA	2.93-3.06
ACT	23.77-23.98
Previous Semester Hours Completed	42.05-64.01

Additionally, approximately 60% of the participants from each sample were female.

Summary of Preliminary Findings

Studies 1 and 2 were conducted to field test and refine items written to reflect both components (TL and LC) of the PRO model. Acceptable estimates of internal consistency (>.85) were obtained for both versions of the scale. Given those results and the availability of information pertaining to variables previously associated with self-direction, preliminary validity analyses also were conducted. In both studies, the PRO-SDLS showed a significant positive correlation with age, GPA, previous

semester hours, and class performance (variables previously associated with self-direction).

Summary of Research Objectives

The focus of Study 3 was to examine six research objectives for this study. These results are summarized in the following paragraphs.

Research Objective #1: A reliable measure of self-directedness will be developed. For purposes of this study, the new scale will subsequently be identified as the Personal Responsibility Orientation to Self-Direction in Learning Scale (PRO-SDLS). It is expected that this scale will comprise one factor and will achieve an internal consistency of at least .80, using Cronbach's alpha.

Previous reliability analyses resulting in item additions brought the total number of scale items to 41 in the PRO-SDLS (Study 3). From these, 35 items, all producing corrected item-total correlations greater than .30 were retained. The resultant coefficient alpha was .92. Both dimensions (TL and LC) of the PRO model were well represented. Scores drawn from items reflecting the author-designated TL component explained 90% of the variance of the total scale score, and scores from the LC component account for 89% of the variance in total scale scores. The high coefficient alpha (.92) indicated that self-direction as measured by the PRO-SDLS can be regarded as a unitary construct.

Research Objective #2: Content validation will be established using a panel of experts with positive agreement and high inter-rater reliability as to the

representativeness of item samples, appropriateness of item content, and appropriateness of item format.

High inter-rater agreement was not achieved for all items. However, experts agreed that the majority of items (31 out of the final 35 items) were representative of one or both components of the model. Experts were generally unable to agree on the placement of an item within a component of the scale.

Research Objective #3: To explore the congruent validity of the measure of self-directedness, the relationship between scores from the Self-Directed Learning Readiness Scale (SDLRS; L. M. Guglielmino, 1977) and the PRO-SDLS will be examined. The PRO-SDLS total scores are expected to produce moderately significant congruent validity coefficients with scores from the SDLRS, an established measure of self-directedness.

The Pearson product moment correlation (*r*) value (.76) for this analysis indicated a moderately strong relationship between the two scales. The calculated coefficient of determination for the *r*-value found PRO-SDLS (Study 3) scores accounted for 58% of the variance in SDLRS scores. This suggested both scales tap, to a moderate degree, similar behaviors and attitudes related to self-direction.

Research Objective #4: Construct validity will be informed by examining the relationship between scores on self-directedness and logically related concurrent behavioral criteria, including optional web-site use of supplementary materials, age, gender, GPA, course performance, and educational attainment.

With the exception of gender, all behavioral criteria were significantly correlated with PRO-SDLS (Study 3) scores. The PRO-SDLS scores correlated most highly with GPA (explaining 21% of the variance in GPA), previous semester hours (18%), age (9%); and to a lesser degree with Supplemental Materials Access scores (explaining only 4% of the variance in traditional-aged students). PRO-SDLS scores were a better predictor of GPA, previous semester hours, course performance, and supplemental materials access than were SDLRS scores.

Research Objective #5: Convergent validity will be evaluated by examining the relationship between scores on self-directedness and ratings by professors on the self-directedness of their students who have completed the scale.

There was no significant relationship between professor and student rated self-direction. Therefore, convergent validity was not established.

Research Objective #6: Incremental validity statistics will demonstrate that the new scale scores (PRO-SDLS) add significant unique variance to the prediction of self-direction above and beyond scores from the SDLRS.

The PRO-SDLS (Study 3) scores improved upon the prediction of GPA, age (based on an *r* correlation), and course performance over that afforded by SDLRS scores. When SDLRS scores were entered after PRO-SDLS scores to predict the dependent variables, SDLRS scores did not account for any unique variance.

Discussion

This section is divided into discussions of the scale construction process, the scale product: the PRO-SDLS, and recommendations for practice and research. It also should be noted that the second section ends with a discussion of results not presented in Chapter IV. These results are presented within the section to allow for discussion of a pertinent issue related to construct validity that was not originally planned as a research objective.

The Process of Scale Construction

Crocker and Algina (1986) delineated the following basic steps in scale construction: identify a purpose, identify appropriate behaviors, delineate test specifics, select an item format, write the items, review the items, and field test the scale. This section of the discussion will focus on issues relevant to the identification of appropriate behaviors and writing/reviewing the items.

Identification of Appropriate Behaviors

Traditionally, test authors utilize expert opinion(s) to identify behaviors that may reflect the construct and then apply a factor analysis to more clearly determine the nature of the construct. In contrast, this study employed a general theory to identify appropriate behaviors. Nunnally and Bernstein (1994) clearly support this approach when they state that

> the reader surely has heard about the evils of shotgun empiricism before. Progress in science must be guided by theories rather than by random efforts to

> relate things to one another. Good theories greatly reduce the amount of trial-and-error effort, and people who explore theories stand at the vanguard of each field of science. It is just as important to formulate theories regarding attributes to be measured as it is to develop methods of analysis. This point applies with great force when factor analysis is applied to a polyglot collection of items in the hope of obtaining important measures of human attributes. (p. 317)

As would be expected from the descriptors of the components, Brockett and Hiemstra (1991) more clearly identified behaviors that reflect self-direction in the teaching-learning (TL) component. Identifying behaviors that represented self-direction in the learner characteristics (LC) component involved developing these characteristics more fully based on Brockett and Hiemstra's emphasis on personal responsibility. Findings from recent educational psychology literature, specifically writings addressing self-efficacy and intrinsic motivation, appeared to be the most appropriate to inform this component. The validity of this inference will be more fully developed in the discussion of construct validation.

The findings from the survey of expert opinion as to the representativeness of the items to the model suggested that experts agreed that the items do represent the model, but did not agree as to the component they represented. Consensus would be preferable; however, the high correlations between the author-designated components, the extremely high correlations between component and total scale scores, and the high coefficient alpha support a model that included both components.

Writing /Reviewing the Items

Nunnally and Bernstein (1994) suggest that "although there are some rules for writing good items, writing test items is an art few people master" (p. 297). Earlier in this dissertation, Crocker and Algina (1986) identified 12 such rules. In this study, the "art" of writing test items was called into play when adherence with two of the rules produced incongruent results. Specifically, Crocker and Algina suggested avoiding the use of universals (always, never) while at the same time, avoiding statements that are likely to be endorsed by almost everyone (or no one). Initial field testing of items such as "I am personally responsible for my learning." resulted in universal agreement responses. Given the social desirability of this response within the study setting, the results are not surprising. Rewording the item to "I always assume personal responsibility for my learning. " resulted in a more discriminating item and, thus, was incorporated in the scale.

Furthermore, Nunnally and Bernstein (1994) state that the "primary criterion for including an item is the discrimination index, e.g., the corrected item-total correlation … how well this is done depends on the number of discriminating items ($r \geq .30$)" (p. 305). Rewording the example from the previous paragraph produced an r-value greater than .40. Therefore, in the PRO-SDLS, universals were employed in the content of certain items to avoid universal agreement, which then resulted in acceptable discrimination indices.

The Product of Scale Construction: PRO-SDLS

One stated purpose of this dissertation was the development of a valid instrument to measure self-direction among college students. The previous section of this discussion focused on measurement issues usually associated with reliability (high coefficient alpha, homogeneity of content). However, several types of validity also were explored in this investigation. The subsequent discussion will focus on issues related to the difficulties establishing convergent and criterion validity and an issue related to construct validity.

Convergent Validity

Convergent validity generally refers to the ability of two independent methods of measuring a construct to produce similar results. In this study, PRO-SDLS (Study 3) scores were compared to a professor's rating of the respondent's level of self-direction. No significant association was established. One obvious limitation of this analysis was the small size of the chosen sub-sample. However, to allow a professor to accurately rate a student's level of a construct such as self-direction seemed (to the author) to require a level of intimate knowledge about a student's academic performance not afforded in larger classrooms. Adding additional raters (professors) to increase the sample size would have brought into play issues of inter-rater reliability that were beyond the scope of this dissertation.

The findings from three studies (Barnes & Morris, 2000; Long & Agyekum, 1983; Long & Agyekum, 1984) that evaluated the relationship between Guglielmino's (1977) Self-Directed Learning Readiness Scale (SDLRS) and professor ratings also

failed to note any significant relationships. However, Crook (1985) found that peers were able to predict (in limited situations) self-directedness. Perhaps peers possess more intimate knowledge as to the self-directed activities of their classmates, and they would be a better source of an independent rating.

Criterion-Related Validity

Criterion-related validity is evaluated by comparing the test score with external variables thought to provide a direct measure of the characteristic or behavior. This study attempted to link self-reported self-direction with optional access to supplementary materials available on a course web site. However, based on anecdotal evidence, the author may have inadvertently violated one standard Laurillard (1999) cited as paramount to effective use of technology–that all students understand how to access the web site. Older-than-average students often voiced confusion early in the course about this process. A more accurate view of students' web accesses might have been obtained later in the semester; unfortunately, a technical problem prevented this tabulation.

The results of other studies that attempted to establish a degree of criterion-related validity between self-report instruments and other direct measures have also been disappointing. For example, West and Bentley (1991) surveyed over 700 teachers as to their participation in continuing education opportunities. The teachers also completed both the SDLRS (Guglielmino, 1977) and the Oddi Continuing Learning Inventory (OCLI; Oddi, 1986). The overall results suggest that neither instrument was valuable in explaining participation in continuing education activities.

Lacking a clear criterion-related variable that provides a direct measure of self-direction, most scale authors rely on the relationship between age, GPA, educational attainment and a student's self-reported level of self-direction. The results from this dissertation suggest the PRO-SDLS (Study 3) adds unique variance to the prediction of GPA and age, above that afforded by the SDLRS.

The following section of this dissertation extends the discussion of construct validity beyond the findings related to the six research objectives. Accomplishing this purpose involves presenting statistical analyses not included in Chapter IV. Recognizing additional analyses usually are not included in this chapter, it is done in this instance to allow for a discussion of a pertinent issue related to construct validity.

Construct Validity: One Step Further

Nunnally and Bernstein (1994) ask us to "recall that construct validation simultaneously tests the theory at the same time that it tests the measure, a difficult process of 'bootstrapping.' . . . these include the ability to translate the deductions of the theory into meaningful correlates" (p. 311). The basic purpose of this dissertation was the development of a reliable and valid instrument to measure self-direction among college students based on Brockett and Hiemstra's (1991) PRO model. As mentioned earlier, the content of items reflecting the TL component could be drawn directly from the authors' definitions. However, the content of items sampling the LC component drew heavily from current research on self-efficacy and intrinsic motivation. Therefore, an underlying assumption of this dissertation was that self-efficacy and intrinsic motivation are important components of self-direction.

Nunnally and Bernstein (1994) suggested in the previous quote that the author has a responsibility to translate this deduction into meaningful correlates. Fortunately, in the present study, this was possible. Calculated reliability coefficients (coefficient alphas) for the items reflecting self-efficacy (22, 23, 24, 26, 28, 29, 32, 34, 35 from Table 4.19) and the items sampling intrinsic motivation (7, 21, 25, 27, 30, 31, 33) produced coefficients of .84 and .82 respectively.

Table 5.1 displays the relationships between SDLRS (L. M. Guglielmino, 1977) scores (the established measure of self-direction) and total and subcomponent (self-efficacy, intrinsic motivation) PRO-SDLS scores. The significant relationship between scores from the SDLRS and the self-efficacy and intrinsic motivation subcomponents of the PRO-SDLS seem to suggest that self-efficacy and intrinsic motivation do inform the construct of self-direction, and that the deductions about the PRO model can be translated into meaningful correlates.

Table 5.1. Correlations Between Total and Sub-Component Measures of Self-Direction

		Instrinsic Motivation Total	Self-Efficacy Items Total
SDLRS Total	Pearson Correlation	.652 **	.642 **
	Sig. (2-tailed)	.000	.000
	N	188	189
PRO-SDLS Total	Pearson Correlation	.777 **	.872 **
	Sig. (2-tailed)	.000	.000
	N	188	190

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

However, since all components and subcomponents of the PRO-SDLS correlate significantly with the SDLRS, could the PRO-SDLS be pruned to include fewer components? Certainly all reliability coefficients surpassed Gay and Airasian's (1996) standard of >. 70. Yet, as displayed in Table 5.2 on the following page, the total PRO-SDLS score most consistently produced the highest correlations with variables thought to be associated with self-direction. Therefore, although all components are singularly predictive, the total scale score appears to possess the best overall predictive potential.

Recommendations for Practice

Based on extremely limited results, the findings of this study seem to suggest a link between self-direction, as measured by the PRO-SDLS, and successful college outcomes. For example, PRO-SDLS scores account for 21% of the variance in GPA. It is not necessary to assume there is a causal relationship between GPA and self-direction. For purposes relevant to this section, it may be enough to note the correlational relationship: an increase in a student's PRO-SDLS score is generally linked to an increase in their academic performance.

Logically, fostering self-direction based on an operationalization of Brockett and Hiemstra's (1991) model involves targeting the behaviors/attitudes present in the TL and LC components (intrinsic motivation and self-efficacy). This section will examine strategies offered by adult educators to foster self-direction, most of which emphasize strategies to foster learner skills located in the TL component of the PRO

Table 5.2. Correlations Between PRO-SDLS Total and Component Scores and Criterion Variables

		PRO-SDLS Total	PRO-SDLS TL Component	PRO-SDLS LC Component	Instrinsic Motivation Items Total	Self-Efficacy Items Total
Age	Pearson Correlation	.389**	.349**	.383**	.439**	.294**
	Sig. (2-tailed)	.000	.000	.000	.000	.000
	N	187	190	193	194	194
GPA	Pearson Correlation	.461**	.470**	.395**	.305**	.370**
	Sig. (2-tailed)	.000	.000	.000	.000	.000
	N	176	179	181	182	182
Previous Semester Hours	Pearson Correlation	.448**	.397**	.431**	.429**	.379**
	Sig. (2-tailed)	.000	.000	.000	.000	.000
	N	172	175	177	179	178
Supplemental Materials Access	Pearson Correlation	.160	.167	.138	.045	.143
	Sig. (2-tailed)	.075	.064	.121	.613	.109
	N	124	124	127	126	127
Total Course Points	Pearson Correlation	.234**	.204**	.245**	.120	.260**
	Sig. (2-tailed)	.003	.010	.002	.129	.001
	N	157	159	162	162	163
Professor Rating	Pearson Correlation	.151	.087	.212	.332	.159
	Sig. (2-tailed)	.536	.723	.385	.165	.517
	N	19	19	19	19	19

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

model, and strategies offered by educational psychologists to foster self-efficacy and intrinsic motivation, most of which emphasize instructional strategies most relevant to the LC component of the PRO model. Specific recommendations for practice will then be presented.

Hiemstra (1994) condensed years of research devoted to fostering self-direction in adult learners into a short, how-to book chapter. Hiemstra noted traditional teaching and learning situations do not foster self-direction. Instead these approaches emphasize that "control over content or process remains in the hands of experts, designers, or teachers who depend primarily on didactic or teacher-directed approaches" (pp. 81-82). To rectify this approach, Hiemstra proposed a series of microcomponents for teachers that outline nine aspects of the learning process over which students may assume control. Hiemstra suggested teachers might wish to use the specific areas listed under the microcomponents as a checklist to determine how they can allow students more control. The microcomponents are reproduced in Appendix F.

Hiemstra's (1994) framework addressed issues most relevant to Brockett and Hiemstra's (1991) teaching-learning component. The author highlighted the amount of control students could assume, if teachers were willing to let go. Hiemstra also highlighted the numerous reasons teachers did not relinquishing control. Yet, the findings of this publication suggest relinquishing control does foster learning.

Deci and Ryan (2000b) proposed that their theory of self-determination provides a direct link between self-direction and motivation. Deci and Ryan stated

that "people can be motivated to learn in more controlled ways or more self-determined ways, and it is the self-determined forms of motivation that positively predict high quality learning and adjustment in school" (p. 86). Deci and Ryan summarized studies that demonstrate intrinsic motivation and extrinsic motivation that is self-determined are related to greater interest in course material (Ryan, Mims, & Koesstner, 1983; as cited in Deci & Ryan), higher academic performance (Harter & Connell, 1984; as cited in Deci & Ryan), increased effort and positive emotions (Ryan & Connell, 1989; as cited in Deci & Ryan), and perseverance (Vallerand & Bissonette, 1992; as cited in Deci & Ryan).

Deci and Ryan (2000b) suggested a student's motivational orientation was influenced by factors in the environment (e.g., teachers) that affect their self-perceptions of competence and autonomy. Teachers who allow students to make their own decisions about their learning and provide clear feedback about the student's progress support student's perceptions of their autonomy and competence. Unfortunately, much of Deci and Ryan's research utilized samples drawn from younger students, which are not directly applicable to this study.

However, Noels, Clement, and Pelletier (1999) investigated how a student's perceptions of their teacher's support for their autonomy and the provision of useful feedback were related to a student's motivational orientation in adult students learning a second language. Their results supported Deci and Ryan's (2000b) previous contentions. Noels et al. further suggested that intrinsic motivation is associated with the teacher's communicative style. Language that was perceived as controlling or non-

constructive was associated with lessened self-determined motivations. The authors contend that providing constructive information is "necessary to develop the learner's competence, while at the same time encouraging the student to regulate his or her own learning behavior" (p. 31).

Zimmerman (2000), in an article written to capture and summarize 30 years of research in self-efficacy, defined perceived self-efficacy as "personal judgments of one's capabilities to organize and execute courses of action to meet designated goals" (p.83). Self-efficacy focuses on performance capabilities for future functioning and are domain specific. Bandura (1997; as cited in Zimmerman, 2000) suggested self-efficacious students participate more readily in activities, persist longer, work harder, choose more challenging goals, and display fewer adverse emotional reactions in difficult situations than do less self-efficacious students. Zimmerman also noted "self-efficacy beliefs provide students with a sense of agency to motivate their learning through use of such self-regulatory processes as goal setting, self-monitoring, self-evaluation, and strategy use" (p. 87). To facilitate improved self-efficacy, research reviewed by Zimmerman suggested modeling specific self-regulatory techniques, providing enactive feedback regarding the use of these strategies, and encouraging student-chosen proximal goals.

Common instructional recommendations appear to emerge across the literature devoted to each construct. Utilizing the recommendations highlighted in the following paragraphs may lead to improved levels of self-direction and classroom performance. Although the recommendations are stated in broad terms, in the discussion that

follows each recommendation intentionally includes specific techniques. It is the author's contention that instructors are more willing to entertain changes in their teaching if the changes are presented in concrete, manageable chunks.

Recommendation #1: Allow the student to assume some responsibility for the learning-teaching transaction. Inasmuch as Hiemstra's (1994) specific guidelines for the implementation of this recommendation are available in Appendix F, they will not be repeated here. However, it is noteworthy that Hiemstra offered over 90 specific teaching-learning aspects that teachers might allow students to control. Initially, teachers should choose the situations they are most comfortable relinquishing to learner control.

Recommendation #2: Instructors should model general and specific learning strategies. Stouch (1993) stated that "each time instructors incorporate learning-how-to-learn components into the curriculum, they are providing information and practice that increases their student's ability to learn that content as well as future content" (p. 59). In other words, as student's competence in the specific skill is increased, so is their perception of control over future learning. As noted earlier in this dissertation, the learner's perception of control is paramount in determining their level of self-direction.

Stouch (1993) suggested highly generalizable learning strategies be modeled before more content-specific strategies. An example of a generalizable strategy might include reflecting in class on one's learning style and how it could be best used in learning new skills. Modeling specific content instruction strategies might include

modeling course specific study-skills, reviewing practice exam questions and the strategy the instructor used to arrive at the correct answer, modeling active reading strategies, and collecting and reviewing student's lecture notes for organization and necessary information.

McKeachie (1999) offered many of the same instructor strategies in his review of effective domain- and course-specific learning strategies. Through modeling and direct instruction, students need to be taught general ways of thinking about the material, and appropriate strategies for specific content mastery. McKeachie made the following five suggestions instructors may wish to consider:

1. Preview (with the students) the textbook and its text structure.
2. Model effective notetaking by taking notes on the overhead to emphasize the important points of the lecture.
3. Provide anonymous examples of student work to illustrate both dos and don'ts.
4. Give and discuss sample items from previous tests as practice.
5. Be clear and highlight the importance of terminology that has domain-specific meaning.

Recommendation #3: Provide clear feedback in the form of encouragement about the student's proximal goals. Although this recommendation seems somewhat straightforward, research writings suggest teachers may confuse praise for encouragement. The specific operationized components of praise, according to Kelly and Daniels (1997) involves (a) the approval, evaluation, or expectations of

the person giving the praise; (b) the use of superlative; (c) overt or implied comparisons with the performance of others; and, (d) focusing on the goal of performance outcome over effort. On the other hand, encouragement is operationalized as (a) being descriptive rather than judgmental; (b) highlighting the social usefulness or functional value of the behavior; (c) emphasizing progress and improvement compared to one's prior performance; (d) emphasizing effort/persistence over outcome; and, (e) focusing on the pride/good feelings the person may have about self as a result of a positive performance. Kelly and Daniels (1997) contend that encouragement fosters a person's self-acceptance of their basic worth, stimulates self-evaluation, and encourages responsibility for their behavior. Both Kelly and Daniels and Stapleton-Vitale (1984) infer that adults may more readily identify praise as controlling or manipulative.

In summary, the operationalized components of encouragement differ significantly from simple praise. Encouragement supports self-direction, praise may be interpreted as controlling and, therefore, other-directed. However, learning to utilize clear feedback in place of praise is a skill few teachers have practiced, but once mastered is no more difficult to dispense.

Research Recommendations

The next section offers eight specific research recommendations for future research. These recommendations may provide additional insight into the measurement of self-direction.

1. Although experts agreed that most PRO-SDLS items represent the PRO model, some conflicting results appeared when the experts categorized by component. Additional research is indicated to further clarify and delineate the characteristics of each component. Such research may allow educators to determine if the components can be separated or, if as suggested in this study, the components seem to go hand-in-hand.

2. Further research is also indicated to ascertain whether certain other learner characteristics may be relevant to the LC component of the PRO model. For example, writings on meta-cognition (Garrison, 1997), learning conation (Ponton, Carr, & Confessore, 2000), self-regulation of cognition (Pintrich, 1995), expectancy of success and task value (VanZile-Tamsen, 2001), psychological type (Kreber, 1998) and goal orientation (Bell & Kozlowski, 2002) may also inform this component.

3. The social desirability of certain responses to the wording of initial scale items was hypothesized as a source of measurement error. The addition of a fake-good scale (Lounsbury & Gibson, 1999) would allow this hypothesis to be explored further.

4. The internal consistency of this scale was high. However, the responses employed to establish this reliability were drawn from an extremely homogeneous sample. Without question, the PRO-SDLS should be administered to students from other colleges or disciplines and to students in different settings. Additionally, a larger sample of adult learners would allow the reliability of this scale in older-than-average students to be established.

5. Very few studies have been able to establish convergent validity between the degree of a student's self-reported self-direction and an independent rating of this same self-direction. Further research in this area may need to use independent raters who are more knowledgeable about a student's out-of-class school activities.

6. This study attempted to link a student's level of self-direction to optional web access of supplemental materials. Although the associations were not significant in the total sample, there is some suggestion that this objective criterion may have merit. Further research is recommended.

7. Although adult education literature has investigated the link between self-direction and self-efficacy, the results of this study suggest an empirical link between intrinsic motivation and self-direction. Further research could address this relationship directly.

8. Brockett and Hiemstra (1991) state that both components of their model operate within the learner's social environment. A qualitative investigation of the influences of social environment may be fruitful and shed further light on the interaction postulated by Brockett and Hiemstra.

A Concluding Reflection

Although college instructors might promote self-direction as a means for improving class performance, this rationale dismisses the basic humanistic principle for self-direction in learning. Eduard C. Lindeman (1989/1926) offered the following argument:

> Growth is the goal of life. Power, knowledge, freedom, enjoyment, creativity–these and all other immediate ends for which we strive are contributory to the one ultimate goal which is to grow, to become . . . Otherwise life is illusion, for ends which can be achieved-which are conceived in terms of static qualities-leave the self without further incentives to growth . . . If then the meaning of life is to be discovered in becoming, education can serve as revealor only insofar as the learning process is continuos-coterminous with the functions of personality. Education is superficially conceived when viewed as a preparation for life. Education *is* life. (pp. 128-129)

Education for students can end each semester with the issued grade report, or continue through self-directed learning as life.

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APPENDICES

Appendix A

Demographic Questionnaire

Learning Experiences Scale

(A.) Last Four Digits SS#___ ___ ___ ___ (B.) SAT or ACT Score_____

(C.) Age_____ (D.) Gender: Male or Female

(E.) Undergraduate Semester Hours Completed:_____

(F.) Undergraduate GPA_____

(G.) IF APPLICABLE: Graduate Semester Hours Completed_____

(H.) IF APPLICABLE: Graduate GPA_____

(I.) Class Status: _____

Please circle one answer for each statement. There are no "right" answers to these statements, which pertain to your recent learning experiences in college – not just those experiences from this class (although they may be the same). This activity is part of the EP 210 (EP 525) research project and as such you have previously given your written informed consent.

Items	**1 = Strongly Disagree**	**2= Disagree**	**3 = Sometimes**	**4= Agree**	**5 = Strongly Agree**
1. I frequently do extra work in a course just because I am interested in the answers.	**1**	**2**	**3**	**4**	**5**

Appendix B

Professor Rating Form

Below are the students who were kind enough to fill out the self-direction rating scales. I would appreciate you taking a moment and rating these students' self-direction as you perceived it (using the PRO Model as your guide). A rating of 0 would mean you perceived the student exhibited NO self-direction; a rating of 10 would stand for complete self-direction. Please circle a rating for each student you feel comfortable rating. If you do not feel comfortable rating a student, don't. If you would either black out or rip off the students' names before returning the form to me, I would appreciate it.

Susan

Name:	Rating	ID #
	0 1 2 (3) 4 5 6 7 8 9 10	
	0 1 2 3 4 5 (6) 7 8 9 10	
	0 1 2 3 4 5 (6) 7 8 9 10	
	0 1 2 3 4 5 (6) 7 8 9 10	
	0 1 2 3 4 (5) 6 7 8 9 10	
	0 1 2 3 4 5 (6) 7 8 9 10	
	0 1 2 3 4 5 (6) 7 8 9 10	
	0 1 2 3 4 (5) 6 7 8 9 10	
	0 1 2 (3) (4) 5 6 7 8 9 10	

Appendix C

Survey of Expert Opinion Packet

Susan L. Stockdale
Educational Psychology Department
524A Claxton Complex
University of Tennessee
Knoxville, TN 37803

January 20, 2003

Name
Address
City State

Dear Dr.

I am a doctoral student at the Univeristy of Tennesee. For my dissertation research I am working to develop a reliable and valid instrument to measure self-directedness in learning based on an operationalization of the process and learner characteristic components of the Personal Responsibility Orientation (PRO) Model of Self-Direction (Brockett & Hiemstra, 1991) in college students. Accomplishing this purpose involves the identification and operationization of scale items that validly reflect the process and learner components of the PRO model of Self-Direction as described by Brockett and Hiemstra.

The purpose of this letter is to seek your help. Attached to this letter is a list of 41 items that may reflect two of the components of self-direction in learning based on the PRO Model. I have enclosed a copy of Brockett and Hiemstra's description of their model. I would greatly appreciate your expert opinion as to the match between each item and the two identified components of the PRO Model.

Individual responses to the questionnaire will remain confidential, and tabulated results will be presented only as mean level of agreement per item. If you desire further information concerning this survey, please contact me. Additionally I should note that although Ralph Brockett chairs my dissertation committee, Dr. Robert Williams, Professor of Educational Psychology, and member of my dissertation commitment will oversee this portion of data collection to further assure your confidential responses. Thank you for your assistance in the research study.

Sincerely,

Susan L. Stockdale
Researcher

Ralph G. Brockett
Professor and Chair

Survey of Item Representativeness – PRO Model of Self-Direction in Learning

Please rate your level of agreement as to the representativeness of the following items to the Brockett and Hiemstra's enclosed description of the PRO Model of Self Direction in Learning based on the following continuum:

1= **Strongly Disagree** that the item represents either component of the PRO Model of Self-Direction
2= **Disagree** that the item represents either component of the PRO Model of Self-Direction
3= **Unsure** that the item represents either component of the PRO Model of Self-Direction
3= **Agree** that the item represents one component of the PRO Model of Self-Direction
4= **Strongly Agree** that the item represents one component of the PRO Model of Self-Direction

I would further appreciate your reasoning for items your rate 1 or 2. For items you rate 4 or 5, please indicate whether you think the item represents a characteristic of the teaching–learning transaction or a characteristic of the learner (as described by Brockett and Hiemstra's in the enclosed model information).

ITEM (mean level agree representativeness of item)	1 Strongly Disagree	2 Disagree	3 Unsure	4 Agree	5 Strongly Agree	If rated 1 or 2 indicate, please indicate the reason for your disagreement	If rated 3 or 4, does the item represent a characteristic of the transaction or of the learner ?
1. I never have a problem carrying out my study plans.		1 rater	1 rater		3 raters	Problem = predisposition, not LC	T, L, L, L, T&L
2. I don't see any connection between the work I do for my courses and my personal goals and interests.		1		3	1	Context specific	
3. I frequently do extra work in a course just because I am interested in the answers.			1	3	1		L, L, L, L, L
4. I am very confident in my ability to independently prioritize my learning goals.				2	3		L, L, L, L, L
5. I always view problems I encounter in my learning as "personal challenges" I can overcome.				3	2		L, L, L, L, T&L
6. The primary reason I complete course requirements is to obtain the grade that is expected of me.		1		2	2	Instructional motivation, not LC	
7. I consistently motivate myself to do well in any course I take.				4	1		L, L, L, L, L

ITEM	1 Strongly Disagree	2 Disagree	3 Unsure	4 Agree	5 Strongly Agree	If rated 1 or 2 indicate, please indicate the reason for your disagreement	If rated 3 or 4, does the item represent a characteristic of the transaction or the learner?
8. When I complete course work activities that aren't personally interesting, I do so because I know that will be valuable to me in later life.		1 rater	2 raters	2 raters		To a large degree, the PRO model shares the problem-centered approach of andragogy – learning not only accumulation of knowledge	L, L
9. I usually do better in courses when the instructor tells me exactly what I need to learn rather then when I choose my own topics for learning.					5		T, L, L
10. I am confident in my ability to consistently motivate myself.				4	1		L, L, L
11. If I'm not doing as well as I would like in a course I always independently make the changes necessary for improvement.		1	1	3		Bureaucratically, this is not always possible	T, L, T, T&L
12. I have a lot of doubts about my ability to effectively direct my own learning.				3	2		L, L, L, T&L
13. I always feel in control of the learning process.			2	1	2		T, L&T, L&T
14. I usually struggle in classes if the professor allows me to set my own timetable for work completion.				3	2		L, T
15. I complete most of my college activities because I WANT to.			1	4			L, L, L, L
16. I would rather take the initiative to learn new things in a course rather than wait for the instructor to foster new learning.				1	4		L, L, L, L&T
17. I always depend on the instructor to make sense of things I don't understand.			2	3		Does not necessarily take place in isolation	L&T, L&T
18. I am unsure about my ability to independently find needed outside materials for courses.			1	4			T, T, L, L&T

ITEM	1 Strongly Disagree	2 Disagree	3 Unsure	4 Agree	5 Strongly Agree	If rated 1 or 2, please indicate the reason for your disagreement	If rated 3 or 4, does the item represent a characteristic of the transaction or the learner?
19. I often collect additional information about interesting topics even after the course has ended.				2 raters	3 raters		L, L, T, L
20. If there is something I don't understand in a class, I always try to find a way to learn it on my own.				3	2		L, L, T, L
21. For most of my classes, I really don't know why I complete the work I do.			2	1	2		T
22. Without the instructor's help, I always have a problem knowing what changes I need to make to improve my learning.			1	3	1		T, T, T
23. I am very certain I have the capacity to effectively organize my study time on my own.			1	4			T, T, L, T&L
24. I usually find a way to relate my research projects for a course to my own interests.				4	1		L, L, T, L
25. I am really uncertain about my capacity to take primary responsibility for my learning.			1	1	3		L, T, L&T
26. I am very successful at prioritizing my learning goals.				2	3		T, T, L, L
27. Even after the course is over, I often continue to spend time learning about the topic.				4	1		L, L, L, L
28. Most of the work I do for my college courses is personally enjoyable or seems relevant to my reasons for attending college.			1	3	1		L, L, T
29. I always effectively organize my study time.				3	2		T, T, L, L

ITEM	1 Strongly Disagree	2 Disagree	3 Unsure	4 Agree	5 Strongly Agree	If rated 1 or 2 indicate, please indicate the reason for your disagreement	If rated 3 or 4, does the item represent a characteristic of the transaction or the learner?
30. I always assume personal responsibility for my learning.			1 rater	1 rater	3 raters	Cognitive orientation but about process?	L, L, L, L&T
31. The main reason I do the course work activities I do is to avoid feeling guilty or getting a bad grade.	1	1		2	1	State vs. trait, confounding issue Inconsistent	L
32. I often have a problem motivating myself to learn.		1		3	1	Failure of Personal Responsibility	L, L, L&T
33. The instructor is always in control of what I learn about a topic.			1	1	3		T, L&T
34. Most of the activities I complete for my college classes are NOT really personally useful or interesting.		1	1	3		Failure of Personal Responsibbility	L, L, T, L&T
35. I often use materials I've found on my own to help me in a course.				3	2		L, T, T, T, L&T
36. I don't have much confidence in my ability to independently carry out my study plans.			1	4			L&T, L&T
37. I have taken elective courses simply because they were personally useful.		1	1	2		Not clear; not planned or LC	L, T
38. I am uncertain about my ability to make sense of classroom material on my own.		1	1	3			T, L, L&T
39. I always effectively take responsibility for my own learning.			1	3	1		L, L, L&T, L&T, L&T
40. I am very convinced I have the ability to take personal control of my learning.			1	1	3		L, L, L&T, L&T
41. I always rely on the instructor to tell me what I need to do in a course to succeed.		1		2	2		T, T, T

Is the item format (Likert) an appropriate format for this questionnaire?	Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree	Comments:
					1	

Appendix D

Informed Consents

INFORMED CONSENT EDUC PSYCH 210 RESEARCH PARTICIPATION

The purpose of this research is to examine factors that may affect performance in Ed Psych 210. This research has been ongoing for the past several semesters, yielding many important conclusions as to what factors contribute to student success in courses like 210. Although most of the information used in this research has been obtained from the regular course records, we also have requested that students provide information that may be relevant to their performance in the course. This semester we are requesting that you respond to a Learning Experiences Questionnaire and a short Critical Thinking Exam. Neither of these activities should take much of your time and both will be administered in class.

To match your responses to the various research activities with your performance records in the course, we ask you to identify yourself on all research forms by the **last four** digits of your social security number. The data will be entered in a computer file by these last four digits of your social security number. No names will ever be included in the data file. The data file will be retained in Claxton Complex A516, which is Dr. Robert Williams' locked office.

We invite you to participate in this research project, but you may decline without penalty. You may also withdraw from participation at any point without penalty. The total amount of credit available for the research participation amounts to about 4% of the total course credit. If you elect not to participate, alternative credit-producing activities will be provided. If you have any questions about the research, either now or later, please contact Dr. Robert L. Williams, Claxton Complex A516, 974-6625, bobwilliams@utk.edu.

****

I have read and understood the explanation of the Educ Psych 210 Research Participation and agree to participate.

_____ Sp01
Name (print) Date

_____
Signature

Please submit one signed copy of the Informed Consent Statement to the instructor at the designated time. Keep the other copy for your records.

File name: rinforco.rlw

INFORMED CONSENT EDUC PSYCH 210 RESEARCH PARTICIPATION

The purpose of this research is to examine factors that may affect performance in Educ Psych 210. This research has been ongoing for the past several semesters, yielding many important conclusion as to what factors contribute to student success in courses like 210. You will have an opportunity to learn about some of these past research findings in articles that you will read this semester. Although most of the information used in this research has been obtained from regular course records, we also have requested that students provide information that may be relevant to their performance in the course. This semester we are requesting that you respond to three instruments: an instrument about your learning experiences, another that assesses critical thinking skills, and a third that measures divergent thinking. All three can be taken within one class period. You will receive 5 points toward your total credit in the course for each instrument that you take.

To match your responses to the various research activities with your performance records in the course, we ask you to identify yourself on all research forms by the **last four** digits of your social security number. The data will be entered in a computer file by these last four digits of your social security number. No names will ever be included in the data file. The data file will be retained in Claxton Complex 516, which is Dr. Robert Williams' locked office.

We invite you to participate in this research project, but you may decline without penalty. The total credit available for the research participation amounts to about 4% of the total course credit. If you elect not to participate, alternative credit-producing activities will be provided. If you have any questions about the research, either now or later, please contact Dr. Robert L. Williams, Claxton Complex 516, 974-6625, bobwilliams@utk.edu.

I have read and understood the explanation of the Informed Consent Educ Psych 210 Research Participation and agree to participate.

_____ _____ FaOl
Name (print) Date

_____
Signature

Please submit one signed copy of the Informed Consent Statement to the instructor at the designated time. Keep the other copy for your records.

INFORMED CONSENT EDUC PSYCH 210 RESEARCH PARTICIPATION

The purpose of this research is to examine factors that may affect performance in Educational Psychology 210. This research has been ongoing for the past several semesters, yielding many important conclusions as to what factors contribute to student success in courses like 210. Although most of the information used in this research has been obtained from regular course records, we also have requested that students provide information that may be relevant to their experience in the course. This semester we are requesting that you respond to a Learning Experiences Questionnaire and a Learning Preferences Questionnaire. Neither of these activities should take more than 15 minutes of your time and both will be administered in class.

To match your responses to the various research activities with your performance records in the course, we ask you to identify yourself on all research forms by the last four digits of your social security number. The data will be entered in a computer file by these last four digits of your social security number. No names will ever be included in the data file. The data file will be retained in CA 527, which is Susan Stockdale's locked office.

We invite you to participate in this research project, but you may decline without penalty. You may also withdraw from participation at any point without penalty. The total amount of credit available for the research participation amounts to about 3% of the total course credit. If you elect not to participate, alternative credit-producing activities will be provided. If you have questions about the research, either now or later, please contact Susan Stockdale, Claxton Complex A527, 974-4169, stockdal@utkux.utcc.utk.edu

****

I have read and understood the explanation of the Ed Psych 210 Research Participation and agree to participate.

_____ Sp02
Name (Print) Date

_____
Signature

INFORMED CONSENT EDUC PSYCH 525 / 529 RESEARCH PARTICIPATION

The purpose of this research is to examine factors that may affect performance in Educational Psychology courses. This research has been ongoing for the past several semesters in undergraduate courses, yielding many important conclusions as to what factors contribute to student success. Although most of the information used in this research has been obtained from regular course records, we also have requested that students provide information that may be relevant to their experience in this graduate course. This semester we are requesting that you respond to a Learning Experiences Questionnaire and a Learning Preferences Questionnaire. Neither of these activities should take more than 15 minutes of your time and both will be administered in class.

To match your responses to the various research activities with your performance records in the course, we ask you to identify yourself on all research forms by the last four digits of your social security number. The data will be entered in a computer file by these last four digits of your social security number. No names will ever be included in the data file. The data file will be retained in CA 527, which is Susan Stockdale's locked office.

We invite you to participate in this research project, but you may decline without penalty. You may also withdraw from participation at any point without penalty. If you have questions about the research, either now or later, please contact Susan Stockdale, Claxton Complex A527, 974-4169, stockdal@utkux.utcc.utk.edu

****

I have read and understood the explanation of the Ed Psych 525/ 529 Research Participation and agree to participate.

_____ _____

Name (Print) Date

_____

Signature

Appendix E

Survey of Supplemental Materials Use

210 Survey Regarding Posted Information

Semester_____ Year_____ Section_____ ID Number ___ ___ ___ ___

Please take a moment to help us understand how useful (if at all) you found the posted foundational notes for this course. Your responses are voluntary and will be used only for research purposes.

1. How much of the posted foundational information did you print?
Circle one: All Some None

IF YOU CIRCLED "All" or "Some," please answer questions 1a – 1f. IF YOU ANSWERED "none," please go on to Question #2 on the next page.

1a. When did you typically print the foundational information? (Check one)
____Before the unit began
____During the unit
____Right before the exam

1b. How did you use the printed information? (Check ALL that apply)
_____I read the foundational information BEFORE coming to the related lecture
_____I brought the foundational information to class and used it to "follow along" with the lecture.
_____I read the foundational information immediately AFTER the related lecture
_____I read the foundational information as a review for the exam.

1c. Did you typically copy information from the foundational notes directly to your notes? Circle one: Yes No

IF YOU CIRCLED "YES," please answer question 1d, IF YOU CIRCLED "NO" please go on to questions 1e and 1f.

1d. When did you typically copy the foundational information into your notes?
_____ before coming to the related lecture
_____ immediately after the related lecture
_____ shortly before the unit exams

1e. How much overlap did you find between the posted foundational information and the material presented in class? (Check one)
____ Little overlap
____ Moderate overlap
____ Substantial overlap

1f. How much did you use the posted notes in reviewing for exams? (Check one)
_____ More than the in-class notes
_____About the same as the in-class notes
_____Less than the in-class notes

Please take a moment to help us understand how useful (if at all) you found the posted review questions?

2. How often did you print the review questions?
Circle one: For all units For some units For no units

If YOU CIRCLED, "FOR ALL UNITS" OR "FOR SOME UNITS," please answer ALL the remaining questions . IF YOU CIRCLED, "FOR NO UNITS," please go on to questions 3 through 5.

2a. When did you typically copy them?
_____Before the unit began
_____During the unit
_____Right before the exam

2b. How often did you try to answer the review questions on your own before coming to class?
Circle one: Always Sometimes Never

3. When the review questions were presented in class, did you typically
_____attempt to answer them on your own before they were discussed.
_____prefer to wait for the in-class answers and explanations.

4. When the review questions were discussed in class, how often did you typically volunteer answers? (Check one)
_____Very frequently
_____Somewhat frequently
_____Seldom
_____Never

5. How much did the practice questions help you learn how to respond to the actual examination items? (Check one)
_____Minimally
_____Considerably
_____Greatly

Appendix F

Hiemsta's (1994) Microcomponents of the Teaching Learning Process

Hiemstra's (1994) Aspects of the Learning Process Over Which Learners Can Assume Some Control

1. Assessing Needs
   - 1.1 Choosing among various individualized techniques
   - 1.2 Deciding whether to use group techniques
   - 1.3 Choosing how needs information is reported
   - 1.4 Choosing how needs information is used
2. Setting Goals
   - 2.1 Deciding on specific learning objectives
   - 2.2 Choosing the nature of any learning experience
     - 2.2.1 Deciding between competency or mastery learning and pleasure interest
     - 2.2.2 Deciding on the types of questions to be asked and answered during learning efforts
     - 2.2.3 Choosing the emphases to be placed on use and application of the acquired knowledge or skill
   - 2.3 Deciding whether to change objectives during the learning experience
   - 2.4 Deciding whether to use learning contracts
     - 2.4.1 Choosing among various learning options
     - 2.4.2 Choosing how to achieve learning objectives
3. Specifying Learning Content
   - 3.1 Choosing among varied levels of difficulty
   - 3.2 Choosing a sequence for the introduction of learning material
   - 3.3 Choosing the types of knowledge (psychomotor, cognition, affective) to be acquired
   - 3.4 Deciding on emphasizing the acquisition of theory versus practice or application activities
   - 3.5 Deciding on a level of competency to be acquired
   - 3.6 Deciding on actual content areas to be learned
     - 3.6.1 Deciding on financial or other costs involved in a learning effort
     - 3.6.2 Deciding on the help, resources, or experiences required for the content
   - 3.7 Choosing the learning content priorities
   - 3.8 Deciding on the major planning type, such as self, a group or its leader, an expert, or a nonhuman resource
4. Pacing the Learning
   - 4.1 Choosing the amount of time to be devoted to teacher presentations
   - 4.2 Choosing the amount of time to be spent on teacher-to-learner interactions
   - 4.3 Choosing the amount of time to be spent on learner-to-learner interactions

4.4 Choosing the amount of time to be spent on individualized learning activities
4.5 Choosing the pace of movement through learning experiences
4.6 Deciding when to complete parts or all of the activities

5. Selecting the Instructional Methods, Techniques, and Devices
   5.1 Deciding among options for technological support and instructional devices
   5.2 Deciding on the instructional method or technique to be used
   5.3 Choosing the type of learning resources to be used
   5.4 Choosing the appropriate learning modality (sight, sound, touch)
   5.5 Deciding among opportunities for learner-to-learner, learner-to-teacher, small group, or large group discussion
6. Controlling the Learning Environment
   6.1 Deciding how to manipulate various physical or environmental features
   6.2 Deciding how to deal with emotional or psychological impediments
   6.3 Choosing how to confront social and cultural barriers
   6.4 Deciding how to match personal learning style preferences with informational presentations
7. Promoting Introspection, Reflection, and Critical Thinking
   7.1 Choosing how to interpret theory
   7.2 Deciding on means for reporting or recording critical reflections
   7.3 Deciding whether to use reflective-practitioner techniques
   7.4 Deciding whether to undertake decision making, problem-solving, and policy formulation activities
   7.5 Choose how to clarify newly acquired ideas
   7.6 Choosing how to apply newly acquired information
8. Instructors or Trainer's Role
   8.1 Deciding on the role or nature of any didactic (lecturing) presentations
   8.2 Deciding on the role or nature of any socratic (questioning) techniques to be used
   8.3 Deciding on the role or nature of *any* facilitative procedures used to guide the learning process
9. Evaluating the Laming
   9.1 Choosing the use and type of any testing
      9.1.1 Choosing the nature and use of any reviewing activities
      9.1.2 Choosing the nature and use of any practice testing activities
      9.1.3 Choosing the nature and Use of any retesting activities
      9.1.4 Choosing how tests will be used in any required grading
      9.1.5 Deciding on the weight given to any test results
   9.2 Choosing the type of feedback to be used
      9.2.1 Deciding on the type of feedback provided to learners by an instructor
      9.2.2 Deciding on the type of learner's feedback provided to the instructor

9.3 Choosing the means used for validating achievements
9.4 Choosing the nature of learning outcomes
- 9.4.1 Choosing the type of any final products
  - 9.4,1.1 Deciding how evidence of learning is reported or presented
  - 9.4,1.2 Deciding how to revise and resubmit final products
  - 9.4,1.3 Choosing the nature of any written products
- 9.4.2 Deciding on the weight given to final products
- 9.4.3 Choosing the level of practicality for any teaming outcomes
  - 9.4,3.1 Deciding how to relate learning to current or future employment
  - 9.4,3.2 Choosing how to propose knowledge application ideas
- 9.4.4 Choosing the nature of the benefits from any learning
  - 9.4,4.1 Deciding how to propose immediate benefits versus long-term benefits
  - 9.4,4.2 Deciding how to seek various types of benefits, such as pleasure, occupational enhancement, or acquisition of new skills

9.5 Choosing the nature of any follow-up evaluation
- 9.5.1 Choosing how knowledge can be maintained
- 9.5.2 Choosing how concepts are applied
- 9.5.3 Choosing how to review material
- 9.5.4 Choosing how to follow up on new learning

9.6 Choosing how to exit a learning experience and return later if appropriate

9.7 Deciding on the type of grading used or completion rewards to be received

9.8 Choosing the nature of any evaluation of instructor and learning experience

9.9 Choosing the type of learning contract validation

(Source: Hiemstra, 1994, pg. 85-86)

VITA

Susan Stockdale was born in Twin Lakes, Ohio. Her parents were Helen and Bob Stockdale. Susan initially attended Kent State University for three years before marrying and parenting four wonderful children. Susan received a Bachelor of Science degree in middle school education in 1987 and a Master of Science degree in special education in 1995 from the University of North Dakota. She taught in the K-12 school system in North Dakota for eight years before returning to graduate school. Susan received a Ph.D. in Education with a concentration in educational psychology in 2003.

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