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ABSTRACT

A study involving teachers and administrators from 16 elementary, middle, and high schools in Tennessee investigated the factorial structure of the Self-Directed Learning Readiness Scale (SDLRS). The SDLRS includes 58 Likert-like items designed to measure the readiness of adult learners to assume self-direction in the learning process. Study subjects were participants in TN LEAD, a statewide school leadership development program. A total of 439 subjects completed and returned the SDLRS. Exploratory factor analysis of the SDLRS was conducted using principal components factor solutions with orthogonal rotation. Application of the Kaiser-Guttman rule provided 15 initial factors with eigenvalues greater than 1. A scree test was conducted to extract the four most significant factors. Using orthogonal rotations, two- and four-factor models were examined. A reliability analysis of the total SDLRS was conducted using Cronbach's coefficient alpha; the reliability and corrected split-half reliability were 0.93 and 0.89, respectively. It is concluded that the SDLRS has an underlying structure of four dimensions measuring readiness for self-directed learning: (1) love of and enthusiasm for learning; (2) self-confidence in the ability to learn; (3) self-concept as an independent learner; and (4) tolerance of ambiguity, risk, and complexity in learning. Eight data tables are included. (TJH)

The Factor Structure of the Self-Directed Learning Readiness Scale (SDLRS)

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The Factor Structure of the Self-Directed Learning Readiness Scale (SDLRS)

During recent years, self-directed learning has become an important area of study in the field of adult education. A substantial number of writings on the concept have emerged as adult education theorists, such as Alan Tough (1971) and Malcolm Knowles (1975), have challenged researchers to understand and explain the natural self-directed learning process as it occurs during the adult years. The idea of self-directed learning is described by Malcolm Knowles (1975) as follows:

> Self-directed learning describes a process in which individuals take 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).

Such an idea has enchanted the world of adult educators, and it underlies much current adult education philosophy and practice (Brookfield, 1985). To many in the field, adult learners are viewed as natural self-directed learners and adult education is seen as a process of releasing and developing adult learners' capacities to become more self-directed in their learning. The beginning of the intensive inquiry into the concept of self-directed learning can be traced back to Alan Tough's initial studies on learning projects in the late 1960s and early 1970s (Tough, 1966, 1971). Tough's original study of forty Canadian

graduates' (Tough, 1967) self-teaching (and later called learning projects, 1971) provoked extensive interest in a quest of the nature of the phenomenon of self-directed learning by other practitioners and theorists of adult education. As many as 50 follow-up studies in the same vein have been conducted (Tough, 1982) and more than 13 different groups of adults have been used as target groups in the research (Brookfield, 1984, Caffarella, & O'Donnell, 1987). Although such research efforts have generated rich descriptions of the self-directed learning activities and interests in different groups of adult learners, such verification studies have also been criticized. As is summarized by Caffarella and O'Donnell (1987) in their review of the literature of self-directed learning, some of the criticisms about such research include:

> (a) The populations are primarily middle class; (b) the Tough schedule calls for probing and prompting which can contaminate findings; (c) subjects must primarily look back in time to reflect on their learning experiences; and (d) in general, enough verification has been completed (pp.200-201).

The apparent early stagnation of research on self-directed learning projects called for other approaches to studying and understanding self-directed learning. One of the newer approaches was to look at and understand the characteristics and styles of self-directed adult learners. The Self-Directed Learning Readiness Scale (SDLRS) devised by Guglielmino (1977) is one of such major efforts. The SDLRS is a self-report instrument

with 58 Likert-type items which measures readiness of individual adult learners to assume self-direction in the learning process. The development of the original instrument was based on the study and consensus from a panel of experts on the most important personality characteristics of highly self-directed learners (Guglielmino, 1977). The delphi technique was used as 14 experts in adult education and self-directed learning were selected and asked to participate in the three-round survey. The respondents identified the most important personality characteristics of highly self-directed learners. Based on the results of the survey, the original 41 item SDLRS instrument was developed. The instrument was then tested and validated through an initial study; it was administered to a sample of 307 subjects containing 4 different groups: high school juniors, high school seniors, college undergraduates and noncredit students that were enrolled in university enrichment courses. The item-test homogeneity analysis and factor analyses were conducted. According to those analyses, the 41-item scale had a reliability of .87, and the principal components factor analysis with orthogonal rotation generated eight meaningful and interpretable factors. Although the final version of the scale contains 58 items, all the initial analyses were conducted on the 41-item scale.

The SDLRS has received much attention in the field of adult education and has been widely used since its development in 1977. Among other studies, there have been at least 20 doctoral studies conducted using the SDLRS scale as the main source of data

(Field, 1989) with studies by Sabbaghian (1979), Savoie (1979) and Hassan (1981) being often cited examples. Some of the sample groups included in the research are gifted students who ranged from Grade 3 to Grade 12 (Torrance, & Mourad, 1978a), graduate students enrolled in the class of creative thinking (Torrance, & Mourad, 1978b), undergraduate adult students (Sabbaghian, 1979), black and white collage students (Long, & Agyekum, 1983), nurses enrolled in continuing education courses (Savoie, 1979), adults of low formal educational attainment (Brockett, 1985), first-year college nursing students (Crook, 1985), and students enrolled in adult education graduate courses that utilized learning contracts (Caffarella, & Caffarella, 1986).

Previous reliability studies generated internal consistency estimates of .87 for both the 41-item scale (Guglielmino, 1977) and the 58-item scale (Brockett, 1985). Information is also available on the construct and predictive validity of the scale. Investigations have been conducted on the relationship between the self-directed learning readiness and other psychosocial variables. The instrument has also been used to assess learners' perceived readiness for self-direction in learning. In the studies conducted by Torrance and Mourad (1978a, 1978b), positive correlations were found between the total SDLRS scores and measures of originality, ability to produce analogies, creative achievements and experiences, the right and left hemisphere styles of learning, and gifted students' abilities to think creatively. A significant relationship was found between readiness of self-directed learning and self-concept in

Sabbaghian's study (1979) of 77 adult undergraduates using the SDLRS. While Long and Agyekum (1983) found a significant relationship between the black and white college students' SDLRS scores and the measures of perceived social values, social beliefs and age, they failed to find a significant relationship between the SDLRS scores and faculty ratings of the students' self-directedness. In Crook's study (1985) on the predictive validity of the self-directed learning readiness scale, researchers found a significant relationship between the first-year nursing students' SDLRS scores, their first-year final subject grades and peer nomination scores as self-directed learners. The author concluded, however, "the SDLRS score was not educationally meaningful or predictive" (p.278) since it only explained a small amount of the variance. Another study on the predictive validity of the scale was carried out by Savoie (1979) and she found a positive relationship between the SDLRS scores of 152 nurses enrolled in a continuing education course and their course grade.

Research on self-directed learning readiness has also raised some problems with the scale. While the SDLRS was shown to have high reliability and validity in a number of investigations, it has been found to be less appropriate for use in other situations. Brockett (1983) concluded in his study of a sample of adults aged 60 and older that "the SDLRS defines self-directed learning from a highly school-and-book-oriented perspective, which could be inappropriate when studying a sample of adults who have had relatively few years of schooling" (p.17). Recently,

researchers have questioned the claim that the instrument measures eight orthogonal factors (West & Bentley, 1989; Field, 1989), a claim made by Guglielmino in her original study (1977). Guglielmino's original factor analysis was conducted using the method of principal components factor analysis with orthogonal rotation. The researcher applied the Kaiser-Guttman rule and determined that the scale had an eight-factor structure. The interpretable eight factors included the following: openness to learning opportunities, self-concept as an effective learner, initiative and independence in learning, informed acceptance of responsibility for one's own learning, love of learning, creativity, positive orientation to the future, and ability to use basic study skills and problem solving skills. Later in another factor analysis of the 58-item scale by Guglielmino (1978, cited in Guglielmino, 1989) the eight factors were named:

Factor 1: Love of learning

Factor 2: Self-concept as an effective independent learner

Factor 3: Tolerance of risk, ambiguity, and complexity in learning

Factor 4: Creativity

Factor 5: View of learning as a life long, beneficial process

Factor 6: Initiative in learning

Factor 7: Self-understanding

Factor 8: Acceptance of responsibility for one's own learning

In the study of West and Bentley (1989), an approach

different from the one used by Guglielmino was utilized. They conducted an analysis of the underlying factorial structure of the SDLRS using confirmatory factor analysis (CFA) methods. These researchers concluded that while the one-factor model provided a better fit to the data than the eight-factor model the best fit was the six-factor model. In Field's study (1989), the common factor analysis method was used to study the measurement's model underlying the scale and the orthogonal rotation generated four interpretable factors. Based on the results of his analysis Field concluded that the construct measured by the SDLRS was not multifactorial, but homogeneous, since the first factor carried 17.6% of the 30.1% variance of the 4-factor model.

In light of the present ambiguity that exits regarding the number of factors measured on the SDLRS, the purpose of the present study was to access the factorial structure underlying the SDLRS with exploratory factor analysis (EFA) procedures. Internal consistency reliability and item-test correlation analyses were also conducted.

Method

Subjects

The subjects of this study were teachers and administrators from 16 different elementary, middle and high schools across the state of TN who participated in TN LEAD, a statewide school leadership development program. All the subjects received the SDLRS instruments and were asked to complete the SDLRS during the Fall, 1988. A total of 439 individuals returned the SDLRS. The demographics of the subjects included the following: of all the

respondents, 77% were female, and 90% were white. The average age was 41. Classroom teachers occupied 94% of all the other respondents. The typical respondent had between 13 and 14 years of teaching experience.

Procedures

The 58-item SDLRS was administered to the teachers and administrators in the 16 participating schools. Optical scan sheets were used to record the raw data. The data were analyzed using SPSS-X statistical software. The SPSS-X program was used to obtain the interitem correlations, to conduct the factor analysis and to access the reliability of the scale.

Exploratory factor analysis of the scale was conducted using principal components factor solutions with orthogonal rotation in order to examine the structure underlying the SDLRS. According to Gorsuch (1983), the purpose of the principal factor analysis is to "examine the structure of a given domain as represented by the sample of variables. The long term interest is to identify basic conceptual dimensions that can be examined in future research. The appeal of principal factors is that they represent the greatest proportion of the variance of the variables in the fewest dimensions" (p.121).

Results

Factor Analysis

The initial solution was extracted using principal components factor analysis. By applying the Kaiser-Guttman rule, as Guglielmino did, 15 initial factors had eigenvalues greater than 1 and were extracted. They are presented in Table 1.

Insert Table 1 About Here

An inspection of the information presented in Table 1 reveals that Factor 1 accounted for 24% of the total variance, substantially more than the rest of the factors do; the rest of the factors account for from 5.1% to 1.7% of the total variance respectively. Although all the 15 factors satisfied the Kaiser-Guttman rule, it was obvious that some of them were trivial factors since they each added only a very small percentage to the total variance extracted. As Gorsuch points out, "If a new factor does not add very much to the information already extracted, it would not be worth extracting and interpreting" (p.165). Therefore, a scree test was conducted to estimate the number of non-trivial factors. The scree test is a procedure by which a graph of the raw roots for the factors extracted is examined in order to minimize the number of factors while accounting for the maximum account of the variance. The basic theoretical rationale underlying the scree test is that a sample of variables only measures a limited number of major factors well and many other trivial factors less well. Gorsuch (1983) explains the rationale in the following way:

> Because the principal factor solution extracts factors by size, the substantive factor will be extracted first and the smaller trivial factors will be removed later. Because the smaller factors are so numerous and are taken out in order of size, it would be expected that

plotting them on a graph would result in a straight line sloping down. The dominant factors should not fall on this line because some of them will be much more dominant than others and they will be stronger than the trivial factors (p. 166).

An examination of the graph of the characteristic roots of the factors revealed three breaks in the roots: an obvious break after Factor 1, another after Factor 2, and another after Factor 4. The application of the scree test indicated that four factors appeared to maximize the amount of information extracted to the number of factors. In order to decide which break reflected the model that best fits the data, both the two-factor model and the four-factor models were examined.

Orthogonal rotations were run to test the two-factor solution and the four-factor solution respectively. Only items that achieved a factor loading of at least .30 were used in the interpretation of the factors. In the two factor solution, 6 items failed to achieve the standard, and in the four-factor model, only two items failed to achieve it.

Two-factor solution

In the two-factor solution, Factor 1 appeared to be associated with love of and enthusiasm for learning. It involved a positive view of learning as a means of self-development. Some of the items that had highest loadings are presented in Table 2.

Insert Table 2 About Here

Factor 2 in the two-factor solution involved a theme of self-confidence in the ability of carrying out creative learning. Some of the items that had highest loadings are presented in Table 3.

Insert Table 3 About Here

Four-factor solution

An examination of the items in the four-factor solution revealed that the first two factors included the same themes as the first two factors in the two-factor solution. The additional two factors were, however, meaningful and interpretable. Factor 3 was associated with self-concept as an independent learner. Factor 4 dealt with the tolerance of ambiguity, risk and complexity of study. The labels and the items that loaded most strongly are presented in Table 4, Table 5, Table 6 and Table 7.

Insert Tables 4, 5, 6, and 7 About Here

By comparing the two-factor solution and the four-factor solution, the four-factor model was determined to provide a better fit to the structure of the scale in that it maximized the ratio of the amount of information extracted to the number of factors.

Reliability

A reliability analysis of the total SDLRS was conducted using Cronbach's coefficient alpha. The reliability was .93.

The corrected split-half reliability was also estimated to be .89. The results are presented in Table 8.

Insert Table 8 About Here

An examination of the item-test correlations shows that all but four of the items achieved the item-test correlation of .30, thereby supporting the argument that the scale has good internal consistency.

Summary

In this study, a principal components factor analysis with orthogonal rotation was conducted to explore the dimensionality of the SDLRS. Two solutions were run: the two-factor solution and the four-factor solution, based on the scree test. The results indicated that the four-factor model appeared to best fit the data. These results were similar to those of Field (1989), who also found four interpretable factors. The four dimensions of the scale were: love of and enthusiasm for learning, self-confidence in the ability of learning, self-concept as an independent learner, and tolerance of ambiguity, risk and complexity in learning. All but two items had a factor loading equal to or greater than .30.

The reliability analysis showed that the scale has a very high reliability with the Cronbach's reliability alpha .93 and the split-half reliability of .89.

Based on the results of the study, it was concluded that the

SDLRS has an underlying structure of four dimensions measuring readiness of self-directed learning instead of eight, a conclusion made by Guglielmino in her studies. However, further research is suggested to assess if the four-factor model is valid when studying groups with different characteristics.

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Table 1. The fifteen initial factors extracted from Self-Directed Learning Readiness Scale scores using the Kaiser-Guttman Rule

Factor	Eigenvalue	Variance	Cumulative Variance
1	13.94	24.0	24.0
2	2.95	5.1	29.1
3	2.20	3.8	32.9
4	2.06	3.6	36.5
5	1.74	3.0	39.5
6	1.50	2.6	42.1
7	1.33	2.3	44.4
8	1.28	2.2	46.6
9	1.23	2.1	48.7
10	1.20	2.1	50.8
11	1.14	2.0	52.8
12	1.14	2.0	54.8
13	1.09	1.9	56.7
14	1.03	1.8	58.5
15	1.01	1.7	60.2

Table 2. Two-Factor Solution: Factor 1

Love of and Enthusiasm for Learning

	Item	Loading
Item 49:	I want to learn more so that I can keep growing as a person.	.76
Item 54:	Learning is a tool for life.	.66
Item 47:	Learning is fun.	.64
Item 51:	Learning how to learn is important to me.	.62

Table 3. Two-Factor Solution: Factor 2

Self-Confidence in Ability of Learning

	Item	Loadings
Item 25:	I can think of many different ways to learn about new things.	.65
Item 41:	I am happy with the way I investigate problems.	.64
Item 29:	I think problems as challenges not stop signs.	.63
Item 42:	I become a leader in group learning situations.	.61
Item 36:	I am good at thinking of unusual ways to do things.	.59

Table 4. Four-Factor Solution: Factor 1

Love of and Enthusiasm for Learning

	Item	Loading
Item 49:	I want to learn more so that I can keep growing as a person.	.77
Item 47:	Learning is fun.	.67
Item 51:	Learning how to learn is important to me.	.66
Item 51:	I have a strong desire to learn new things.	.65
Item 46:	The more I learn, the more exciting the world becomes.	.64
Item 54:	Learning is a tool for life.	.62

Table 5. Four-Factor Solution: Factor 2

Self-Confidence in Ability to Learn

	Item	Loading
Item 41:	I am happy with the way I investigate problems.	.65
Item 39:	I ~~am good at~~ think~~ing~~ problems as challenges not stop signs.	.63
Item 36:	I am good at thinking of unusual ways to do things.	.63
Item 38:	I am better than most people are at truing to find out things I need t know.	.60
Item 25:	I can think of many different ways to learn about a new topic.	.60

Table 6. Four-Factor Solution: Factor 3

Self-Concept as an Independent Learner

	Item	Loading
Item 1:	I am looking forward to learning as long as I live.	.70
Item 5:	I love to learn.	.65
Item 4:	If there is something I want to learn, I can figure out a way to learn it.	.64
Item 2:	I know what I want to learn.	.54
Item 10:	If I discover a need for information that I don't have I know where to go to get it.	.54

Table 7. Four-Factor Solution: Factor 4

Tolerance of Ambiguity, Risk, and Complexity in Learning

	Item	Loading
Item 29:	I don't like dealing with questions where there's not one right answer.	.56
Item 9:	I don't work very well on my own.	.50
Item 19:	Understanding what I read is a problem.	.50
Item 44:	I don't like challenging learning situations.	.47

Table 8. Split-half reliability coefficients for the Self-Directed Learning Readiness Scale (SDLRS)

Correlation Between Have of the Test= .8014
Equal Length Spearman-Brown = .8898
Guttman Split-Half = .8885
Unequal-Length Spearman-Brown = .8898
Alpha for Part 1 = .8569
Alpha for Part 2 = .9013