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Exploring Self-Directed Learning Among Children

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Abstract**—**Self-directed learning (SDL) was developed initially for adult learning. Guglielmino constructed a scale to measure SDL. Recent researchers have applied this concept to children. Although there are sufficient theoretical evidences to present the possibility of applying this concept to children, empirical evidences were not provided. This study aimed to examine the quality of SDL and construct a scale to measure SDL among young children. A modified scale of Guglielmino's scale was constructed and piloted with 183 subjects of age 9. Findings suggest that the qualities of SDL in young ages are apparently congruent with that of adults.

Keywords**—**SDLR, Self-Directed Learning, Young Children.

I. Introduction

SELF-directed learning (SDL) as an alternative form of learning [1] has been widely documented. Since 1970, the SDL has been the major theme in adult learning. The priorities of helping students to become self-directed learners have been ranked high [2]. A major effort to measure the SDL is Guglielmino's [3] scale – the Self-Directed Learning Readiness (SDLR) – which is the most cited scale in the literature afterwards.

Recent developments of the SDL have extended it to children [4], though there are not many research studies on the SDL among children. Although scholars claim that the SDL is a continuum applicable to children as well as adults [4] and it "is not restricted solely to learning in the adult years" [5], there is not any scale measuring the SDL among children.

This study has aimed to: (a) introduce a modified scale of SDLR for young children, (b) estimate the validity and reliability of this modified scale, and (c) describe the characteristics of SDL among children.

II. Theoretical background

Groundwork of the SDL goes back to Houl in 1961 at University of Chicago, Illinois [5] where he conducted a study to find out reasons that motivate learners to participate in learning situations. There are common themes in several definitions of the SDL. The definition of Brookfield [6] apparently includes most of these common themes. He maintained that the SDL includes any learning activity with the characteristics like (a) initiative in designing learning experiences; (b) diagnosing needs, locating resources; and (c) evaluating learning [6].

The SDLR scale was developed in 1977 by Lucy M. Guglielmino for a doctoral dissertation at the University of Georgia. It was designed through a three-round Delphi survey process involving 14 individuals considered to be experts of SDL. Upon revision, the 58-item scale of five-point Likert type was administrated to 307 respondents. After revision, items reduced to 41. The reliability coefficient of .87 was reported [3].

After the administration of the SDLR, Guglielmino [3] identified eight independent factors through factor analysis. These factors [3] are shown in Table I.

Although the SDL was initially developed in the field of adult education, recent developments showed that there is no age limits concerning the SDL [4], [7]. Brockett and Hiemstra [1] also stressed to remove the restricting of SDL to adults. Even Knowles as the founder of SDL later asserted that SDL could be appropriate for children as well as adults; however research in SDL among young children is extremely rare.

TABLE I
FACTOR ANALYSIS ELEMENTS

1. Openness to learning opportunities
2. Self-concept as an effective learner
3. Initiative and independence in learning
4. Informed acceptance of responsibility for one's own learning
5. Love of learning
6. Creativity
7. Future orientation
8. Ability to use basic study skills and problem solving skills

Application of SDLR as basic tool at all educational levels was suggested by Guglielmino [3]; however using her scale without modifications is not possible for young children. Because SDLR is a self-report scale and very young children are not able to read. In addition, older children who can read are not yet able to understand most statements of the scale. Besides, some items do not appear to be meaningful for young children. Therefore, there is a need to develop a scale for young children to measure SDL.

Therefore, there are two gaps in the literature: a need for (a) exploring the quality of SDL and (b) construction of a scale for SDL among children. This study aims to (a) examine the

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quality of SDL in young age and (b) construct a scale to measure SDL in young age through modification of the scale (SDLR) as developed by Guglielmino [3].

To achieve these objectives, a modified scale of SDLR was developed.

III. Method

A. Participants

A total of 183 subjects of age 9 years old were selected, 128 male and 55 female from educational institutes in Tehran, Iran.

B. Instrument

Despite the fact that SDLR was the most popular and reliable in measuring SDL, it was not possible to use it for the age 9. Obviously, subjects of age 9 can not understand statements such as "I don't like dealing with questions where there is not one right answer". Therefore, it was required to construct a modified scale of SDLR.

Finally, 20 items of Guglielmino's scale, with necessary modifications, were selected as the instrument of this study to measure SDL among young children. This instrument is referred to as Modified Self-Directed Learning Readiness (MSDLR) (Appendix A). Similar to the original scale, the MSDLR also includes Likert type statements. 12 statements are positive and 8 statements are negative. However, the MSDLR is not a self-report questionnaire compared to Guglielmino's scale.

The validity of the MSDLR is closely dependent on validity of SDLR. The SDLR is known as a valid instrument for measuring SDL [3]. Because items of MSDLR have been adapted from the SDLR so that cover the factors that has been found in Guglielmino's research (Table I) it is expected that the MSDLR may be a constructed valid instrument. Table II shows the number of MSDLR items that measures the factors that has been reported by Guglielmino [3].

TABLE II
THE NUMBER OF MSDLR ITEMS THAT MEASURE FACTOR ANALYSIS ELEMENTS

The items of MSDLR (See Appendix A)	Factor Analysis Elements (See Table 1)
8- 9- 18	1
6-12-20	2
1-2-13-14- 3- 7	3
15-16-17- 4	4
11	5
5	6
10-19	7
-	8

Table II – for example – shows that items 10 and 19 of MSDLR measure factor 7 of factor analysis elements.

In order to run the study in Iran, the Persian version of the MSDLR was provided (Appendix B).

As a pilot of the study, a total of 69 subjects, 53 male and 16 female, were selected from the same population to examine the reliability of the instrument[1]. Examiners who ranked subjects were their educators, teachers, or facilitators who had long time contact with subjects. They were instructed regarding the scale and were asked to rank the subjects regarding each statement. After recoding the negative statements, the total score of each subject in the SDLR was calculated. The data were used to calculate the internal consistency using the Cronbach's Alpha reliability coefficient. It was .869 which is fairly satisfactory.

To calculate inter *rater* reliability *(homogeneity)*, 20 subjects were examined by two educators, independently at the same time. Because N >15, using Pearson correlation coefficient was preferable [8]. Table III presents the results.

TABLE III
INTER RATER RELIABILITY THROUGH PEARSON CORRELATION COEFFICIENT

N=20	rater 1	rater 2
Rater 1	1	.596**
Rarer 2	.596**	1
2tailed	p < .01	sig. (2tailed) = .006

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

The correlation coefficient is .596 which is significant at p< .01. This indicates that the instrument is reliable (homogenous).

Aiming to estimate test-retest reliability (*stability*), 18 of other subjects were ranked one more time by same educators after an interval of 3 months. Using Spearman-Brown coefficient of equal length of forms, the reliability estimated as .943. This indicates that the instrument is reliable over time.

C. Procedure

After ensuring of the reliability of the instrument, the same procedure to the pilot was administrated to the 183 participants of the study.

IV. Findings

SPSS ed.16 was employed to find the outliers of the total scores. Since 11 extreme data were found and removed, the number of subjects reduced to 172.

SPSS has estimated the Cronbach's Alpha reliability coefficient (internal consistency) of the instrument as .927 which is substantial.

According to Ferguson [9], to run the Factor Analysis, the least numbers of subjects should be 5 times of Items. Since the items of the instrument are 20 and numbers of subjects are 172, factor analysis was employed for this study.

R-Matrix – matrix of correlations between the items of MSDLR - which was produced by Factor Analysis, presented that item 18 has quite weak correlation with almost all other. This indicates that this item should be removed [10]. Other correlations were fair and no correlation coefficient more than .8 was found which indicates that there was no *singularity* to affect the study. The range of correlation coefficients between

[1] The report of the pilot of this study has been presented in APERA conference in Singapore in 28 Nov. 2008.

items and the total scores were from .43 to .84. To avoid extreme multi co-linearity, *Determinant* of R-Matrix should be greater than 0.00001 [10]. Determinant was estimated as 3.01E-05 (0.0000301) which satisfies the requirement.

The Bartlett's Test of Sphericity estimation was sig. at p< .0001 which rejects the null hypothesis that the R-Matrix is an identity matrix. The Coefficient of Kaiser-Meyer-Olkin was estimated as .930 which is "superb" [10] and indicates that Factor Analysis is appropriate for this study.

After ascertaining the appropriateness of Factor Analysis, the question of using the type of *Rotation* has been raised. Guglielmino [3] claimed that she has found independent factors. Since MSDLR has been adopted from her scale and it was aimed to verify the possibility of using it among children, the same assumption should be made. Therefore the *Varimax Rotation* was chosen. Although by Kaiser's criterion which is the SPSS default, 3 independent factors has been extracted, as Field [10] has suggested, Kaiser's criterion is accurate when communalities after extraction are greater than .7 or sample size exceeds 250. Since none of this conditions existed, alternative choice should be applied. Although there is no unique way to choose the amount of factors [9], there are evidences [3] that there are 8 independent factors. It was stated in *Background* section that items of MSDLR cover relatively 7 factors of 8 original factors (see Table II). Therefore, since it was expected that 7 independent factors has been found, this study chose to extract 7 factors. This selection has given the room for comparison between two sets of factors; moreover it caused the increase of communalities. Increased communality makes Factor Analysis more appropriate [10]. The average of communalities has increased from .58 (when Kaiser's criterion was applied) to .75 when it has been chosen to extract 7 factors. The 7 extracted independent factors and the items with the most loading on them are presented in Table IV and Table V. The loading coefficients are rounded to 2 decimals.

TABLE IV
FACTOR 1 AND THE ITEMS WITH MOST LOADING ON IT

13. He/She doesn't work very well on his/her own.	.78
6. He/She has a lot of curiosity about things.	.78
12. He/She feels he/she is capable of learning almost anything he/she might need to know.	.76
1. He/She loves to learn.	.75
11. He/She really enjoys tracking down the answer to a question.	.73
17. He/She can tell whether he/she is learning something well or not.	.72
20. If there is something he/she wants to learn, he can figure out a way to learn it.	.68
5. He/She can think of many different ways to learn about a new topic.	.64
15. In a learning experience, he/she prefer to take part in deciding what will be learned and how.	.63

TABLE V
FACTOR 2 TO 7 AND THE ITEMS WITH MOST LOADING ON THEM

Factor 2	Loading
2. It takes him/her a while to get started on new projects.	.77
3. He/She expects the teacher to tell him/her exactly what to do at all times.	.70
7. When he/she see something that he/she don't understand, he/she stays away from it.	.58
Factor 3	**Loading**
19. He/She likes to think about future.	.89
10. He/She tries to relate what he/she learns to his/her long-term goals.	.48
Factor 4	**Loading**
14. Even if he/she has a great idea, he/she can't seem to develop a plan for making it work.	.86
9. When he/she is taken to library, feels boring.	.51
Factor 5	**Loading**
4. He/She thinks if he/she doesn't learn, it's not his/her fault.	.90
Factor 6	**Loading**
8. If he/she can understand something well enough to get a good grade on a test, it doesn't bother him/her if he/she still has question about it.	.87
Factor 7	**Loading**
16. Difficult study doesn't bother him/her if he/she is interested in something.	.75

V. Discussion

This study has found an evidence for the theoretical proposition that SDL "is not restricted solely to learning in the adult years" [5]. The reliability and validity of the MSDLR indicates that SDL is measurable among children and it is in agreement with Guglielmino who stated "If the SDLR is determined to be a valid instrument … it will be a basic tool in … all educational levels, from elementary school through graduate school …" [3].

The extracted factors can be interpreted in different ways. The first way is to compare with the core concept of SDL. There are two references to find out the core concept of SDL.

1. Scholar's definition of SDL: Variant definitions that have been suggested by scholars [6], [5], [11] could be summarized as follow: two main dimensions are distinguishable in SDL; (a) an intrinsic (internal) motivation as the exhilarator of learning and (b) an ability to undertaken the complete cycle of learning. The first factor that is found in this study relatively covers these two main dimensions.

Items 1, 6, and 11 from Factor 1 indicate (a) a love of learning, (b) being curious, and (c) an enjoyment of seeking the answers for questions. These items imply the existence of an internal motivation to learn.

Items 15, 20, and 17 from Factor 1 indicate the ability to complete the cycle of learning which are the ability to (a) decide the goals and needs, (b) choose and use strategies, and (c) evaluate one's own learning [11].

Items 5, 12, and 13, although are not directly involved within the two main mentioned dimension, they imply some essential characteristics of a learner in order to be a self-directed learner which are (a) being creative, (b) a perceive of

being capable to learn anything that is needed, and (c) ability to work on one's own.

It seems that Factor 1 present the core concept of SDL as a whole which is independent from other characteristic that have been mentioned by scholars. The other factors can be themed here for further discussion.

Factor 2 can be themed as initial and independence in learning which includes (a) ability to begin new activity (Item 2), (b) ability to learn without relying to teacher (Item 3), and (c) ability to challenge the unknown rather than running away (Item 7).

Factor 3 clearly could be themed as future orientation where includes (a) to be interested to talk about future (Item 19) and to be eager to relate his/her learning to long-term goals (Item 10).

Factor 4 with the loading Items 9 and 14, does not seem to present any theme except to be consider as declination to avoid the negative statements as it has been reported in other similar research (e.g., [3], [12]).

Factor 5 implies the acceptance of responsibly of one's learning (Item 4).

Factor 6 may reflect the context of the study which is extremely reinforcement oriented, that is, Iran's system of education is firmly mark oriented and it could be reflected as an independent factor. The Item 8 indicates the interest to learn regardless to the mark that will be gained from learning.

Factor 7 could be considered as the ability of looking at problems as challenges rather than stop signs (Item 16).

2.The expert's consensus definition (as cited in [3]): the components that have been mentioned by those experts and corresponding factor of this study that cover them are presented in Table VI.

TABLE VI
SDL COMPONENT (EXPERTS) AND CORRESPONDING FACTORS FOUND IN THIS STUDY

Components	Covered Factor (and Items)
Self-Discipline	Factor 1 (Items 12, 15, 17, and 20)
High degrees of curiosity	Factor 1 (Item 6)
Ability to learn independently	Factor 1 (Item 13)
Enjoyment of learning	Factor 1 (Items 1, 11)
Initiative, independence, and persistence in learning	Factor 2 (Items 2, 3, 7)
Goal-Oriented	Factor 3 (Items 10, 19)
Acceptance of responsibility for one's learning	Factor 5 (Item 4)
Decline to see the problems as challenges	Factor 7 (Item 16)

Table VI shows that Factor 1 of this study covers the four first components of expert's consensus. Other components have a correspondence with other factors of this study.

The second way is to compare with other factor analysis that has been done by researchers. The major finding of factors is belonging to Guglielmino [3]. Factors that have been found in this study do match more with expert's consensus than with those of Guglielmino's factors. Factors that have been found in some other research also do not match with findings of Guglielmino (e.g., [12]).

A major suggestion of this study could be that it challenges the independence of Guglielmino's factors as Hoban, Lawson, Mazmanian, Best, & Seibel [12] also have mentioned. SDL could be considered as a whole concept and the precise definitions could better reflect the integrity of the concept. Factor 1 seems to reflect this integrity as it matches with the common themes of scholar's definition. Other factors may either reflect the context of the study (e.g., Factor 6) or present the results of being self-directed learner (e.g., Factor 2, 3, and 5).

The items of MSDLR with most average scores (25% max) were: (a) "He/She loves to learn", (b) "He/She feels he/she is capable of learning almost anything he/she might need to know" which indicates self-confidence in learning, (c) "He/She like to think about future", (d) "He/She can tell whether he/she is learning something well or not" which indicates the ability to evaluate one's own learning, and (e) "He/She doesn't work very well on his/her own" which indicates the independency in learning.

The main theme of these items perhaps is a kind of internal capacity for being a good self-directed learner.

In contrast, the items with least average scores (25% min.) were: (a) "He/She expects the teacher to tell him/her exactly what to do at all times" which indicates the teacher-oriented educational system, (b) "It takes him/her a while to get started on new projects", (c) "When he/she see something that he/she don't understand, he/she stays away from it", (d) "If he/she can understand something well enough to get a good grade on a test, it doesn't bother him/her if he/she still has question about it" which indicate the predominant of grade-oriented evaluation system, (e) and "He/She doesn't like people point out his/her mistakes in learning" which indicates the inefficiency of evaluation system.

The main theme of these items seems to be the inefficiency of educational system in practice to let the capabilities of children which has been shown in above items (25% max.) to be actualized. This weakness, although has been evidenced for children in Iran, seems to be a relatively general problem in educational systems.

APPENDIX

Appendix A: Modified Self-Directed Learning Readiness (MSDLR)

INSTRUCTION: The items below are 20 statements designed to gather data on learning preferences and attitudes toward learning. Please read the statements and remember subjects learning status. When ever you feel you got a sense about any of subjects regarding to some of the statements, indicate the degree to which you feel that statement is true of him or her. The blanks on the answer sheet represented the following:

Almost never true of him or her: It is hard ever felt this way.

Not often true of him or her: It is felt this way less than half the time.

Sometimes true of him or her: It is felt this way about half the time.

*Usually true of him or her***:** It is felt this way more than half the time.

Almost always true of him or her: There are very few times when it is not felt this way.

Fill up one sheet for every subject. Intervene few minute between fillings.

براي هر يك از آزمودني ها يك برگه پر كنيد. براي شروع بعدي دقايقي فاصله بياندازيد.

.....

1. عاشق ياد گرفتن است.
2. مدتي طول مي كشد تا فعاليت جديدي را شروع كند.
3. هميشه انتظار دارد كه معلم دقيقا به او بگويد كه چه بايد بكند.
4. فكر مي كند كه اگر چيزي را ياد نگيرد، او مقصر نيست.
5. در باره يك موضوع جديد به شكلهاي مختلفي فكر مي كند.
6. كنجكاوي بسيار زيادي در باره چيزها دارد.
7. وقتي با چيزي روبرو ميشود كه آنرا نمي فهمد، از آن دوري مي كند.
8. اگر چيزي را تا حدي بفهمد كه بتواند از آن نمره خوبي بگيرد، اينكه هنوز در باره آن سؤالاتي داشته باشد، او را اذيت نمي كند.
9. وقتي به كتابخانه برده ميشود، احساس كسالت ميكند.
10. تلاش مي كند كه آنچه مي آموزد به اهداف بلند مدت خود مرتبط كند.
11. واقعا از دنبال كردن جواب يك سؤال لذت مي برد.
12. احساس مي كند قادر به يادگرفتن هر چه كه نياز داشته باشد، هست.
13. به تنهايي و متكي به خود به خوبي كار مي كند.
14. حتي اگر ايده ي عالي هم داشته باشد، بنظر نمي رسد بتوا ند طرحي براي پياده كردن آن بريزد.
15. در يك تجربه يادگيري، ترجيح مي دهد درتصميم گيري اينكه چه چيزي و چگونه بايد ياد گرفته شود شركت كند.
16. اگر به چيزي علاقمند باشد، سختي يادگرفتن آن او را ناراحت نمي كند.
17. مي تواند قضاوت كند كه چيزي را ياد گرفته يا نه.
18. دوست ندارد كه ديگران اشتباهات يادگيري او را يادآور شوند.
19. دوست دارد در باره آينده حرف بزند.
20. اگر چيزي باشد كه بخواهد ياد بگيرد، مي تواند راهي براي يادگرفتن آن بيابد.

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1. He/She loves to learn.
2. It takes him/her a while to get started on new projects.
3. He/She expects the teacher to tell him/her exactly what to do at all times.
4. He/She thinks if he/she doesn't learn, it's not his/her fault.
5. He/She can think of many different ways to learn about a new topic.
6. He/She has a lot of curiosity about things.
7. When he/she see something that he/she don't understand, he/she stays away from it.
8. If he/she can understand something well enough to get a good grade on a test, it doesn't bother him/her if he/she still has question about it.
9. When he/she is taken to library, feels boring.
10. He/She tries to relate what he/she learns to his/her long-term goals.
11. He/She really enjoy tracking down the answer to a question.
12. He/She feels he/she is capable of learning almost anything he/she might need to know.
13. He/She doesn't work very well on his/her own.
14. Even if he/she has a great idea, he/she can't seem to develop a plan for making it work.
15. In a learning experience, he/she prefer to take part in deciding what will be learned and how.
16. Difficult study doesn't bother him/her if he/she is interested in something.
17. He/She can tell whether he/she is learning something well or not.
18. He/She doesn't like people point out his/her mistakes in learning.
19. He/She like to think about future.
20. If there is something he/she wants to learn, he can figure out a way to learn it.

Appendix B: Translation of MSDLR in Persian

كد آزمودني: تاريخ تولد آزمودني:
13.... / .... / ....

راهنما: همكار گرامي، اين تست براي جمع آوري اطلاعات در باره نگرش آزمودني ها به يادگيري طراحي شده است و شامل 20 جمله مي باشد. لطفا جملات را يكبار با دقت بخوانيد. سپس آزمودني را در حاليكه در فعاليتهاي يادگيري شركت مي كند، بدقت مشاهده كنيد. هر گاه در باره هر يك از آزمودنيها نسبت به جملات برداشتي پيدا كرديد، در مقابل آن جمله، آنرا ثبت كنيد.

شما بايد تصميم بگيريد كه هر يك از جملات اين تست تا چه حد در مورد آزمودني درست است. اعداد تا 5 به ترتيب درجات موافقت شما را به قرار زير نشان مي دهد:

1.تقريبا هرگز در باره او درست نيست (به سختي مي توان اين حس را داشت.
2.اغلب در باره او درست نيست (كمتر از نيمي از اوقات اين حس را مي توان داشت.
3.گاهي در باره او درست است (نيمي از اوقات اين حس را مي توان داشت.
4.معمولا در باره او درست است (بيش از نيمي از اوقات اين حس را مي توان داشت.
5.تقريبا هميشه در باره او درست است (ندرتا مي توان اوقاتي يافت كه در باره او درست نيست.

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