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DOI: 10.4103/jehp.jehp_82_19

Validation of revisited self-directed learning readiness scale for nursing education among Iranian nursing and midwifery students

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Abstract:

BACKGROUND: Self-directed learning readiness scale for nursing education (SDLRSNE) was first edited in Fisher and King Learning, which was an alternative for self-directed learning readiness.

OBJECTIVES: The present research aims at reinvestigating the subscale factor structure of this tool and present evidence regarding its validity and reliability.

METHODS: In this cross-psychometric study, 379 students completed SDLRSNE, with 29 items and three subscales that were selected by conducting simple random sampling method, from among 1135 nursing and midwifery students at Islamic Azad University of Isfahan (Khorasgan), in 2015–2016 academic years. The data were analyzed using SPSS20 and Lisrel8.5 Software. The mentioned data were studied by utilizing descriptive standards and inferential tests such as Cronbach's alpha coefficients, Spearman–Brown, Gutmann, and confirmatory factor analysis (CFA).

RESULTS: According to the proper fitness indicators, CFA of 29 items clearly distinguishes self-directing into three elements, including self-management, desire for learning, and self-control. Results demonstrated that all three scale elements have high internal consistency coefficients.

CONCLUSION: Results exhibit that short-form scale for self-directed readiness in Fisher and King learning is a valid and reliable tool for identifying the capabilities of the nursing and midwifery student's self-learning.

Keywords:

Confirmatory factor analysis, nursing and midwifery students, self-directed learning readiness

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Received: 15-02-2019

Accepted: 02-09-2019

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Introduction

We live in a knowledge age, which is described through a sort of economy that is knowledge-based and has high demands for knowledge workers. What is certain here is the social well-being and wealth of a knowledge-based society, which heavily depend on the capacity of the people thus to create, share, and use knowledge. Effective functioning in such a society highly demands a person to possess adequate social capital and the rampant skills in the 21st. One of such skills can be self-directed learning (SDL).^[1]

In a knowledge-based society, when one engages in complex problem-solving and nonroutine analytic tasks, SDL thus becomes prominent as one pursues lifelong learning. In the past years, self-direction has been a case suggested as an important and crucial life-skill so as to be motivated through K-12 education and also higher education. Several programmers who have wanted to construct the self-direction skills of students have also been launched.^[2-4]

SDL is an educational concept, which, especially in the context of higher education, has received increasing consideration

How to cite this article: Fooladvand M, Nadi MA. Validation of revisited self-directed learning readiness scale for nursing education among Iranian nursing and midwifery students. *J Edu Health Promot* 2019;8:266.

in recent years. SDL is a state (claimed) for boosting student's confidence up and also increasing their potentiality for independent learning in dynamic and challenging work and educational environments.^[5,6]

SDL, as an instruction, could be explained regarding the degree of responsibility that the learner admits for learning.^[7]

The learner's readiness for engaging in SDL is "the degree the individual possesses the attitudes, abilities, and personalities characteristics essential for SDL."^[8]

There have been reported by several studies that the primary experience by students is fear and anxiety, which they have about SDL and, moreover, they express the need they have for formal instruction for SDL process as their courses begin.^[9-13] Knowles believes that this wish for instruction is the reflection of the fact that adults might not be quite familiar with SDL and, hence, they might see it with certain problems.^[14] Williams put it in this way that it would be much better for students to take part in professional courses as far as they realize their potentiality in engaging continuous learning so as to become sure about their competence in professional practice.^[15] Lunyk-Child *et al.*, in a study conducted on the perception of students and teachers of SDL, got to know that students might endure a transformation, which, so to speak, starts with certain feelings that are negative but, the end is with confidence and the skills rampant in self-direction and within this transformation will be what the teachers bear as responsibility so as to prepare supports for students.^[10]

Kell and Van Deursen stated their outlook that it is the educators' responsibility to make the students sure to obtain SDL skills that can be transferred from education to their work.^[16] The results by Ranvar show that there is a positive and significant relationship between SDL and academic parameters in adults, including performance, assessment, motivation, anxiety, and academic engagement.^[17] Omer and Halil assert this view that SDL with technology scale was proved valid and reliable for young students. Teachers can use SDL with technology scale for young students as a handy measurement tool so as to define the current level of students in SDL with technology.^[18]

Safavi *et al.* put that when there is considered a high level for readiness for SDL in a substantial amount of students and predominance of only one style among majority of them, there recommended to use adjustment and adaptation of teaching methods that feature such learning traits among students.^[19] Results obtained from investigating reliability and validity of Guglielmino's SDL readiness scale showed that (SDLRS) consisted of

58 items across the eight factors that follow openness to learning opportunities, initiation and independence in learning, self-concept as an influential learner, briefed acceptance of authority for a person's own learning, zeal of learning, creativity, potentiality to use fundamental skills for study, and skills for solving the problems. The value of Cronbach's Alpha revealed that all eight factors had suitable inner consistency coefficients, and reliability was 0.94 for the whole scale. Furthermore, the Guglielmino's SDLRS is a valid and reliable instrument for identifying SDLR abilities, skills, and attitudes among medical and dentistry students.^[20] According to Nadi and Sajadian, the SDLRS resulted was with 40 items along the three domains as follows: self-management, desire for learning (learning desire), and self-control. The last model in confirmatory factor analysis (CFA) showed that 39 items showed a good fit for the model. The value of Cronbach's Alpha indicated that the whole three factors are with high inner consistency coefficients. In addition, such a scale is a reliable and valid instrument for the assessment of the readiness of the students for SDL.^[21] Other results by Nadi *et al.*'s study about perceptions of medical and dentistry students about SDL and the Relationship it has with private traits of people showed that readiness for SDL appears to have a significant relationship with students' grade-point average; however, it has a negative relationship with fundamental score of sciences. There additionally was no significant difference between demographic features and SDL readiness scores.^[22] Finally, research finding indicated a significant impact of teaching critical thinking, problem-solving and meta-cognitive on the total scores of self-directed and its components (self-management, desire for learning, and self-control). According to the data analysis, teaching critical thinking, problem-solving, and meta-cognitive will increase total score of self-directed and its components (willingness for learning, self-management, and self-control).^[23] An Australian scholar, who has investigated and evaluated the undergraduate students' readiness for SDL in their fresher state in the Bachelor of Nursing programmer, backed the high level of internal consistency of the SDLRS for nursing education (SDLRSNE).^[24] The Cronbach's alpha coefficient for the subscales that were reported by Smedley as follows: "Desire for learning," 0.78; "Self-management" 0.81; and "Self-control" 0.84. The total score distributions and subscale were thus consistent with the sample by Fisher *et al.* (2001). Another study investigated the factor structure of the SDLRSNE. Hendry and Ginns studied the SDLRSNE's factorial validity among medical students by the use of the factor method related to the exploratory factor analysis; they, moreover, recognized a four-factor model, which fits their data.^[25] "Self-determination" and "Effective organization for learning" were the two factors that corresponded to the original subscales of the "Self-control" and the

“Self-management,” respectively. Two other factors that were recognized, “Learning self-efficacy” and “Critical evaluation” were not correspondent with the original factors well, as reported by Fisher *et al.*^[7] This, thus to say, suggests that there need to be required further researches so as to establish the factorial validity for the SDLRSNE. Finally, it should be state that the full version of Fisher’s tool is well spent to us ability and going beyond the cultural filters. Eventually, those people who work in the field of medical sciences should update their knowledge and skills regularly, after their graduation, in a way that it changes to a kind of instrumented lifelong which can ensure and guarantee such characteristic among graduate students and make them ready for SDL. Taking into consideration the time, limitation of such people in their occupation, professional activities, and also having the special equipment which evaluate self-direction and take a shorter time is of crucial. Considering the readiness scale of Fisher and King’s SDL, it is necessary to analyze the validity and reliability of an Iranian’s sample, in order for the researcher to assuredly apply the result in his/her following researches.

Methods

Data that are collected from a cross-sectional survey of 379 fresher undergraduate students of nursing and midwifing were thus used for examining the factor structure of the SDLRSNE. The researches distributed the SDLRSNE and the sheet for the participant information to the convenience sample within the course orientation week. There was considered the consent as implied on the survey return and completion. The participants had the surveys returned anonymously to a box that was located centrally. There were collected no participant’s name or identifiable characteristics on the survey. The Islamic Azad University of Isfahan (Khorasgan) Branch granted the ethical approval for this study. There were a total of 29 items included in the short form of the SDLRSNE that were in three subscales: desire for learning (9 items), self-management (10 items), and self-control (10 items). There were four items which were phrased negatively.

The participants, therefore, were required to show how much each item indicated their characteristics by the use of a 5-point Likert scale, wherein the score 1 indicated “strongly disagree” and score 5 showed “strongly agree.” In this study, the reported Cronbach’s alpha coefficient was 0.93 for the total scale. Furthermore, 383 questionnaires distributed but 379 case used because many cases was disturbed. According to this reason, resonated rate was 98.95%.

Analysis

In order to have the factor structure of the SDLRSNE examined, there were tested three models of one-factor congeneric, each of which represent a dissociate subscale, with an analysis factor of a maximum likelihood confirmatory through LISREL (version 8.75, SSI-Software Company, USA) and SPSS (version 20-IBM Company, Chicago, IL, USA). There was selected the separate analyses of the 3/1 models of factor congeneric over a higher-order or, in other case, the multi-factor model that was resulted from the relative small sample size. Those techniques of structural equation modeling also required large sample sizes so as to keep the estimates stable of the parameter.^[26]

The participants’ age ranged from 19 years old to 21 years old with a median age of 20 years. All of the participants were female.

Self-management variable is presented, and Cronbach’s alpha subscales, coefficient of determination (R^2), Sobel test, residual variance, and factors and path coefficient are all reported in Table 1.

The desire for learning variable is presented, and Cronbach’s alpha subscales, Coefficient of determination (R^2), Sobel test, Residual variance, and factors and path coefficient are all reported in Table 2.

Self-control variable is presented, and Cronbach’s alpha subscales, Coefficient of determination (R^2), Sobel Test, Residual variance, and factors and path coefficient are all reported in Table 3.

Table 1: Path coefficient, mean, coefficient of determination (R^2), Sobel test, residual variance, factors, and Cronbach’s alpha subscales

Self-management	Path coefficient	Mean	R^2	Sobel T	Residual variance	Cronbach’s alpha
Q 1	0.45	3.94	0.20	8.76	0.051	0.85
Q 2	0.41	3.84	13.40	7.59	0.053	
Q 3	0.55	3.64	0.39	12.88	0.043	
Q 4	0.53	3.81	0.39	12.91	0.041	
Q 5	0.54	3.66	0.44	13.75	0.040	
Q 6	0.63	3.72	0.47	14.43	0.044	
Q 7	0.64	3.64	0.35	11.95	0.053	
Q 8	0.68	3.90	0.51	15.33	0.044	
Q 9	0.49	3.92	0.34	11.86	0.041	
Q 10	0.53	3.97	0.36	12.23	0.043	

As the multiple goodness of fit indices were used, good fit as a result was indicated by root mean-squared error of approximation (RMSEA) values, which were lower than 0.05, standardized root mean-squared residual values, which were lower than 0.05, Comparative Fit Index (CFI) values, which were higher than 0.83, and goodness of fit index >0.83. The model fit indices that were used as “Self-management” and “Desire for learning” show that the resultant models were with the data that has good fit. The model of “Self-control” also has reasonable fit as was put aside the borderline of indices of RMSEA and CFI, which are shown in Table 4 and Figure 1.

Conclusion

Considering the importance of skills and SDL abilities in students’ learning and the absence of a valid and reliable tools for these potencies, this effort was made to fill the void in area of Fisher and king validation of self-directed scale in short-form learning. Moreover, this scale was executed on the whole Islamic Azad University of Esfahan nursing and midwifery students before their internship.

Criterion for the validity of scale was the gathered CFA of the data model parameters, and the reliability criterion was achieving more than 0.70 Cronbach’s alpha coefficients. The amounts obtained from Structural Equation Model of fitness indicators showed the proper factor structural model scale among nursing and midwifery students. Moreover, their Sobel T coefficients indicated the items high dependency on their factors. These findings were closely coordinated with the survey results.^[26] Although one of the main limitations of the former studies except Fisher and King’s study in 2009 was utilizing exploration factor analysis in investigating the self-directed scale validation, and results of this research were in harmony with findings of internal or international researches stating the scale factor trinity.^[26-28] This harmony emphasizes on two considerations; on the one hand, the scale is translated in an explicit and clear way that there was no ambiguity during the subjects’ study. On the other hand items and factors in this scale are, and in general, this scale is neutral to all racial, cultural, and gender issues. Moreover, this capability differentiates this tool from other standard tools in this area since SDLR is preserved in this short form scale. In addition, in this research correlation

Table 2: Path coefficient, mean, coefficient of determination (R²), Sobel test, residual variance, factors, and Cronbach’s alpha subscales

Desire for learning	Path coefficient	Mean	R ²	Sobel T	Residual variance	Cronbach’s alpha
Q 11	0.69	4.32	0.66	18.36	0.038	0.82
Q 12	0.66	4.35	0.63	17.85	0.037	
Q 13	0.63	4.23	0.38	12.65	0.050	
Q 14	0.61	3.96	0.34	11.73	0.052	
Q 15	0.39	3.75	0.13	6.88	0.057	
Q 16	0.43	3.56	0.22	9.10	0.048	
Q 17	0.46	4.02	0.30	11.05	0.042	
Q 18	0.47	4.11	0.35	12.03	0.039	
Q 19	0.41	3.93	0.35	8.10	0.051	

Table 3: Path coefficient, mean, coefficient of determination (R²), Sobel test, residual variance, factors, and Cronbach’s alpha subscales

Self-control	Path coefficient	Mean	R ²	Sobel T	Residual variance	Cronbach’s alpha
Q 20	0.49	4.11	0.28	10.62	0.046	0.85
Q 21	0.26	3.63	0.052	4.28	0.061	
Q 22	0.56	3.84	0.41	13.43	0.042	
Q 23	0.55	4.00	0.42	13.45	0.041	
Q 24	0.57	3.93	0.48	14.69	0.039	
Q 25	0.60	4.10	0.46	14.38	0.042	
Q 26	0.66	3.87	0.46	14.41	0.046	
Q 27	0.63	3.96	0.44	13.93	0.045	
Q 28	0.56	4.01	0.44	13.88	0.040	
Q 29	0.62	3.94	0.42	13.47	0.046	

Table 4: Goodness of fit indices

Goodness of fit indices	χ ²	Df	χ ² /df	RMSEA	RMR	GFI	AGFI	NFI	CFI	NNFI	IFI
Critical goodness	1056.05	374	2.823	0.071	0.053	0.83	0.81	0.93	0.96	0.95	0.96

RMSEA=Root mean square error of approximation, RMR=Root mean squared residual, GFI=Goodness of fit index, AGFI=Adjusted GFI, NFI=Normed fit index, CFI=Comparative fit index, NNFI=Non-NFI, IFI=Incremental fit index

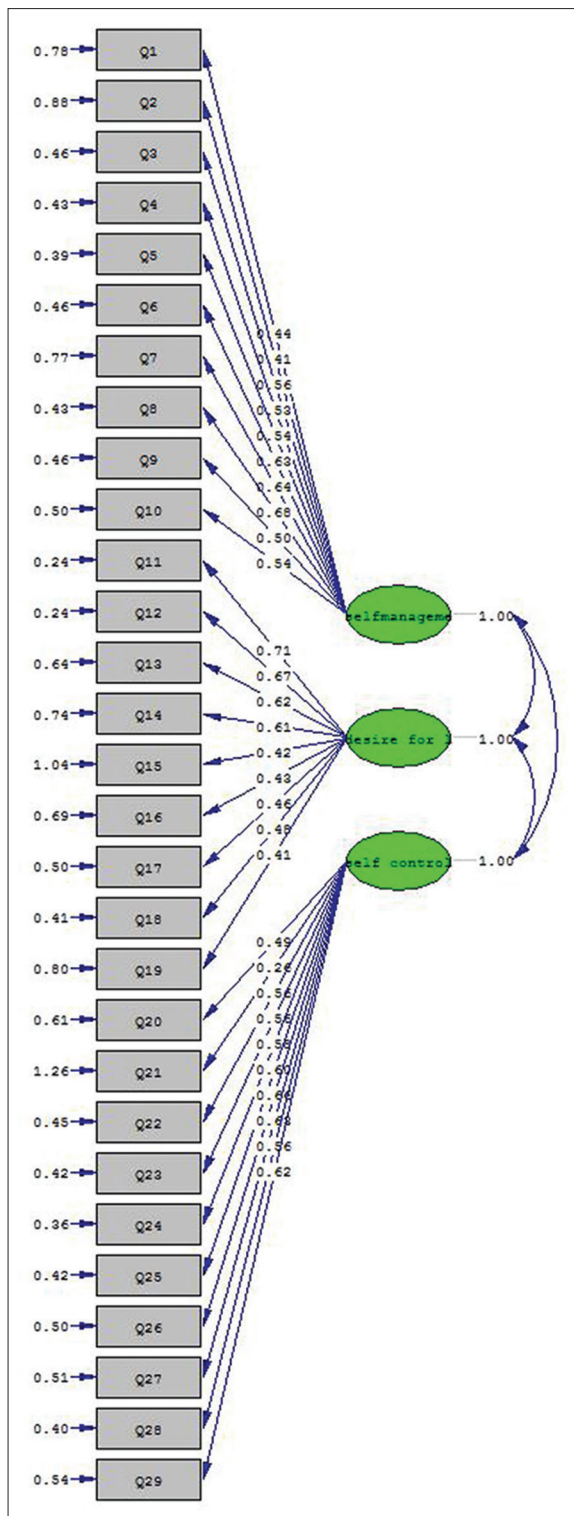


Figure 1: The model of paper

between factors and items has demonstrated the high relations between items related to the learning desires with this factor which these findings are also matched with the Fisher and King's research results.^[26] Despite the fact that correlations between items and factors related to some factors such as self-management were so weak, but coefficient such as Sobel T statistics, adaptive fitness,

goodness of fitness, modified goodness, and CFA of average square approximate error model were removed for the sake of achieving the proper amount. Also, in this research, the internal solidarity of trinity factors which is the final goal for this effort, are emphasized and are coordinated with the high basic principles of this scale.^[24,25,29,30]

For as much as Fisher and King scale of self-directing for employing on the Iranian subjects was confirmed, it is possible to consider and utilize it as a criterion tool for the purpose of other validation of self-directed tools. In addition, with the close consideration, the aim of University of Medical Sciences and Nursing and Midwifery colleges, particularly, is preparing students for life-long and continuing learning, and the center and the turning point of life-long learning is to achieve skills and capabilities of self-directing. After teaching the skills of self-directing to students, it is possible that these skills can be evaluated according to the standards of scale validation. Also as this very fact that problem-solving teaching method has a significant effect on increasing self-directing is considered, it can be grasped from using this valid tool that to what extent teaching method in Esfahan University of Medical Sciences would improve this potency. Moreover, the simple grading in this scale according to the three factors increases the possibility of using this tool for professors and students. On the one hand, there has been a relation between educational performances (before entering university) with student's readiness for self-directing in learning in former studies.^[27] With relying on this tool, it could be possible to anticipate students' educational performance progress at university, since the main behavior of self-directing is continuous knowledge and skills up-to-dating, alongside the entrance examinations; it can be possible to take advantages from this tool for evaluating the students' performance. Finally, since this research was limited to only the scale of nursing and midwifery students of Islamic Azad University of Esfahan, a close attention should be paid for generalizing the results to other fields of study or other students.

Discussion

Fisher and King CFA of readiness scale in short-form learning in Iranian nursing and midwifery student sample presented a proper infrastructure and three subscales, self-management, learning desire, and self-control. Also, in terms of internal solidarity, the items of this scale in each of three factors had a desirable reliability. Findings of this study provided desirable evidence about validity and reliability of self-directed readiness scale for learning. By utilizing this scale, it is suggested that professors adjust their plans and programs for teaching with students' readiness for SDL,

and with using this scale of teaching methods, they can provide different kinds of assignments, educational atmosphere and learning capabilities in a way that students' level of progress during these steps, facilitates and turns to a life-long learning.

Acknowledgment

We greatly appreciate all nursing and midwifery students of Islamic Azad University for their contribution in this project, and special thanks Dr Ilnaz Sajadian for all supported in this project.

Financial support and sponsorship

Nil.

Conflict of interest

There are no conflicts of interest

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