

Measuring Readiness for Self-Directed Learning in Medical Undergraduates

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Purpose: To measure the readiness for self-directed learning in medical students for the evaluation of self-directed learning in the study population.

Materials and Methods: The survey was conducted in undergraduate students. The instrument used was Fisher's readiness scale comprising of self-management, desire for learning, and self-control domains. The data were analyzed by Mann-Whitney *U*-test and bivariate and partial correlations. The results were compared with the reported ones.

Results: Total students surveyed were 300. Of these, 96 responded - 73 (76%) of preclinical and 23 (24%) of clinical classes. The mean readiness score was 124. The mean domains' scores for self-management, desire for learning, and self-control were 38, 38, and 48, respectively. The preclinical group had a mean score of 122 for readiness, 37 for self-management and desire for learning each, and 48 for self-control. The clinical group's scores were 129, 40, and 49, respectively. Preclinical and clinical groups differed significantly in self-management domain ($P = 0.03$). The difference was not significant in desire for learning ($P = 0.08$), self-control domains ($P = 0.40$) and readiness score ($P = 0.12$). The domains of self-control and desire for learning had a positive correlation if self-management was controlled, and self-control and self-management had a positive correlation if desire for learning was controlled ($P < 0.05$).

Conclusion: The measurement of readiness for self-directed learning helps in knowing the true value of self-directed learning in a particular setting. Relatively lower scores in our study mean self-directed learning alone cannot be relied upon to achieve optimum students' learning. There is also a need for implementing strategies that will help students in improving their readiness for independent learning.

Keywords: self-directed learning, readiness for self-directed learning

Introduction

Self-directed learning (SDL) means self-managed learning. First introduced by Malcolm Knowles in 1978, it became popular because it was considered superior to teacher-directed learning in achieving adult learning.¹ SDL motivates students and generates their interest in learning, thereby enabling them to retain and utilize whatever they learn. It also prepares them to be lifelong learners so they may remain abreast with ever-expanding knowledge and new developments²⁻⁴ Not least, SDL is also an essential component of problem-based learning.^{3,5}

SDL, however, can work only if learners possess certain key characteristics, such as self-confidence, curiosity, critical thinking, and decision-making abilities.⁶ SDL readiness (SDLR) is the degree to which an individual possesses these qualities.⁷ It varies widely amongst individuals – some being minimally self-directed and so heavily teacher dependent while others are entirely independent. It will be hard for a group of students with a low SDLR to cope with SDL, while the one with a high SDLR will make the best use of it. A teaching method that matches the students' SDLR level offers the best opportunity for their learning. Thus measurement of SDLR can be vital for educational planning. It will reveal students' strengths and weaknesses and, therefore, the areas to target for better learning. Further, knowledge of students' SDLR will help in developing the most appropriate teaching model and the curriculum.

At the graduate level, our institution has adopted a hybrid problem-based curriculum, of which SDL is an essential component. Therefore, we conducted the present study to get undergraduate students' perspectives regarding their SDLR. The information gathered could then be used to judge how much SDL can be relied upon to meet the learning needs of the students.

We used Fischer's readiness scale for measuring SDLR. It was initially devised for nurses but later also validated for medical students.^{8–10}

Materials and Methods

The undergraduate students in the first to fifth years of the session 2017–2018 at the College of Medicine, Princess Norah University, Riyadh, were included in the study. Informed consent was obtained from all the students prior to their participation in the study. The study complied with all the provisions of the Declaration of Helsinki. It was approved by the Institutional Review Board of Princess Nourah Bint Abdulrahman University vide its letter dated September 20, 2018 (IRB Log Number: 18–0234).

It was a cross-sectional study with non-probability convenient sampling. The questionnaire was sent online to 300 students and the responses were self-administered. The data was collected over three months. The first-year and second-year students were grouped as pre-clinical while the third, fourth and fifth-year ones as clinical. We used the Fisher's readiness scale which comprised of 40 questions and 200 total point scores. It had three sections covering the domains - self-management [SM], desire for learning [DL], and self-control [SC] – each having 13, 12, and 15 questions which amounted to 65, 60, and 75 points per section respectively. Following Fisher's lead, an SDLR score of more than 150 and SM, DL and SC domains' score of 47, 44, and 59 or more respectively were considered optimum.

We recorded the response to each question on a Likert scale of 1 to 5. Items numbers 7, 20, 27, and 33 were scored in reverse order. The data was analyzed using the software SPSS version 23. The readiness score was calculated by summing up the domains' scores. All the scores were calculated as mean \pm standard deviation and rounded off for final analysis. Mann–Whitney *U*-test was used for comparing the clinical and preclinical groups. The correlation between the domains was determined by bivariate and partial correlation coefficients. A *p*-value < 0.05 was considered significant.

Results

Total number of students who responded to the questionnaire was 96. Of these, 73 (76%) were in the preclinical and 23 (24%) in the clinical group. The mean readiness score was 124. The mean domains' scores for self-management, desire for learning, and self-control individually were 38, 38, and 48 respectively. The preclinical group had a mean score of 122 for readiness, 37 for SM and DL each, and 48 for SC. The respective scores for the clinical group were 129, 40, and 49. The details are shown in Tables 1, 2 and 3.

Preclinical and clinical groups differed significantly in self-management domain ($P=0.03$) but not in desire for learning ($P=0.08$) and self-control domains ($P=0.40$) and the readiness score ($P=0.12$) [Table 4].

We did a bivariate and partial correlation – the latter by controlling one of the domains, to find out the relationship amongst the three domains. If either SM or DL was controlled, a strong positive correlation was found between the two remaining domains ($p\text{-value} = < 0.05$). However, a moderate negative correlation was found between SM and DL when SC was controlled ($p\text{-value} = 0.39$). The details are shown in Table 5.

Discussion

SDL has become the hallmark of higher education. This model hinges on extrinsic factors, such as learner's instructional processes, and intrinsic factors, such as learner's internal characteristics.¹¹ SDLR, which denotes the latter, is the backbone of SDL. Its concept is not new but yet not given due weightage in educational planning. Our study brings to light its importance. Measuring SDLR among the local population highlights its variability in different settings and provides insight into the factors influencing students' learning.

The majority of authors considered a mean SDLR score of > 150 to be optimum for the Fisher scale that we used in our study.^{9,12–14} However, in the survey by Devi et al¹⁵ the corresponding value was > 129 . Our SDLR score of 124 falls short of both these values. Studies employing other instruments to measure SDLR had diverse rankings and threshold

Table 1 Scores in Self-Management Domain

Fisher's Scale Item No	Domain Item No	Items	Score (Mean \pm SD)		
			Cohort (n=96)	Preclinical (n=73)	Clinical (n=23)
1	1	I solve my problem using a plan	3.07 \pm 0.92	2.93 \pm .93	3.52 \pm .73
2	2	I prioritize my work	3.08 \pm 0.90	3.08 \pm .90	3.09 \pm .90
3	3	I have good management skills	3.06 \pm 0.92	3.03 \pm .94	3.17 \pm .83
4	4	I set strict time frames	2.64 \pm 1.08	2.59 \pm 1.07	2.78 \pm 1.08
5	5	I prefer to plan my own learning	3.25 \pm 0.88	3.25 \pm .92	3.26 \pm .75
6	6	I am systematic in my learning	2.97 \pm 0.83	2.88 \pm .83	3.26 \pm .75
7	7	I am confident in my ability to search out information	3.08 \pm 0.89	2.96 \pm .92	3.48 \pm .66
8	8	I set specific times for my study	2.80 \pm 1.07	2.70 \pm 1.15	3.13 \pm .69
9	9	I am self-discipline	2.89 \pm 0.96	2.88 \pm .98	2.91 \pm .90
10	10	I am methodical	2.83 \pm 0.84	2.84 \pm .83	2.83 \pm .88
11	11	I can be trusted to peruse my own learning	3.05 \pm 0.93	3.05 \pm .94	3.04 \pm .92
12	12	I do not manage my time well	2.49 \pm 1.06	2.44 \pm 1.05	2.65 \pm 1.07
13	13	I am disorganized	2.58 \pm 0.97	2.51 \pm .88	2.83 \pm 1.19
Total Score			37.8 \pm 5.99	37.12 \pm 6.2	39.95 \pm 4.7

Note: Adapted from *Nurse Educ Today*. 21(7). Fisher M, King J, Tague G. Development of a self-directed learning readiness scale for nursing education. 516-525, copyright 2001, with permission from Elsevier.²⁵

Table 2 Scores in “Desire for Learning” Domain

Fisher's Scale Item No	Domain Item No	Items	Score (Mean \pm SD)		
			Cohort (n=96)	Preclinical (n=73)	Clinical (n=23)
14	1	I need to know “why”?	3.42 \pm 0.76	3.34 \pm .82	3.65 \pm .48
15	2	I critically evaluate new ideas	2.97 \pm 0.90	2.95 \pm .91	3.04 \pm .87
16	3	I learn from my mistakes	3.16 \pm 0.92	3.10 \pm .94	3.35 \pm .83
17	4	I am open to new ideas	3.38 \pm 0.90	3.32 \pm .95	3.57 \pm .66
18	5	I like to evaluate what I do	3.09 \pm 0.86	3.07 \pm .87	3.17 \pm .83
19	6	I have a need to learn	3.43 \pm 0.78	3.33 \pm .82	3.74 \pm .54
20	7	When presented with a problem I cannot resolve, I will ask for assistance	2.75 \pm 1.06	2.59 \pm 1.06	3.26 \pm .81
21	8	I enjoy a challenge	3.04 \pm 0.96	3.08 \pm .94	2.91 \pm 1.09
22	9	I want to learn new information	3.50 \pm 0.74	3.49 \pm .75	3.52 \pm .73
23	10	I enjoy learning new information	3.43 \pm 0.79	3.36 \pm .84	3.65 \pm .57
24	11	I like to gather the facts before I make a decision	3.28 \pm 0.80	3.26 \pm .83	3.35 \pm .71
25	12	I do not enjoy studying	2.64 \pm 0.98	2.64 \pm .96	2.61 \pm 1.03
TOTAL			38.07 \pm 5.57	37.52 \pm 5.6	39.82 \pm 5.02

Note: Adapted from *Nurse Educ Today*. 21(7). Fisher M, King J, Tague G. Development of a self-directed learning readiness scale for nursing education. 516-525, copyright 2001, with permission from Elsevier.²⁵

Table 3 Scores in “Self-Control” Domain

Fisher's Scale Item No	Domain Item No	Items	Score (Mean \pm SD)		
			Cohort (n=96)	Preclinical (n=73)	Clinical (n=23)
26	1	I am able to focus on a problem	3.03 \pm 0.86	3.0 \pm .89	3.13 \pm .75
27	2	I prefer to set my own learning goals	3.35 \pm 0.82	3.34 \pm .85	3.39 \pm .72
28	3	I am responsible	3.43 \pm 0.81	3.37 \pm .85	3.61 \pm .56
29	4	I have high personal expectations	3.38 \pm 0.80	3.40 \pm .81	3.30 \pm .76
30	5	I have high personal standards	3.29 \pm 0.70	3.27 \pm .69	3.35 \pm .71
31	6	I have high beliefs in my abilities	3.26 \pm 0.84	3.22 \pm .88	3.39 \pm .66
32	7	I am aware of my own limitations	2.86 \pm 0.98	2.74 \pm .97	3.26 \pm .91
33	8	I am logical	3.30 \pm 0.85	3.27 \pm .85	3.39 \pm .84
34	9	I prefer to set my own goals	3.41 \pm 0.78	3.34 \pm .82	3.61 \pm .50
35	10	I evaluate my own performance	3.13 \pm 0.90	3.08 \pm .94	3.26 \pm .75
36	11	I prefer to set my own criteria on which to evaluate my performance	2.94 \pm 0.88	2.92 \pm .90	3.0 \pm .85
37	12	I am responsible for my own decisions /actions	3.45 \pm 0.79	3.42 \pm .80	3.04 \pm .82
38	13	I can find out information for myself	3.17 \pm 0.85	3.21 \pm .86	3.04 \pm .82
39	14	I like to make decisions for myself	3.32 \pm 0.89	3.26 \pm .94	3.52 \pm .66
40	15	I am not in control of my life	2.78 \pm 0.99	2.85 \pm .98	2.57 \pm .99
Total			48.09 \pm 6.7	47.69 \pm 7.1	49.34 \pm 5.09

Note: Adapted from *Nurse Educ Today*. 21(7). Fisher M, King J, Tague G. Development of a self-directed learning readiness scale for nursing education. 516-525, copyright 2001, with permission from Elsevier.²⁵

Table 4 Comparison of Scores in Pre-Clinical and Clinical Groups

Domain	Pre-Clinical Group (n=73)	Clinical Group (n=23)	Significance*
	Total Score	Total Score	P-value
Self-Management	20–50 (mean 37.12 \pm 6.2)	28–48 (mean 39.95 \pm 4.7)	0.03
Desire of Learning	14–48 (mean 37.52 \pm 5.6)	26–48 (mean 39.82 \pm 5.02)	0.08
Self-Control	21–59 (mean 47.69 \pm 7.1)	37–59 (mean 49.34 \pm 5.09)	0.40
Readiness Score	57–152 \pm (mean 122.34 \pm 16.8)	102–155 (mean 129.13 \pm 12.4)	0.12

Notes: *Mann-Whitney U Test. The significance level is <0.05.

scores for optimum SDLR, making it challenging to do a straightforward conversion and numerical comparison of these studies with ours.^{16–19} Notably, though, their scores exceeded the minimum desired level for their respective standards for optimum SDLR. Our score, falling below the desired level by our scale, thus has the same ranking even when compared with the studies using different scales.

Low SDLR in our study could be due to many reasons, such as the students' attributes, their cultural and educational background, and unfamiliarity with the process.^{6,20} To have good SDLR and be proficient independent learners, the

Table 5 Correlation between Domains of SDLR*

Controlled Factor	Correlated Factors	Pearson Correlation Coefficient	Partial Correlation Coefficient	P-value
None	Self-management and Desire for Learning	0.56	-	0.00
None	Self-Management and Self-Control	0.66	-	0.00
None	Desire for Learning and Self-Control	0.78	-	0.00
Self-Management	Desire for Learning and Self-Control	-	0.67	0.00
Desire of Learning	Self-Management and Self-Control	-	0.43	0.00
Self-Control	Self-Management and Desire for Learning	-	0.09	0.39

Note: *Self-directed Learning Readiness.

students need to be fostered for SDL at a very young age. They have to be encouraged to participate in learning activities that promote their intellectual growth and cognitive functions to help control their behavior, emotions, motivation, and self-regulate. The techniques to improve self-direction skills in higher education are the individualized teaching-learning process and contract learning.²¹

SDLR score reflects the overall level of students' disposition towards SDL while scores in various domains depict the students' specific strengths and weaknesses. In our study, the score was highest in SC, and those in SM and DL were the same. As was true for the SDLR score, the domains' scores were also lower than the desired ones for the respective domains though these matched in the ranking.^{9,10,14,15,20}

We grouped our subjects as preclinical and clinical for a more revealing comparison given the paradigm shift in the curriculum of basic and clinical sciences and the consequent change in learning dynamics. The changeover is evident from the finding that early clinical exposure augments SDL skills irrespective of the type of curriculum.¹⁹ In line with this contention, our two groups differed in the SDLR and domains' scores, though the difference was statistically significant in the SM domain only.

The higher scale and subscale values in the clinical than in the preclinical group reflect the maturational process of developing self-directedness. It also means that SDLR is not a static attribute but is improvable by adopting appropriate strategies. Our results conform those of many studies that have shown an upward trend in the readiness score as the students move from junior to senior classes.^{15,19} In some studies, a decline or little change was found in the readiness score with the increasing year of study,^{16,17,19} one reported higher scores for the first and fourth-year than those of other students.¹⁴ The author attributed it to the changes in students' attitudes and enthusiasm at the start and end of the course.

Partial correlation analysis showed various domains of SDLR to be inter-dependent and not mutually exclusive. For example, students with good SC are likely to have better SM and DL and greater readiness for SDL. It further showed that certain attributes are complementary to one other.

Some researchers have tried to find a correlation between the readiness score and students' academic performance. Their findings, however, have been quite contradictory - many reporting a poor relationship between the two.^{15,18} It might be due to the difference in their determinants - the former depending upon the ability to utilize a particular learning method and the latter, on the depth and breadth of learners' knowledge base.¹⁴ On the contrary, a few studies have shown a higher SDLR associated with a significantly higher academic success^{19,22} - indicating an overlap of the skills required for either SDL or academic success - particularly those related to self-management.

One of the studies has reported a positive correlation between self-direction skills and lifelong learning.¹⁹ With one-time data and without a follow-up, our study could not explain the relationship between SDLR and academic performance or lifelong learning.

A self-reporting questionnaire in our study provides the students' perspective of their readiness. Being subjective, however, it might not reflect the actual level of their readiness.¹⁵ The teachers' perspective about students' readiness

might be quite the opposite of students themselves.^{4,5} It is also worth noting that the readiness scale is a predictor and not the measure of students' success in self-direction.

Readiness for SDL is only one determinant of the effectiveness of SDL. Equally crucial in this regard is the learning environment to which the students are exposed and which depends on many factors, such as the instructional processes, teachers' collaboration, use of technology, and administrative and technical support services. All these components need to be also evaluated for a comprehensive assessment of SDL's utility in a particular setting.²³ Ideally, the SDL model chosen should fit both the level of students' readiness and the prevailing learning environment.³ The model thus could vary from a very structured process grounded in behaviorism to complete learner's autonomy based on a humanistic approach.²¹

Self-direction, despite its attraction, may not be applicable in all situations.^{4,5,24} Further, a person's ability of self-direction may vary with the circumstances. SDL needs to be implemented more consciously where the SDLR is modest and the learning environment less conducive.³ The employment of an integrated or a hybrid curriculum in such situations might be the better option.⁴

The response rate in our study seems low, particularly in higher classes. It could be because, unlike 1st and 2nd-year students, third, fourth, and 5th-year students, were too busy in their clinical rotations to remain in touch with college tutors who could have persuaded them to participate in the study. Furthermore, SDL surveys might attract junior students because they are less familiar with the existing education system and more open and inquisitive about novel learning techniques.

Our data was about a limited number of students who belonged to a single institution. Large, multi-institutional, multidimensional, and longitudinal studies would be required to define the true scope and value of SDL.

Conclusion

The measurement of readiness for self-directed learning is essential to determine the utility of self-directed learning in a particular setting. Relatively lower scores in our study mean a hybrid system incorporating both self-directed and teacher-based learning may be more appropriate for the institutions like us. Strategies may also be implemented in lower education to assist students to improve their readiness for independent learning for the coming times.

Abbreviations

SDL, self-directed learning; SDLR, self-directed learning readiness; SC, self-control; DL, desire for learning; SM, self-management.

Data Sharing Statement

The data of the study is being kept by the corresponding author and is accessible through him.

Consent for Publication

All the authors have consented for the submission and publication of the manuscript.

Acknowledgments

Our thanks are due to Dr. Patrick Ottoman of Abington-Jefferson Hospital, U.S, for proofreading the manuscript and giving valuable suggestions in this regard.

Funding

No funding has been received.

Disclosure

The authors report no conflicts of interest in this work.

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