Medical Education-Original Article **Open Access**

Assessment of Self-directed Learning (SDL) Readiness among Medical and Dental Students, in a Private University.

Narmeen Ahmed, Iram Khursheed

BSTRACT

Adult learners have the proven capability of self-directedness when provided with the appropriate learning environment. Self-directedness foster continuing medical education and stimulate medical students to become lifelong learners which is essential to provide evidence-based patient care.

Objectives: The objectives of this study were to assess the self-directed learning readiness of students and identify the impact of student-centered teaching strategies on their readiness level.

Study Design & Setting: This study was conducted at 2 colleges of Ziauddin University. All students of 1st & 2nd year MBBS and BDS program were included in the study (N=325). This was a cross-sectional study conducted from May-June 2023, at the middle of the Professional Year.

Methodology: After taking the informed consent, students were provided with a valid questionnaire, based on a Likert-scale, developed by Williamson, to measure students' readiness for their SDL level.

Results: The response rate was 35% (n=114/325), with the majority of participants from the MBBS program (88.5%, n=101) and females (67.5%, n=77). The overall mean SDL readiness score was 234.58 (±23.94). Students form Year 1 and Year 2 both predominantly scored high levels (76.3%) with mean SDL scores of 233.5 (±24.56) and 235.2 (±23.63) respectively. The scores reflected the positive impact of student-centered teaching strategies that are being used in their curriculum.

Conclusion: Overall, the study supports the idea that active teaching methods significantly enhance self-directed learning readiness of students. This reinforces the importance of integrating such strategies into medical and dental education curricula to foster lifelong learning and independent knowledge acquisition.

Keywords: Continuing medical education, learning, medical students, dental students

How to cite this Article:
Ahmed N, Khursheed I. Assessment of Self-directed Learning (SDL) Readiness among Medical and Dental Students, in a Private University. J Bahria Uni Med Dental Coll. 2025;15(3):246-252 DOI: https://doi.org/10.51985/JBUMDC2025585

INTRODUCTION:

Self-directed learning (SDL) is an autonomous and dynamic educational process in which the responsibility for acquiring knowledge and skills is borne by the students themselves and they maintain their cognitive state according to their own pace of learning.[1,2]

When the students are self-directed from their initial years of study, they realize their responsibility of learning and improvising, fostering continuing medical education and become more self-disciplined.[1,3,4] Self-directed learning is generally defined as "learning on one's initiative, with the learners having subsequent involvement in curricular planning, designing, and evaluating the entire program". [3,5]

Self-directed learning inculcates better time management, team work, reflective writing skills, promotes clarification of theoretical concepts and ability of self-evaluation.[3,6] However, certain criteria and structure are required to optimize the benefits of this strategy.[7]

According to the adult learning principles suggested by Knowles, adult learners have the ability to determine what to learn and how to learn in a conducive learning environment.[8] They have the proven capability of being accountable for identifying their learning needs, planning their study time accordingly and using multiple resources to understand the content deeply.[9,10,11] They are also capable of monitoring their learning progress thus striving towards continuing medical education.[8,12]

Medical profession is a field that requires continuous learning and upgradation regarding the innovations and technological advancements in healthcare delivery system to provide quality and evidence-based patient care.[11,13] It is important

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Received: 13-04-2025 1st Revision: 18-04-2025
Accepted: 30-06-2025 2nd Revision: 20-06-2025

that medical professionals maintain the quality to learn throughout their professional careers and become lifelong learners.[2,10,11]

Studies also suggest that self-directed learners perform better as compared to traditional lecture group learners.[14] To promote the competency of self-directed learning amongst students, it is necessary that they possess analytical and problem-solving skills and to develop these skills, appropriate teaching strategies need to be implemented in the medical curricula.[1,2,8] Furthermore, self-directed learning can grow into self-determined learning which is termed as Heutagogy. The foundation of heutagogy lies on the concept of SDL but it fosters more autonomy in the learners and develops essential competencies in students.[15]

Literature states that student-centered learning strategies, like PBL, CBL and flipped classroom, motivate students towards being self-directed and lifelong learners.[9,16] In fact, it is stated in literature that the success of SDL depends on the learning strategies used in the curriculum.[3] Problem-based learning, which involves learning in an authentic and social context, is one of the most popular learning strategies that promote SDL.[6,17] Evidence exists that PBL stimulates SDL ability because during PBLs, learners are accountable to plan, supervise and evaluate their own learning process.[18] In PBLs, students also learn to work collaboratively in teams which is essential for them as they have to become a part of the larger community of practice in the future to solve larger problems.[4,6] Thus, PBL promotes SDL which is primarily considered as a higher order active learning technique that promotes self-efficacy of the students.[19]

The significance of being a self-directed lifelong learner can be judged by the fact that various accreditation bodies all over the world, including the National Medical Commission have now labelled this as a core competency that should be developed in all medical and dental students.[1,20,21] According to the Accreditation Standards by Pakistan Medical & Dental Council 2024, all medical institutes should incorporate teaching strategies that enhance self-directed and independent learning.[20]

There is a scarcity of literature that assesses the readiness levels of students regarding self-directedness in learning in medical institutes of Pakistan, though literature states the increasing importance of implementing SDL slots in their curriculum.[22]

Various instruments are available internationally that assess the readiness level of students regarding the self-directed learning. The most common instruments, SDLRS by Guglielmino 1978 and by Fischer et al 2019 have been widely used for this purpose.[23,24] However, there are a few validated instruments that relate the effect of learning strategies and activities with the level of self-directedness like Williamson 2007.[12] This scale was further updated by Cadorin et al 2013.[25] It is significant to assess the readiness level of students in order to evaluate the impact active teaching strategies have on them.

METHODOLOGY

After obtaining the consent from ERC at Ziauddin University (Reference Code: 6740223NADED, the study was conducted at 2 colleges of Ziauddin University- Ziauddin Medical College (ZMC) and Ziauddin College of Dentistry (ZCD). Students enrolled in MBBS and BDS program participated in the study after filling the e-consent form.

As per the PMDC guidelines, ZMC and ZCD ensured timely accommodation of self-directed learning hours throughout the duration of the 5-year MBBS and 4-year BDS programs respectively. These self-directed learning slots are sometimes task-driven, that is, students are given specific tasks/ assignments for which they have to conduct research and collect data to produce authentic results. Usually, such SDLs are scheduled between PBL sessions so that students can organize their learning according to the learning objectives decided in the first PBL-Session. However, in some SDL slots, students are independent to determine their own learning needs, making a continuous effort to achieve the desired learning outcomes themselves.

In both the MBBS and BDS programs, the initial 2 years are pre-clinical followed by clerkship period. For the pre-clinical years at ZMC and ZCD an integrated (modular system) curriculum is being followed where the basic theoretical knowledge is taught with relevance to clinical practice. The primary goal of this integration is acquisition of skills and competencies through the progressive development of concepts and their application.[22]

The 1st and 2nd year MBBS and BDS students are provided with real-life case scenarios in their PBL sessions with the aim to stimulate their problem-solving and critical thinking abilities. Each PBL case is Peer-Reviewed by a panel of subject experts and medical educationist.

There are 2 PBL sessions, incorporating the 7-Jumps of PBL. An SDL slot is scheduled in between these two sessions to address Jump # 5 where students study independently and achieve their desired learning goals.

Sample size: All year-one and year-two students of the ZMC and ZCD were included in the study. N=325

Inclusion criteria: MBBS & BDS students who were enrolled in ZMC & ZCD of either gender.

Students who gave consent to fill the questionnaire. Exclusion criteria: 1st & 2nd year medical and dental students who did not gave consent were excluded from the study. Medical & dental students from clinical years and students from other colleges of Ziauddin University were not included in the study.

Sample size: Purposive Sampling was done as data had to be collected from specific population only.

n=22 students participated from 1st year MBBS and BDS program, n=92 students participated from 2nd year MBBS and BDS. Total 114 students participated. Design & duration: This was a cross-sectional study and the data were collected in May-June 2023, mid-year of the 1st and 2nd Professional Year.

A valid questionnaire, based on a Likert-scale, developed by Williamson was used to measure students' readiness for their SDL level. The questionnaire consisted of 60 questions assessing the students' level of self-directedness in learning and they were organized in five domains: self-awareness, learning strategies, learning activities, self-evaluation, and interpersonal skills. Although many rating scales are available online but Willaimson SRSSDL is one of the few scales that is comparatively more comprehensive and includes learning strategies and relates its significance to the self-directed learning readiness of students. The scale proved to be reliable with Cronbach's alpha coefficient for each domain to be lying in between 0.71 and 0.79. [,22]

Students' level of self-directedness in learning was ranked as low SDL (if they score within 60–140 range), medium SDL (141–220 score), or high SDL (221–300 score)[2].

Data collection process: After taking the informed consent, students were emailed with the consent form and the link to the questionnaire.

Analysis: Quantitative data was analyzed using IBM SPSS version 20. Mean and standard deviation of students' SDL scores were computed. Independent t-tests were used to investigate if there was a difference between the means of the scores obtained from students of different academic years, gender or programs.

RESULTS:

The response rate was 35% (n=114/325), with the majority of participants from the MBBS program (88.5%, n=101) and vastly were females (67.5%, n=77) as shown in Table 1. SDL Readiness Scores: The overall mean SDL readiness score was 234.58 (±23.94). Year 1 and Year 2 students both predominantly scored high levels (76.3%) with mean SDL scores of 233.5 (±24.56) and 235.2 (±23.63) respectively. A total of 23.6% of students had moderate-level scores (Figure 1). Comparison of Subscale Scores & individual items: When comparing the subscale scores of SRSSDL between 1st-year and 2nd-year students using independent t-tests, no significant gender-based differences were found as shown in Table 2. However, some individual SRSSDL items did show significant gender-based differences. Among 1st-year students, males scored higher in relating experiences with new information, while females scored higher in taking breaks and being inspired by others' success (Table 3a). Among 2nd-year students, significant differences were observed, with females generally scoring higher in various areas (Table 3b).

DISCUSSION

The findings of this study indicate that the majority of 1st

Table 1- Demographic Data

Year	Program N(%)		Gender N(%)		Age (Mean± S.D)
	MBBS	BDS	Male	Female	
1st (n=22, 19.2%)	77.3%	22.7%	22.7%	77.3%	19.5 ±0.8
2nd (n=92, 80.7%)	91.3%	8.7%	34.8%	65.2%	20.62 ±0.8

Figure-1

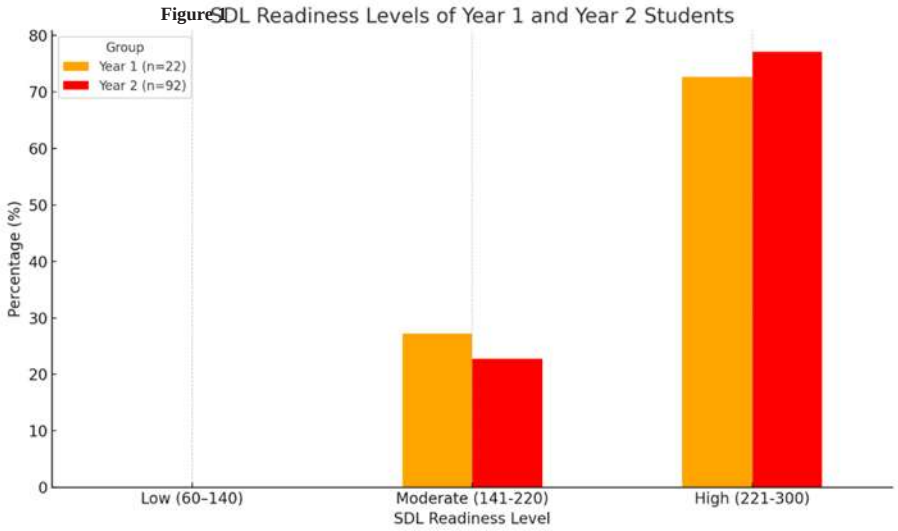

Table 2: Comparison of mean scores of self-directed learning readiness (subscale scores) in 1st and 2nd year students using independent t test.

Subscale SRSSDL	Gender	1st Year				2nd Year			
		Mean	Std. Deviation	T	P-value	Mean	Std. Deviation	T	P-value
Awareness	Male	6.8	1.48	-1.149	0.26	4.1	0.4	1.369	0.175
	Female	7.8	1.81			4.0	0.4		
Learning strategies	Male	3.9	0.79	0.037	0.97	3.7	0.6	-0.591	0.556
	Female	3.9	0.50			3.8	0.6		
Learning activities	Male	4.0	0.54	0.255	0.80	3.8	0.4	-1.566	0.121
	Female	3.9	0.47			4.0	0.5		
Evaluation	Male	3.6	0.41	-1.847	0.08	3.8	0.5	-1.436	0.155
	Female	4.0	0.44			4.0	0.6		
Interpersonal skills	Male	3.9	0.59	-0.064	0.95	3.9	0.5	-0.109	0.914
	Female	3.9	0.45			3.9	0.5		

Table 3a- Significant associations of SRSSDL items (1st year students)

SRSSDL items	Gender	Mean	(Mean± S.D)	P-value
I relate my experience with new information	Male	4.4	4.4 ± 0.9	0.03
	Female	3.5	3.5 ± 0.7	
I prefer to take any break in between any learning task	Male	2.6	2.6 ± 0.9	0.03
	Female	3.9	3.9 ± 1.1	
I am inspired by others' success	Male	3	3 ± 1.6	0.04
	Female	4.2	4.2 ± 0.9	

Table 3b- Significant associations of SRSSDL items (2nd year students)

SRSSDL items	Gender	Mean ± Std. Deviation	P-value
I am responsible for identifying the areas I need training in	Male	4.6 ± 0.6	0.03
	Female	4.3± 0.6	
I have a break during long periods of work	Male	4.5 ± 0.7	0.04
	Female	4.2 ± 0.8	
I find 'role play' is a useful method for complex learning	Male	2.9 ± 1.1	0.02
	Female	3.4 ± 1.0	
I rehearse and revise new lessons	Male	3.5 ± 1.0	0.01
	Female	4.1 ± 0.8	
I use concept mapping/outlining as a useful method of comprehending a Wide range of information	Male	3.6 ± 1.1	0.01
	Female	4.1 ± 0.9	
I raise relevant question(s) in teaching-learning sessions	Male	3.0 ± 1.1	0.05
	Female	3.4 ± 1.0	

and 2nd-year students at Ziauddin Medical College (ZMC) and Ziauddin College of Dentistry (ZCD) demonstrated a high level of readiness for self-directed learning (SDL), with a mean SDL score of 234.58 (±23.94). One of the anticipated reasons could be the inclusion of active learning strategies in the curriculum of both colleges. This aligns with the results of study by Patra S and Hill M who stated that when students are exposed to active learning strategies like problem-based learning methods, they are encouraged to critically think and come up with solutions that they might not develop if teacher-centered strategies are used.[14,21]. A similar study conducted in India by Dulloo P and Kar et al also observed high levels of SDL readiness among medical students exposed to student-centered learning strategies.[11,26] Premkumar et al. found that medical students demonstrated greater SDL readiness after being taught with active learning techniques such as PBL and interactive discussions, similar to our findings.[5] He concluded that active learning strategies promote independent learning, critical thinking, and problem-solving which are essential components of SDL readiness

and further fosters continuing medical education. Study by Liu TH indicated that active, student-centered learning strategies, like PBL, CBL and flipped classroom, motivate students towards being self-directed and lifelong learners.[9,16] Similarly, in the study by Buch AC and Hill M, it was also stated that PBL helps develop self-directedness in students and boost students' self-confidence.[3,21]

The results of our study showed no substantial difference between first- and second-year students, with both groups predominantly scoring in the high SDL readiness range, further suggesting that the teaching methods used in both years are consistently fostering SDL skills. As stated in the study by Khan EH, when students are exposed to active learning activities, they are bound to become self-directed in their learning, irrespective of their Academic year.[22]

Interestingly, while there were no significant differences in overall SDL readiness scores between genders, some specific SDL behaviors revealed gender-based differences. For example, among 1st-year students, males scored higher in relating their experiences to new information, while females performed better in taking breaks and being inspired by others' successes. In the second-year cohort, females scored significantly higher in areas like rehearsal and revision of new lessons and the use of concept mapping. These variations suggest that although both genders are generally well-prepared for SDL, certain aspects of their learning processes may benefit from gender-specific teaching interventions or support mechanisms. Similar findings were seen in the study by Roberts M which also highlighted that gender-related differences in the readiness level are present in the end of 1st year medical students, specifically related to self-determination.[13] This may be due to the difference in self-rating assessment between boys and girls.

The study highlighted the effectiveness of the integrated curriculum and active learning strategies such as PBL at ZMC and ZCD, which were specifically designed to promote self-directed learning. In Ethiopian medical schools, Kidane et al. reported that students exposed to innovative curricula that emphasized SDL techniques like PBL showed high levels of self-directedness.[9] The study revealed how SDL helps students become lifelong learners and builds their confidence in identifying and addressing learning gaps. The findings align with our study, as both demonstrate that student-centered methods boost SDL readiness.[9]. Since medical profession requires continuous upgrade of competencies and skills according to the innovations being done for better patient outcome, individuals who learn to organize their own learning transform into better lifelong learners which is a prerequisite for the medical profession, as stated in the study by Patra S. [14]

A study by Bhandari et al also signified that SDL strategies improve self-efficacy and promote independent learning skills, particularly when PBL are integrated into the curriculum.[19]

In contrast to our findings, a study conducted at KIST Medical College in Nepal found that students did not show significant improvements in SDL readiness despite the introduction of a PBL-based curriculum.[18] Also, in a study by Anil D., SDL levels were not significantly related to learning activites.[8] While some students benefited from PBL, the overall readiness levels remained moderate. This suggests that other factors, such as institutional support and faculty engagement, may influence SDL effectiveness.[18] Also, this may be due to lack of training of faculty and students on how to conduct PBLs appropriately.

In Pakistan, Zeb et al. reported that self-directed learning readiness among medical students was relatively low, particularly among students not adequately supported with structured SDL slots or guidance.[24] Their study indicated that without proper implementation of SDL strategies, students may struggle to achieve high levels of self-directedness, which supports our findings that most ZMC and ZCD students demonstrated high SDL readiness due to the availability of structured SDL slots for them.[24] This supports the discussion stated in literature that incorporation of SDL requires more than just curriculum changes. It depends on curriculum organization along with students' motivation and self-regulation.[27]

SDL slots provide opportunities to students to identify their strengths and limitations with reference to their studies. Once students recognize their needs, their motivation, awareness and confidence level also boosts. A study by Yang C had similar findings which stated that students SDL ability is interlinked with their confidence level, as in our study interlinked with the awareness level. [10]

In contrast to the findings of our study, Dulloo P stated that only active learning strategies do not affect the readiness level of students.[11] There are other factors as well that can affect the SDL readiness level. However, this study does emphasize the need of including student-centric strategies in the curriculum to promote the mastery of the approach of SDL.

In contrast to our findings, a study by Roberts M. stated that quantitative longitudinal studies have failed to provide consistent results regarding SDL readiness in medical students.[13] This may be due to lack of organization and administration of appropriate surveys or due to the fact that quantitative surveys alone may not be the most appropriate method to assess students' readiness.

CONCLUSION

This study found that most of the students from the 1st and 2nd year medical and dental programs had a high readiness level of self-directed learning likely because of the incorporation of active learning strategies used in their curricula, PBL being one of them. The consistent use of

these strategies throughout the curricula of both years have significantly fostered the lifelong learning abilities of the students. Although there were no significant differences observed between the readiness scores of different academic years but some gender-based differences were noted in their learning behaviors reflecting their different learning processes. This study emphasizes the importance of structured integration of SDL slots in medical and dental programs to increase awareness and motivation amongst students.

Authors Contribution:
Narmeen Ahmed: Contribute in discussion writing, contribute in data collection
Iram Khursheed: Contribute in introduction writing, contribute in data collection

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