Mapping the Terrain of Learning: A Study on the Association between Self-Directed Learning Readiness and Learning Environment Dynamics among Students studying in a Public Health Institute at Kolkata, India

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Abstract:

Introduction: Self-directed learning (SDL) is the process in which individuals take the initiative and learning environment involves all other aspects of the institute. Good SDL ability is the foundation of lifelong learning. Students' perception of the educational environment plays a subtle role in learning and contributes to learning input and students' achievement. Self-directed learning is integral to public health teaching. **Objective:** To assess the perceptions of learning environment and self-directed learning readiness and association between the two among public health researchers and also to elicit the factors associated with SDLRS. **Method:** A cross-sectional study was conducted from July to December 2023 in a public health institute in Kolkata. A total of 102 participants across five courses were selected by Complete Enumeration method and their self-directed learning readiness (SDLRS) and perceptions of learning environment were assessed using a self-administered questionnaire. The data was analysed in SPSS, version 16. Ethical approval was taken. **Results:** The mean age of the study participants was 26.7 years and 64.7% of the study participants were from MBBS background. The median academic hours was 18 hours per week, 37.3% of the participants were studying in the institute for less than 6 months and 20.6% for more than 24 months. The overall perception of learning environment was more positive than negative. There was significant positive correlation between SDLRS and Learning Environment (Spearman's rho=0.281, p=0.004). Age (p=0.015) and prior academic qualification (p=0.016) were significantly associated with SDLRS. **Conclusion:** SDLRS was associated with positive Learning Environment. The overall perception of SDLRS was average and the SDL ability improved with duration of study in the institute and deteriorated with age of the study participants.

Keywords: Learning Environment, Medical Education, Public Health, Self-Directed Learning Readiness, Teaching Method

Introduction:

The medical education system in our country has a new role and a challenge in shaping competent medical professionals to meet the health needs of the rapidly changing society. It is a known fact that the passive unidirectional teaching-learning leads to non-facilitation of meta-cognitive skills, thus causing decreased students' engagement and motivation towards the course.[1] Self-directed learning (SDL) is a process in which individuals take the 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

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learning strategies, and evaluating learning outcomes.[2] However, it does not mean leaving the learner alone-rather he/she has the constant support of curriculum planners, institutions, teachers and peers. Self-directed learning is based on several core characteristics of adult learners viz. readiness to learn, knowledge of results, goal-directed learning, and independence to select learning tools and time.[3] The traditional education strategy is insufficient to meet the demands of dynamically changing medical science and the fast-growing medical field. SDL is crucial for public health researchers owing to their ever dynamic course curriculum. It helps researchers to keep up with rapidly evolving knowledge, fill knowledge gaps in specific areas relevant to their work, promotes innovation and creativity and empowers career development. The present Competency-Based Medical Curriculum for medical undergraduates and postgraduates in India emphasizes acquisition of a set of competencies for self-directed learning (SDL) through an explicit approach and dedicated teaching hours in the disciplines which gives the opportunity to develop skills for developing lifelong learners.[4] Self-directed learning is not solely important for students from medical background; it is a crucial skill for students across all disciplines and backgrounds to develop lifelong learning abilities, critical thinking, problem solving ability to navigate through complex issues, flexibility, adaptability, resourcefulness, independence and career advancement. Public health training is highly dynamic owing to the ever-evolving public health challenges and advancement in technology. Hence, students undergoing public health training need to develop SDL ability. The allied branches of public health like Nutrition and Veterinary Sciences are of equal importance with the advent of the concept of One Health which is the future, Hence, students from these disciplines also need to develop good SDL ability in order to collaborate with their peers from medical background and contribute to the field of public health.

The education environment is everything that happens inside an institution, including the learning environment, perception of infrastructure, interaction between students and classmates, teachers' attitudes and skills, and many other related factors.[5] A learning environment is defined as the social, psychological and pedagogical contexts in which learning occurs.[6] The Learning environment is an important factor in enriching students' learning because it plays a central role in learning and contributes positively to students' achievement, satisfaction and success.[7] Students' perception of the learning environment plays a subtle role in learning and contributes positively to learning input and students achievement, which can stimulate students' interest in learning and affect their motivation.[8] Maslow's hierarchy of needs states that an encouraging learning environment is the result of promoting the learner's needs more than the content of the materials, and by meeting diverse needs and expectations.[9]

Public health researchers are expected to cultivate the habits of SDL and develop lifelong learning skills at the institute.[10] The study therefore aims to assess the perceptions of learning environment and levels of self-directed learning readiness and its factors among public health researchers. The learning environment and SDL ability are multidimensional, and our study also aims to establish an association between the two.

Method:

Study design, setting, participants:

An institution based observational study of cross-sectional design was conducted from July 2023 to December 2023 in a renowned public health institute in Kolkata among students studying in various courses viz. MD Community Medicine, MD MPH Epidemiology, Diploma Dietetics, MSc Nutrition and Masters in Veterinary Public Health (MVPH) in the institute. The students from non-medical background have also been included in the study

because they are all part of a public health institute and are engaged in public health research, activities and collaboration.

Sample size and sampling:

Using standard formula, $N=Z^2 (SD)^2/d^2$, considering standard normal deviate at $\alpha=0.05$ and 95% CI as 1.96 and from a previous study conducted by Tang et al[5], SD=12.12 and precision 2.4 on either side of the SD the final sample size comes out to be 97. However, all the 102 students studying in the various courses in the institute were selected by Complete Enumeration Method. Those who did not give informed written consent were excluded from the study.

Data Collection, Study Tools, and Parameters Used:

The study was conducted with the help of a pre-tested, pre-designed structured validated Google form based self-administered questionnaire. Prior permission for using the tools were obtained from the authors. The tool was pre-tested among 10 similar researchers outside the study settings. The schedule encompassed the following domains:

a. Background information of the researchers (age, gender, course details, academic hours per week, prior academic qualification and availing hostel facility or not)

b. DREEM tool for assessing perceptions of Learning Environment.[12] The DREEM tool had 5 domains with statements on a 5-point Likert Scale: (Strongly agree=4, agree=3, neutral=2, disagree=1 and strongly disagree=0). However, 9 out of the 50 items which had negative statements were scored in a reverse manner. The various domains of the DREEM tool are: Students' Perception of Learning (SPL), Students' Perception of Teachers (SPT), Student's Academic Self Perception (SASP), Students' Perception of Atmosphere (SPA) and Students' Social Self Perception (SSSP). The cumulative score was categorised as: 0-50: very poor, 51-100: plenty of problems, 101-150: more positive than negative and 151-200: excellent.

c. SDLRS tool for assessing the levels of Self-directed learning readiness.[13] The SDLRS tool had 3 domains which had statements scored as follows:

1= Almost never true of me; I hardly ever feel this way

2=Not often true of me; I feel this way less than half the time

3=Sometimes true od me; I feel this way about half the time

4=Usually true of me; I feel this way more than half the time

5=Almost always true of me; there are very few times when I don't feel this way

The three domains of SDLRS are: Self-management ability, Information capability and Cooperative Learning ability. The cumulative score was categorised as 58-201: below average, 202-226: average and 227-290: above average.

Data Analysis:

Quantitative data was analysed using Microsoft Excel 2016 and Statistical Package for Social Sciences software (version 16). Descriptive statistics for the predictor variables and the outcome variables were shown by frequency table, mean, median and interquartile range. Factors were then seen by test of significance (p-value<0.05) at 95% confidence interval. The association between self-directed learning readiness and perceptions of learning environment was seen with Scatter plot and Canonical Correlation Analysis which is a multivariate statistical model.[11]

Ethical Approval:

Permission was taken from Institutional Ethics Committee of the institute. Informed written consent

was taken from each participant before data collection. Confidentiality was maintained throughout the process.

Results:

Out of the 102 study participants, 56 (54.9%) belonged to the age group 26-30 years, 57(55.9%) were males, 52(51%) were from MD Community Medicine Course, 31(30.4%) from Nutrition courses, 14(13.7%) from MD MPH Epidemiology course, 5(4.9%) from MVPH course, 53 (51.9%) were in the first year of their course, 66(64.7%) were from MBBS background and 54(52.9%) were availing hostel accommodation. The median academic hours of the study participants was 18 hours per week.

The median scores obtained in the various domains of Self-Directed Learning Readiness (SDLRS) and Perceptions of Learning Environment are shown in Table 1.

The overall median score of self-directed learning readiness of the study participants belonged to average category and the overall median perceptions of learning environment score of the study participants belonged to more positive than negative category.

The association between SDL and Perceptions of Learning Environment is shown is Figure 1.

Canonical correlation analysis was done to establish the association across various domains of SDLRS and Perceptions of Learning Environment as shown in Figure 2.

The learning environment and SDL ability are multi-dimensional, and therefore it is difficult to directly evaluate the relationship between them and hence the canonical correlation analysis which is a multivariate statistical model was used to further study the association. Canonical correlation analysis shows that the domains of SDLRS and Learning Environment are associated with each other and the proportion of variance explained by the model is 78.02% with a correlation coefficient of 0.490. The canonical loadings of the various domains of SDLRS and Learning Environment are shown in Figure 2.

The relationship of SDLRS with duration of study in the institute and age is shown in Figure 3. The figure shows that with the increase in duration of study in the institute the scores gradually improve and vice versa occurs with age.

Factors associated with Self-Directed Learning Readiness:

Chi-square test was done to find out association of SDL with explanatory factors. Age and prior academic background were found to be significantly associated with SDL as shown in Table 2.

Table 1: Median Scores obtained in the various domains of SDLRS and Perceptions of Learning Environment (N=102)

SDLRS Domains	Maximum attainable scores	Median scores (IQR)
Self-Management Ability	140	100 (91.7,112)
Information Capability	90	64 (58,71)
Cooperative Learning Ability	60	39 (35,43)
Total Score	290	201 (186.7,224)
Learning Environment Domains	**Maximum attainable scores**	**Median scores (IQR)**
SPL	48	32 (25.7,38)
SPT	44	30 (24,36)
SASP	32	19 (16.7,23)
SPA	48	33 (27.7,38)
SSSP	28	16 (13,19)
Total Score	200	130 (109.7,149.3)

Figure 1: Correlation between SDLRS and Perceptions of Learning Environment

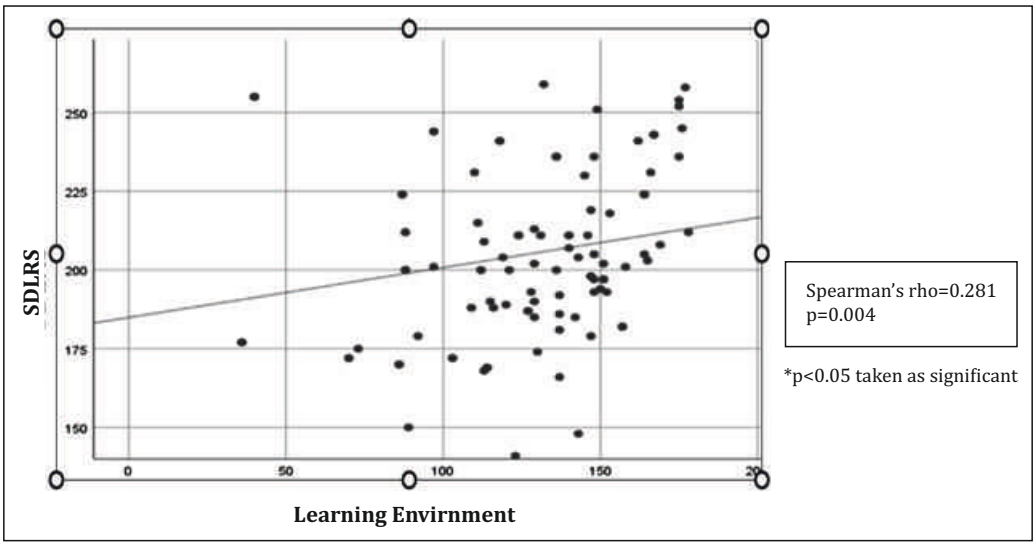

Figure 2: Canonical correlation across various domains of SDLRS and Learning Environment

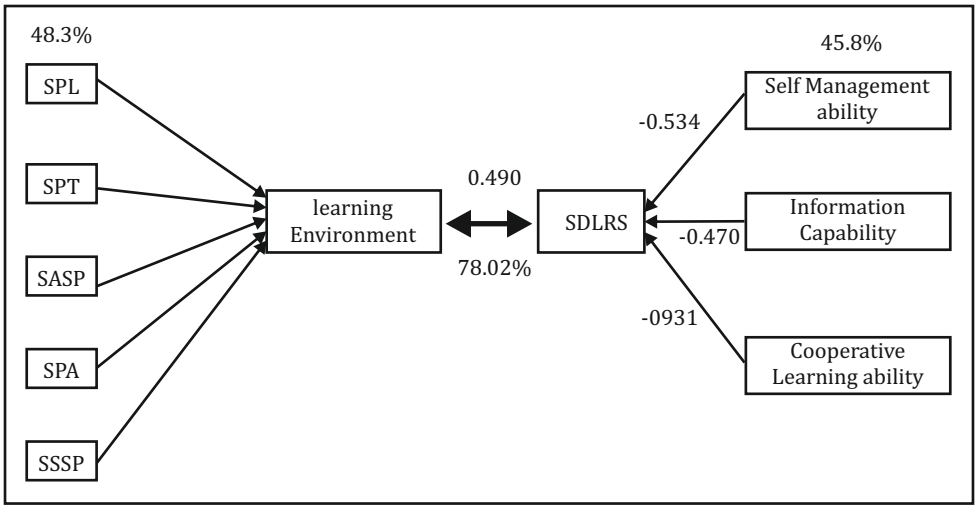

Figure 3: Relationship of various domains of SDL with duration of study in the institute and age

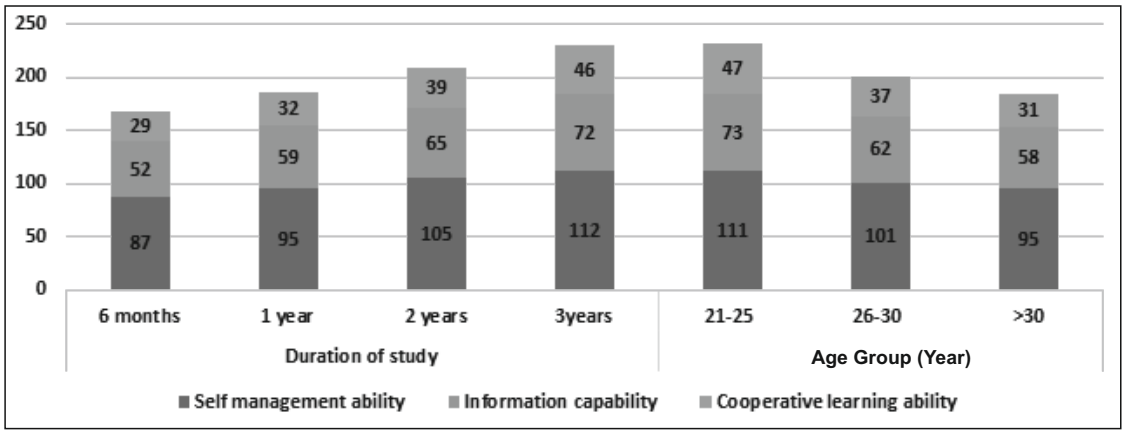

Table 2: Association of self-directed learning with explanatory factors (N=102)

Variables	SDLRS score		Chi-square statistic(df)	p-value
	Less than median score No. (%)	More than Median score No. (%)		
Age in years				
≤26	11 (32.4)	23 (67.6)	5.7(1)	0.015
>26	39 (57.4)	29 (42.6)		
Gender				
Male	31 (54.4)	26 (45.6)	1.5(1)	0.154
Female	19 (42.2)	26 (57.8)		
Academic hours/week				
≤18	23 (48.9)	24 (51.1)	0.1(1)	0.573
>18	27 (49.1)	28 (50.9)		
Place of accommodation				
Boarder	27 (50.0)	27 (50.0)	0.4(1)	0.495
Non-boarder	23 (47.9)	25 (52.1)		
Prior academic background:				
Non-medical	38 (57.6)	28 (42.4)	5.5(1)	0.016
Medical	12 (33.3)	24 (66.7)		

Discussion:

In this study, the cumulative median self-directed learning readiness score obtained by the study participants was 201 which belonged to average category. This finding aligned to the findings obtained in a study conducted by Premkumar et al.[14] The similarity in findings could be possibly due to the fact that both the studies were conducted mostly among students from medical background. However, this finding was contrary to the findings in a study conducted by Alradini et al[15] where the cumulative score obtained was 124. This difference can be attributed to the fact that this study was conducted among under-graduates whereas our study participants were public health researchers, so with increase in experience and expertise the scores of SDL improved. The scores in the domains of self-management ability and information capability were higher than cooperative learning ability. This finding was consistent with the findings obtained in a study by Tang et al.[5]. This may be due to the fact that public health researchers in the institute are engaged in various trainings and workshops which enhanced their management and information capabilities The uniqueness of the study institute is that all courses irrespective of their background have to go through a period of core course in their first semester where students across various disciplines collaborate and participate in group learning activities, seminars and discussions in various domains of public health which improve their domains of SDL Age and prior academic background were found to be significantly associated with SDL. A study conducted by Slater et al[16] showed similar findings. This may be attributed to the fact that in both the studies, the majority of the participants were in their first year of course curriculum. Thus, with increased age, SDL ability decreases and since the MBBS curriculum which is structured and has multiple hands on and group activities, there are areas in the curriculum where SDL is fostered thus increasing the SDL ability in students from medical academic background.

The overall perception of Learning Environment of the study participants was more positive than negative. This finding was consistent with the findings obtained in studies conducted by

Stormon et al[17] and Esan et al.[18] The students were generally satisfied with their learning environment. The public health researchers had highest rate for SPT and the lowest rate for SASP and SSSP, similar to the findings obtained by Tang et al.[5] This may be related to the teaching reforms in the institute, including a significant adjustment to teaching content and methods in recent years.[19] However, SSSP had the lowest score rate, followed by SASP, for all participants. This may be explained by the fact that the students have been engaged in passive receptive learning and rely on mechanical memory, an inefficient learning technique of rote memorisation to cope with the exams.[20] Sahu et al [21] reported that the SSSP significantly correlates with subjective happiness and suggested that institutions should promote not only students' academic development but also their happiness by fostering an appropriate educational environment. Although , the overall learning environment was perceived more positive than negative by the study participants, the individual domains need to be looked into for further restructuring.

The study found out significant positive correlation between SDL ability and perceptions of learning environment similar to the findings obtained in a study by Tang et al.[5] The learning environment is a major driving force for self-directed learning. Sayed et al[22] showed that a collaborative, academic and supportive environment might increase the participation of students, while an environment of competition, pressure or threats might reduce their motivation to learn and weaken their interests in the learning process. In recent years, public health institutes have tried to incorporate substantial changes in the course curriculum to improve the learning environment and inculcate SDL ability among the students. However, traditional academic structures may not effectively promote SDL, and there is growing recognition of the importance of an academic climate or environment for students to learn effectively.[23] Thus the above findings indicate that changing some aspects of the learning environment can improve the overall motivation to learn and in turn increase the SDL ability among the participants.

There were some limitations of the study. The study involved participants across various courses and in different years of their course to get a broader picture and see the effect of duration of study with SDL. However, the duration of study might influence their perceptions of SDL owing to their lack of knowledge on the same in the initial years of their course curriculum. The study involved participants from diverse backgrounds which was not studied before in previous studies owing to the unique nature of the institute where students from diverse backgrounds get trained in various aspects of public health and research. The study was conducted in a selected public health institute in Kolkata so the results may not be generalisable. The study tool was a google form based questionnaire, so there may be some bias in capturing the perceptions of the study participants.

Conclusion:

The overall SDL ability was average and perception of learning environment was more positive than negative among the study participants. There was significant positive correlation between SDL ability and learning environment. The SDL ability improved with duration of study in the institute and deteriorated with age of the study participants. The teachers need to adopt more innovative teaching and learning methods which are more student centered. The following measures can be taken to improve the SDL ability and learning environment- peer learning and collaboration, utilisation of latest technology in teaching, goal setting and planning and promoting a culture of lifelong learning. By implementing these recommendations, public health research institutions can empower their researchers to take ownership of their learning and professional development, ultimately leading to enhanced research outcomes and advancements in the field of medicine. The SDL ability has to be inculcated from the initial days of admission in the institute through regular group activities and assignments monitored

by the experts in the institute to bring about positive changes in their perceptions and transform the researchers into lifelong learners. The unique collaborative learning called core course practiced in the institute in the first semester can be adopted across institutes to foster better SDL.

Declaration:

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Conflict of Interest: Nil

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