ORIGINAL ARTICLE

Evaluation of environment through DREEM by medical students with preferred learning styles in a Private Medical College of Pakistan.

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ABSTRACT… Objective: To identify how students with the preferred learning styles rate the academic environment of the Medical College. **Study Design:** Cross-sectional study. **Setting:** Shifa College of Medicine, Shifa Tameer-e-Millat University. **Period:** April 2022 to September 2022. **Material & Methods:** After taking ethical approval from the ethical review board of the institute, a two hours slot was designated in the schedule of students of five years in the private medical college. Students were given two questionnaire, Honey & Mumford LSQ and DREEM. Students were requested to leave the demographic part in order to maintain confidentiality of data. Data analysis was done and the preferred learning style of the cohort was found. DREEM questionnaires of these students were also analyzed in order to find their ratings of the environment. **Results:** Preferred learning style of the cohort was Reflectors (58.4%). Reflectors marked domains of DREEM as, A more Positive Approach, Moving in the right Direction, Feeling More on the Positive Side, A more Positive Atmosphere and Not too bad. **Conclusion:** Environment of the medical college seemed fit for the students with preferred learning style (Reflector). Further studies are indicated to rate the environment from students with other learning styles.

Key words: Learning, Atmosphere, Curriculum.

INTRODUCTION

The field of medicine is an ever-evolving field with a sudden and frequent change of existing knowledge and practices[1] and thus, so does various domains of medical education evolve with it. With time the pattern of medical education has shifted from a traditional, teacher-oriented system to a more integrated, student-centered learning, this transition is also witnessed in developing countries like Pakistan[2], though institutes in Pakistan face multiple issues in this transformation.[2] It is necessary, however, in such an era of change, to keep in touch with the experiences of the students, and iron out any hitches that may be found. Multiple studies have already proven that the major ingredient in the successful learning instruction in an institute is educational environment.[3,4] The overall environment of an institute is not only the most significant predictor of the academic success and growth but also has a huge impact on effectiveness of the curriculum implemented in an institute and in turn effectiveness of students learning.[5] Assessing educational environment is vital in determining the success or failure of any institute. A positive environment leads to achievements of students in learning while a negative one would hinder their accomplishments.[6]

The medical educational environment is becoming increasingly the focus of research around the world and the literature detailing findings of this research is rapidly growing. The students in a medical institution apart from the formal and informal curriculum have become aware of the environment of the education. An excellent method to gauge the student perception of educational environment is the Dundee Ready Education Environment Measure abbreviated as DREEM.[5,6,7,8,9,10,11,12] It employs various

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parameters to see how satisfied students are with the educational environment of the institute.

It is generally acknowledged that learning styles indicate an individual's preferred way of learning or how the individual acquires information.[13] Learning styles also influence the way in which learners master the goals and objectives of an educational program.[14] It is only in the last four decades that research has been active in this area.[15] Learning Style Questionnaire designed by Honey & Mumford is an 80-item tool used to measure preferences for learning styles. It builds on the earlier work of Kolb and identifies four preferred learning styles; Activist, Reflector, Theorist and Pragmatist. The LSQ describes four learning styles within a learning cycle. It can be used to enable the individual to identify how they learn and can help them to become a more effective learner by identifying their learning strengths. Honey and Mumford purposed that an individual have preferences for all the learning styles but may have a strong to very strong preference for one learning style.[16]

Though numerous studies have reported findings of DREEM in Medical institutes in Pakistan; similarly, studies are there to report learning styles of undergraduate students. To the knowledge of author, no single study has determined preferred learning styles of the students along with their perceptions of the environment on DREEM.

OBJECTIVES
Following are the objectives of this study:
1. To find out the preferred learning style by Honey & Mumford LSQ of undergraduate medical students of a private Medical College of Pakistan
2. To find students with preferred learning Style ratings of different parameters of environment on DREEM.

Through this study authors will be able to understand, are the different domains of the educational environment in the institute favoring learning of students with preferred learning styles or not and in which domains changes are needed in order to make environment feasible for these students.

MATERIAL & METHODS
It was a cross sectional study conducted at Shifa College of Medicine from April 2022 to September 2022. Convenient sampling was used, all the students who consented to be part of the study were included in the study.

Approval was taken for this interventional study from the Ethics Committee of the said medical college Reference Number: IRB-7077-22. All students currently enrolled in medical program of the college were deemed eligible and included in the study. A designated slot of two hours was provided in the schedule of five years of undergraduate medicine program for filling of questionnaires. Students were informed prior to the session about the research project through a small talk. On the designated time and venue, researchers approached the students of the respective class. Informed consent was taken from the students.

The educational environment was gauged by using DREEM as questionnaire, while the students' learning styles were analyzed using the Honey and Mumford LSQ. Questionnaires were arranged in a set of two, each set consisting of DREEM and LSQ. All the sets were coded with the number to hide the true identity of the students. Students were asked to fill the questionnaires and leave the venue after putting the questionnaires on the front desk. This is to ensure the confidentiality of data.

Tools Used:

DREEM
The DREEM parameters are "Student Perception of Learning", "Student Perception of Course Organizers", and "Student Academic Self-Perception", "Student's perception of Atmosphere and StudentSelf-Social Perception". The DREEM questionnaire comprises of 50 questions, each with a maximum of 4 points (total of 200 maximum attainable points), divided over 5 categories including 'Strongly Agree', 'Agree', 'Unsure', 'Disagree', and 'Strongly Disagree'. The scoring

scale is attributed as 4, 3, 2, 1, and 0 respectively, except in 9 questions where it is reversed because these specific questions implore about the negative aspects of the learning environment. Following are the domains of DREEM.[17,18]

1. Student's perception of learning (SPL): It has 12 items; maximum score is 48.
2. Students perception of teachers (SPT): It has 11 items; maximum score of 44.
3. Students' academic self-perception (SAP): It has 8 items; maximum score is 32.
4. Students' perception for atmosphere (SPA): It has 12 items; maximum score is 48
5. Students' social self-perception (SSP): It has 7 items; maximum score is 28.

The total score is then graded as follows[16]:

HONEY & MUMFORD LEARNING STYLE QUESTIONNAIRE

It is an 80 item questionnaire. Twenty items are given for each type of learning styles. Questions are randomly arranged. Students are asked to mark "TICK" in front of items which they feel are true for them. They are asked to mark "CROSS" in front of items which they feel are not true for them. At the end of the questionnaire key is given, the more the number of "TICK" in any category determines an individual favored or preferred Learning Style.[19,20]

The learning styles can further be classified in to five categories. These categories are very low, low, moderate, strong and very strong according to the following table.[19,20]

Perception	Grade I	Grade II	Grade III	Grade IV
Learning (L)	Very poor (0-12)	Teaching viewed negatively (13-24)	More positive Perception (25-36)	Teaching highly regarded (37-48)
Course organizers (CO)	Abysmal (0-11)	In need of some re-training (12-22)	Moving in right direction (23-33)	Model course organizers (34-44)
Academic (Ac)	Feel total failure (0-8)	Many negative aspects (9-16)	Feeling more positive (17-24)	Confident (25-32)
Atmosphere (At)	Terrible environment (0-12)	Many issues need changing (13-24)	More positive attitude (25-36)	Good feeling overall (37-48)
Social (S)	Miserable (0-7)	Not a nice place (8-14)	Not too bad (15-21)	Very good socially (22-28)

Table-I. Grading of domains of DREEM

Categories	Activist	Reflector	Theorist	Pragmatist
Very strong preference	13-20	18-20	16-20	17-20
Strong preference	11-12	15-17	14-15	15-16
Moderate preference	7-10	12-14	11-13	12-14
Low preference	4-6	9-11	8-10	9-11
Very low preference	0-3	0-8	0-7	0-8

Table-II. Categories of Honey & Mumford learning style

It can also be categorized as dominant /preferred and non-dominant learning styles[21]

DOMINANT/PREFFERED LEARNING STYLE

The dominant/preferred learning style is defined as "a learning style score that falls into the strong or very strong category".[21] The categories depend upon the highest scores which learner marks on LSQ.

The learning styles were largely categorized into "Theorist", "Pragmatist", "Activist", and "Reflector". The "Theorist" style denotes a method in which students observe, analyze, and theorize about the syllabus given to them. The "Pragmatist" style implies that the students keep employing various ideas and methods of deconstructing a problem. In the "Activist" style, the students completely engross themselves and are open to new ideas and working strategies. The

"Reflector" style of learning is a more passive one, wherein the students rely largely on retrospective observation of their own past strategies, as well as the effectiveness of the methods employed by their colleagues.[21]

RESULTS

For the purpose of this paper, the results of Students with higher percentage of Strong and very strong Preference for a Particular Learning Style will determine the preferred learning style of this cohort. In the next section authors have tried to determine how these particular students rate the environment in the institute on DREEM.

A total of 279 students took part in the study throughout the college, all 5 classes included.

Class	Number of Students (%)
1st year	71 (25.44%)
2nd year	51 (18.27%)
3rd year	69 (24.73%)
4th year	31 (11.11%)
5th year	57 (20.4%)
Table-III. Distribution of students	

Out of these, a massive 112 (40.1%) showed inclination toward the Reflector style of studying, 51 (18.3%) toward Theorist style, 49 (17.6%) toward Pragmatist style, 39 (14%) toward Activist, and the remainder divided over hybrid methods such as Theorist-Pragmatist (1.1%), Activist-Reflector (1.4%), Activist-Pragmatist (1.4%), Reflector-Theorist (3.2%), and Reflector-Pragmatist (2.9%).

Learning Styles	Numbers (%)
Activist	39 (14%)
Reflector	112 (40.1%)
Theorist	51 (18.3%)
Pragmatist	49 (17.6%)
Table-IV. Learning styles in the cohort	

22.9 % of students showed very strong preference for learning style of "Reflectors", similarly 35.5 % of students showed strong preference for the "Reflector" learning styles. Hence, Students' preferred learning style of this cohort was "Reflector". Highest total of Very strong and strong preferences of learning styles of this cohort was Reflectors (58.4%). Following Table shows the percentage of Very strong, strong, moderate, low and very low preferences of learning styles:

Learning Style	Very Strong Preference %	Strong Preference %	Moderate Preference %	Low preference %	Very low Preference %
Activist	16.5	15.1	30.0	16.5	21.9
Reflector	22.9	35.5	28.3	11.8	1.5
Theorist	22.9	22.9	35.1	14.1	5
Pragmatist	13.3	21.9	35.5	22.6	6.7
Table-V. Percentages of students among different categories of learning styles					
Following tables show perceptions of Reflectors about "Learning", "Teaching", "Academic Self-Perception", "Atmosphere" and "Social Self"; these are the domains of DREEM.					

Grades	Students Perception of Learning	Scores on DREEM	% of Reflectors Rating of Domain
I	Very Poor	0-12	2.6
II	Teaching is viewed negatively	13-24	13.39
III	A more Positive Approach	25-36	72.3
IV	Teaching Highly Thought of	37-48	11.6
Table-VI. Scoring of reflectors for the domain "Students Perception of Learning"			
Largest percentage, 72.3 % of Reflectors seemed satisfied with learning and rated as a more positive approach			

Grades	Students Perception of Course Organizers	Scores on DREEM	% of Reflectors Rating of Domain
I	Abysmal	0-11	0.89
II	In need of some Re-training	12-22	17.85
III	Moving in the right Direction	23-33	71.4
IV	Model Teachers	34-44	9.8
Table-VII. Scoring of reflectors for the domain "Students Perception of Course Organizers"			
Majority of Reflectors, 71.4% rated Teaching as moving in right Direction			

Grades	Students' Academic Self-Perception	Scores on DREEM	% of Reflectors Rating of Domain
I	Feeling of Total Failure	0-8	3.57
II	Many Negative Aspects	9-16	19.64
III	Feeling More on the Positive Side	17-24	65.1
IV	Confident	25-32	11.6
Table-VIII. Scoring of reflectors for the domain "Students' Academic Self-Perception"			
Largest percentage, 65.1 % of Reflectors feel more on a positive side with regards to academics self-perception			

Grades	Students Perception of Atmosphere	Scores on DREEM	% of Reflectors Rating of Domain
I	A terrible Environment	0-12	4.46
II	There are many Issues that need Changing	13-24	21.4
III	A more Positive Atmosphere	25-36	67.85
IV	A good feeling Overall	37-48	6.25
Table-IX. Scoring of reflectors for the domain "Students Perception of Atmosphere"			
Largest percentage, 67.85 % of Reflectors takes atmosphere in the institute as positive			

Grades	Social Self-Perception	Scores on DREEM	% of Reflectors Rating of Domain
I	Miserable	0-7	1.7
II	Not a nice Place	8-14	27.6
III	Not too bad	15-21	63.39
IV	Very good socially	22-28	7.1
Table-X. Scoring of reflectors for the domain "Social Self-Perception"			
Most of the reflectors, 63.39% marked social self-perception as not too bad.			

DISCUSSION

The current study evaluated environment of a private medical college in Pakistan on the five domains of DREEM according to perspective of students with preferred learning style i.e. Reflectors.

According to the authors' knowledge there is no such study to compare the results of this study. Studies on medical students have either mentioned learning styles of students or scores on the DREEM. It was first time in Pakistan that the environment in medical college is viewed by students having preferred learning styles. This is to determine; whether the environment is feasible for majority of students or not.

Medical education revolves around facilitating learning and making an environment that enables students to learn effectively. Evidence convincingly recommends that learning is more powerful in the case teaching is conveyed and arranged in a manner that coordinates with individual's learning style.[22,23,24,25,26] There are variety of learning styles models discussed in literature, learning style model used in the present study is Honey & Mumford Learning Style Questionnaire. In our study the majority of students were reflectors (112) (40.1%) followed by theorists, then pragmatists and finally activists, this is in line with study by Wilkinson et al, who also found the same pattern in their students.[27] Results of this study are in aligned with findings of Guraya et al. and Churngchow et al. who also found reflectors to be a predominate learning style of their cohorts. Reflectors are considered good observers, they make efforts to acclimatize to situations and problems prior to moving forward with decisions, and can arrive at a choice without pressure and influence.[23,26]

The educational environment constitutes a vital role in effective student learning. Studies have evaluated this effectiveness using the Dundee Ready Education Environment Measure (DREEM).[28,29,30,31] For this study DREEM was applied on students with reflectors learning style, the overall scores indicate that undergraduate medical students with the preferred learning style have a positive perspective of their learning environment. The reflectors scored highest in the domain of learning with 72.3% of the participants viewing learning to have a positive approach. This aligns with literature on medical students in

general, that documented a positive approach of medical students towards learning by stating that they were clear about their learning objectives, had urge to partake in sessions and had the option to foster their ideal capability.[32,33,34,35,36,37] The reason for this needs further exploration in future studies, probable reasons for the Reflectors to acquire a positive approach for learning in this cohort of the said private medical college may be multiple. One of the reasons could be that the curriculum adopted in the said medical college offers variety of learning opportunities for the students. Major instructional strategies involved are large group interactive sessions and small group discussions, these strategies are favorable for individuals with learning styles of Reflectors.[38,39] Curriculum adopted in the said medical college is integrated and has opportunities for early clinical visits i.e. students in first year, visit multiple relevant civic centers along with units and wards in the hospital. These strategies are also in aligned with the Reflector learning styles.[39]

In our study the 71.4% reflectors perceived the course organizers as moving in the right direction, this contradicts with literature that has found students feeling that teachers were authoritarian, also suggesting the need for faculty training for the ever-varying requirements of medical education.[24] Probable reason for this finding can be, the said medical college started the transformation in adopting student centered teaching and learning approaches a few years back and laid a significant importance on faculty development workshops. Adopting student centered approaches in teaching and learning made it comfortable for Reflectors in the environment and hence they rated the domain of teaching as moving in the right direction. Though the ratings of this domain from perspective of students with other learning styles needs exploration in future studies.

Academic Self-Perception is related to the students' view of self-[40], holds the central position and is the most significant element of DREEM as it highlights how student perceive his confidence with his academic performance.[40] 65.1% of Reflectors scored the domain of academic self-perception as "Feeling more on the positive side",

whereas study by Patil and Chaudhari found this domain to be the highest scoring for all students regardless of their learning style. Studies suggest that self-academic perceptions can be influenced by the exposure to comfortable nature of the assessments and formative examinations this may have assisted with fostering undergraduates' confidence.[24]

Social self-perception is also related to the students' view of self. In the domains of atmosphere and social self, the highest positive perceptions on DREEM were seen for 67.85% and 63.39% of reflectors respectively. Same was the case with similar studies on students in medical colleges.[24,28,29,32,33] The two domains are significant in identifying problems within the curriculum and pose an ongoing challenge for educators and educationalists in terms of dealing with diverse student cohort from different cultures, life experiences and personal attributes.[40]

Social self-perception focuses on student based social factors. These are the indicators of how the educational environment such as long hours of class, clinical commitments, SDL requirements, influences students' social and personal self-esteem. This domain can be a global indicator of student wellbeing.[40]

On average 22.62% of reflectors had negative results for three of these domains highlighting the need for improvement in these domains for medical college.

Reasons for moderate scores in these domain needs further exploration in future studies but previous studies have documented that high scores in these domains reflect students' self-directedness and intrinsic goal orientation with a strong desire to pursue the relevant field. Studies also showed that if students are studying in their preferred professions, this impacts on their academic performance, motivation and wellbeing positively.[41,42,43,44,45]

It is also debated that not only curriculum, teachers and classroom environment should be regularly monitored but also the criteria selected

for the admission of the students and the support provided to them are also crucial factors for the positive perceptions of the students for the programs and the academic environment.[40]

These recorded perceptions of reflectors in our study can be utilized to begin rolling out future improvements and upgrades. Medical education costs are high, and scholarly disappointments could be an extraordinary misuse of assets of society and individuals.[30,46] In this manner, we are needed to guarantee that the learning climate is pretty much as empowering as could be expected and eventually attempt to decrease the danger of scholastic underachievement.

LIMITATIONS
This study was conducted in one of the Private Medical College of Pakistan and that too at one point of time.

CONCLUSION
To conclude the overall environment of the said medical college is in favor of the students with the preferred learning style.
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