

## ORIGINAL ARTICLE

# DREEM Study: Students' Perceptions of Learning Environment in a Medical College in Mumbai, India

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## Abstract

**Purpose:** This study was carried out to assess medical education environment (MEE) at our institution and to determine if there is an association between the assessment scores and factors such as gender, residence, family educational background and medium of instruction during school years.

**Methods:** Students appearing for the final qualifying examination were enrolled in the cross-sectional survey after obtaining written informed consent. Demographic data and personal information such as place of residence, parental education and medium of instruction was collected. The Dundee Ready Education Environment Measure (DREEM) Questionnaire was used for assessment of MEE. The numerical variables were described in terms of mean and standard deviation, median and inter-quartile range and percentages. Independent t-test, one-way Anova, Mann-Whitney test and Kruskal-Wallis test were the analytical tests used depending upon the number of groups and characteristics of the data.

**Results:** Fifty-five students were enrolled in the study. The overall DREEM score was 119+/-22 (Median 116), 46(83.64%) reported overall positive perception). Students' perception of atmosphere (SPA) scored highest as compared to other domains. Teacher-centered teaching with emphasis on factual learning, authoritarian teachers, boredom in the course and lacking support systems were some of the problem areas identified on the basis of students' perceptions. There was a significant difference in Students' academic self-perception (SASP) and students' social self-perception scores between students coming from urban and rural backgrounds.

**Conclusions:** Students reported an overall positive perception of MEE. Problem areas and research priorities were identified leading to a preparation of an action plan

## Introduction

Medical education (ME) is highly demanding world over. ME and professional conduct as aspects of university life are considered very complex and stressful.<sup>1</sup> Medical students need to develop wide-ranging skills and aptitudes to meet the healthcare needs of the patients and society that they intend to serve. The education environment (EE) defined as everything that is happening in the classroom, hospital, wards, department, faculty, university is known to affect students' performance<sup>2</sup> and a conducive EE should ideally nurture intellectual activities and progression, while at the same time

boosting friendliness, cooperation, collaboration and support.<sup>3-5</sup>

Studies carried across the world to assess ME environment, identify problem areas<sup>8</sup> and help implement corrective measures. Some of them have shown that perception of MEE may be affected by factors such as gender,<sup>3-4,7-10</sup> year of study<sup>3,8</sup> or nativity<sup>10</sup> among others. No information was available about the EE at our institution. In absence of such data, the faculty members carry on the teaching activities without knowing, let alone understanding the students' perceptions and needs related to the EE. In addition, students admitted to medical courses in our institution come from diverse backgrounds:

rural or urban, with different family educational backgrounds, having studied in English or vernacular-medium schools from the various states of India. It was postulated that the same MEE could be perceived differently by students coming from different backgrounds.

Hence, a study was undertaken to assess the MEE in the institution and to determine if an association exists between the assessment scores and factors such as gender, residence, family educational background and medium of instruction during school years.

## Material and Methods

This cross-sectional survey was carried out over a period of 6 months after obtaining approval from the institutional ethics committee. The students studying at the medical college for medical graduate course (MBBS), who had completed their training up to the III MBBS and had appeared for the final qualifying examination in 2014 or 2015 were enrolled after obtaining written informed consent. Information regarding demographic and other personal information such as age, gender, place of residence prior to entry into the medical college and medium of instruction in secondary school was collected in an anonymous manner.

They were then requested to complete the Dundee Ready Education Environment Measure (DREEM) Questionnaire. The DREEM instrument is a 50-item inventory, consisting of five subscales:<sup>7</sup>

- a. Students' perception of learning (SPL): 12 items, maximum score 48: [Item numbers: 1, 7, 13, 16, 20,

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**Table 1: Definition of factors whose association with DREEM scores was studied**

Category	Options	Definition
Residence	Urban (Including city, town, metropolis)	Place of residence for majority of school years (1 <sup>st</sup> - 10 <sup>th</sup> standard: Area with a municipality or cantonment board or a place satisfying the following three criteria simultaneously: a minimum population of 5,000; at least 75% of male working population engaged in non-agricultural pursuits; and a density of population of at least 400 per sq. km. (1,000 per sq. mile)
	Rural	Residence characteristics not satisfying criteria for urban area
Highest educational status of any parent	Post-graduation	Holding a post-graduate degree from a University
	Graduation	Holding a graduate degree from a University
	Secondary School Certification (SSC)	Completed and passed the SSC examination (or equivalent) completing 10 years of schooling
	Primary Education	Completed a minimum of four years of schooling
Medium of Instruction during secondary schooling	Literate	A person who can both read and write with understanding in any language irrespective of receiving or not receiving any formal education. A person who is blind and can read in Braille is treated to be literate.
	Illiterate	Not able to read and write in any language
	English	Medium of instruction English throughout 6 years of secondary schooling (5 <sup>th</sup> - 10 <sup>th</sup> Standard)
	Other than english	Medium of instruction other than English for any period during secondary schooling (5 <sup>th</sup> -10 <sup>th</sup> Standard)

**Table 2: Total DREEM score and domain-wise scores**

Domain	No. of items	Max. score possible	Obtained score			Students with positive perceptions no., %
			Mean (SD)	Median	Mean score as %Max. score	
SPL	12	48	27.15 (6.78)	28	56.56	36, 65.45
SPT	11	44	25.27 (5.12)	24	57.43	39, 70.91
SASP	8	32	19.56 (5.17)	20	61.13	39, 70.91
SPA	12	48	30.18 (5.71)	29	62.88	48, 87.27
SSSP	7	28	17.03 (3.51)	17	60.82	42, 76.36
DREEM score	50	200	119 (22)	116	59.50	46, 83.64

SPL: Student's perception of Learning; SPT: Student's perception of teaching; SPA: Student's perception of atmosphere; SASP: Student's Academic self-perception; SSSP: Student's social self-perception

- 22, 24, 25, 38, 44, 47, 48]
- Students' perceptions of teachers (SPT): 11 items; maximum score 44; [Item numbers: 2, 6, 8, 9, 18, 29, 32, 37, 39, 40, 50]
  - Students' academic self-perceptions (SASP): 8 items; maximum score of 32; [Item numbers: 5, 10, 21, 26, 27, 31, 41, 45]
  - Students' perceptions of atmosphere (SPA): 12 items; maximum score of 48; [Item numbers: 11, 12, 17, 23, 30, 33, 34, 35, 36, 42, 43, 49]
  - Students' social self-perceptions (SSSP): 7 items; maximum score of 28; [Item numbers: 3, 4, 14, 15, 19, 28, 46]

The total score of all subscales was 200.

The students were requested to read each statement carefully and respond using a 5-point Likert-type scale ranging from strongly agree to strongly disagree. The items were scored as follows:

Strongly agree (SA): 4, Agree (A): 3; Uncertain (U): 2; Disagree (D): 1,

Strongly Disagree (SD): 0. Nine of the 50 items (item numbers 4, 8, 9, 17, 25, 35, 39, 48 and 50) were negative statements. These negative items were scored in reverse for analysis so that the higher the score, the more negative the feedback, or the more incorrect perception. Thus, the negative items were scored in the reverse order as Strongly agree (SA): 0, Agree (A): 1; Uncertain (U): 2; Disagree (D): 3 and Strongly Disagree (SD): 4.

The overall score was interpreted as follows (2): 0-50: Very poor; 51-100: Plenty of problems; 101-150: More positive than negative; 151-200: Excellent

The description of factors whose association with DREEM score was studied, is provided in Table 1.

Statistical Plan: The data from respondents was entered in the Excel Sheet. It was presented using descriptive statistics (frequency and percentages for gender, place of residence prior to entry into the medical college, medium of instruction in secondary school and highest educational qualification of parents). The numerical variables

(domain and total scores as per DREEM inventory) were described using mean and standard deviation and median and inter-quartile range (IQR). The data was checked for normal distribution by the Shapiro-Wilk test. It was decided to apply the independent t-test for comparison between two means variables (gender, place of residence prior to entry into the medical college, parental educational status and medium of instruction in secondary school) if the data were normally distributed. Similarly it was decided to use one way Anova if there were more than two groups. It was decided to use Mann-Whitney test if the data were non-parametric and there were two groups (or Kruskal-Wallis test, if there were to be more than two groups) for non-parametric data (PSPP 1.0.1 free software).

## Results

Sixty participants were approached. Fifty-five (Response rate: 91.67%, Males 29, 52.73%) consented to participate and were enrolled. Their age ranged from 22-28 years, 43(78.18%) were from the urban background and 39(70.91%) studied with English as the medium of instruction. Parents of 49(89.01%) students studied over SSC. The total DREEM score ranged from 63-158 with a mean total DREEM Score being 119±22 (Median score 116). Forty-six (83.64%) reported overall positive perception (mean Total DREEM score over 100). Data regarding Total DREEM score and domain-wise scores is depicted in Table 2. The mean score as percentage of the maximum possible score ranged from 56.56% (SPL) to 62.88% (for SPA). Similarly, the number of students reporting positive perceptions for various domains ranged from 39 (65.45%) for SPL to 46 (87.27%) for SPA.

Table 3 lists all the items in the instrument and the mean scores for each item. The three items that were highly rated were 'I have good friends in this course', 'the teachers are knowledgeable' and 'I am confident about passing this year'. None of the items was scored as over 3.5

Table 4 lists the scores of items across the various domains that were marked at an average of 2 or less. There were 9 such items, with three from the domain of Students' perception of teachers (SPT). The lowest scored item referred to the perception of authoritarianism

**Table 3: Scoring of each item in the DREEM questionnaire**

Item No.	Item statement	Score
<b>SPL: Students' Perception of Learning</b>		
1	I am encouraged to participate during teaching sessions	2.80(0.76)
7	The teaching is often stimulating	2.40(0.83)
13	The teaching is student centred	2.09 (1.01)
16	The teaching helps develop my competence	2.38(1.01)
20	The teaching is well focused	2.43(0.94)
22	The teaching helps to develop my confidence	2.31(0.98)
24	The teaching time is put to good use	2.40(0.89)
25	The teaching over emphasizes factual learning*	1.49(0.90)
38	I am clear about the learning objectives of the course	2.35(1.08)
44	The teaching encourages me to be an active learner	2.36(0.91)
47	Long term learning is emphasized over short term learning	2.38(1.10)
48	The teaching is too teacher centred*	1.75(1.11)
<b>SPT: Students' Perception of Teachers</b>		
2	The teachers are knowledgeable	3.15(0.65)
6	The teachers espouse a patient-centred approach to consulting	2.49(0.79)
8	The teachers ridicule the students*	2.18(0.86)
9	The teachers are authoritarian*	1.45(0.81)
18	The teachers have good communication skills with patients	2.71(1.12)
29	The teachers are good at providing feedback	2.16(1.12)
32	The teachers provide constructive criticism here	2.16(0.96)
37	The teachers give clear examples	2.44(0.90)
39	The teachers get angry in teaching sessions*	2.00(1.07)
40	The teachers are well prepared for their teaching sessions	2.62(0.73)
50	The students irritate the teachers*	1.91(0.95)
<b>SASP: Students' Academic Self-perception</b>		
5	Learning strategies that worked for me before continue to work for me now	2.13(1.04)
10	I am confident about passing this year	3.02(0.87)
21	I feel I am being well prepared for my profession	2.22(1.12)
26	Last year's work has been good preparation for this year's work	2.60(0.85)
27	I am able to memorise all I need	1.93(1.10)
31	I have learnt a lot about empathy in my profession	2.64(1.01)
41	My problem solving skills are being developed here	2.40(0.97)
45	Much of what I have to learn seems relevant to a career in healthcare	2.6(0.95)
<b>SPA: Students' Perception of Atmosphere</b>		
11	The atmosphere is relaxed during ward teaching	2.42(1.08)
12	This college is well time tabled	2.62(1.03)
17	Cheating is a problem in this college*	1.99(1.27)
23	The atmosphere is relaxed during lectures	2.65(1.04)
30	There are opportunities for me to develop interpersonal skills	2.85(0.76)
33	I feel comfortable in class socially	2.98(0.89)
34	The atmosphere is relaxed during class/seminars/tutorials	2.69(0.94)
35	I find the experience disappointing*	2.42(1.15)
36	I am able to concentrate well	2.56(0.86)
42	The enjoyment outweighs the stress of the course	2.29(0.98)
43	The atmosphere encourages me as a learner	2.29(0.88)
49	I feel able to ask the questions I want	2.42(0.99)
<b>SSSP: Students' Perception of self-performance</b>		
3	There is a good support system for students who get stressed	1.95(0.85)
4	I am too tired to enjoy the course*	2.22(1.08)
14	I am rarely bored in this course	1.87(1.06)
15	I have good friends in this course	3.31(0.63)
19	My social life is good	2.85(0.83)
28	I seldom feel lonely	2.18(1.14)
46	My accommodation is pleasant	2.65(1.27)

Figures in parentheses indicate standard deviation; \*Negative items whose scores were reversed for analysis

of teachers.

Tables 5 and 6 depict the data regarding scores for each domain

and their regression or predictions with predictive variables studied. The scores were normally distributed for all domains except SPT. On linear

**Table 4: Questions that scored low**

Item No.	Question	Score Mean (SD)
<b>Domain: Students' Perceptions of Learning (SPL)</b>		
25	The teaching over-emphasizes factual learning	1.49 (0.9)
48	The teaching is too teacher-centered	1.75 (1.11)
<b>Domain: Students' Perceptions of Teachers (SPT)</b>		
9	The teachers are authoritarian	1.45 (0.81)
39	The teachers get angry in teaching sessions	2.00 (1.07)
50	The students irritate teachers	1.91(0.95)
<b>Domain: Students' Academic self-perception (SASP)</b>		
27	I am able to memorize all I need	1.93(1.10)
<b>Domain: Students' perception of atmosphere (SPA)</b>		
17	Cheating is a problem in this college	1.98(1.27)
<b>Domain: Students' social self-perceptions (SSSP)</b>		
3	There is good support system for students who get stressed	1.95(0.85)
14	I am rarely bored in this course	1.86(1.06)

regression analysis, it was noted that the SASP and SSSP scores were significantly different among students from urban and those from rural backgrounds.

## Discussion

This study showed that an overwhelming majority (83%) of students who received training at our institution had overall positive opinion about learning, teachers and atmosphere and academic and social self-perceptions through the under-graduate learning period. The students' perception of atmosphere scored the highest among all the domains. The overall mean DREEM score of 119 generally conveys a positive attitude with a definitive scope for improvement. The SPL, SASP and SPA scores were in the category of "more positive perception", while SPT scores were interpreted as "moving in the right direction". The SSSP scores could be labeled as "not too bad". It is worth noting that for all the domains, the scores were in the category one-notch below the highest one. The problems perceived by students included over-emphasis on

**Table 5: Analysis of scores for each domain with reference to independent variable**

Grouping Variable	Domain	Mean, SD		Median, IQR		t/zI	P value
		Female	Male	Female	Male		
Gender (Female/ Male)	SPL	27.69, 6.84	26.52, 6.81	29.00, 9.00	26.00, 11.00	0.64	0.53
	SPT <sup>^</sup>	26.62, 4.50	26.00, 5.26	26.00, 7.00	24.00, 7.50	-0.80 <sup>†</sup>	0.42
	SPA	29.92, 5.88	30.31, 5.52	30.00, 9.00	29.00, 9.00	0.80	0.80
	SASP	18.27, 5.67	20.72, 4.46	19.00, 11.25	22.00, 7.50	0.08	0.08
	SSSP	16.58, 3.13	17.59, 3.62	16.50, 5.25	18.00, 5.00	0.28	0.28
	All Domains	119.08, 22.22	121.14, 20.89	120.50, 34.00	118.00, 25.00	0.27	0.72
Place of Residence (Urban/ Rural)	SPL	26.65, 7.05	28.58, 5.78	26.00, 11.00	29.00, 12.00	-0.87	0.39
	SPT <sup>^</sup>	25.51, 4.40	29.08, 5.66	25.00, 6.00	30.00, 11.00	-2.05 <sup>†</sup>	0.04*
	SPA	29.63, 5.23	31.92, 6.88	29.00, 8.00	32.50, 10.50	1.25	0.22
	SASP	18.53, 5.02	23.25, 4.03	19.00, 9.00	24.00, 6.75	2.99	0.04*
	SSSP	16.47, 3.22	19.42, 3.15	16.00, 5.00	19.50, 5.25	2.82	0.01*
	All Domains	116.79, 20.69	132.25, 19.99	111.00, 29.00	129.50, 35.00	2.30	0.02*
Medium of Instruction (English/ Vernacular)	SPL	English	Vernacular	English	Vernacular		
	SPL	26.49, 6.78	28.50, 6.80	26.00, 11.00	29.00, 12.25	-1.00	0.32
	SPT <sup>^</sup>	25.46, 4.33	28.31, 5.65	25.00, 6.00	27.5, 10.75	-1.07 <sup>†</sup>	0.09
	SPA	29.31, 5.09	32.13, 6.55	29.00, 7.00	32.50, 10.50	-1.71	0.09
	SASP	18.74, 5.09	21.56, 4.95	19.00, 9.00	22.50, 9.00	-1.88	0.07
	SSSP	16.87, 3.47	17.69, 3.28	16.00, 6.00	18.00, 4.00	-0.81	0.43
Parental Education (Above SSC/ SSC or below)	All Domains	116.87, 20.16	128.19, 22.70	114.00, 27.00	126.00, 44.50	-1.82	0.07
	SPL	SSC, below	Above SSC	SSC, below	Above SSC		
	SPL	25.33, 7.58	27.29, 6.74	24.50, 15.00	27.00, 10.00	-0.62	0.51
	SPT <sup>^</sup>	26.50, 4.32	26.27, 4.99	26.50, 9.00	25.00, 7.00	-0.30 <sup>†</sup>	0.77
	SPA	30.00, 6.72	30.14, 5.58	30.00, 10.00	29.00, 9.00	-0.06	0.95
	SASP	22.17, 4.58	19.24, 5.19	24.00, 9.00	19.00, 8.00	1.32	0.19
SSSP	18.67, 4.59	16.92, 3.24	17.50, 8.00	17.00, 6.00	1.19	0.24	
All Domains	122.67, 23.75	119.86, 21.29	124.50, 45.00	118.00, 30.00	0.30	0.76	

SPL: Student's perception of Learning; SPT: Student's perception of teaching; SPA: Student's perception of atmosphere; SASP: Student's Academic self-perception; SSSP: Student's social self-perception; <sup>^</sup>: Failed Shapiro-based test of normality; I: z value; Mann-Whitney U test used; \*: Statistically significant, P<0.05

**Table 6: Linear regression analysis**

Dependent variable	Independent variable	t	P value
Students' Perception of Learning (SPL)	Gender	-0.87	0.39
	Stay	0.83	0.41
	Education medium	0.90	0.37
	Parental education	1.32	0.19
Students' Perception of Teachers (SPT)	Gender	-1.11	0.27
	Stay	1.81	0.08
	Education medium	1.11	0.27
	Parental education	1.31	0.20
Students' Perception of Atmosphere (SPA)	Gender	-0.17	0.87
	Stay	0.59	0.56
	Education medium	1.29	0.20
	Parental education	0.97	0.34
Students' Academic self-perception (SASP)	Gender	1.22	0.23
	Stay	2.10	0.04*
	Education medium	-0.08	0.94
	Parental education	0.31	0.76
Student's social self-perception (SSSP)	Gender	0.75	0.46
	Stay	2.71	0.01*
	Education medium	-1.27	0.21
	Parental education	0.15	0.88
All Domains	Gender	-0.18	0.86
	Stay	1.75	0.09
	Education medium	0.67	0.50
	Parental education	1.08	0.29

†: Statistically significant; P<0.05; SPL: Student's perception of Learning; SPT: Student's perception of teaching; SPA: Student's perception of atmosphere; SASP: Student's Academic self-perception; SSSP: Student's social self-perception

factual and teacher-centered learning; authoritarianism, irritation and anger displayed by teachers; learning through memorization, cheating, lack of support system and feeling of boredom during the course. SASP and SSSP scores were significantly lower in students with urban background.

This is the first study of its kind conducted at our institution and this effort should help the institution plan and implement measures that will improve the overall educational environment. It has tried to determine if predictive factors unique to Indian settings had any impact on perceptions. India is a multi-religious, multi-ethnic, multi-linguistic, multi-cultural society with economic diversity. Students coming from diverse backgrounds (rural vs. urban, varying parental educational status and differing medium of instruction) are admitted to the MBBS course at our institution through selection on the basis of a state-level entrance examination and a nation-wide entrance examination. This is probably the first study to determine if the scores differ based on any of these characteristics. In fact, in contrast to most other studies, our study has tried to look at these predictive characteristics. As the students with rural background have scored significantly higher for SASP and SSSP domains, it appears that they are not unduly awed by the metropolitan city and are able to cope with learning in a large institution in such a city.

We have decided to share the results of this study with the institution head, institution's Academic Committee and its Medical Education and Teaching Technology Unit as well as with teachers. We also intend to hold focused group discussion with respondents to obtain more information regarding the students' perceptions and the reasoning behind them. For example, we intend to get the details regarding their perception of cheating. We need to know the situations in which students have encountered cheating (marking attendance, holding training sessions, assessment of performance or any other) before we plan corrective steps. Medical teachers in our institution do receive training regarding adult learning processes, making sessions interactive, effective use of media through workshops. However, the students' perceptions indicate that

there is a scope for improvement and there is a need to make the teaching student-centered with greater emphasis on participatory and experiential learning. It needs to be probed why students find the course boring: is it not stimulating enough because of its content or is it presented in an uninteresting manner. It is possible that after deliberations, a need would be felt to increase the hours provided for problem-based learning (PBL). At the same time, students seem to be facing stress and feel that the support systems are deficient. This issue has been reported in other studies<sup>11-13</sup> as well and it appears that medical colleges need to provide added attention to this issue so as to meet students' expectations. Our institution has a preceptor program, wherein newly admitted students during the first year of training are assigned to a group of senior students and a faculty mentor. Although, the first year of the MBBS course is most stressful and it is hoped that after spending one year at the institution, students would find their own friends and social support; it appears from the study that the preceptor program needs to be extended through the fifth year of training.

The study had its share of limitations. We could interview only 55 of the 95 eligible individuals due to logistic problems, as some of them were not visiting the institution. Thus, they were unavailable for interview. The methodology of self-reporting questionnaires is associated with response bias,<sup>11</sup> although the response rate in the study was 92%. The DREEM questionnaire used for the study has not been validated in Indian settings though it has been used world-wide across cultures in medical,<sup>14-18</sup> dental colleges<sup>2,8,19-21</sup> and institutions offering other healthcare courses,<sup>22,23</sup> including Indian ones<sup>9,14,24-26</sup> for assessing students' perceptions. Thus, it is now considered a valid and reliable tool and is accepted globally for measuring the medical education environment.<sup>6,16,27-28</sup>

It can be stated that validation of

the instrument in Indian settings is a research priority. The authors intend to undertake a follow-up study and report its impact after corrective measures are implemented. In fact, medical colleges should carry out such surveys periodically to determine the perceptions of students and this feedback can be used to identify problem areas and plan and implement corrective strategies. The Indian studies should also try to determine association of lower scores with certain locally- and nationally-relevant social, economic and educational background risk factors; so that focused interventions can be planned.

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