

Original article

Students' perception of learning environment: A Base Line Study for identifying areas of concern at a Private Medical College, Bangladesh

Hafiza A¹, Al-Mahmood AK², Islam S³, Afrin SF⁴, Khan SA⁶, Susie JS⁵

Abstract:

Background: The importance of learning environment in teaching institution is increasingly being appreciated in terms of its effect on learning and outcome. **Objective:** The objective of this study was to explore students' perception of learning environment for identifying measures to improve it of a private medical college, Bangladesh. **Method:** Two phase cross-sectional study combining quantitative and qualitative components was conducted among the students of a private medical college. In Phase I part the Dundee Ready Education Environment Measure (DREEM) inventory was used to obtain data for base line quantitative information on a total of 204 medical and final professional examinee students. Purposive sampling method was employed in this phase and the Item that scored >3 was categorised as highest and < 2 was categorised as lowest scored item. In Phase II part the highest and lowest score items were explored further by qualitative method of focus group discussions among teachers and students on two separate occasions. For focus group discussion a combination of 10 (clinical and preclinical) teachers and 10 students (2x5 =10) except the examinee batch were selected by convenience sampling method. The purpose and method of the focus group was clearly stated to the participants and a consent form was signed by one participant on behalf of the respective group. **Results:** The response rate was 100% in Phase I part of the study with a perceived global DREEM mean score was 120/200 (22.984) which indicated students' positive perception towards the learning environment of ISMC. The global score for year 1, 2, 3, 4, 5 and examinee students were 133/200 (12.959); 134/200 (15.678); 127/200 (9.895); 112/200 (17.205); 67/200 (22.623) and 14/200 (22.984) respectively. The 1st year and 2nd year had highest global score whereas 5th year students had lowest score. The perceived Domains mean scores for Students Perception of Learning (SPoL) was 29.35/48 (8.189); Students Perception of Teacher (SPoT) 27.24/44 (5.195); Students Academic Self Perception (SASP) 18.69/32 (6.726); Students Perception of Atmosphere (SPoA) 28.09/48 (6.844) and Students Social Self Perception (SSSP) 14.65/28 (2.952) which indicated students' positive perception in all five Domains of DREEM as well. Out of 50 items three scored >3 and 7 items scored <2 which were explored further by focus group discussions among teachers and students to know the underlying causes for such scores. many similar issues were identified by both the groups in focus group discussion. **Conclusion:** The combination of a quantitative and qualitative method revealed students' positive perception and the strong and weak areas of the learning environment of ISMC. The findings were used in recommending remedial measure for creating an encouraging learning environment of ISMC which is one the main ingredient for effective learning.

Keywords: Dundee Ready Education Environment Measure (DREEM); learning environment; perceptions

Bangladesh Journal of Medical Science Vol. 15 No. 02 April'16. Page : 234-242

1. Hafiza Arzuman, Professor, Faculty of Medicine, SEGi University, Selangor, Malaysia
2. Abu Kholdun Al-Mahmood, Professor Dept. of Biochemistry, Ibn Sina Medical College, Dhaka, Bangladesh
3. Sharmin Islam, Associate Professor, Faculty of Business, Northern University, Bangladesh
4. Syeda Fahmida Afrin, Associate Professor, Dept. of Biochemistry, Ibn Sina Medical College, Dhaka, Bangladesh
5. Saquib Ahmad Khan, Lecturer, School of Environmental Science and Management, Independent University, Dhaka, Bangladesh
6. Schofield Susie J, Senior lecturar, University of Dundee, Dundee, UK

Corresponds to: Dr.HafizaArzuman,Professor, Faculty of Medicine, SEGi University, Kota Damansara, PJU 5, 47810 Petaling Jaya, Selangor, Malaysia. **E-mail:** hafizaarzuman@segi.edu.my, hafiza.arzuman@gmail.com

Introduction

Academic interest in students' perceptions of health professional (medical, dental, nursing and other) learning environment has been increasing in recent years. The learning environment encompasses student/teacher interactions, teaching, and learning activity, good physical resources and students' psychosocial and emotional aspects that are experienced by students and other stakeholders in a learning institution. By addressing all these, an institute might be said to have a good learning environment¹⁻⁸. The development of assessment inventories of learning environment enables students' perceptions of their learning environment to be quantified and compared, either longitudinally or as a snapshot, and within a single health institution or between institutions and countries^{9,10}. There are many study findings quoting the differences in students' perception about their learning environment based on gender differences, types of curriculum, years of study, entry requirements, ethnicity, across different courses of study, disciplines and academic results^{1,3,11-18}. The learning environment has been linked for many years to student achievement, satisfaction and success¹⁹⁻²². Consideration of the learning environment in an education institution, along the lines of continuous quality improvement and innovation is likely to further improve the learning outcomes of the school. Therefore, the learning environment is an important consideration for producing highly competent graduates and a good approach to and systematic design of the learning environment can lead to good outcomes for graduates²³. The environment in a medical and allied health school is often competitive and at times even incompatible²⁴. Students are influenced by both positive and negative role models, while working closely with teachers^{25, 26}. A learning environment study is one way to improve the quality of an education programme²².

For the past two decades the DREEM is used to assess the key aspects involved in teaching and learning in medical and health professional schools³. Globally validated and reliable DREEM was developed by a world-wide panel of educational experts at the University of Dundee^{19, 27, 28} and being used successfully in different setups and geographical locations.^{3, 13, 29, 30} High internal consistency has been reported for the DREEM independently with Cronbach alpha levels of 0.92 and 0.93³¹. The inventory has been used for different purposes including: generating a profile of an institution's

or course's strengths and weaknesses; making a comparative analysis within the institution or standardising between themselves and another institution; applying it as a predictor of student performance; and using it to obtain base line data for remedial action and as a diagnostic tool^{1,2,20,32}. The data can be collected and analysed according to variables such as year of study, ethnicity, gender, age and course^{1,3,7,8,10,20,23, 27}.

DREEM quantitative scores have further been explored by qualitative focus group discussion for many purposes including collecting baseline information for reinforcing the findings of the study, developing and suggesting remedial interventions or helping in pinpointing the actual problem^{8,10,17,29,33,34}. The 50-item self-report inventory using a 5-point Likert scale, with scores reflecting a student's overall perception of the environment as well as their perceptions of five main aspects of the environment namely: their learning, the teachers, academic self-perception, atmosphere, and social self-perception. It can also indicate areas of strength and weakness by mean scores and also can pinpoint a particular problem by individual item analysis^{27, 35}. So the researchers decided to use DREEM for identifying the strengths and weaknesses of ISMC's learning environment. The Medical College is a non-profitable institution established in the year 1995 with the aim to produce highly competent graduates by introducing a sophisticated teaching and learning environment³⁶. It has already been completed few cycles and students have already been graduated. It was thus important and timely for the college to know how the students are actually experiencing the learning environment of the College. The outcome of this study would assist the college to modify its learning environment for fostering the desirable approaches to learning that could enhance academic achievement and meaningful learning experiences for students. Identifying areas of concern from the medical students' perspective will also provide medical educators of Bangladesh with a road map that would be helpful for those responsible in producing efficient medical practitioners for the country.

The study was designed to explore the medical students' perceptions of: their learning environment; their academic climate; the teacher-student relationships; and the quality of their learning experience in different academic years. The baseline information was then be explored further for

identifying the areas of concern in learning environment of the college.

Methodology

A descriptive cross-sectional study was conducted at a Ibn Sina Medical College, Dhaka, Bangladesh in two phases comprising quantitative (Phase I) and qualitative (Phase II) components. With 10% dropout rate, the estimated sample size should be 227 participants, so we included all medical (n=171) and final professional examinee (n=33) students with a total of N=204³. In Phase I data was collected by guided self-administered DREEM inventory at face to face session after lecture class in different occasions for different years²⁷. Students' profile was included as the first section in the DREEM inventory. As the medical students had good command in English we used English version of DREEM as a diagnostic tool³⁵. Bangladesh's participation in DREEM's validation process was another reason to use the original English version. The students were briefed about the purpose and process of data collection and stressed anonymity. It was also made clear to them that the data would only be used for research purpose and the findings would be used collectively. The meaning of some educational terms and phrases such as "factual learning", "ridicule", and "authoritarian", of DREEM were explained before the students completed the questionnaire and the completed questionnaires were collected at the same session. Data was analysed by using Statistical Package for Social Sciences (SPSS) version 20. Descriptive analysis was performed for demographic variables, the overall DREEM mean score for each item, each Domain and for overall total mean score per year. The culture free DREEM is an instrument for measuring learning environment^{1-8, 11, 15,19,23,24}. It gives a global score of 200 for 50 items measuring five aspects of educational environment which includes students' perception of learning (SPoL), teacher (SPoT), Academic self-perception (SASP), atmosphere (SPoA) and social self-perception (SSSP)²⁷⁻²⁹. Each item is scored 0-4 on a 5-point Likert scale (4 -strongly agree, 3 -agree, 2-unsure, 1- disagree, and 0-strongly disagree): higher score indicates an agreement with the item whereas there are 9 negative items scored in a reverse manner (Items 4, 8, 9, 17, 25, 35, 39, 48, and 50); high scores on these indicate disagreement with the item. The guidelines for interpreting the overall DREEM score are 0-50 very poor; 51-100 many problems; 101-150 more positive than negative; and 151-

200 excellent. To indicate the different areas of the learning environment, the DREEM items are grouped into five Domains with clear guidelines for interpretation of each Domain^{27-29, 37}.

In Phase II of the project, two structured focus group discussions were conducted based on the information gathered in Phase I of the study. This phase aimed to explore in detail the highest >3 and lowest <2 scored items in Phase I of the study. Strengths of this focus group qualitative approach include inexpensive and quick method of information gathering, the ability to explore the participants' thoughts, experiences, and perceptions; values which are difficult to comprehend or express numerically only by quantitative research^{12,38}.

Two students from each year (year 1-5) except examinee students with a total of 10 students and 10 teachers (clinical and non-clinical) of different disciplines were selected by a convenience sampling for the Phase II part of the study. The discussion was informed by items that scored >3 and <2 in the DREEM questionnaire, items 1, 2 and 19 (positive/ strong areas) and (50, 27, 42, 3, 14, 28 and 46 (areas of concern)³. The discussions were conducted in two separate occasions for two groups and in two different dates. The confidentiality of the discussion was ensured and the students and teachers were briefed about the purpose, methodology and data analysis part of this session. They were allowed to express their views, ideas, thoughts and suggestion about the identified issues. The researcher was the scribe and the course coordinator of MBBS programme was present as the observer for both sessions. He was also branded as external researcher to ensure the trustworthiness of the information gathered during the discussions. Both discussions were audio recorded with informed consent of the participants to enable the researcher to interpret the data during analysis. In analysis the discussion issues (recorded and documented), no noticeable inconsistency was found in the views of the participants in both groups. The analysis process considered word used, tone, content of discussion, frequency, extensiveness, intensity and specificity of the responses. Descriptive analysis of focus group discussion was done based on discussion guidelines and recorded discussion. Issues raised are prioritised based on the total number of comments made by respondents. Throughout the analysis process the external researcher acted as an audit trail to ensure the confirmability and for allowing others to assess the significance of the research reporting³⁹.

Results:**Table 1:** Demographic profile of the students

Variables		Frequency (%) N- 204
Year of study	1 st year	41(19.7)
	2 nd year	37(18.2)
	3 rd year	39(19.2)
	4 th year	39(19.2)
	5 th year	15(7.4)
	Examinee students	33(16.5)
Gender	Male	104(51)
	Female	100(49)
Age	17-19 years	41 (20)
	20-22 years	109 (53)
	23 – 25 years	54 (27)

Table 2: Students' perceptions of year wise and global mean score of DREEM

Mean score	Mean score /200	Standard Deviation
1 st year	133	12.959
2 nd year	134	15.678
3 rd year	127	9.895
4 th year	112	17.205
5 th year	67	22.623
Final professional examinee	114	22.984
Global mean score	120	22.984

Table 3: Students' perception as per Domains mean score of DREEM

Domains	Mean/Maximum score (%)	SD
1 Students' Perceptions of Learning (SPoL)	28.5/48 (59%)	5.639
2 Students' Perceptions of Teachers (SPoT)	27 /44 (61%)	3.972
3 Students' Academic Self- Perceptions (SASP)	18/32 (56%)	4.722
4 Students' Perceptions of Atmosphere (SPoA)	27.2/48 (57%)	5.090
5 Students' Social Self- Perceptions (SSSP)	14.5/28 (52%)	2.881

A total of 204 students were responded to the questionnaire giving a response rate of 100%. Splitting by year the number of students over the first four years were fairly constant, examinee year students' number slightly lower and the 5th year much less in number. The majority (109, 53%) of

respondents were within 20-22 years of age; (41, 20%) in the 17-19 age group and 54 (27%) in the 23 – 25 age group. The male and female were (104, 51%) and (100, 49%) respectively (Table 1) The perceived global mean score of DREEM for ISMC was 120/200(SD 22.984) indicates students' positive perception towards the learning environment. The overall perception was fairly constant over the first three years i.e. 133/200, 134/200 and 127/200 in 1st, 2nd and 3rd year respectively. The perception rate starts to decline in clinical years (4th year 112/200), and in 5th year it was extremely low (67/200). The perception rate sharply improves when students are about to leave the course (Examinee students) 114/200 (Table 2) As per interpretation guidelines for DREEM Domains³⁷ the students of this college had positive perception across the board, but there is lot of scope for improvement in all five Domains (Table 3).

The five Domains comparative mean scores in different years have shown a similar trend of overall mean score of DREEM (Figure 1, 2, 3, 4 and 5) The students started the course with high and positive perceptions about this college's learning environment but gradually it started to decline. In all the domains the perception level was lowest in 5th year but a sharp increase of perception level for examinee students. In Domain 1, 2, 3, 4 the perception pattern is similar among the different year students except in Domain 5 there is a sharp fall of perception among 2nd year student about their learning environment.

Three items scored > 3 (item 1, 2 and 19) respectively (3.04, 3.24 and 3.17) in Domains 1, 2 and 5 (Table 4.A) indicated the most positive and strong areas of the learning environment of the college. There was no strong area in SASP and SPoA.

Seven items scored < 2 out of which item 50 is a negative item means students agreed with the statement. 4/7 items were from the Domain 5 which means the students of the college were having major problems in their social life. (Table 4.B)

The most positive (Table 4.A) and most problematic items (Table 4.B) were further explored in focus group discussion to determine the underlying causes of high and low score. The views of the participants in different aspects in both group discussions were similar and there was no intra group conflict. The participants of both groups agreed and mentioned similar issues that need to be addressed in future for creating a positive learning environment for

Table 4. A: Items scored > 3 in different Domains

Domain	#Items	Mean > 3	SD
1. SPoL	1. I am encouraged to participate during teaching sessions	3.04*	1.102
2. SPoT	2. The teachers are knowledgeable	3.24*	.885
3. SASP			
4. SPoA			
5. SSSP	19. My spiritual and social life is good	3.17*	.935

Table 4.B: items scored < 2 in different Domains

Domain	#Items	Mean > 3	SD
SPoL			
SPoT	50. <i>The students irritate the teachers</i> (*) (negative)	1.32 (A)	1.311
SASP	27. I am able to memorize all I need	1.94(DA)	1.117
SPoA	42. The enjoyment outweighs the stress of the course	1.91(DA)	1.288
SSSP	3. There is a good support system for students who get stressed	1.71(DA)	1.293
	14. I am rarely bored In this course	1.77 (DA)	1.210
	28. I seldom feel lonely	1.84(DA)	1.352
	46. My accommodation is pleasant	1.82(DA)	1.340

effective students’ learning. The participants of both groups also suggested remedial measures for areas of concern in the learning environment of their college. The unanimous suggestions for improvement of the situation by both groups are: organise regular faculty development programme for training of the teacher specially on educational methodology and assessment methods, Increase manpower, modify teacher’s recruitment policy as contract basis with fixed terms and conditions to reduce quick turn over of teacher, establish good support system for students, selection of group leader for tutorial class, proper accommodation and teaching learning facilities for students.

Discussion

This is the first study to report results of learning environment from the complete undergraduate cohort of a private Medical College in Bangladesh. The DREEM questionnaire has provided an overview of students’ perception throughout the medical school and allowed areas of concern to be highlighted for remedial actions. The students of this college took part spontaneously in both phases of the study as marked by good response rate (100%) in Phase I part which is also reported in literatures^{1, 2, 5}. The participants of both focus group discussions were also spontaneous and enthusiastic to express their thoughts, ideas and suggestions for remedial

measures to improve their learning environment.

In totality as per DREEM scoring scheme, This college was perceived by the students as having more positive than negative (120/200) towards their learning environment^{27,40}. The score is similar with the reported global score of DREEM in other medical and allied healthschools around the globe ranging from very low 83 to more positive 149^{9, 11, 12, 14, 21-35}. Our study score was higher than reported study in Bangladesh 110/ 200 for academic achievers and 106/200 for under-achievers⁴¹, medical school of King Abdul Aziz University 102/200, Umm Al-Qura University 107/200 and Sana’a University 100/200¹⁰ and Faculty of Medical Sciences in

Trinidad 109.9/200⁸. However the score was lower than reported score of Dundee Medical School 139/200(45), Monash University of Australia 137.3/200³¹, of Poly Tech MARA, Malaysia 134.4/200⁴² and Universiti Sains Malaysia 120/200¹, which may reflect that these institutions are fairly innovative in terms of providing a student-centred approach to education.

Though in all five Domains the students had a positive perception about their learning environment (Table 3), many individual items scored between 2 -3 indicated that there is plenty of scope for improvement in all five Domains of learning environment of the (Table 4). The study findings are comparable with reported findings^{7, 26, 29, 23,34,7,43}. It is not definitive to say that this overall score is due to participants’ first time encounter with such a study which may have presented them with a dilemma, however since scores were not universally high it can be sensibly assumed this was not the case.

The year wise mean perception score had shown a gradual declination from 1st year to 4th year, with a severe deterioration in 5th year (67/200), interestingly the perception level sharply improved among the examinee students (Figure 1). The finding again indicated the scores were social desirability bias free which means that the participants’ had no

wish to please the researcher^{44, 45}.

The students' started the programme with high expectations and positive perceptions which gradually eroded as they face the reality of medical education. The challenge and diverse teaching learning methods in clinical years, possible lack of proper resources like number of patients, lack of proper hospital facility, academic staff and other physical facilities for clinical teaching might played an important role in worsening the students' perception of their learning environment. The 5th year students had a negative impression reflected by overall mean score (67/200) and were extremely stressed may be due the overall pressure of final professional examination along with other difficulties in clinical teaching. The sharp rise of perception score (114/200) in examinee students probably be due to release of pressure of regular classes, clinical teaching and other learning experiences in 5th year which is comparable with many reported literatures^{5,46,47}. (Figure 1)

The overall perception score of Domain SPoL was 30/48 indicative of positive perception. 1 of 12 items scored > 3 and the rest of the items scored within 2-3 which indicates that the students were quite satisfied with their learning. This suggests that the teaching is stimulating, well focused and helping the students in developing confidence and competence. Though it has a discipline-based curriculum, still the students expressed their opinion in favour of student-centered teaching which is also reflected by item 44: *teaching encourages me to be an active learner*. Domain 1 was perceived favourably in all aspects which is a great strength of this Medical in terms of students' learning and the findings are also consistent with reported findings^{5, 23, 24}.

In SPoT, one item scored <2 and the 9 items scored within 2-3, indicating that the teaching and the teachers are well perceived by the students. Students perceived their teacher as knowledgeable (Item 2: 3.24), had good communication skills (item 18: 2.81) and well prepared for the class (item 40 -2.80). Item 50 score d <2 (*students irritate the teachers*) was explored by focus group discussion (Table 4). The opinion and feelings of the students should be taken into consideration to create a positive environment so that the students participated in teaching and learning activities. These findings are consistent with reported findings^{5, 7, 23, 24, 34, 48}.

The students were confident and they perceived positively their academic performance as most of the items scored within 2-3 in SSAP. Many

previous studies reported low score in different items of this Domain (24, 34) e.g. item 27: *I am able to memorise all I need* scored <2 which is also reported in many previous findings^{3,23}. The findings of this Domain were interesting and not all items are consistent with reported findings as students did not report factual overload in their teaching and learning which is consistent with their opinion in Domain SPoL and SPoT. In Domain SPoA, no item scored > 3 and 10 items scored within 2-3. Item 42 (*The enjoyment outweighs the stress of the course*) scored < 2. The reported score for the Item was very low for first year students (1.76) and for clinical year (1.62) in a reported study⁵. A study confirmed that psychological distress such as stress, anxiety, and burnout among students was consistently higher than the age-matched general population^{49, 50}.

The overall score of Domain 5- SSSP was 15/28 which means it has many negative aspects as per detail interpretation of DREEM Domains³⁷. In this domain over half the items scored <2 which is a very concerning for the . All low-scored items were explored further to get more information of the problem. The individual item scores revealed, a deficiency or lack of support service for the students who get stressed and struggle with many issues related to personal and social life, teaching and learning. The knowledge regarding sources of support system if any in the school must be available to the students throughout their academic course. Importance of having proper support service for students is also highlighted in many literatures^{51, 52}. This Domain indicated that although the students' spiritual and social life is good (Item 19 - 3.17) they are still stressed and lonely. Accommodation is a big concern for them and there is a lack or deficit in support service as consistent with literature by Nahar et al, 2010⁴¹ study in Bangladesh. Other study findings are not consistent with our study findings^{3, 53, 54}.

The study can conclude that, the students of the college felt their teachers are knowledgeable, well focused, well prepared for their teaching and stimulate them to participate in teaching sessions. They also felt the teachers are good in communicating with them and their teaching helps them to become competent to be a good professional in the future. Students' perception towards their academic performance was quite good as well. Also despite of the many problems in different areas of their learning environment they are confident

enough to get through their examination and that was the excellent aspect of learning environment of this college. These findings are consistent with many previous findings^{3, 7,23,34,55}.

Conclusion

The study identified positive learning environment of ISMC which is rewarding for the college in terms of the credibility of the programme. The lack of many excellent aspects may at present be considered as shortcomings, on the other hand it only means that there are lot of rooms for improvement and improvisation in the learning environment. The scores for the individual item from the first and in-depth exploration of second phase of the study gave clear indications of where the priorities for reform should be given. One of the main areas of concern was the support system for students who get stressed. The second main concern was not having a formal teacher training programme for the teachers. Based on the findings, the recommendations were made for improving the learning environment situation. The findings of

the study met the overall objectives but cannot be generalised, as it was a snapshot study and limited to one private Medical College of Bangladesh. A further study to include triangulation would strengthen this aspect.

Future direction and research ideas

The results obtained in this study could be used to guide strategic planning for remedial programmes. For generalising the study findings, there should be a wide scale study in Bangladesh involving all private Medical Colleges and go beyond perception level. It could be a wise idea to conduct study by involving both private and public sector as echoed in literature as well⁵⁶.

Ethical issues - The study was approved by the local authority and ethically cleared by the Centre for Medical Education, Dundee University, UK.

Acknowledgement - The Principal of ISMC for approving and allowing us to conduct the research. The students and teachers of the college for their spontaneous participation and support.

Conflict of interests: None

References

1. Yusoff M., Jaa'far R., Arzuman H., Arifin W and Mat Pa M. Perceptions of medical students regarding educational climate at different phases of medical training in a Malaysian medical school. *Education in Medicine Journal*, 2013; 5(3) Date accessed: 18 Sep. 2015.
2. Hamid B, Faroukh, and Mohammad hosein B. Nursing Students' Perceptions of their Educational Environment Based on DREEM Model in an Iranian University. *Malaysian Journal of Medical Sciences*, Jul 2013; 20(4): 56-63.
3. Arzuman H, Yusoff M B, Chit SP. The Big Sib students' perceptions of the learning environment in the School of Medical Sciences, Universiti Sains Malaysia using DREEM. *Malaysian Journal of Medical Sciences*, 2010; 17(3): 40-47.
4. Aghamolaei T, Fazeli. Medical students' perceptions of the educational environment at an Iranian Medical Sciences University. *BMC Medical Education* 2010; 10:87.
5. Abraham R, Ramnarayan K, Vinod P and Torke S. Students' perceptions of learning environment in an Indian medical school. *BMC Medical Education*, 2008; 8:20.
6. Demiroren M, Palaoglu O, Kemahli S, Ozyurda F, Ayhan HI. Perceptions of Students in Different Phases of Medical Education of Learning Environment. Ankara University Faculty of Medicine, Medical Education Online, 2008. <http://www.med-ed-online.org> retrieved on 10th July, 2011.
7. Jiffry MTT, McAleer S, Fernando S and Marasinghe RB. Using the DREEM questionnaire to gather baseline information on an evolving medical school in Sri Lanka. *Medical Teacher*, 2005; 27:348-52.
8. Bassaw B, Roff S, McAleer S, Roopnarinesingh S, De Lisle J, Teelucksingh S and Gopaul S. Students' perspectives on the learning environment, Faculty of Medical Sciences, Trinidad. *Medical Teacher*, 2003; 25(5): 522-526.
9. Hutchinson L. Learning environment, ABC of learning and teaching. *British Medical Journal*, 2003; 326(7393): 810-812.
10. Awdah AH, Raniah Z, Abdulmonem A, Nageeb H, Abdallah G, Gominda P, Indika K, Roff, McAleer S, Davis M. Learning Environment in Traditional and Innovative Medical Schools: A Study in Four Undergraduate Medical Schools. *Education for Health*, 2004; 17 (2):192 - 203.
11. Khan JS, Tabasum S, Usman K. Yousafzai and Mukhtar O. Measuring the Medical Education Environment in Undergraduate Medical schools across Punjab, Pakistan. *Biomedica*, 2011; 27.
12. Murakami M, Kawabata H and Maezawa M. The

- influence of learning environments on medical education: a qualitative research study in one Japanese medical school. *South East Asian Journal of Medical Education*, 2009; **3**(2).
13. Wang J, Zang S and Shan TM. Dundee Ready Education Environment Measure: psychometric testing with Chinese nursing students. *Journal of Advanced Nursing*, 2009; **65**(12): 2701–2709.
 14. Harden RM. Curriculum planning and development, A Practical Guide for Medical Teachers, 2005; Elsevier Churchill Livingstone. Philadelphia, USA.
 15. Mayya S and Roff S. Students' perceptions of learning environment: A comparison of academic achievers and under-achievers at Kasturba Medical, India. *Education for Health*, 2004; **17**(3):280–291
 16. Al-Hazimi A, Zaini R, Al-Hyiani A, Hassan N, Gunaid A, Ponnampuruma G, et al. Learning environment in traditional and innovative medical schools: A study in four undergraduate medical schools. *Education for Health*, 2004; **17**(2):192–203.
 17. Pimparyon P, Roff, McAleer S, Poonchai B and Pemba S. Learning environment, student approaches to learning and academic achievement in a Thai nursing school. *Medical Teacher*, 2000; **22**(4): 359-365.
 18. Al Rukban M O, Khalil MS and Al-Zalabani A. Learning environment in medical schools adopting different learning strategies. *Learning Research and Reviews*, 2010; **5**(3):126-129.
 19. Roff S. The Dundee Ready Education Environment Measure (DREEM)-a generic instrument for measuring students' perceptions of undergraduate health professions curricula. *Medical Teacher*, 2005; **27**: 322-5.
 20. Roff S, McAleer S, Ifere OS and Bhattacharya S. A global diagnostic tool for measuring learning environment: comparing Nigeria and Nepal. *Medical Teacher*, 2001; **23**(4): 378-382.
 21. Lempp H and Seale C. The hidden curriculum in undergraduate medical education: qualitative study of medical students' perceptions of teaching. *British Medical Journal*, 2004; **329**: 770 -773.
 22. Genn JM. AMEE Medical Education Guide No 23(Part1): Curriculum, environment, climate, quality and change in medical education – a unifying perspectives. *Medical Teacher*, 2001; **23** (4): 337-344.
 23. Nurumal MS, Jaafar R and Arzuman H. A study of learning environment in the Kulliyah of Nursing, International Islamic University, Malaysia. *Malaysian Journal of Medical Sciences*, 2009 Oct –Dec; **16**(4): 15 -24
 24. Veerapen K and McAleer S. Students' perception of the learning environment in a distributed medical programme. *Medical Education Online*, 2010; 15: 10.3402/meo.v15i0.5168.
 25. Snadden D. Student health and abuse: what is going on out there? *Medical Teacher*, Sep 2003; **25**(5):461-2.
 26. Maudsley RF. Role models and the learning environment: essential elements in effective medical education. *Academic Medicine*, 2001; **76**: 432–4.
 27. Roff S, McAller S, Harden RM, Al-Qahtani M, Ahmed A, Deza H, Groenen G and Pimparyon P. Development and validation of the Dundee Ready Education Environment Measure (DREEM). *Medical Teacher*, 1997; **19**(4): 295-299.
 28. McAleer S, Roff S, Harden RM, Al-Qahtani M, Ahmed A, Deza H and Groenen G. The medical education environment measure: A diagnostic tool. *Medical Education*, 1997; **32**: 209-221.
 29. Zawawi AH and Elzubeir M. Using DREEM to compare graduating students' perceptions of learning environment at medical schools adopting contrasting educational strategies. *Medical Teacher*, 2012; **34** Suppl 1:S25-31.
 30. Demiroren M, Palaoglu O, Kemahli S, Ozyurda F, Ayhan HI. Perceptions of Students in Different Phases of Medical Education of Learning Environment. Ankara University Faculty of Medicine, *Medical Education Online*, 2008. <http://www.med-ed-online.org> retrieved on 10th July, 2014
 31. Brown T, Williams B and Lynch M. The Australian DREEM: evaluating student perceptions of academic learning environments within eight health science courses. *International Journal of Med Education*, 2011; **2**: 94-101.
 32. Miles S, Leinster SJ. Medical students' perceptions of their educational environment: expected versus actual perceptions. *Medical Education*, 2007; **41**(3): 265–272.
 33. Chan D. Combining qualitative and quantitative methods in hospital learning environment. *International Journal of Nursing Studies*, 2001; **38**: 447–459.
 34. Whittle SR, Whelan B and Murdoch-Eaton DG. DREEM and beyond: studies of the learning environment as a means for its enhancement. *Education for Health*, 2007; **20** (1): 7Epub 2007 Apr 18.
 35. Varma R, Tiyagi E and Gupta JK. Determining the quality of learning climate across multiple undergraduate teaching sites using the DREEM inventory. *BMC Medical Education*, 2005; **5**(1):8.
 36. IbnSina Medical. A project of the IbnSina Trust (2005). Retrieved from <http://www.ismc.ac.bd/home.html> on 24th January, 2010.
 37. McAleer S and Roff S. Part 3; A practical guide to using the Dundee Ready Education Measure (DREEM). In, J.M. GENN (Ed), AMEE Medical Education Guide No.23 Curriculum, environment, climate, quality and

- change in medical education; a unifying perspective, 2002; Dundee, UK: Association of Medical Education in Europe.
38. Polit DF and Beck CT. *Nursing Research Principles and Methods*. 7th Edition. Lippincott Williams and Wilkins: Philadelphia. 2004.
 39. Carcary, M. The Research Audit Trial – Enhancing Trustworthiness in Qualitative Inquiry. *The Electronic Journal of Business Research Methods*, 2009; Volume 7 Issue 1 (pp.11 - 24).
 40. Dunne F, McAleer S, Roff S. Assessment of the undergraduate medical environment in a large UK medical school. *Health Education Journal*, 2006; 65:149-58.
 41. Nahar N, TalukderMd HK and Khan Md TH. Perceptions of Academic achievers and under achievers regarding learning environment in medical s in Bangladesh. *Bangladesh Medical Journal*, 2010; 39(2).
 42. Intan ID. A study of stressor and coping strategies among first year nursing students in the of Poly Tech Mara. Kelantan, Malaysia (unpublished Master thesis). 2007; School of Medical Sciences, UniversitiSains Malaysia.
 43. Seabrook MA. Clinical students' initial reports of the educational climate in a single medical school. *Medical Education*, 2004; 38: 659-669.
 44. Neeley MS and Maria CL. When Research Participants Don't tell it like it is: Pinpointing the Effects of Social Desirability Bias Using Self vs. Indirect-Questioning. *Advances in Consumer Research*, 2004; Volume 31:pg 432- 433.
 45. Van de Mortel TF. Faking it: social desirability response bias in self-report research. *Australian Journal of Advanced Nursing*, 2008; vol.25, no. 4, pp 40-48
 46. Al-Ayed IH, Sheik SA. Assessment of the educational environment at the of Medicine of King Saud University, Riyadh. *Eastern Mediterranean Health Journal*, 2008; 14: 953-959.
 47. Till H. Identifying the perceived weaknesses of a new curriculum by means of the Dundee Ready Education Environment Measure (DREEM) Inventory. *Medical Teacher*, 2004; 26(1): 39-45.
 48. Nurumal MS, Jaafar R and Arzuman H. Great teacher creates effective learning environment: A study through IIUM Nursing Students' Eyes. *Medicine and Health*. 2008; 3 (2): 275-280.
 49. Lyndon MP, Strom JM, Alyami HM, Yu TC, Wilson NC, Singh PP, Lemanu DP, Yielder J and Hill AG. The relationship between academic assessment and psychological distress among medical students: a systematic review. *Perspectives on Medical Education*, 2014; 3:405-418 DOI 10.1007/s40037-014-0148-6.
 50. Dyrbye LN, Thomas MR and Shanafelt TD. Medical student distress: causes, consequences, and proposed solutions. *Mayo Clinic Proceedings*. 2005; 80(12):1613-22.
 - Jamaiah I. Review of Research in Learning Environment. *Journal of the University of Malaya Medical Centre*, 2008; 11(1).
 51. Shenton K. Strategies for ensuring trustworthiness in qualitative research projects. *Education for Information*, 22 (2004); 63-75.
 52. Manjula H and NGASS C. Evaluation of educational environment of Nursing Undergraduates. *Galle Medical Journal*, October 2012;17(2).
 53. Lokuhetty MDS, Warnakulasuriya SP, Perera RIR, De Silva HTR and Wijesinghe HD. Students' perception of the educational environment in a Medical Faculty with an innovative curriculum in Sri Lanka. *SouthEast Asian Journal of Medical Education*, 2010;4 (1).
 54. Denz-Penhey H, Murdoch CA. Comparison between findings from the DREEM questionnaire and that from qualitative reviews. *Medical Teacher*, 2009; 31:449-53.
 55. Laskar MS. Measuring medical education environment in Bangladesh (editorial). *Mediscope*, 2015; 2(1):1-3.
-