Medical students perception of their medical environment-expected versus actual perceptions — a cross sectional study

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Abstract

Objective: To compare the expected (perceptions of their environment at the beginning of their 1st year) versus actual perceptions (perceptions at the end of 1st year) of 1st year students at Dow University of Health Sciences.

Methods: The 'expected' perceptions of the students were recorded at the beginning of their 1st year (n=411) of medical education when they entered the medical school using Dundee Ready Educational Environment Measure (DREEM). DREEM is a validated and self-administered inventory which focuses on learning, teachers, self-confidence and academic as well as social environment. The 'actual' perceptions were then recorded at the end of their first year (n=405) of education when they had received adequate exposure of their environment. The 2 records were then compared.

Results: The total expected DREEM score was 118/200 and the total actual DREEM score was 113/200. The expected domain (Students' perceptions of learning, students' perceptions of teachers, students' academic self-perceptions, students' perceptions of atmosphere, and students' social self-perceptions) scores were 28/48, 26/44, 20/32, 28/48, and 16/28. The actual domain scores were 27/48, 23/44, 19/32, 27/48, 16/28. However both the actual and expected scoring displayed satisfactory environment for learning. Significant differences (p<0.0001) were found in the two samples.

Conclusion: In general the results displayed that the students perceived the environment positively but the significant difference found in the two samples, demonstrated that their expectations were not met.

Keywords: Medical education, Environment behavior, Psychology. (JPMA 64: 230; 2014)

Introduction

Learning environment in any medical school is found to be important in determining students' academic success. This is exemplified by the following quote, "Considerations of climate in the medical school, along the lines of continuous quality improvement and innovation, are likely to further the medical school as a learning organization with the attendant benefits."[1] Educational environment, synonymous with climate, atmosphere, or ambiance, is multifaceted and can be described as an educational institution's personality, spirit, and culture.[2] When a student walks into a medical institution, he/she has his/her own expectations. A good institution tries its best to fulfill these expectations and hence it is necessary to study how much the medical educational environment is living up to the students' standards. Medical students should be allowed to learn the art of medicine in beautifully designed and uplifting spaces. Shaughnessy recommends an educational climate consisting of communication, consensus, consistency, clarity, coherence, consideration, community, cohesiveness, commitment, concern, care, and cooperation.[3]

A systematic versatile approach is effective in integrating computer-based learning in a medical school environment. Computer based learning has the potential to meet medical training needs and other professions have already started to embrace it in continuing professional education.[4] At the Heinrich-Heine-University, Düsseldorf, a hypermedia learning environment (HML) called "Physics for Medical Students" has been developed and evaluated.[5]

In today's world, students require new ways of learning because the teaching methodology affects them. The University of Derby decided to give iPods to radiography students, to provide them with "different ways to learn".[6] These devices contain preloaded sessions on positioning of patients for X-rays, with the hope that video demonstrations would be more helpful than traditional

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texts and the students are further permitted to upload music or other sessions.

There is great interest in studying medical educational environments in recent years especially since the 1990s when national initiatives to reform undergraduate and postgraduate medical education were introduced.[7] Increasing community based learning (learning through visiting patients in the low status areas of our community), introduction of problem based learning, creating an outcome based curriculum, encouraging lab courses and continuous teacher training programmes, further enhance the environment and create a more welcoming and enjoyable atmosphere for medical students. Various objectives can be attributed to lab work courses, e.g. linking theory to practice, learning experimental skills or fostering motivation, personal development and social competency.[8]

Critically, we can measure and improve on our educational environment. DREEM (Dundee Ready Education Environment Measure) is an instrument designed to measure educational environment specifically for health professions.[9] DREEM has been used to compare areas of strengths and weaknesses in a medical environment,[10] to compare different medical institutions,[10] students at different stages of a course[10] and gender,[10] and to judge the effects of curriculum change on the students,[1,11] and to compare new and old curricula.[12] This article reports the medical environment as expected and experienced by the students at DUHS (Dow University of Health Sciences). DUHS offers a 5 year programme of Bachelor of Science and Bachelor of Medicine (MBBS). DREEM has never been administered to the students of DUHS before so it was hypothesized that students' expectations would be high and actual perceptions would be low in many areas.

Methods

The study was done at DUHS, Karachi, Pakistan in 2010-2011. The study duration was approximately 18 months. DUHS is a university under which there are several medical schools like Dow Medical College (DMC), Sindh Medical College (SMC), Dow International Medical College (DIMC) and Dr. Ishratul Ibad Khan Institute of Oral Health Sciences (DIKIOHS). No ethical issues were encountered during the course of the study. The study was approved by Ethical Review Board of DUHS in 2009. This cross-sectional, descriptive study was done on all the students from these institutes who were ready to participate, to compare expected versus actual perceptions. Expected perceptions were considered those which the students perceived when they stepped into the

medical school, that is, in the beginning of their first year of education. Actual perceptions were received at the end of the first year of education when the students had experienced substantial exposure to their educational environment.[12] A few changes were made in the statements of the questionnaire. These were reviewed and approved by an international consultant and the ERB of Dow University of Health Sciences.

Instrument

DREEM is a 50 item inventory, consisting of 5 subscales; Students' Perceptions of Learning (SPL) containing 12 items with a maximum score of 48, Students' Perceptions of Teachers (SPT) containing 11 items with a maximum score of 44, Students' Academic Self-Perceptions (SASP) consisting of 8 items and a maximum score of 32, Students' Perceptions of Atmosphere (SPA) with 12 items and maximum score of 48, Students' Social Self-Perceptions (SSSP) consisting of 7 items and maximum score of 28. The maximum total score for all subscales is 200 (Table-1 shows detailed subdivisions of questions).

Population and Sampling

The DREEM questionnaire was administered to 450 first year students of DUHS in their first week of university before a lecture. This provided us with the set of expected perceptions of the students. In advance to administration of the questionnaire, the class was informed about the purpose and process of data collection, the anonymity of the participants was stressed upon and they were requested for their co-operation. The questions for actual and expected DREEM proformas were changed according to the students' understanding and are shown in detail in Table-1. The changes were reviewed and approved by an international medical education consultant as well as the ERB. This version has also been used in a previous study.[12] Consent was received before participation and 411 students submitted a complete proforma. The rest were either submitted incomplete or were not submitted altogether.

Each DREEM item was scored 0 to 4 with scores of 4,3,2,1 and 0 assigned for strongly agree, agree, uncertain, disagree and strongly disagree, respectively. Reverse scoring was used for the negative items (9 items).

To pinpoint more specific strengths and weaknesses within the learning environment at DUHS, items with a mean score of 3 and above were taken as positive points and items with a mean score of 2 and below were taken as problem areas. Items with a mean score between 2 and 3 were considered as aspects of the learning environment that could be enhanced.

The whole procedure was repeated at the end of their 1st year to provide us with the set of 405 students who completed the questionnaire for actual perceptions. The data from the 2 records (1 at the beginning of the year and second at the end of year) were compared to point out expected versus actual perceptions of the students.

Data Analysis

The two sets of data were compared for the total DREEM score as well as each of the subtotal scores of the subscales using spss version 16.0. The individual scores of

each question were also compared. Since the data was not normally distributed; p<0.0001 for expected perceptions and p=0.009 for actual perceptions using the Shapiro-Wilk test for normality), Wicoxon Signed Rank test was used to compare actual versus expected perceptions. The institution wise differences were also analyzed using Wicoxon Signed Rank test.

Results

Out of a total of 450 students, 405 students completed the questionnaire at the beginning of the year (expected

Table-1: Detailed Subdivisions of Questions into different Domains.

Domain	ITEM in expected dreem	ITEM in actual dreem
SPL	1. I will be encouraged to participate in class	1. I am encouraged to participate in class
	7. The teaching will often be stimulating	7. The teaching is often stimulating
	13. The teaching will be student centered	13. The teaching is student centered
	16. The teaching will help to develop my competence	16. The teaching helps to develop my competence
	20. The teaching will be well focused	20. The teaching is well focused
	22. The teaching will help to develop my confidence	22. The teaching helps to develop my confidence
	24. The teaching time will be put to good use	24. The teaching time is put to good use
	25. The teaching will overemphasize factual learning	25. The teaching overemphasizes factual learning
	38. I will be clear about the learning objectives of the course	38. I am clear about the learning objectives of the course
	44. The teaching will encourage me to be an active learner	44. The teaching encourages me to be an active learner
	47. Long term learning will be emphasized over short term learning	47. Long term learning is emphasized over short term learning
	48. The teaching will be too teacher centered	48. The teaching is too teacher centered
SPT	2. The teachers will be knowledgeable	2. The teachers are knowledgeable
	6. The teachers will be patient with patients	6. The teachers are patient with the patients
	8. The teachers will ridicule the students	8. The teachers ridicule the students
	9. The teachers will be authoritarian	9. The teachers are authoritarian
	18. The teachers will have effective communication skills with patients	18. The teachers have effective communication skills with patients
	29. The teachers will be good at providing feedback to students	29. The teachers are good at providing feedback to students
	32. The teachers will provide constructive criticism here	32. The teachers provide constructive criticism here
	37. The teachers will give clear examples	37. The teachers give clear examples
	39. The teachers will get angry in class	39. The teachers get angry in class
	40. The teachers will be well prepared for their classes	40. The teachers are well prepared for their classes
	50. The students will irritate the teachers	50. The students irritate the teachers
SASP	5. Learning strategies which worked for me before will continue to work for me now	5. Learning strategies which worked for me before continue to work for me now
	10. I am confident about passing this year	10. I am confident about passing this year
	21. I feel I will be well prepared for my profession	21. I feel I am being well prepared for my profession
	26. Last year's work will have been a good preparation for this year's work	26. Last year's work has been a good preparation for this year's work
	27. I will be able to memorize all I need	27. I am able to memorize all I need
	31. I will learn a lot about empathy in my profession	31. I have learned a lot about empathy in my profession
	41. My problem solving skills will be well developed here	41. My problem solving skills are being well developed here
	45. Much of what I have to learn will seem relevant to a career in healthcare	45. Much of what I have to learn seems relevant to a career in healthcare
SPA	11. The atmosphere will be relaxed during ward teaching	11. The atmosphere is relaxed during ward teaching
	12. The school will be well time tabled	12. The school is well time tabled
	17. Cheating will be a problem in this school	17. Cheating is a problem in this school
	23. The atmosphere will be relaxed during lectures	23. The atmosphere is relaxed during lectures
	30. There will be opportunities for me to develop interpersonal skills	30. There are opportunities for me to develop interpersonal skills
	33. I will feel comfortable in class socially	\33. I feel comfortable in class socially
	34. The atmosphere will be relaxed during seminars/tutorials	34. The atmosphere is relaxed during seminars/tutorials
	35. I will find the experience disappointing	35. I find the experience disappointing
	36. I will be able to concentrate well	36. I am able to concentrate well

Continued>>>

	42. The enjoyment will outweigh the stress of studying medicine	42. The enjoyment outweighs the stress of studying medicine
	43. The atmosphere will motivate me as a learner	43. The atmosphere motivated me as a learner
	49. I will feel able to ask the questions I want	49. I feel able to ask the questions I want
SSSP	3. There will be a good support system for students who get stressed	3. There is a good support system for students who get stressed
	4. I will be too tired to enjoy this course	4. I am too tired to enjoy this course
	14. I will be rarely bored on this course	14. I am rarely bored on this course
	15. I will have good friends in this school	15. I have good friends in this school
	19. My social life will be good	19. My social life is good
	28. I will seldom feel lonely	28. I seldom feel lonely
	46. My accommodation will be pleasant	46. My accommodation is pleasant

Table-2: Mean expected and actual DREEM scores.

Score	Expected	Actual	Z value	P value
Total	118/200 (20.3)	113/200 (20.1)	-1.075	0.283
SPL	28/48 (5.9)	27/48 (6.2)	-2.672	0.008
SPT	25/44 (5.1)	23/44 (4.9)	-5.414	<0.0001
SASP	20/32 (4.4)	19/32 (4.6)	-1.090	0.276
SPA	28/48 (6.3)	27/48 (6.4)	-3.442	0.001
SSSP	16/28 (3.8)	16/28 (3.5)	-0.730	0.466

SPL: Students' Perceptions of Learning.
SPT: Students' Perceptions of Teachers.
SASP: Students' Academic Self Perceptions.
SPA: Students' Perceptions of Academics.
SSSP: Students' Social Self Perceptions.

perceptions) and 405 students completed the questionnaire at the end of the year (actual perceptions) giving a total response of 90%. The rest either submitted incomplete questionnaires or declined to participate.

Table-2 shows the mean (SD) expected and actual DREEM total and domain scores. The mean total expected dreem score was 118/200 and the mean total actual dreem score was found to be 113/200. For Students' Perceptions of Learning (SPL), Students' Perceptions of Teachers (SPT), Students' Academic Self-Perception (SASP), Students' Perceptions of Atmosphere (SPA) and Students' Social Self Perceptions (SSSP), the mean expected domain scores are 28/48, 25/44, 20/32, 28/48, 16/28 and the mean actual

Table-3: Mean inventory items where significant differences were observed between expected and actual perceptions.

Domain	Expected Item	Expected score	Actual Item	Actual score	Z value	P-value
SPL	1. I will be Encouraged to participate in class	2.53 (1.02)	1. I am Encouraged to participate in class	2.36 (1.08)	-2.401	0.016
	7. The teaching will often be stimulating	2.48 (1.04)	7. The teaching is often stimulating	2.29 (1.01)	-2.732	0.006
	16. The teaching Will help to develop my competence	2.58 (1.03)	16. The teaching helps to develop my competence	2.40 (1.02)	-2.456	0.014
	20. The teaching will be well focused	2.52 (1.09)	20. The teaching is well focused	2.31 (1.07)	-2.956	0.003
	22. The teaching will help to develop my confidence	2.48 (1.05)	22. The teaching helps to develop my confidence	2.30 (1.07)	-2.549	0.011
	38. I will be clear About the learning objectives of the course	1.87 (1.32)	38. I am clear About the learning objectives of the course	2.43 (1.00)	-6.017	<0.0001
	44. The teaching will encourage me to be an active learner	2.60 (1.07)	44. The teaching encourages me to be an active learner	2.34 (1.06)	-3.548	<0.0001
	47. Long term learning will be emphasized over short term learning	2.71 (1.13)	47. Long term learning is emphasized over short term learning	2.43 (1.16)	-3.520	<0.0001
SPT	2. The teachers will be knowledgeable	2.89 (0.90)	2. The teachers are knowledgeable	2.72 (0.90)	-2.712	0.007
	8. The teachers will ridicule the students	2.21 (1.01)	8. The teachers ridicule the students	1.97 (0.91)	-3.777	<0.0001
	37. The teachers will give clear examples	2.60 (0.99)	37. The teachers give clear examples	2.24 (1.03)	-5.025	<0.0001
	39. The teachers will get angry in class	2.40 (1.24)	39. The teachers get angry in class	1.74 (1.11)	-8.147	<0.0001
SASP	21. I feel I will be well prepared for my profession	2.74 (1.07)	21. I feel I am being well prepared for my profession	2.46 (1.08)	-3.718	<0.0001
	45. Much of what I have to learn will seem relevant to a career in healthcare	2.88 (0.93)	45. Much of what I have to learn seems relevant to a career in healthcare	2.74 (0.91)	-2.166	0.030
SPA	11. The atmosphere will be relaxed during ward teaching	2.55 (1.07)	11. The atmosphere is relaxed during ward teaching	2.30 (1.10)	-3.230	0.001
	17. Cheating will be a problem in this course	2.29 (1.25)	17. Cheating is a problem in this course	2.53 (1.26)	-2.593	0.010
	23. The atmosphere will be relaxed during lectures	2.45 (1.21)	23. The atmosphere is relaxed during lectures	2.14 (1.15)	-3.338	0.001
	30. There will be opportunities for me to develop interpersonal skills	2.62 (0.98)	30. There are opportunities for me to develop interpersonal skills	2.29 (1.03)	-4.451	<0.0001
	33. I will feel comfortable in class socially	2.67 (0.98)	33. I feel comfortable in class socially	2.49 (1.02)	-2.466	0.014
	34. The atmosphere will be relaxed during seminars/tutorials	2.58 (1.07)	34. The atmosphere is relaxed during seminars/tutorials	2.36 (1.09)	-2.790	0.005
	35. I will find the experience disappointing	2.50 (1.05)	35. I find the experience disappointing	2.17 (1.08)	4.545	<0.0001
	42. The enjoyment will outweigh the stress of studying medicine	2.34 (1.10)	42. The enjoyment outweighs the stress of studying medicine	2.09 (1.25)	-3.094	0.002
SSSP	3. There will be a good support system for students who get stressed	2.04 (0.88)	3. There is a good support system for students who get stressed	1.80 (0.94)	-3.542	<0.0001

Table-4: Institution wise differences in the expected and actual dreem scores.

Institution	Mean Expected dreem score	Mean Actual dreem score	Z value	P value
DMC	122	109	-6.942	<0.0001
SMC	112	118	-2.499	0.012
DIMC	110	118	-2.124	0.034
DIKIOHS	117	111	-1.704	0.088

DMC: Dow Medical College. SMC: Sindh Medical College. DIMC: Dow International Medical College. DIKIOHS: Dr. Ishratul Ibad Khan Institute of Oral Health Sciences.

domain scores are 27/48, 23/44, 19/32, 27/48, 16/28. No significant differences were found in the expected and actual perceptions overall (z=-1.075; p=0.283). Significant differences were observed in SPL (z=-2.672; p=0.008), SPT (z=-5.414; p<.0001) and SPA (z=-3.442; p=0.001).

Amongst the expected perceptions, it was observed that the students scored less than 2 for 9 items (4, 9, 12, 14, 25, 27, 38, 48 and 50) and above 3 for 1 item (15), while for actual perceptions a score of less than 2 was found for 10 items (3, 4, 8, 9, 14, 25, 27, 39, 48 and 50) and that above 3 was found for 2 items (10 and 15). Table-3 shows statistically significant differences in the individual scores of expected and actual perceptions.

Mean age of the group of expected perceptions was 18.34±0.83 with ages in the range of 16 to 23 years. Mean age of the group of actual perceptions was 19.65±0.778 with ages in the range of 17 to 22 years.

From each set, 221(54.6%) belonged to Dow Medical College (DMC), 123(30.4%) belonged to Sindh Medical College (SMC), 40 (9.9%) to Dow International Medical College (DIMC) and 21(5.1%) belonged to Dr Ishrat-ul-ebad Khan Institute of Oral Health Sciences (DIKIOHS).

DMC presented the most significant (p<0.0001) difference in their expected versus actual perceptions (Table-4).

Discussion

The students' interest in completing the questionnaire is evidenced by the good overall response. As hypothesized, the overall expected perceptions (118/200) were higher than the actual perceptions (113/200). A similar study at East Anglia Medical School showed expected to be 153/200 and actual to be 143/200.[12] Both results of our study indicated a more positive response and the difference in the 2 results of expected and actual perceptions was found to be insignificant (z= -1.075; p=0.283). The DREEM global scores for medical schools in Sri Lanka, Nepal, Nigeria and UK were reported as 108/200,[13] 130/200, 118/200,[10] and 139/200[14] respectively. In this study the domain scores all indicate a

more positive perception in both the expected as well as actual sample but significant difference was found in SPL (p=0.008) (Students' Perceptions of Learning), SPT (p<0.0001) (Students' Perceptions of Teachers) and SPA (p=0.001)(Students' Perceptions of Atmosphere) domains.

In the expected perceptions out of the 9 items with a score of less than 2, 5 of the items were negative and belonged to SPL (25, 48), SPT (9, 50) and SSSP (4) domains. In the actual perceptions out of 10 items with a score below 2, 7 were negative and belonged to SPL (25, 48), SPT (8, 9, 39, and 50) and SSSP (4). Of these 5 items were problematic (<2) in expected perceptions too.

The students expected the course to be not well time tabled and themselves to not be clear about their learning objectives but they actually found them to be more positive after spending a year at their respective institutions. This demonstrates that learning objectives are clearly outlined and the courses are well organized. It also depicts that students appreciate the time allotted to each course. Time holds a lot of importance for students. In an advanced communication elective at medical schools, the students reported that their self-confidence in time management and in the use of nine communication skills improved significantly since the course was well organized and learner-centered.[15] Other problematic areas in the expected DREEM were that the students expected to get tired, bored and unable to memorize easily, the teachers were not expected to be authoritarian and were expected to be ridiculed by the students. The teaching was also expected to be teacher-centered.

Areas where students did not expect problem and actually ended up facing problems included the fact that teachers ridiculed students and got angry during sessions. On investigation it was revealed that the teachers could not sustain the interest of students during class and hence could not tolerate when the students got distracted or conversed amongst themselves. They felt that there was poor support for stressed students probably because they did not have mentors, counselors or peer reviewers to let their frustration out or guide them to sail through without anxiety. Learner-centered methods such as peer observation and video review and editing may strengthen communication training and reinforce skills introduced earlier in medical education.[15] The students were unable to memorize properly. When probed into this problem it was disclosed that they could not score well in the mid-semester assessment tests. Other problematic areas in the actual DREEM that were common with the expected DREEM included the fact that the students got tired and bored mostly because of the

stress of learning; the teachers were not authoritarian, probably because the classes were too big to be handled by a single teacher and hence were ridiculed by the students easily; the teaching was teacher- centered because the students could not receive individual attention when taught in big groups. Kampo medical sessions, including a lecture series, written examinations, and small-group (12-14 students) EBL (experience-based learning) sessions, were provided for 4th-year medical students at Tokai University School of Medicine, yielding a training method that improved students' general understanding of Kampo medicine and increased their interest and motivation to study Kampo medicine.[16]

Areas showing significant differences in the expected and actual perceptions are shown in Table-3. Most of these showed a lower actual score than expected score. They felt that they were not encouraged much to participate in learning and be an active learner, the teaching was less stimulating and less focused than expected, it did not help them greatly in developing their competence and confidence. The students also felt that long term learning was not instilled as much as they had expected. The teachers were less knowledgeable than expected, they felt irrelevance to the subject was more and they weren't as well prepared as they had expected. A number of reasons could have caused these problems but the major issue was that the class presentations provided by the teachers were lengthy and often irrelevant to the topic being taught. Also, most teaching was done through lectures rather than PBL (problem based learning) sessions where students can participate during classes and learn together in groups. In all kinds of interactions during sessions, lectures and ward teachings, the atmosphere was less relaxed and there were fewer opportunities for them to develop interpersonal skills. This was of concern and when investigated it was revealed that students preferred small group sessions over big lectures and this was lacking at our university. There is an international move from traditional curriculum towards the learner — centered, and patient-oriented curriculum; in this study the modified PBL method was the preferred one for 39% of the students, followed by the PBL (36%) and lastly the lectures (25%).[17] But some of these problematic points that improved over the year were that students were clearer about their learning objectives and they found cheating to be more difficult than they had expected.

Students of DMC showed most significant differences (p<0.0001) in expected and actual perceptions. SMC also displayed a significant difference(p=0.012). This could be because many of these students belonged to non English backgrounds and might have problems adjusting. Studies have discovered that students from non-English speaking backgrounds reported having more difficulties in their class and exams because they required more time to understand the content of books, journal articles, etc.[18,19] Such students probably have higher expectations than normal. DIMC students displayed a higher actual score than expected, which means the students expectations were much lower than what the university provided them. These are mostly overseas students who do not have very high expectations from a third world country like Pakistan and it probably takes them a lot of time to settle in their new culture and different ways of learning. Being new arrivals, international students also have to struggle with local host, language and culture.[20]

The measures taken after this study were that PBL sessions were introduced and students were encouraged to participate in research projects for their interpersonal skills and deducing power to be developed. They were encouraged to participate in the annual week which includes a wide range of extracurricular activities and classes were not held during this time to keep their brain stress free. Students were also assigned mentors from amongst the teaching staff, so that they could discuss their problems and be more relaxed with the atmosphere around them. The results of the above changes were observed by reduced number of complaints over the year and would further be investigated when the DREEM is repeated over the successive years.

Conclusions

A more positive response was observed in both the expected as well as actual perceptions. However there was significant difference between the 2 sets which indicates that measures should be taken to come up to the students' expectations. Several problematic areas were also found (as most of the scores were between 2 and 3); this calls for a drive towards improvement and to work on the problematic areas as discussed above. Students' perception of their medical environment requires regular evaluation (at the end of every year) to make new enforcements more effective and create a healthier atmosphere for learning.

Acknowledgements

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