SQU Med J, February 2012, Vol. 12, Iss. 1, pp. 77-85, Epub. 7th Feb 12.
Submitted 3rd May 11
Revision Req. 1st Jun 11, Revision recd. 23rd Jul 11
Accepted 27th Aug 11

CLINICAL & BASIC RESEARCH

Faculty and Students' Perceptions of Student Experiences in a Medical School Undergoing Curricular Transition in the United Arab Emirates

*Syed I Shehnaz,[1] Jayadevan Sreedharan,[2] Kadayam G Gomathi[3]

آراء أعضاء هيئة التدريس والطلاب لتجربة تغيير المنهاج الدراسي لكلية الطب بدولة الإمارات العربية المتحدة

سيد شاهيناز، جيدافن سريدهاران، كادايام جوماثي

الملخص: **الهدف**: في عام 2008 قامت جامعة الخليج الطبية بدولة الإمارات العربية المتحدة بتغيير نظام التدريس فيها، فأصبح المنهاج متداخلا ومعتمدا على دراسة أجهزة الجسم كوحدة متكاملة بدلا من المنهاج القديم المعتمد على دراسة المواد الدراسية بطريقة منفصلة. تهدف هذه الدراسة إلى مقارنة مدى تقبّل أعضاء هيئة التدريس والطلاب للمنهاج الجديد. **الطريقة**: تم جمع المعطيات من أعضاء هيئة التدريس وطلاب الطب في السنة الثانية حول المنهاج الجديد باستخدام مقياس دندي الجاهز للبيئة التعليمية، وجرى تحليل المعطيات إحصائيا بواسطة برنامج التحليلات التنبؤية، الإصدار 18، وكذلك استخدمنا برنامج محصلة رتبة ولكوكسن للعلامات العامة والخاصة، بينما استخدمنا فحص (ز) للنسب. **النتائج**: وجدنا عدم وجود فرق إحصائي معتدّ بين تقبّل أعضاء هيئة التدريس (135/200) والطلاب (139/200) للمنهاج المتداخل الجديد، مع وجود إحساس لدى أعضاء هيئة التدريس بأن المنهاج الجديد قد زاد من فرص وقدرة الطلاب على التعلم الإيجابي كما تبين ذلك من "إدراك الطلاب للتعلم". وظهر أنّ هناك اتفاقا بين أعضاء هيئة التدريس والطلاب مفاده أنّ أعضاء هيئة التدريس يتصورون أن هناك حاجة أكثر إلى زيادة التغذية الراجعة للطلاب وزيادة التركيز على التعلم على المدى الطويل. **الخلاصة**: أظهرت الدراسة أن كلا من أعضاء الهيئة التدريسية والطلاب لديهم إدراك مماثل حول تجارب الطلاب في المنهاج الجديد، ومن المجالات التي كانت تستلزم تدابير علاجية هي حاجة أعضاء هيئة التدريس لتعلم تقنيات التغذية الراجعة البنّاءة والتركيز على التعلّم على المدى الطويل في المناهج الجديدة.

مفتاح الكلمات: المنهاج، التعليم الطبي الأولي، طلاب الطب، هيئة التدريس الطبي، إدراك.

ABSTRACT: ***Objectives:*** In 2008, the Gulf Medical College in the United Arab Emirates underwent a curricular change from a discipline-based to an organ-system-based integrated curriculum. In this context, this study aimed to compare the faculty and students' perceptions of the student experiences with the new curriculum. ***Methods:*** Data were collected from faculty and second-year students in the integrated curriculum using the Dundee Ready Education Environment Measure (DREEM). Data collected were transferred to Predictive Analytics Software, Version 18. Global and domain scores were assessed with the Wilcoxon Rank-Sum Test. Percentage agreement, disagreement and uncertainty were assessed by the z-test for proportion. ***Results:*** There were no significant differences between the total DREEM scores of faculty (139/200) and students (135/200). The faculty perceived that the students were experiencing significantly more positive learning as indicated by the domain score of "Students' Perceptions of Learning". Proportions of agreement between faculty and students showed that more faculty members than students perceived the need for increased feedback to students and a greater emphasis on long term learning. ***Conclusion:*** The study showed that the faculty and students had similar perceptions about the student experiences in the integrated curriculum. Areas necessitating remedial measures were the need for faculty to learn constructive feedback techniques and an emphasis on long term learning in the new curriculum.

Keywords: Curriculum; Undergraduate medical education; Medical students; Medical faculty; Perception.

Advances in Knowledge

1. *This is the first study in Gulf Cooperation Council countries comparing perceptions of students and faculty regarding student experiences in an integrated medical curriculum.*

Departments of [1]Pharmacology and [3]Biochemistry, Gulf Medical University, Ajman, United Arab Emirates; [2]Research Division, Gulf Medical University, Ajman, United Arab Emirates.

**Corresponding Author e-mail: shehnazilyas@yahoo.com*

2. *Perceptional differences highlighted by this study give insights into the differences between the intended curriculum and that which is actually implemented.*
3. *Constructive feedback techniques and more emphasis on long-term learning were areas identified as requiring remedial intervention.*

Application to the patient care

1. *The insights gained from this study into student and faculty perceptions of student experiences should help in the design of better curricular strategies to maximise the learning of future physicians. It should ultimately improve the quality of health care which they will subsequently deliver.*

The educational environment of a medical school has considerable bearing on students' learning, academic progress, and well-being.[1-3] A conducive educational environment will result in positive learning outcomes.[1] The connection between the learning environment and the curriculum is robust. The "curriculum's most significant manifestation and conceptualization is the environment, educational and organizational, which embraces everything that is happening in the medical school".[1]

Following in-depth reviews in 2008 of the existing curriculum at the Gulf Medical College, in Ajman, United Arab Emirates (UAE), which revealed major weaknesses, a major curricular change was introduced from a traditional discipline-based curriculum to a modular, organ-system-based integrated curriculum with elements of problem-based learning (PBL). The new curriculum accentuates student-centered learning with more interactive teaching/learning sessions such as small group learning, computer-aided learning, case-based learning and PBL. The language of instruction remains English as in the previous curriculum. The first year involves an introduction to medical sciences beginning with courses like *Cells, Molecules* and *Genes* and then moving on to more in-depth courses such as *Tissues* and *Organs*; *Embryogenesis* and *Life Cycle*; *Metabolism* and *Nutrition*, and *Internal* and *External Environment*. Courses like *Language* and *Communication Skills* and *Psychosocial Sciences* introduce the students to various aspects of the delicate doctor-patient relationship. The next two years are dedicated to the integrated study of organ systems. The final two years are the clinical clerkship phase which is followed by a one-year compulsory rotating internship.

Students' perceptions of the educational environment have been explored in depth,[4-7] but the same attention has not been paid to teachers' perceptions. Faculty perceptions of the educational environment will have a strong bearing on the learning environment of the students.[1] As the learning environment is an important determinant of the behaviour of both students and teachers, a comparative study of the perceptions of the teaching faculty and the students will enable the development of guidelines to improve the quality of the educational environment in any institution. Such a study would also help ascertain whether the faculty perceptions of student experiences in the new integrated curriculum actually align with those of the students. Subsequently, these findings will probably reveal the strengths and weaknesses of a newly introduced curriculum with the findings contributing to the ultimate aim of refining it.

The aim of this study was to compare the faculty members' and students' perceptions of the student experiences after one year of study in the newly introduced organ-system based integrated curriculum at the Gulf Medical College, Ajman, UAE.

Methods

The DREEM Questionnaire, which has universal face validity[4,7] and high reliability,[6,8] has been used to assess the learning environment as perceived by students.[4-7] This questionnaire has identified the perceived weaknesses of a new curriculum[3] and has been used to compare the educational environment in two different curricula.[7,9] In a UK medical school, a modified version of the DREEM inventory[10] was used to compare the perceptions of teachers and students.

The DREEM inventory comprises 50 items divided into 5 domains which are 1) *Students' Perceptions of Learning* (SPL) - 12 items (max. score 48); 2) *Students' Perceptions of Teachers* (SPT) - 11 items (max. score 44); 3) *Students' Academic Self-Perceptions* (SAP) - 8 items (max. score 32); 4) *Students' Perceptions of Atmosphere* (SPA) - 12 items (max. score 48); 5) *Students' Social Self-Perceptions*

Table 1. Demographics of the study sample

Variable		Faculty	Students
Gender	Male	10 (36%)	17 (39%)
	Female	18 (64%)	27 (61%)
Age (yrs)	Male	49.4±8.7 yrs	20.6±2.2 yrs
(Mean ± Standard Deviation)	Female	44.4±9.0 yrs	19.5±1.7 yrs
Teaching experience (yrs)	≤10 yrs	9 (32%)	-
	11–36 yrs	19 (68%)	-
Department	Preclinical	23 (82%)	-
	Clinical	5 (18%)	-

(SSP) - 7 items (max. score 28). The total score for all domains is 200. Each item is scored from 0–4 with 4 = strongly agree; 3 = agree; 2 = unsure; 1= disagree; 0 = strongly disagree. Nine negative items are scored in reverse for analysis.

The DREEM Questionnaire was pilot tested on a sample of our students and faculty. Following the pilot study, descriptive phrases were added to some items of the questionnaire for better understanding. As the DREEM Questionnaire was originally developed to give only the students' perceptions of the educational environment. The faculty DREEM Questionnaire was modified in our study to assess the perceptions of the faculty about the student experiences in our institution. (*I feel comfortable in class socially* was modified to *The students feel comfortable in class socially*).

The questionnaire was administered to 44 second year students in the integrated curriculum at the Gulf Medical College at the beginning of the 2009 academic year. Brief explanations of the objectives and the method of filling out the questionnaire were given.

The 28 faculty members of the Gulf Medical College, teaching in the integrated curriculum of the Bachelor of Medicine, Bachelor of Surgery (MBBS) programme, were given details of the objectives. They were informed that their perceptions should be about the students' experiences in the previous academic year. They were encouraged to answer items regarding students' personal views of the environment (e.g. *students have good friends in this school*), or which were outside the context in which the staff dealt with the students (e.g. *teachers are patient with the hospital patients*) as "unsure".

Voluntary participation was stressed for both the sample groups. The DREEM questionnaire was answered anonymously by both students and faculty. The study was approved by the Ethics Review Committee of the institution.

Data were analysed using the statistical package Predictive Analytics Software (Version 18, IBM, Illinois, Chicago, USA). The mean global scores and domain scores were expressed as mean ± standard deviation (SD). The comparison of scores was done using the Wilcoxon Rank-Sum Test. A *P* value of less than 0.05 was considered statistically significant. We also analysed the domain scores based on the interpretation suggested by Mc Aleer and Roff.[11]

As there were items in the DREEM questionnaire on the personal views of the students, we anticipated a large number of "unsure" responses by the faculty." Hence, to weed out the actual differences between the student and faculty responses, the responses to each individual item of the questionnaire were classified into three categories: 'Agreement' (strongly agree/agree), 'Disagreement' (strongly disagree/disagree) and 'Unsure' (unsure); they were compared using the z-test for proportion with a significance level of 0.05.

Results

The response rate for the faculty was 93% and all students present in the class on the day of the survey responded (93% of all second year students). The characteristics of the sample are given in Table 1. The total DREEM scores for the faculty and the students

Table 2: Mean ± standard deviation Dundee Ready Education Environment Measure (DREEM) domain scores (% of maximum score) for faculty and students

Domain	Faculty	Student
Students' perception of learning (SPL)	36.89±4.34 (76.9%)*	33.36±5.21 (69.5%)
Students' perception of teachers (SPT)	31.68±4.60 (72%)	29.98±5.08 (68%)
Students' academic self-perception (SAP)	21.25±3.34 (66.4%)	22.41±4.13 (70%)
Students' perceptions of atmosphere (SPA)	32.57±4.80 (67.9 %)	31.45±7.17 (65.5%)
Students' social self-perceptions (SSP)	16.57±2.86 (59.2%)	18.20±4.66 (65%)
Total DREEM score for the group	138.96±15.51 (69.5%)	135.4±22.1 (67.7%)

**P = <0.001*

was 139/200 and 135/200 respectively. The mean domain scores obtained by faculty and students are shown in Table 2. The domain scores of *Students' Perceptions of Teachers* in the range 23–33 revealed that both the groups perceived "moving in the right direction" for the teachers; scores between 17–24 for *Students' Academic Self-Perceptions* showed "feeling more on the positive side" for the academic self-perception; scores between 25–36 for *Students' Perceptions of Atmosphere* indicated "a more positive atmosphere" and scores between 15–21 for *Students' Social Self-Perceptions* suggested "not too bad" for the social self-perceptions. As the domain score of *Students' Perceptions of Learning* for faculty was 36.8, they perceived "teaching highly thought of" while the students perceived "a more positive approach" for the learning (*Students' Perceptions of Learning score* of 33.4). The mean domain score for this domain (SPL) was significantly higher for the faculty as compared to the students ($P < 0.001$).

The faculty identified *Perception of Learning* as the domain with the highest mean score, whereas the students gave the highest scores to the domains *Perception of Learning* and *Academic Self-Perceptions*. Both groups gave the lowest mean scores to the domain *Social Self-Perceptions.*

There was consensus between the faculty and students with respect to percentage agreement, disagreement and uncertainty. On comparison of percentage agreement, the faculty tended to agree significantly more than the students for two items: #47 *Long term learning is given importance over short term learning*, and #29 *The teachers are good at providing feedback to students*. On the other hand, the students tended to agree significantly more than the faculty for 9 items: #6 *The teachers are patient with the hospital patients*; #18 *The teachers have good communication skills with hospital patients*; #10 *The students are confident about passing this year*; #26 *The students' last year's work has been a good preparation for this year's work*; #31 *The students have learned a lot about empathy in this profession*; #11 *The atmosphere is relaxed during the hospital ward teaching*; #15 *The students have good friends in this school*; #19 *The students' social life is good*, and #46 *The students' accommodation is pleasant* [Tables 3 & 4].

Analysis of percentage uncertainty identified two items for which faculty were significantly unsure as compared to the students: #11 T*he atmosphere is relaxed during the hospital ward teaching* and #46 *The student's accommodation is pleasant.*

Discussion

The educational environment is the soul and spirit of the medical curriculum.[1] The success of an effective curriculum depends on a positive educational environment. A curricular modification will customarily affect the educational environment. Hence, we anticipated a positive change in the learning environment of our institution due to a shift to a more student-centered curriculum.

For curricular change to be a successful, the commitment of the faculty must be ensured. Faculty perceptions of the changed educational environment could not be assessed due to the lack of an appropriate instrument, so we dealt with this problem by modifying the DREEM questionnaire and using it to assess the perceptions of the faculty about student experiences in our school. The same instrument was used to investigate whether the views of the faculty and students were univocal with respect to the student experiences in the new integrated curriculum.

We had an acceptable response rate of 93% for both the faculty and students. We found that the total DREEM mean scores of our faculty (139/200) and students (135/200) were lower than that found by Miles and Leinster[10] (144/200 for staff and 141/200 for students).

The results of the present study show that both the faculty and students had positive perceptions of the student experiences in the educational environment, which is similar to that reported by Miles and Leinster.[10] These higher scores can be ascribed to the student-centered curricular change which is fully endorsed both by the faculty and the students. The faculty in our study perceived that the students were experiencing significantly more positive learning as indicated by the domain score of *Students' Perceptions of Learning*. Proportions of agreement between faculty and students showed that more faculty members than students thought there was increased feedback to students and a greater emphasis on long term learning.

"Curriculum generates and establishes environment".[1] As the curriculum forms an integral part of the educational environment, we used it as a proxy for comparison between

Table 3 : Items with significant differences between faculty and students

ITEMS		AGREEMENT		DISAGREEMENT		UNCERTAINITY	
Faculty and Student DREEM		Faculty Number (%)	Student Number (%)	Faculty Number (%)	Student Number (%)	Faculty Number (%))	Student Number (%)
Students' perceptions of learning (SPL)							
Long term learning is given importance over short term learning		26 (92.9%)	32 (72.7%)#	0	5 (11.4%)	2 (7.1%)	7 (15.9%)
Students' perceptions of teachers (SPT)							
The teachers are patient with the hospital patients		13 (46.4%)	38 (86.4%)*	0	3 (6.8%)	15 (53.6%)	3 (6.8%)
The teachers have good communication skills with hospital patients		15 (53.6%)	38 (86.4%)*	0	5 (11.4%)	13 (46.4%)	1 (2.3%)
The teachers are good at providing feedback to students		22 (78.6%)	20 (45.5%)	3 (10.7%)	14 (31.8%)	3 (10.7%)	10 (22.7%)
Students perceptions of atmosphere (SPA)							
The atmosphere is relaxed during the hospital ward teaching		6 (21.4%)	35 (79.5%)*	1 (3.6%)	6 (13.6%)	21 (75.0%)	3 (6.8%)#
Faculty DREEM	Student DREEM	**Students academic self perception (SAP)**					
The students are confident about passing this year	I am confident about my passing this year	11 (39.3%)	33 (75%)#	5 (17.9%)	1 (2.3%)	12 (42.9%)	10 (22.7%)
The students' last year's work has been a good preparation for this year's work.	Last year work has been a good preparation for this year's work.	15 (53.6%)	39 (88.6%)*	2 (7.1%)	2 (4.5%)	11 (39.3%)	3 (6.8%)
The students have learned a lot about empathy in this profession	In my profession, I have learned a lot about empathy	15 (53.6%)	38 (86.4%)*	0	5 (11.4%)	13 (46.4%)	1 (2.3%)
Students social self-perceptions (SSP)							
The students have good friends in this school	I have good friends in this school	18 (64.3%)	40 (90.9%) #	0	1 (2.3%)	10 (35.7%)	3 (6.8%)
The students' social life is good	My social life is good	10 (35.7%)	36 (81.8%)*	2 (7.1%)	6 (13.6%)	16 (57.1%)	2 (4.5%)
The students' accommodation is pleasant	My accommodation is pleasant	2 (7.1%)	36 (81.8%) #	4 (14.3%)	6 (13.6%)	22 (78.6%)	2 (4.5%)#

*Note: *P = <0.01; #P = <0.05*

faculty and student perceptions of the educational environment. We therefore looked at studies dealing with faculty and student perceptions of the curriculum. We found a plethora of studies detailing student perceptions of integrated medical curricula, but studies focusing on faculty perceptions and comparing faculty and student perceptions were sparse. Many previous studies[12-14] have shown teachers' views on revised, integrated, problem-based medical curricula to be positive, with the students in the new curriculum being perceived as faring better in many respects, including taking self-directed learning initiatives, gaining problem-solving and interpersonal skills, and improved clinical performance in patient care. Our study, which showed a positive effect on faculty members' attitudes to students' experiences and (indirectly) to the curriculum, is similar to that reported by

Table 4 : Examples of items without significant differences between faculty and students

ITEMS	AGREEMENT		DISAGREEMENT		UNCERTAINTY	
Faculty (student) DREEM	Faculty No. (%)	Student No. (%)	Faculty No. (%)	Student No. (%)	Faculty No. (%)	Student No. (%)
Students' Perceptions of Learning (SPL)						
The students(I am)are encouraged to participate in class	25 (89.3)	39 (88.6)	1 (3.6)	2 (4.5)	2 (7.1)	3 (6.8)
The teaching is often stimulating	24 (85.7)	38 (86.4)	--	5 (11.4)	4 (14.3)	1 (2.3)
The teaching is "student centered"	24 (85.7)	35 (79.5)	2 (7.1)	2 (4.5)	2 (7.1)	7 (15.9)
The teaching is sufficiently concerned to develop the student's (my) competence	24 (85.7)	38 (86.4)	--	2 (4.5)	4 (14.3)	4 (9.1)
The teaching overemphasizes factual learning	6 (21.4)	23 (52.3)	18 (64)	16 (36.4)	4 (14.3)	5 (11.4)
The students are (I am) clear about L.O. of the course	25 (89.3)	31 (70.5)	1 (3.6)	4 (9.1)	2 (7.1)	9 (20.5)
The teaching is too teacher-centered	5 (17.9)	5 (11.4)	20 (71)	24 (54.5)	3 (10.7)	15 (34.1)
Students' Perceptions of Teachers (SPT)						
The teachers are knowledgeable	25 (89.3)	42 (95.5)	-	1 (2.3)	3 (10.7)	1 (2.3)
The teachers ridicule the students	-	5 (11.4)	25 (89.3)	34 (77.3)	3 (10.7)	5 (11.4)
The teachers are authoritarian	3 (10.7)	11 (25.0)	15 (53.6)	25 (56.8)	10 (35.7)	8 (18.2)
The teachers provide constructive criticism	24 (85.7)	32 (72.7)	1 (3.6)	4 (9.1)	3 (10.7)	8 (18.2)
The teachers get angry in class	3 (10.7)	7 (15.9)	17 (60.7)	29 (65.9)	8 (28.6)	8 (18.2)
Teachers are well prepared for classes	22 (78.6)	35 (79.5)	2 (7.1)	2 (4.5)	4 (14.3)	7 (15.9)
The students irritate the teachers	3 (10.7)	11 (25.0)	18 (64.3)	21 (47.7)	7 (25.0)	12 (27.3)
Students academic self perception (SAP)						
Learning strategies which worked for the students (me) before continue to work	13 (46.4)	26 (59.1)	7 (25)	6 (13.6)	8 (28.6)	12 (27)
The students are (I am) able to memorize all they (I) need	9 (32.1)	19 (43.2)	7 (25.0)	14 (31.8)	12 (42.9)	11 (25.0)
The students' (my)problem solving skills are being well developed here	27 (96.4)	35 (79.5)	--	3 (6.8)	1 (3.6)	6 (13.6)
Much of what students (I) have to learn seems relevant for a career in medicine	26 (92.9)	41 (93.2)	--	1 (2.3)	2 (7.1)	2 (4.5)
Students perceptions of atmosphere (SPA)						
Cheating is a problem in this school	6 (21.4)	16 (36.4)	12 (42.9)	15 (34.1)	10 (35.7)	13 (29.5)
The atmosphere is relaxed during lectures	23 (82.1)	33 (75.0)	--	5 (11.4)	5 (17.9)	6 (13.6)
There are opportunities for students (me) to develop interpersonal skills	23 (82.1)	33 (75.0)	1 (3.6)	8 (18.2)	4 (14.3)	3 (6.8)
The atmosphere is relaxed during seminars/tutorial	22 (78.6)	39 (88.6)	2 (7.1)	5 (11.4)	4 (14.3)	-
The students (I) find the experience disappointing	4 (14.3)	11 (25.0)	14 (50.0)	19 (43.2)	10 (35.7)	14 (31.8)
The students are (I am) able to concentrate well	20 (71.4)	34 (77.3)	2 (7.1)	8 (18.2)	6 (21.4)	2 (4.5)
The enjoyment outweighs stress of studying medicine	12 (42.9)	21 (47.7)	7 (25.0)	12 (27.3)	9 (32.1)	11 (25.0)
The students'(I) feel able to ask question they (I)want	26 (92.9)	36 (81.8)	--	3 (6.8)	2 (7.1)	5 (11.4)
Students social self-perceptions (SSP)						
There is a good support system for students who get stressed	18 (64.3)	20 (45.5)	5 (17.9)	13 (29.5)	5 (17.9)	11 (25.0)
The students are (I am) too tired to enjoy the course	10(35.7)	15(34.1)	10(35.7)	22(50.0)	8 (28.6)	7(15.9)
The students are (I am) rarely bored in the course	16(57.1)	19(43.2)	6(21.4)	19(43.2)	6(21.4)	6(13.6)
The students (I) seldom feel lonely	14(50.0)	29(65.9)	3(10.7)	11(25.0)	11(39.3)	4(9.1)

Tavanaiepour *et al.* where they concluded that a hybrid curriculum had almost as great a positive effect as did the PBL curriculum.[15] In two other studies, the students' and faculty's opinions about PBL were found to be closely aligned and positive.[16,17] Brynhildsen *et al.* found that students and teachers highly appreciated horizontal and vertical integration.[18] Our findings appear to be consistent with the above studies.

Enduring and successful curricular change necessitates the support of all the stakeholders.[19] Factors found to be positively associated with successful innovation are 1) participating students' acceptance, feedback and enthusiasm for the change; 2) a cooperative environment, characterised by collaborative problem solving, harmony, effective communication and skillful conflict resolution; 3) involvement of different disciplines or departments in the planning and implementation of curricular innovation; 4) ensuring faculty involvement (through orientations, problem-solving teams, committees) so as to strengthen their collective ownership of the project and deepen their commitment to seeing the innovation through to completion; 5) frequent, timely, substantive and effective communication among participants to promote understanding of the goals; 6) faculty comprehension of the theoretical underpinnings of the desired innovati on and the required training in the skills to implement it; 7) formative evaluation (through focus groups and student feedback) to locate difficulties and solve problems thus fostering a cooperative climate, and renewing "ownership" of the project and 8) stable positive leadership with leaders who effectively communicate and promote the organisation's shared vision for curricular change.[20] All these factors were an essential component of the curricular change in our institution and may have contributed to most faculty and students finding the experiences of the students in the new curriculum favourable. This study, in fact, contributed to the evaluation process of our curricular change.

The higher mean scores in the domain *Students' Perception of Learning* by both groups reflects the positive response to our student-centered curriculum which emphasises long term learning and problem solving skills. Low scores in the domain *Social Self-Perceptions* by the faculty does not reveal perceptions of weaknesses, but suggests staff's unfamiliarity with these aspects of the students' experience. We had in fact mentioned that the faculty was advised to select "unsure" when the statements dealt with *Social Self-Perceptions* and other unfamiliar aspects. However, the low student scores for the domain *Social Self-Perceptions* reveal this to be an area of weakness necessitating rectification. This had already been identified in another study conducted in our institution where the insufficient support system for stressed students, the tiredness of students and the tediousness of the course emerged as areas of concern.[9]

We were aware that the DREEM was not designed to investigate other stakeholders' opinions on how the students experience their educational climate. Consequently, we compared the percentage of agreement, disagreement and uncertainty rather than analysing subscale and item mean scores so as to provide a clearer view of staff and student perceptions of the students' experience. Comparison of percentage agreement (faculty and students who agreed/strongly agreed) identified two areas where the staff significantly believed that students would have a more positive perception than the students actually did. These two items were: *Long-term learning is given importance over short term learning* and *The teachers are good at providing feedback to students*.

Students in PBL curricula tend to use a more in-depth approach of learning and have a greater intrinsic interest in learning and this may foster long- term knowledge retention.[21,22] As students' learning approaches are affected by their perceptions of the learning environment, any changes in learning environment will invariably alter their learning approach.[23,24] Though our new curriculum had incorporated features to enhance a deep approach to learning (clearly written learning objectives, assessment methods aligned to the learning objectives, student-centered teaching)[25] apparently these were not sufficient to influence the students and thus faculty and students perceptions' were not in consensus.

Effective feedback is a renowned catalyst for effective learning, especially for average or poor performers. Feedback should be given in a way that "helps the recipient to listen to it, receive it constructively, reflect on it, and consider how to take action as a result".[26] However, often there is a mismatch between student expectations and faculty feedback practices,[27,28] as also perceived in our study.

The rest of the items with which the students tended to agree significantly more compared to the faculty were mainly items with which the predominantly basic sciences staff were unfamiliar, e.g. *The teachers are patient with the hospital patients;* or unsure as these concerned the personal views of the students, for example, *The students are confident about passing this year; The students have learned a lot about empathy in the profession; The students have good friends in this school; The students' social life is good;* Similarly, the two items about which the faculty were significantly unsure compared to the students, *The atmosphere is relaxed during the hospital ward teaching; The student's accommodation is pleasant,* also dealt with areas involving personal views of the students.

The comparison of student and faculty perceptions revealed the need for certain interventions to improve our curriculum. Constructive and effective feedback techniques should be reinforced through faculty development programmes so as to influence attitudes as well as skills. Formative feedback should be task oriented, simple, timely, provided by the appropriate person, in a friendly non-threatening climate and involve praise alongside constructive criticism and corrective advice.[26,28,29] However, as student satisfaction ratings are not an accurate indicator of the quality of feedback, improved performance should instead be the gauge.[27] Avoidance of curriculum overload, clearly written objectives, teaching practices promoting conceptual change, assessments which emphasise understanding and application should be adopted to enhance long term learning.[25]

Our study provides preliminary data about the faculty perceptions' of the student experiences in the new curriculum. We are aware that our study was restricted to one school and our sample size was small. Consequently, it may be premature to come to concrete conclusions, or to generalise the results to other schools. The method we have used is subjective and dependent on students' and teachers' recollections of students' experiences from the previous year; however, these perceptions will inevitably have some relation to actual faculty and student behaviour. Future structured qualitative studies can also deal with the limitations of these questionnaire-based data.[30] Another limitation is that the instrument used was not intended to evaluate staff opinions about the students' experience with the educational environment. We dealt with this limitation by analysing the data slightly differently so as to extract valuable differences between the staff and student opinions of the student experiences. While all attempts had been made to ensure validity of the questionnaire, we are aware that a modification of the instrument may have had an effect on the validity.

Conclusion

The desired outcomes of excellent student behaviour, achievement, satisfaction and success have a proven connection to positive perceptions of the educational environment. Moreover, continuous assessments are important for the sustainability of the curriculum. Student and faculty perceptions are essential as they have direct impact on teaching and learning, and the development and well-being of the students.[1] In addition, these different perspectives will shed light on alternative focus points in the improvement of the new curriculum. Although the modified DREEM questionnaire identified that both the students and the faculty perceived that the new organ system-based integrated curriculum provided a good educational environment, they also had differing perceptions regarding effective feedback and the emphasis on long term learning. Therefore, the remedial measures identified were that faculty should learn constructive feedback techniques, and a greater emphasis should be placed on long term learning in the new curriculum.

CONFLICT OF INTEREST

The authors reported no conflict of interest.

ACKNOWLEDGMENT

The authors would like to thank Dr. Gamini Premadasa for his suggestions in editing this article.

References

1. Genn JM. AMEE Medical Education Guide No.23 (Part 1): Curriculum, environment, climate, quality and change in medical education—a unifying perspective. Med Teach 2001; 23:337–44.
2. Roff S, McAleer S, Ifere OS, Bhattacharya S. A global diagnostic tool for measuring educational environment: Comparing Nigeria and Nepal. Med Teach 2001; 23:378–82.

3. Till H. Identifying the perceived weaknesses of a new curriculum by means of the Dundee Ready Education Environment Measure (DREEM) Inventory. Med Teach 2004; 26:39–45.
4. Bassaw B, Roff S, McAleer S, Roopnarinesingh S, De Lisle J, Teelucksingh S, et al. Students' perspectives of the educational environment, Faculty of Medical Sciences, Trinidad. Med Teach 2003; 25:522–6.
5. Jiffry MTM, McAleer S, Fernandoo S, Marasinghe RB. Using the DREEM questionnaire to gather baseline information on an evolving medical school in Sri Lanka. Med Teach 2005; 27:348–52.
6. Mayya S, Roff S. Students' perceptions of educational environment: A comparison of academic achievers and under-achievers at Kasturba Medical College, India. Educ Health (Abingdon) 2004; 17:280–91.
7. AlHazimi A, Zaini R, AlHyiani A, Hassan N, Gunaid A, Ponnamperuma G, et al. Educational environment in traditional and innovative medical schools: A study in four undergraduate medical schools. Educ Health (Abingdon) 2004; 17:192–203.
8. Riquelme A, Oporto M, Oporto J, Méndez J, Viviani P, Salech F, et al. Measuring students' perceptions of the educational climate of the new curriculum at the Pontificia Universidad Católica de Chile: Performance of the Spanish translation of the Dundee Ready Education Environment Measure (DREEM). Educ Health (Abingdon) 2009; 22:112.
9. Shehnaz SI, Sreedharan J. Students' perceptions of educational environment in a medical school experiencing curricular transition in United Arab Emirates. Med Teach 2011; 33:e37–42.
10. Miles S, Leinster SJ. Comparing staff and student perceptions of the student experience at a new medical school. Med Teach 2009; 31:539–46.
11. McAleer S, Roff S. A practical guide to using the Dundee Ready Education Environment Measure (DREEM). In: Genn JM, Ed. AMEE Education Guide No. 23 (Part 3): Curriculum, Environment, Climate, Quality and Change in Medical Education: a Unifying Perspective. Dundee: Association for Medical Education in Europe, 2001. Pp. 29–33.
12. Lam TP, Khoo US, Chan YS, Cheng YH, Lam KF. The first batch of graduates of a new medical curriculum in Asia: How their teachers see them. Med Teach 2004; 38:980–6.
13. Vernon DTA. Attitudes and opinions of faculty tutors about problem-based learning. Acad Med 1995; 70:216–23.
14. Vernon DTA, Hosokawa MC. Faculty attitudes and opinions about problem-based learning. Acad Med 1996; 71:1233–8.
15. Tavanaiepour D, Schwartz PL, Loten EG. Faculty opinions about a revised pre-clinical curriculum. Med Educ 2002; 36:299–302.
16. Musal B, Taskiran C, Kelson A. Opinions of tutors and students about the effectiveness of PBL in Dokuz Eylul University School of Medicine. Med Educ Online 2003; 8:16. From: http://www.med-ed-online.org. Accessed: Jun 2011.
17. Khoo HE, Chhem RK, Gwee MC, Balasubramaniam P. Introduction of problem-based learning in a traditional medical curriculum in Singapore - Students' and tutors' perspectives. Ann Acad Med Singapore 2001; 30:371–4.
18. Brynhildsen J, Dahle LO, Fallsberg MB, Rundquist I, Hammar M. Attitudes among students and teachers on vertical integration between clinical medicine and basic science within a problem based undergraduate medical curriculum. Med Teach 2002; 24:286–8
19. Watson RT, Suter E, Romrell LJ, Harman EM, Rooks LG, Neims AH. Moving a graveyard: How one school prepared the way for continuous curriculum renewal. Acad Med 1998; 73:948–55.
20. Bland CJ, Starnaman S, Wersal L, Moorehead-Rosenberg L, Zonia S, Henry R. Curricular change in medical schools: How to succeed. Acad Med 2000; 75:575–94.
21. Norman GR, Schmidt HG. The psychological basis of problem-based learning: A review of the evidence. Acad Med 1992; 67:557–65.
22. Beers GW, Bowden S. The effect of teaching method on long-term knowledge retention. J Nurs Educ 2005; 44:511–4.
23. Newble DI, Clarke RM. The approaches to learning of students in a traditional and in an innovative problem-based medical school. Med Educ 1986; 20:267–73.
24. Lizzio A, Wilson K, Simons R. University students' perceptions of the learning environment and academic outcomes: implications for theory and practice. Stud High Educ 2002; 27:27–52.
25. Reid WA, Duvall E, Evans P. Can we influence medical students' approaches to learning? Med Teach 2005; 27:401–7.
26. Henderson P, Ferguson-Smith AC, Johnson MH. Developing essential professional skills: A framework for teaching and learning about feedback. BMC Med Educ 2005; 5:11.
27. Boehler ML, Rogers DA, Schwind CJ, Mayforth R, Quin J, Williams RG, et al. An investigation of medical student reactions to feedback: A randomised controlled trial. Med Educ 2006; 40:746–9.
28. Perera J, Lee N, Win K, Perera J, Wijesuriya L. Formative feedback to students: the mismatch between faculty perceptions and student expectations. Med Teach 2008; 30:395–9.
29. Nicol DJ, Macfarlane-Dick D. Formative assessment and self regulated learning: A model and seven principles of good feedback practice. Stud High Educ 2006; 31:199–218.
30. Seabrook M. Clinical students' initial reports of the educational climate in a single medical school. Med Educ 2004; 38:659–69.