

## BRIEF REPORT

# Students' perception of the learning environment at Xavier University School of Medicine, Aruba: a follow-up study

P. Ravi Shankar<sup>1\*</sup>, Rishi Bharti<sup>2</sup>, Ravi Ramireddy<sup>3</sup>, Ramanan Balasubramaniam<sup>4</sup>, Vivek Nuguri<sup>4</sup>

Departments of <sup>1</sup>Pharmacology, <sup>2</sup>Epidemiology, <sup>3</sup>Biochemistry, and <sup>4</sup>Pathology, Xavier University School of Medicine, Aruba, Kingdom of the Netherlands

## Abstract

Xavier University School of Medicine admits students mainly from the United States and Canada to the undergraduate medical program. A previous study conducted in June 2013 used the Dundee Ready Educational Environment Measure to measure the educational environment and impact of different teaching and learning methods in the program. The present study aims to obtain information about students' perceptions of changes in the educational environment, which underwent modifications in teaching and learning, in January 2014. Information was collected about the participants' semester of study, gender, nationality, and age. Students' perceptions of the educational environment were documented by noting their degree of agreement with a set of 50 statements grouped into five categories. Average scores were compared among different groups. The mean total and category scores were compared to those of the 2013 study. Sixty of the sixty-nine students (86.9%) who enrolled in the undergraduate medical program participated in the survey. The majority were male, aged 20-25 years, and of American nationality. The mean  $\pm$  SD total score was  $151.32 \pm 18.3$ . The mean scores for students' perception in the survey categories were perception of teaching/learning (38.45), perception of teachers (33.90), academic self-perceptions (22.95), perception of atmosphere (36.32), and social self-perception (19.70). There were no significant differences in these scores among the different groups. All scores except those for academic self-perception were significantly higher in the present study compared to the previous one ( $P < 0.05$ ). The above results will be of particular interest to schools that plan to transition to an integrated curriculum.

**Key Words:** Educational measurement; Follow-up study; Medical education; Medical student; Perception

The Dundee Ready Educational Environment Measure (DREEM) has been widely used to evaluate the educational environment in medical schools [1,2]. Xavier University School of Medicine is a private medical school in Aruba that admits students mainly from the United States of America and Canada to the undergraduate medical (MD) course. Students take the first five semesters of the course in Aruba and then complete their clinical rotations in the United States of America. A

number of modifications to the MD program have been carried out since January 2013 [2,3]. The basic science subjects were partially integrated according to organ systems with normal human structure and function (Anatomy, Physiology, and Biochemistry) and are now covered in the first two semesters; structure and function in disease (Pathology, Microbiology, Pharmacology, and Introduction to Clinical Medicine) are covered in the third and fourth semesters. Problem-based learning (PBL) sessions and sessions on the critical appraisal of scientific literature (CASL) were introduced in May 2013. An online module on patient safety and health management provided by the Institute for Healthcare Improvement (<http://www.ihl.org/>) has also been offered as of September 2013. Fur-

\*Corresponding email: [ravi.dr.shankar@gmail.com](mailto:ravi.dr.shankar@gmail.com)

Received: February 27, 2014; Accepted: May 6, 2014;

Published: May 7, 2014

This article is available from: <http://jeehp.org/>

ther, the assessment system was modified to include formative assessment and assessment of attitudes and behavior. From the January 2014 semester, all basic science subjects (Anatomy, Physiology, Biochemistry, Pathology, Pharmacology, Microbiology, and Epidemiology) are taught in a fully integrated organ system-based manner, and family health visits have been introduced. Given students' difficulty in coping with the tight course schedule, an additional semester of study was introduced to allow them more study and preparation time. The institution's educational environment was previously studied using DREEM in June 2013. The present study was conducted to obtain further information about students' perceptions of the recent changes, including the curriculum integration, changes to student assessment, and introduction of activity-based, small group learning sessions.

Students' DREEM scores were compared among different groups of respondents as well as against those obtained in a previous study [2]. The study was carried out among first- to fourth-semester MD students during the last week of January 2014 using a validated instrument, DREEM [1]. The aims and objectives of the study were explained to the students, and their written informed consent was obtained. A semester of study consists of 15 weeks. Students are admitted three times a year—in January, May, and September. Information was collected about the participating students' semester of study, gender, nationality, and age. Their perceptions of the institution's educational environment were documented by noting their degree of agreement with a set of 50 statements using a modified Likert-type scale. The statements were grouped into five categories: perception of teaching/learning; perception of teachers, academic self-perception, perception of atmosphere, and social self-perception. Certain statements were negative, and their scores were reversed in the calculation of the category

scores. The total score was obtained by adding together the scores of all the categories. The data were analyzed using IBM SPSS ver. 20 (IBM Co., Armonk, NY, USA). The scores of individual statements were noted. The average scores were compared among different groups of respondents using appropriate statistical tests ( $P < 0.05$ ). The mean total score and category scores were also compared to those obtained in the previous study [2]. The present third- and fourth-semester MD students were in their first and second semester, respectively, at the time of the previous survey. Their scores in the previous and present study were compared using a paired t-test. Sixty of the 69 students (86.9%) in the undergraduate medical program participated in the study. Table 1 shows the demographic characteristics of the student respondents. The majority of respondents (66.7%) were male, aged 20 to 25 years, and of American nationality. The mean  $\pm$  SD total score was  $151.32 \pm 18.3$ . The mean  $\pm$  SD scores for perception of teaching/learning and perception of teachers were  $38.45 \pm 4.40$  and  $33.90 \pm 4.77$ , respectively. The mean  $\pm$  SD scores for academic self-perception, perception of atmosphere, and social self-perception were  $22.95 \pm 5.07$ ,  $36.32 \pm 5.53$ , and  $19.70 \pm 3.57$ , respectively.

Table 2 shows the category and total scores according to the gender of the respondents. There was no significant difference in the scores according to gender. Table 3 shows the category scores and total scores according to the respondents' semester of study. There were no significant differences in the scores of students of different semesters. Table 4 shows the category scores and total scores of students by nationality. Among the scores of individual statements, the scores of the following statements (i.e., those with scores of less than 2.5) were areas of concern: *I seldom feel lonely* (2.35), *I am rarely bored in this course* (2.28), *There is a good support system for students who*

**Table 1.** Demographic characteristics of the respondents in the survey of students' perception of the learning environment at Xavier University School of Medicine, Aruba using the Dundee Ready Educational Environment Measure

Characteristic	No. (%)
Gender	
Male	40 (66.7)
Female	20 (33.3)
Semester	
First	14 (23.3)
Second	14 (23.3)
Third	14 (23.3)
Fourth	18 (30.0)
Age (years)	
Less than 20	5 (8.3)
20 to 25	47 (78.3)
More than 25	8 (13.3)
Nationality	
American	34 (56.7)
Canadian	13 (21.7)
Other	13 (21.7)

**Table 2.** Category scores and total scores according to the gender of the respondents in the survey of students' perception of the learning environment at Xavier University School of Medicine, Aruba using the Dundee Ready Educational Environment Measure

Characteristic	Gender	Mean score	P-value
Perception of teaching/learning	Male	37.75	0.081
	Female	39.85	
Perception of teachers	Male	33.20	0.108
	Female	35.30	
Academic self-perception	Male	22.45	0.284
	Female	23.95	
Perception of atmosphere	Male	36.10	0.672
	Female	36.75	
Social self-perception	Male	19.63	0.820
	Female	19.85	
Total	Male	149.13	0.192
	Female	155.70	

**Table 3.** Category scores and total scores according to the respondents' semester of study in the survey of students' perception of the learning environment at Xavier University School of Medicine, Aruba using the Dundee Ready Educational Environment Measure

Characteristic	Semester	Mean score	P-value
Perception of teaching/learning	First	39.86	0.528
	Second	38.64	
	Third	37.71	
	Fourth	37.78	
Perception of teachers	First	34.71	0.443
	Second	34.79	
	Third	34.14	
	Fourth	32.39	
Academic self-perception	First	24.50	0.568
	Second	21.86	
	Third	23.00	
	Fourth	22.56	
Perception of atmosphere	First	36.79	0.797
	Second	37.36	
	Third	35.64	
	Fourth	35.67	
Social self-perception	First	21.14	0.330
	Second	19.79	
	Third	18.86	
	Fourth	19.17	
Total	First	157.00	0.519
	Second	152.43	
	Third	149.36	
	Fourth	147.56	

feel stressed (2.23), The school uses a good timetable (2.00), The enjoyment outweighs the stress of studying medicine (2.30), and The teaching overemphasizes factual learning (reversed score; 2.00). All scores except those for the category of academic self-perception were significantly higher in the present study compared to the 2013 investigation [2]. The mean score for perception of teaching/learning was 38.45 in the present study, whereas it was 31.97 ( $P < 0.001$ ) in the previous one. The mean score for perception of teachers was 33.90, compared to 30.05 ( $P < 0.001$ ) in June 2013. Then, the mean score for perception of atmosphere increased from 30.92 in June 2013 to 36.32 in January 2014 ( $P < 0.001$ ), while the mean score for social self-perception increased from 16.96 to 19.70 ( $P < 0.001$ ) and the mean total score increased from 131.79 in to 151.32 ( $P < 0.001$ ). The mean scores of the present third-semester students were compared to the same scores reported in the previous study when the students were in their first semester (Table 5). The scores for perception of teaching/learning and perception of teachers, and the total score, were significantly higher compared to those reported previously. The mean scores of the present fourth-semester students were compared to those ob-

**Table 4.** Category scores and total score according to the nationality of the respondents in the survey of students' perception of the learning environment at Xavier University School of Medicine, Aruba using the Dundee Ready Educational Environment Measure

Characteristic	Nationality	Mean score	P-value
Perception of teaching/learning	American	38.40	0.863
	Canadian	38.10	
	Other	39.00	
Perception of teachers	American	33.47	0.713
	Canadian	34.23	
	Other	34.69	
Academic self-perception	American	22.35	0.588
	Canadian	23.77	
	Other	23.69	
Perception of atmosphere	American	36.38	0.531
	Canadian	35.00	
	Other	37.46	
Social self-perception	American	19.76	0.800
	Canadian	19.15	
	Other	20.08	
Total	American	150.35	0.731
	Canadian	150.23	
	Other	154.92	

**Table 5.** Total scores for third-semester students in January 2014 and June 2013 (when they were first-semester students) in the survey of students' perception of the learning environment at Xavier University School of Medicine, Aruba using the Dundee Ready Educational Environment Measure

Characteristic	Mean score (June 2013)	Mean score (January 2014)	P-value
Perception of teaching/learning	33.00	38.00	0.023
Perception of teachers	29.77	34.38	0.012
Academic self-perception	20.61	23.23	0.240
Perception of atmosphere	31.85	35.54	0.225
Social self-perception	16.92	18.69	0.286
Total	132.15	149.85	0.037

tained previously (Table 6). The score for perception of teaching/learning and the total score were significantly higher.

In the free comments section, the students wrote as follows: "The sporadic changes in the timetable are confusing and at times frustrating," "Group studying after school hours seems to be discouraged because classrooms are not allowed to be used by separate groups," "Students need to conduct themselves properly outside of school," "Studying at school is impossible, and study carousels are needed," "I think we need to have relaxation time after integrated quizzes and exams, because we are often sleep deprived," and "There needs to be better communication between teachers and students as well as among teachers." Each of these statements was only men-

**Table 6.** Total scores for fourth-semester students in January 2014 and June 2013 (when they were second-semester students) in the survey of students' perception of the learning environment at Xavier University School of Medicine, Aruba using the Dundee Ready Educational Environment Measure

Characteristic	Mean score (June 2013)	Mean score (January 2014)	P-value
Perception of teaching/learning	31.71	36.86	0.006
Perception of teachers	30.50	32.00	0.420
Academic self-perception	20.64	22.00	0.552
Perception of atmosphere	27.00	35.00	0.053
Social self-perception	16.07	19.14	0.209
Total	125.93	145.00	0.048

tioned by a single student.

There was a significant improvement in all category scores and in the total score when the results of this study were compared to those of the previous one. Other previous studies have compared DREEM scores in schools over a period of time. For example, a school in Saudi Arabia saw a significant improvement in scores in 2010/2011 compared to 2007/2008 [4]. In a medical school in the United Arab Emirates, mean total scores were significantly higher for second-year students who participated in an integrated curriculum than for second-year students who had learned under a discipline-based curriculum the previous year [5]. Kuwait University Medical School underwent a curricular transition from a traditional to a problem-based curriculum in 2006/2007. Following the transition, students' academic self-perception deteriorated while their perception of the atmosphere improved [6]. The authors postulate that this may be because conventional learning strategies were perceived as being no longer useful. In our study, there was no significant change in academic self-perception. The amount of PBL has increased, but lectures continue to be the predominant learning method at Xavier University School of Medicine. In addition, there was an improvement in certain areas of concern noted during the previous study. Among these were "The teaching is too teacher centered," "I am too tired to enjoy this course," "The teachers ridicule the students," "The teachers are authoritarian," and "The atmosphere is relaxed during the teaching." We are working towards creating areas in the school where students can learn together in groups. With the increased emphasis on small group learning during PBL sessions and other activities, the students seem to have discovered the benefits of working in a group where group work and cooperative learning are encouraged. We are also working towards streamlining the timetable and have fortnightly meetings to finalize the integrated timetable for the next two weeks; however, sometimes faculties request changes even after the timetable is finalized, which creates confusion. As the course

of study is accelerated and completed over a 15-week period, it is difficult to provide free time to the students both before and after the exam.

In conclusion, there were significant improvements in the category scores and the overall score compared to the results from June 2013. The results of this investigation will be of particular interest to schools that are in the process of transitioning to an integrated curriculum or those that have recently transitioned, as the issues and challenges they face may be similar to those mentioned in this study.

**ORCID:** P. Ravi Shankar: <http://orcid.org/0000-0001-6105-5636>; Rishi Bharti: <http://orcid.org/0000-0002-0446-6516>; Ravi Ramireddy: <http://orcid.org/0000-0002-5561-9658>; Ramanan Balasubramaniam: <http://orcid.org/0000-0002-3111-5383>; Vivek Nuguri: <http://orcid.org/0000-0001-7141-1980>

## CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

## ACKNOWLEDGMENTS

The authors thank all the students who participated in the study.

## SUPPLEMENTARY MATERIAL

Audio recording of the abstract.

## REFERENCES

1. Miles S, Swift L, Leinster SJ. The Dundee Ready Education Environment Measure (DREEM): a review of its adoption and use. *Med Teach*. 2012;34:e620-e634. <http://dx.doi.org/10.3109/0142159X.2012.668625>
2. Shankar PR, Dubey AK, Balasubramaniam R. Students' perception of the learning environment at Xavier University School of Medicine, Aruba. *J Educ Eval Health Prof*. 2013;10:8. <http://dx.doi.org/10.3352/jeehp.2013.10.8>
3. Shankar PR, Dubey AK. 'Modernizing' the basic sciences MD program at XUSOM, Aruba. *WebmedCentral Med Educ*. 2013;4: WMC004198. [https://www.webmedcentral.com/article\\_view/4198](https://www.webmedcentral.com/article_view/4198)
4. Mojaddidi MA, Khoshhal KI, Habib F, Shalaby S, El-Bab ME, Al-Zalabani AH. Reassessment of the undergraduate educational environment in College of Medicine, Taibah University, Al-madinah Almunawwarah, Saudi Arabia. *Med Teach*. 2013;35 s1:S39-S46. <http://dx.doi.org/10.3109/0142159X.2013.765554>
5. 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-e42. <http://dx.doi.org/10.3109/0142159X.2011.530312>

6. Bouhaimed M, Thalib L, Doi SA. Perception of the educational en-

vironment by medical students undergoing a curricular transition in Kuwait. Med Princ Pract. 2009;18:204-208. <http://dx.doi.org/10.1159/000204351>