Original Research Article

Evaluation of the learning environment and the perceived weakness of the curriculum: student perspective

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ABSTRACT

Background: Educational environment has been shown to have influence on learning outcome and affects student achievement, satisfaction, and success. The study was conducted to assess medical students' perception of their learning environment and to explore areas of weakness within the educational environment.
Methods: A mixed method of study, was performed using non-probability sampling at the Faculty of Medicine, Gezira University (FMUG), Sudan. An updated Arabic Dundee Ready Education Environment Measure (DREEM) was developed and administered to 854 students during the academic year 2016-2017.
Results: Seventy five percent of students completed the inventory (638/854) and Sixty four percent (546/854) responded to the open-ended question providing comments and suggestions. The overall reliability coefficient alpha in this study was 0.914. The global score for this study was found positive (122/200). Students were most satisfied with the learning aspects, academic environment, and academic self-perception. However, they were unsatisfied with their teaching and social atmosphere (inadequate social support for stressed students, substandard teaching, overemphasised factual learning, unpleasant accommodation). The qualitative content analysis was performed and emerged with four themes: the physical environment, a number of students, pedagogical approaches and faculty-student communication.
Conclusions: The study suggested the overall students' perceptions of the educational environment in the FMUG were on the positive side. However, certain specific elements of the learning environment and educational programme need to be critically investigated and remedied. The updated Arabic DREAM can be used reliably in the context of medical education in Arabic speaking countries.

Keywords: Arabic DREEM, Curriculum weakness, Learning environment, Student perceptions

INTRODUCTION

The last three-decade had been a period of rapid change in the educational missions and directives of health professions around the world. The evolved changes including programs, curriculum and strategies were usually undertaken to improve the whole educational environment for the students. Nevertheless, the whole process of change, as well as the rate of change, is certainly stressful for all concerned stockholder.[1] It is thus important to determine how students are experiencing the actual learning environment created by asking ''what is (medical) education here really like?''.

Although the concept of a learning environment appears rather intangible, almost 30 years it was argued the effects of the learning environment are substantial, real, and influential.[2-3] As a result, educators and researchers have attempted to define and measure the learning environment and its impact on student learning. Bloom described the learning environment concept as "the conditions, forces, and external stimuli which challenge on the individual.[2] These forces may be physical, social, as well as intellectual forces and conditions".

Learning is situated within a given environment and cannot be dissociated from the context in which it occurs. How students perceive the learning environment can influence their approach to learning and achievement.[1] An ideal school or faculty aspires to create an organisational culture and learning environment that augment the health, well-being, and sustainability of its community and enables people to achieve their full potential.[2]

Learning environment concept has been gaining increased attention in medical education and a recent report from the Association for Medical Education in Europe (AMEE) predicts this trend will continue.[4] Similarly, the General Medical Council (GMC) of the UK recommendations for 'Tomorrow's Doctors' have stimulated major learning innovations in the undergraduate medical curriculum in British medical schools. An improvement of the learning environment is one of the major goals of these innovations.[5] The World Federation for Medical Education (WFME) singled out the "learning environment" as one of the "targets" for what it terms "the conduction of the evaluation of medical education programme."[6]

In 1997, the Dundee Ready Educational Environment Measure (DREEM) was developed by researchers based in University of Dundee along with more than 80 collaborators around the world.[7] The tool was developed as a diagnostic tool to solve educational problems and improve the efficacy of medical education. However, it is recognized as an evaluation measure to identifies deficiencies in the learning environment and to compare different groups' experiences with the learning environment.[8] Its main characteristics include its scientific content, practicality, awareness, sociality and optimality.[8] The DREEM has been used in many universities in more than 27 countries worldwide due to its optimal validity and reliability. It has been translated into at least eight languages for evaluation purposes and was used as reliable and validated tool that diagnose specific problem areas within an institution for components of learning environment.[9,10]

The Faculty of Medicine, University of Gezira (FMUG) is the first community-oriented problem-based school in the Middle East. It was established in 1975 and the main objective of its establishment was to meet the health needs of the Gezira State community.[11] FMUG is

evolving with continues curriculum development with well-established infrastructure in the last 40 years.[12]

As learning environment strongly affects student achievement, satisfaction, and success, it is important to get feedback from our undergraduate students on how they experience the learning environment at FMUG. Students' perception of and satisfaction with the current learning environment and experiences are not being assessed at FMUG.

The purpose of this study was to assess students' perception of the learning environment in FMUG. The study aimed to identify areas of weakness within the educational environment as perceived by students.

METHODS

A cross-sectional descriptive survey conducted at FMUG, using both quantitative and qualitative approaches. All undergraduate students in the academic year 2016-2017 comprised the sample frame. Non-probability sampling method called a convenient sampling of 854 students in the second, sixth and tenth semester. The study obtained ethical clearance from Scientific Research committee of Education Development and Research Centre.

Study instrument and procedure

This study was conducted using updated Arabic translated Dundee Ready Education Environment Measure (DREEM) questionnaire. The original Arabic DREEM questionnaire was obtained from the centre for medical education, the University of Dundee and it was a direct translation (word for word) from the English version. So, it did not reflect the whole soul of the English version, and there is a need to be modified to suit FMUG students and Arabic culture. Attempts for refining and rephrasing were carried out to eliminate un-clarity and ambiguity of wording and phrasing.

The new Arabic version was piloted with a group of 20 students, and their comments were incorporated into an improved version to make more Arabised and understandable. This was piloted with other 15 more volunteers. The volunteer 35 students were not included later in the survey.

The DREEM contains 50 statements which are rated via a 5-point Likert scale 0-4, where 0 stands for strongly disagree, 1 for disagree, 2 for unsure, 3 for agree and 4 for strongly agree. It encompasses five subscales (1) students' perception of learning (SPL)-12 items; (2) students' perception of teachers (SPT)-11 items; (3) students' academic self-perception (SASP)-8 items; (4) students' perception of atmosphere (SPA)-12 items; and (5) students' social self-perception (SSSP)-7 items. The 50 items have a maximum score of 200 indicating the ideal educational environment. An open question of

student opinion of any other topic that affects the educational environment was added to the questionnaire.

Data collection

The updated Arabic DREEM questionnaire was administered to the study sample. However, an electronic version was subsequently disseminated to allow the involvement of more students and to improve the response rate. An e-mail explained the study, as well as a link to the survey, was sent to those who did not participate in the direct administration.

Interpreting the DREEM overall score and subscales

Guideline for interpretation of each subscale score is summarized in Table 1. On an individual item level, scores can be scrutinized to pinpoint strengths and shortcomings. Thus, items with mean scores greater than 3.5 mainly represent strong areas; items with mean scores of less than or equal to 2 should be inspected more meticulously as they indicate problematic areas, and items with mean scores between 2 and 3 indicate areas that could be enhanced.

Table 1: An approximate guide to interpreting the DREEM five subscales.

Total and individual scores	
Total Score	Interpretation
0-50	Very poor
51-100	Plenty of problems
101-150	More positive than negative
151-200	Excellent
SUBSCALES	
Students' Perception of Learning (item 1, 7, 13, 16, 20, 22, 24, 25, 38, 44, 47 & 48)	
0-12	Very poor
13-24	Teaching is viewed negatively
25-36	A more positive perception
37-48	Teaching highly thought of
Students' Perception of Teachers (item 2, 6, 8, 9, 18, 29, 32, 37, 39, 40, & 50)	
0-11	Abysmal
12-22	In need of some retraining
23-33	Moving in the right direction
34-44	Model teachers
Students' Academic-Self Perceptions (item 5, 10, 21, 26, 27, 31, 41, 45)	
0-8	Feeling of total failure
9-16	Many negative aspects
17-24	Feeling more on the positive side
25 32	Confident
Students' Perception of Atmosphere (item 11, 12, 17, 23, 30, 33, 34, 35, 36, 42, 43, & 49)	
0-12	A terrible environment
13-24	There are many issues which need changing
25-36	A more positive atmosphere
37-48	A good feeling overall
Students' Social-Self Perceptions (item 3, 4, 14, 15, 19, 28& 46)	
0-7	Miserable
8-14	Not a nice place
15-21	Not too bad
22-28	Very good socially

Data analysis

The data for the study sample was analysed using Statistical Package for Special Sciences (SPSS) programmed version 20. The total Means were calculated for DREEM global score, subscale score and individual item score for the entire sample. Cronbach's alpha was employed to assess the study reliability and internal consistency of the overall and subscale scores of the instrument the analysis of the qualitative data of the DREEM was accomplished through coding of all the answer of the open-end question.

RESULTS

Response

The response rate was 75 %. Out of 854, 638 students completed the inventory. No questionnaire was rejected because of incompleteness.

Reliability

The overall reliability coefficient alpha of our Arabised version of DREEM in this study was 0.914, and this means that the items of the questionnaire measure the same concept appropriately.

Global, subscale ratings and perception

The global DREEM score for this study was 122/200 (61%). This score indicated that, overall, students had more positive than negative perceptions of their learning environment.

The DREEM 50 items' mean and standard deviations are presented in Table 2.

Table 2: The DREEM global and subscales scores and interpretation of mean scores.

Subscales	Score			Interpretation
	Mean	**SD**	**% Perception**	
SPL	24	5.79	50%	Teaching is viewed negatively
SPT	30	4.9	68.1%	Moving in the right direction
SASP	21	4.3	65.6%	Feeling more on the positive side
SPA	33	3.22	68.7%	A more positive atmosphere
SSSP	14	3.7	50%	Not a nice place
Global	122	16.6	61%	More positive than negative

SPL =students' perception of learning, SPT= students' perceptions of teachers, SASP= students' academic self-perceptions, SPA= students' perception of atmosphere, SSSP= students' social-self-perception. SD=standard deviation

Table 3: Specific and overall areas of concern (i.e. mean score less than 2.00).

Domain	Item	Score
Students' perception of Learning (SPL)	The teaching over-emphasizes factual learning (R)	1.52
	I am clear about the learning objectives of the course	1.89
	The teaching is too teacher-centred (R)	1.85
Students' perceptions of Teachers (SPT)	The teachers are authoritarian (R)	1.34
	The teachers are good at providing feedback to students	1.95
Students' academic self-perceptions (SASP)	I am able to memorize all I need	1.98
Students' perceptions of academic atmosphere (SPA)	This school is well timetabled	1.9
Students' social self-perceptions (SSSP)	There is a good support system for students who get stressed	1.08
	I am too tired to enjoy this course (R)	1.65
	My accommodation is pleasant	1.04

Perceived areas of weaknesses as indicated by the students. For assessing the strengths and weakness of the learning environment, the guide of Mcaleer and Roff was used to interpret the results.[13] There were 10 DREEM items that scored two or less which clearly pinpoint areas of weakness within the educational environment as perceived by students (Table 3). Greatly, the students felt that they are not clear with course objective, not able to memorise all they needed and too tired to enjoy this course. The curriculum is overloaded with factual information and is teacher-centred. They also felt that the teachers were oppressive, lack constructive feedback skills and the school is not well timetabled. Students'

accommodation and effective student support were the lowest items scored by students.

Open-ended question analysis

Four hundred and nine (64%) participants responded to the open-ended question and provided comments and suggestions. The question was about additional comments concerning the factors that play a crucial role in the learning environment.

The qualitative content analysis of students' suggestions and comments emerged with four themes. The physical

environment, class size/number of students, pedagogical approaches and faculty-student communication strategy.

The students commented that the buildings (lecture halls, reading rooms, and laboratory facilities) are important to deliver good quality medical education. However, most of the respondents complained about the physical environment and faculty resources. The poor lecture hall facilities that are congested with a poor cooling system and inadequate lighting. Extracted students' comments and suggestions of FMUG physical environment/resources are summarized as follow:

- Poor classrooms (light, ventilation, aeration, conditioner),
- Poor basic facilities such as café, water coolers, and lavatories,
- Lack of study rooms,
- Inadequate maintenance for dissecting room and anatomy museum.

Most respondents perceived the learning environment to be poor because of the school's inability to accommodate the marked increased number of medical students. The student mentioned that the number of students in the lecture hall, dissecting room or teaching round prohibits their ability to interact with instructors. Facilities are used by other and private colleges are another contributory factor.

The respondents complained about the boring community-based activities and asked for more interaction between lecturer and students. The respondents also criticised the teacher-centred lectures. For example:

"Community medicine courses made us sleepy and bored. I lost my interest after the first half hour especially if there were not any discussions."

Furthermore, the respondents raised the issue of students' feedback as tool and monitoring system for faculty members works as a quality assurance system. Samples of their comments are given below:

"Our instructors are from different educational backgrounds and experiences, some of them cannot deliver the knowledge understandably. We suffered and in pain because of this. So, we need formal student feedback to monitor new staff work."

The respondents suggested setting up a faculty-student mentor program, who would monitor students' progress and provide the necessary advice.

Also, students raised valid, significant issues: the creation of a communication channel between students and stakeholders to discuss their problems and suggestions. They felt that bridging the teacher-student communication barrier was crucial to improving the teaching-learning experience. The desire for fewer and shorter lectures, more formative clinical assessments and more basic science teaching/exposure in the early years were also identified in the answers to the open-ended questions.

DISCUSSION

The updated Arabic DREEM questionnaire used in this study was found to be an internally reliable instrument for measuring students' views of the learning environment of FMUG.

The updated Arabic DREEM version was found to have a similar reliability coefficient (Cronbach alpha) to published studies of the DREEM in different language (Table 4).[14-16] This implies that the instrument supported the choice of the inventory and can be used reliably in the context of medical education in Arabic speaking countries.

Table 4: Reliability coefficient of the DREEM subscales comparison between different studies.

The scales	Present study	Riquelme A[14]	Shreemathi[15]	Dimoliatis[16]	Zaini1[17]	Karim[18]	Rotthoff[19]
SPL	0.81	0.75	0.79	0.79	0.63	0.870	0.84
SPT	0.72	0.71	0.72	0.78	0.78	.0.703	0.75
SASP	0.76	0.65	0.74	0.60	0.71	0.670	0.68
SPA	0.79	0.75	0.71	0.68	0.75	0.776	0.75
SSSP	0.68	0.58	0.51	0.48	0.60	0.502	0.57
Total	0.914	0.91	0.92	0. 90	0.91	0.923	0.92

SPL =students' perception of learning, SPT= students' perceptions of teachers, SASP= students' academic self-perceptions, SPA= students' perception of atmosphere, SSSP= students' social-self-perception

Various studies suggest that the DREEM can be used to pinpoint the positive and negative aspects of individual institutions.[20] Ifere administered DREEM to 127 Nigerian undergraduate medical students and was able to recognize their perceptions of the strengths and weaknesses of the medical school. Similarly, Canadian

study administered clearly reported areas of joint concern for each of the five domains addressed by the DREEM.[10]

Brown used the DREEM in major Australian University and was able to generate a profile of an institution's/course's strengths and weaknesses.[21] Other

studies from Nepal, West Indies, India and Saudi Arabia reported various specific findings for the sub-groups, individual items and sub-scales indicating clearly where remediation was required.[22] Our results showed many weak issues raised by the students that should receive adequate attention.

Perception of learning

A significant group of students reported that there was too much factual knowledge to memorize, and numerous studies have reported similar concerns.[23] This issue is not insurmountable and should be addressed as many institutions globally report similar concerns. This may be broadly rooted in their acquired study habits related to overemphasized factual learning for the entry-level examination. On the other hand, it might be created by the model of formative and summative assessments that the students currently encounter. This is reflected by the fact that number of the students commented in the open question.

''Most of our class teaching is facts oriented because the teachers stress so much on the importance of the topic for exams, so we focus on the facts rather than why it is taught.''

This is because it is very well known that assessment can drive learning. Students in early semesters have a less prior knowledge and experiences to build new facts to move progressively toward stronger understanding. Thereby making factual learning less meaningful to them, which is consistent with the idea that learning has to be meaningful to the learner. One could argue that junior students would view "factual learning" as "overemphasized" and that this would subsequently diminish with the introduction of more clinical hours. This is linked to students assigned low scores to learning being too teacher-centred, which may be congruent with the cramming of factual knowledge.

The problem is learning facts in isolation from a context in which the facts gain purpose and meaning. To improve understanding and preserve what has been learned, teaching has to move away from the memorization of facts and passive learning to promote active and more profound approaches to learning that engage students.[24] In the traditional teacher-centred education, the teacher directs the lecture-room activities and does not allow them to communicate, express themselves, and direct their learning. Negative perceptions of the learning subscale were also reported in Spain, Saudi Arabia and it was attributed to the use of traditional methods of teaching.[25-26]

Perception of teachers

In modern education, the teacher's role has changed from an information provider to a facilitator of knowledge acquisition, attitudes, and skills required for learning.

However, in contrast to this and like many other studies, we found an overall perception that teachers were authoritarian.[10,24] This suggesting that teachers in FMUG are inclined towards traditional styles of teaching and reflection of the older type of senior teachers who teach by experience rather than by training. Authoritarian would be difficult for students to understand and explain it connotation and there may be cultural differences in the meaning of the word.[24]

"*The teachers are good at providing feedback to students*" scores badly at most other reporting institutions suggesting that these are the most difficult areas of educational environment to support.[17,22] This problem seems to be a commonly encountered one, especially in clinical years.[19,21,25] This concern relates to inadequate feedback after examinations. The observation that students can recognize areas of uncertainty during examinations suggests that they can reflect precisely on their strengths and weaknesses. However, they are not yet fully prepared to accept responsibility for resolving their weaknesses independently. The major framework for teaching and learning about feedback require students to develop the skills necessary to become independent learners.[27] Constructive criticism is one vital element for effective teaching through which faculty can provide feedback regarding the level of students' academic performance.[28] The aim of constructive criticism is to recognize the discrepancy between intended and actual behaviour. These results suggest that students are not acquiring these skills to the extent desired. It may be necessary to provide students with additional opportunities to take responsibility for their learning, allowing them to enhance their skills and attitudes in this area. It is vital in one's learning that immediate, specific and frequent feedback is given by teachers.[27] This includes commenting first on the students' achievements and then on their weaknesses or deficiencies.

Academic self-perceptions

One of the main areas for concern is the inability to memorise all the course requirements. Results from most published literature showed that the response to this item had scored less than two which might indicate that the volume of information requires further reduction in many medical curricula.[17,22,29] One has to bear in mind that this is a quite common observation in health professional programmes relating to the quantity and quality of information that has to be delivered during undergraduate studies.[10,30] Researchers have pointed out that to improve understanding and preserve what has been learned, teaching must move away from rote memorization and passive learning and promote active and deeper approaches of learning and endorse engagement of students.[31]

Perception of atmosphere

An important area that needs attention was (course was not well time-tabled), which was considered as insufficient, with very low mean scores. This is can't be explained giving the fact that the FMUG was established nearly 40 years ago. The results may attributable to poor coordination, under-resourcing, and complicated scheduling.

Similarly, other studies found that students' perceptions of the atmosphere were that the school/course was not well time-tabled in Sweden, India, Iran, Kuwait, South Africa, Sri Lanka, UK, and Turkey.[24,29,32-33]

Addressing this matter may do a lot to assuage the distress expressed by the students. A report by the Irish Medical Council highlighted that improved administration is central for qualitative education.[34]

Social-self-perception

Support for stressed students is one of the areas for concern and remain issues of worry in the medical curriculum. Many studies have also found this area to be perceived poorly by students, implying this concern is difficult to improve.[10,22,27]

Moreover, similar results were found in distinct socio-cultural contexts, and different health careers. Incongruity to this, Ashok reported high score (2.05) for item 3 "*there is a good support system for the stressed-out student*".[31] This difference in results was attributed to the mentoring program that supports students to interact with mentors. The mentor guides the stressed student to overcome stressful situations with proper perspectives. Although a tutorial system for students exists in FMUG, its principal objective is to aid in the academic field but seems to be dysfunctional.

It has been shown that perceptions of social life associated with a university are determining factors in choosing a school.[28] It is unfortunately rather common that medical students complain of stress, and tiredness, which prohibits them from enjoying a program to the extent that they would like.[10,31]

It was also observed that the students in medical schools with traditional curricula were more likely to feel tired, less able to memorize all they needed and were less likely to enjoy the course.[17]

Students' accommodation is the biggest issue of worry for the study cohort. "*My accommodation is pleasant*" scored the lowest mean score of all DREEMM items. This low score (1.04) given to the above item was not observed in any of the punished international studies. In another Sudanese study, this item had a poor score of 1.9, which is echoed worse in our study.[35] One may argue this can be related to Sudan economic/financial status. However, studies from similar lower-middle-income economies showed their students were markedly more satisfied with their accommodation. This includes Bangladesh, India, Nepal, Sri Lanka, Yemen, Pakistan and Indonesia.[15,17,22,29]

Sudanese standard of living is generally low to very low, and most importantly that the Sudanese universities including FMUG do not provide accommodation for all students. In fact, the accommodation service is managed by National students' welfare fund. Commonly students rent a shared private flat/house, or room in a shared house; this usually entails them their private/shared room with shared kitchen and bathroom facilities. Both the limited availability of property and the high cost of renting make it harder for students-most of whom rely on parents for financial support to compete on price.

The open-ended question asked at the end of the DREEM inventory has barely been reported in the literature.[32-34] Edgren has acknowledged that commonly used quantitative environmental measures of healthcare professional education fail to incorporate this aspect of the environment.[31]

Qualitative analysis not only confirmed some crucial issues reported in the inventory-such as insufficient feedback and failure to enjoy specific courses, e.g. community medicine-but also confine other items not covered in the inventory. The Physical environment, class size and number of students, pedagogical approaches and Faculty-student communication strategy were captured as new areas not identified in the inventory.

The students addressed an interesting finding and stated that physical environment (buildings, classrooms, resources) are also a part of the learning environment and contribute to the perceptions of the students. Health profession education researches have recommended that an item about the resources and physical environment (e.g. buildings, classrooms facilities) be added to the DREEM as these could influence the student's overall perception.[19,36]

In Palmgren study, the students outlined some deficiencies in the physical environment.[37] Another similar scholar highlighted the importance of sufficient and functional lighting, ventilation.[32] Mutually the closed-ended responses and open-ended analysis showed that student support system and feedback to students were a cause of dissatisfaction by the students. These concerns reflect a common perception among students that would probably not have been emphasised if the open-ended questions were no added to the inventory.

CONCLUSION

This study highlighted some key findings concerning how Sudanese medical students perceive their learning environment. The updated Arabic DREEM can be reliably utilized in the setting of medical education in Arabic speaking countries. The findings suggested the

overall perception of the learning environment by the students in FMUG were on the positive side. However, certain particular areas of the learning process have to be critically investigated and remedied if successful learning is to be realized by students. The perceived curriculum weaknesses within the educational environment were also related to inadequate physical facilities. Piloting a longitudinal study and collecting data from students over longer periods is needed to measure the effect of the future changes and modifications. It is recommended to measure the perceptions of faculty and other stakeholder's attitudes toward the educational environment.

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