



Assessment of Measured Differences in a Dundee-Ready Educational Environment Using Traditional and Integrated Methods in the Hawler College of Medicine, Iraq

Abubakir M. Saleh^{1*} , Nazar P. Shabila¹, Hero I. Kareem¹, Ali A. Aldabbagh¹

Abstract

Objectives: The aim of this study was to assess the perception of medical students in the College of Medicine, Hawler Medical University about the integrated medical and the traditional medical programs and to compare the two programs from the students' perspectives.

Materials and Methods: The study samples were selected from the students in the academic year of 2016-2017, which included the second- and third-year students that had signed up for the integrated program and additionally fourth- and fifth-year students who had participated in the traditional programs. They were asked to fill out the Dundee Ready Education Environment Measure (DREEM) forms and take part in the research.

Results: The mean DREEM total score was significantly higher among the students who enrolled in the integrated program compared to those in the traditional program (104.06 vs. 98.69, $P=0.006$). The subscales of the students' perceptions of teachers ($P<0.001$) and the environment ($P=0.039$) were statistically significant when compared to the data from traditional programs.

Conclusions: In general, students who enrolled in the integrated program had an overall higher DREEM score compared with those who entered in the traditional program. Nevertheless, the students still had a poor perception of the learning environment and subsequently the curriculum.

Keywords: Medical education, Integrated program, Traditional teaching, Learning environment

Introduction

The curriculum is a holistic and comprehensive concept and entity in education (1). In addition, the educational and organizational environment can be considered an essential demonstration and conceptualization of the curriculum. Such an environment comprises anything occurring in the medical college (2).

Assessing a curriculum is primarily dependent on examining the environments that comprise or are linked with the curriculum (3,4). The students' learning experience is primarily based on the educational environment. Therefore, effective learning needs a sound educational environment (5). The evaluation of educational programs is critical for the effectiveness of learning (6). Further, the perception of students of the learning climate can influence their satisfaction, learning behaviors, and academic outcomes (7,8).

The traditional medical education approach is characterized by being teacher-centered. Furthermore, information gathering and discipline-based education have long been used in developed and developing countries. However, there have been immense calls for changing the medical education approach fundamentally to meet the immense social demand of having doctors with adequate interpersonal skills. Thus, medical education

has changed from one-way lectures to a self-centered and problem-solving learning approach (9-11).

Most Iraqi medical colleges follow the traditional lecture approach as the principal teaching method. During the last few years, several medical schools have started to make fundamental changes in the curriculum, some of which implement the spiral integrated program (10,12).

The integrated curriculum has been defined as the organization of teaching materials to bring together the subjects who are usually taught separately (13). In an integrated curriculum, learning basic sciences is placed in the clinical practice context. Therefore, it is crucial in medical education, and students consider it more relevant and meaningful (14).

The College of Medicine of Hawler Medical University has taken significant steps to improve its curriculum by implementing a spiral integrated program.

Considering the above-mentioned explanation, the purpose of this study was to determine the medical students' perceptions of integrated and traditional medical programs and to compare the two programs from students' viewpoints. This research, to the best of our knowledge, is the first one in our university and can be a beneficial factor in the curriculum development process and learning environment improvement.



Subjects and Methods

Setting

This study was undertaken at the College of Medicine of Hawler Medical University, Erbil, Iraqi, Kurdistan Region. The college study program lasted for six years during which students completed a Bachelor of Medicine and Bachelor of Surgery degree.

Participants

During the academic year 2016-2017, all the students of the second- and third-study years who enrolled in the integrated program, as well as those in the fourth- and fifth-study years who enrolled in the traditional program were invited to participate in the study. The total number of invited students was 640. Students in the first study year were excluded from the study due to their new and limited experience with studying the medical program. Students in the sixth study year were also excluded as they primarily involved in the clinical internship rather than class studies.

Measures

The applied questionnaire consisted of two main parts of demographic data and the Dundee Ready Education Environment Measure (DREEM).

DREEM questionnaire contained 50 questions which assessed the learning environment. It should be noted that DREEM was preliminarily designed using the Delphi method and included a wide spectrum of medical teachers and instructors from across the globe. Therefore, it can be relied upon for every medical program regardless of any specific backgrounds or cultures (15).

The measurement criteria were based on a five-point Likert-type scale ranging from 0 to 4 (0 = "Strongly Disagree", 1 = "Disagree", 2 = "Undecided", 3 = "Agree", and 4 = "Strongly Agree"). The student participants in the research were required to give one answer to each question. Moreover, students were informed that items No. 4, 8, 9, 17, 25, 35, 39, 48, and 50 included negative wording and were re-coded prior to the mean total scoring and subscale calculation. The questions were divided into the following five subscales:

1. The students' perception of learning;
2. The students' perception of the teachers;
3. The students' academic self-perception;
4. The students' perception of the environment;
5. The students' social self-perception.

Data Collection

The questionnaires were distributed among the students in the classrooms, and the students were then asked to fill them during the class period. At the end of the time period, the questionnaires were collected by one of the authors.

Data Analysis

The data analysis was carried out using the SPSS software, version 22. The mean total and the standard deviation for every subscale were calculated and the DREEM overall score was produced accordingly. Finally, an independent *t* test was carried out to specify the mean total and the subscale based on the students' type of study program.

Results

In general, 493 out of 640 invited students completed the study questionnaire with a response rate of 77%. The mean and standard deviation (SD) of the participants were 21.1 ± 1.4 years (within the range of 18-27). Additionally, female students represented 55.8% of the participants. In addition, 251 students (50.9%) in the 2nd and 3rd study year were enrolled in the integrated program while 242 students (49.1%) in the 4th and 5th study year were enrolled in the traditional program. The demographic variables of the participants are presented in Table 1.

The mean (SD) DREEM total score for all the students (i.e., both types of study programs together) was $101.4/200 (\pm 21.79)$ with a range of 36 to 164. This score was interpreted as more positive than negative. Further, the total DREEM mean was $104.1/200$ and $98.7/200$ for integrated-based and traditional curriculums, respectively ($P=0.006$). Furthermore, the total DREEM mean was $104.9/200$, $103.3/200$, $93.4/200$, and $103.2/200$ for the second, third, fourth, and fifth study year students,

Table 1. Details of the Demographic Characteristics of Study Participants

Characteristic	Frequency	Percent
Gender		
Male	218	44.2
Female	275	55.8
Study year		
2 nd	120	24.3
3 rd	131	26.6
4 th	112	22.7
5 th	130	26.4
Living arrangement		
With parents	400	81.1
Renting alone	4	0.8
Renting with others	15	3.0
University dormitory	74	15.0
Type of secondary school		
Public school	390	79.1
Private school	103	20.9
Type of study program		
Integrated program	251	50.9
Traditional program	242	49.1

respectively ($P < 0.001$).

The students' perceptions of the presented items in the questionnaire based on the collected data were as follows:

1. For their learning perception, the student "viewed the teaching negatively".
2. As regards their perception of their teachers, the students considered it as "moving in the right direction".
3. Regarding their academic self-perception, the students stated that there are "many issues that need changing".
4. Respecting their social self-perception, the students claimed that it is "not a nice place" (Table 2).

The mean DREEM total score was significantly higher among the students who enrolled in the integrated program compared to those in the traditional program (104.06 vs. 98.69, $P = 0.006$). Students in the integrated program also had a statistically significantly higher mean score regarding the subscales of the students' perceptions of teachers and the atmosphere compared to those in the traditional program (Table 3).

Table 4 presents the difference between the students who enrolled in the traditional program and those in the integrated program regarding scoring on each DREEM statement. The students in the integrated program scored significantly higher in 13 statements while those in the traditional program scored significantly higher only in two statements.

The total mean DREEM score for the students' academic

self-perception (SASP) was significantly higher in the male participants of the integrated program (17.62 vs. 15.99, $P = 0.012$). There were no significant correlations between the demographic data from the integrated program students and the mean total DREEM and the subscales (Table 5).

Discussion

The educational environment plays a significant part in the learning process. Providing a good and positive environment is essential for effective learning in any school (2,5). In this study, the total DREEM mean score of the students enrolled in both types of study programs together was 101/200. This score was higher than the score (100/200) found in a medical school in Yemen (16), but it was lower than the scores (118/200, 110/200, 107/200, 108/200, 127/200, 139/200, 119/200, and 120/200) found in the medical schools in Nigeria (3), Trinidad (1), India (17), Sri Lanka (18), Bahrain, the UK (19), India (20), and Malaysia, respectively (21).

Our results showed that students in the integrated program had a significantly higher DREEM score (104/200) compared to those in the traditional program (101/200). They also had more positive perceptions of the educational learning atmosphere, students' academic self-perceptions (SASP), students' social self-perception (SSSP), and the perception of teachers compared to the other students.

The results demonstrate the new curriculum in a

Table 2. DREEM total and Subscale Statistics for Both Study Programs Together

Total and Subscales	Mean	SD	Score Interpretation
Total score	101.42	21.79	More positive than negative
Students' perception of learning	24.32	5.93	Teaching is viewed negatively
Students' perception of teachers	22.57	4.42	Moving in the right direction
Students' academic self-perceptions	16.43	5.31	Many negative aspects
Students' perception of atmosphere	23.91	6.55	There are many issues that need changing
Students' social self-perceptions	14.20	3.71	Not a nice place

Note. DREEM: Dundee ready education environment measure; SD: Standard deviation.

Table 3. Comparison of the Mean DREEM Total Score and Mean Score in the Subscales for the Students who Enrolled in the Integrated Program and the Traditional Program

Subscale	Traditional Program			Integrated Program			P Value
	Mean	SD	Score Interpretation	Mean	SD	Score Interpretation	
Total score	98.69	22.43	Plenty of problems	104.06	20.86	More positive rather than negative	0.006
Students' perception of learning	23.84	6.15	Negative views on teaching	24.78	5.68	A more positive approach	0.078
Students' perception of teachers	21.38	4.49	In need of some retraining	23.71	4.05	Tendency to the right direction	<0.001
Students' academic self-perceptions	16.24	5.60	Many negative aspects	16.61	5.02	Feeling more on the positive side	0.445
Students' perception of atmosphere	23.29	6.54	The presence of many issues in need of changing	24.51	6.52	A more positive atmosphere	0.039
Students' social self-perceptions	13.94	3.93	Not a nice place	14.45	3.46	Not a nice place	0.128

Note. DREEM: Dundee ready education environment measure; SD: Standard deviation.

Table 4. Difference between the Students Who Enrolled in the Traditional Program and Those in the Integrated System Program in Terms of Scoring on Different DREEM Statements

No.	Statement	Traditional Program		Integrated Program		P Value
		Mean	SD	Mean	SD	
1	I am encouraged to participate in teaching sessions.	2.12	1.035	2.35	1.027	0.013
2	The course organizers are knowledgeable.	2.20	0.895	2.39	0.834	0.016
3	There is a good support system for students who get stressed.	1.30	1.120	1.41	0.993	0.254
4	I am too tired to enjoy the course.*	1.64	1.197	1.35	1.057	0.004
5	Previously applied learning strategies continue to work for me now.	2.00	0.992	2.05	0.970	0.621
6	The course organizers espouse a patient centered approach to consulting.	1.93	0.885	2.03	0.857	0.176
7	The teaching is often stimulating.	1.88	1.019	1.95	0.906	0.381
8	The course organizers ridicule the students.*	1.97	1.060	2.24	0.970	0.004
9	The course organizers are the authoritarian.*	1.70	1.090	1.96	0.927	0.004
10	I am confident about passing this year.	2.46	1.059	2.32	1.029	0.137
11	The atmosphere is relaxed during consultation teaching.	1.95	1.160	2.00	1.049	0.562
12	This course is well timetabled.	1.77	1.175	1.65	1.123	0.246
13	The teaching is student centered.	1.88	1.061	2.06	0.949	0.053
14	I am rarely bored on this course.	1.83	1.226	1.66	1.173	0.118
15	I have good friends in this course.	2.62	1.155	2.98	1.045	<0.001
16	The teaching helps to develop my competence.	2.17	1.044	2.13	0.988	0.615
17	Cheating is a problem on this course.*	1.64	1.249	1.89	1.296	0.026
18	The course organizers have good communication skills with patients.	1.91	1.084	2.19	1.020	0.004
19	My social life is good.	2.44	1.046	2.63	1.013	0.044
20	The teaching is well focused.	2.00	1.004	1.96	0.943	0.651
21	I feel I am being well prepared for my profession.	1.84	1.123	1.99	0.951	0.112
22	The teaching helps to develop my confidence.	2.03	1.072	2.05	0.979	0.838
23	The atmosphere is relaxed during the lectures.	2.07	1.095	2.06	1.057	0.915
24	The teaching time is put to good use.	1.93	1.146	2.10	0.974	0.064
25	The teaching over emphasizes factual learning.*	2.10	1.054	1.91	0.899	0.034
26	Last year's work has been a good preparation for this year's work.	1.91	1.125	1.99	1.159	0.444
27	I am able to memorize all I need	1.79	1.170	1.74	1.121	0.612
28	I seldom feel lonely.	1.99	1.163	2.12	1.191	0.229
29	The course organizers are good at providing feedback to students.	1.96	1.709	1.86	1.010	0.418
30	There are opportunities for me to develop interpersonal skills.	1.94	1.136	2.00	0.996	0.548
31	I have learnt a lot about empathy in my profession.	2.17	1.137	2.16	0.990	0.918
32	The course organizers provide constructive criticism here.	1.89	1.111	2.04	0.939	0.103
33	I feel socially comfortable in teaching sessions.	2.05	1.079	2.07	0.931	0.772
34	The atmosphere is relaxed during seminars / tutorials	2.11	1.033	2.21	1.018	0.281
35	I find the experience disappointing.*	2.06	1.099	2.08	1.119	0.796
36	I am able to concentrate well.	2.05	1.135	2.17	1.054	0.234
37	The course organizers give clear examples.	1.91	1.123	2.28	0.923	<0.001
38	I am clear about the learning objectives of the course.	2.05	0.978	2.02	0.951	0.734
39	The course organizers get angry in teaching sessions.*	1.92	1.119	2.03	0.999	0.248
40	The course organizers are well prepared for their teaching sessions.	1.94	1.147	2.10	0.954	0.089
41	My problem solving skills are being well developed here.	1.90	1.083	2.12	0.953	0.014
42	The enjoyment outweighs the stress of the course.	1.92	1.153	1.97	0.991	0.600
43	The atmosphere motivates me as a learner.	1.66	1.113	1.95	2.116	0.054
44	The teaching encourages me to be an active learner.	1.89	1.209	2.02	1.031	0.208
45	Much of what I have to learn seems relevant to a career in healthcare.	2.17	1.133	2.24	0.953	0.459
46	My accommodation is pleasant.	2.12	1.143	2.30	0.981	0.057
47	Long-term learning is emphasized over short-term learning.	2.10	1.131	2.29	0.983	0.055
48	The teaching is too teacher centered.*	1.70	1.110	1.95	0.979	0.007
49	I feel able to ask the questions I want.	2.11	1.152	2.45	1.132	0.001
50	The students irritate the course organizers.*	2.04	1.218	2.58	1.002	<0.001

Note. DREEM: Dundee ready education environment measure; SD: Standard deviation.

*The negatively worded item that required rescoring.

Table 5. Association Between the Demographic Characteristics of the Students Who Enrolled in the Integrated Program and the Mean DREEM Total and Subscale Scores

Characteristic	Total Score	SPOL	SPOT	SASP	SPOA	SSSP
	Mean (SD)		Mean (SD)		Mean (SD)	
Gender						
Male	107.02 (23.45)	25.21 (6.23)	23.76 (4.41)	17.62 (5.45)	25.45 (7.42)	14.98 (3.71)
Female	102.25 (18.98)	24.52 (5.32)	23.68 (3.82)	15.99 (4.65)	23.94 (5.86)	14.12 (3.28)
<i>P</i> value	0.079	0.351	0.882	0.012	0.074	0.057
Study year						
2nd	104.75 (23.87)	24.90 (6.43)	23.79 (4.44)	16.73 (5.68)	24.65 (7.25)	14.69 (3.84)
3rd	103.30 (17.95)	24.60 (4.94)	23.61 (3.68)	16.51 (4.39)	24.40 (5.87)	14.18 (3.07)
<i>P</i> value	0.585	0.683	0.731	0.735	0.759	0.245
Type of secondary school						
Public	105.69 (20.62)	25.26 (5.47)	23.93 (3.95)	16.99 (4.93)	24.90 (6.77)	14.61 (3.48)
Private	99.66 (21.02)	23.49 (6.06)	23.12 (4.27)	15.57 (5.15)	23.47 (5.71)	14.01 (3.41)
<i>P</i> value	0.042	0.027	0.158	0.046	0.124	0.230
Living arrangement						
With parents	103.61 (20.58)	24.59 (5.52)	23.75 (4.17)	16.40 (4.96)	24.35 (6.31)	14.52 (3.42)
Outside home	106.04 (22.22)	25.63 (6.33)	23.52 (3.48)	17.54 (5.24)	25.24 (7.43)	14.11 (3.70)
<i>P</i> value	0.476	0.262	0.729	0.163	0.403	0.466

Note. DREEM: Dundee ready education environment measure; SD: Standard deviation; SPOL: Students' perception of learning; SPOT: Students' perception of teachers; SASP: Students' academic self-perceptions; SPOA: Students' perception of atmosphere; SSSP: Students' social self-perceptions.

positive light and emphasize the necessity of long-term learning and problem-solving skills.

This finding agrees with the findings of other studies done on medical students in India (20) and on nursing students in Malaysia (21). However, students had negative perceptions of learning in another study done on medical students in India (22).

The students in the integrated program had higher scores in terms of most statements regarding different domains compared to those who enrolled in the traditional program. On the contrary, students in the integrated program had low scores with regard to the statements related to several issues such as the course timetable, confidence about passing the year, competence development by teaching, teaching being focused, ability to memorize, feedback provision by the course organizers, and confidence development. In addition, the other issues included the clearance of the learning objectives of the course, the appropriateness of the timetable, stress, and tiredness of students, along with the provision of clear learning objectives and feedback to the students during the course. The timetabling of the college was deemed inadequate as well. Accordingly, effective organizational skills are needed to make the timetabling more appropriate and suitable for students. Further, course organizers need to provide more clear objectives of the courses at the beginning of the courses, and faculty members should adopt appropriate teaching methods to suit the learning objectives.

The students' active participation in setting educational goals lays more responsibilities on them. The findings of a study in India revealed that the problems that the

students claimed to have faced in a teacher-centered environment were authoritarianism, provocation, and anger on the teachers' side. On the students' side, some issues were reported, including learning by memorizing, cheating, the lack of a support system, and apathy (20). In another study in India, subscales such as "the teachers are knowledgeable", "I have good friends in the school", and "I am positive that I will achieve passing grades this year" received high scores. It was, on the other hand, discovered that the students struggled with issues such as "there is an efficient support system for students dealing with stress", "I can commit to memory what I need to", and "education puts special emphasis on real learning" (22).

The participating students in this study had the same perception of the faculty as the ones in Nigeria or Nepal. They stated that faculty members provide students with positive feedback while this result contradicts the findings of our study in this regard or those of the study conducted in Trinidad or Nigeria (3). In another study carried out in India, students claimed that they are faced with poor feedback, unconstructive criticism, authoritarianism, and provocation from their angry and impatient teachers (22).

The present study suggested that although the faculty's knowledge base was strong, the feedback quality was poor. This can be stemmed from the lack of education in that matter. To implement changes in the spiral integrated program, such curriculums must be fitted into an adequate educational syllabus for the teachers. Additionally, such syllabuses should be flexible enough to meet faculty requirements.

The results further showed that cheating is a weak point and needs intervention. Such weak points were

also observed in other educational institutes in Trinidad (1), Sri Lanka (18), and India (20). The issue of cheating has been handled through using clear instructions and medical ethics interactive training, along with offering new solutions in the student evaluation process (1, 23).

The significant difference that appeared through problem-solving skills (item 41) can be due to the fact that such learning factors have been considered in the new curriculum. The correlation between education and profession in the medical care (item 45) field has been improved, which is very critical since the relevance to learning is closely related to motivation and recall of learning (4).

Although a student-centered learning atmosphere was more desirable in this study, the faculties were still struggling with the traditional methods of teaching as per score of 9 (authoritarian teachers). There was a good support system for students with stress (item 3), which could be attributed to having a more relaxed atmosphere during the course and closer contact between students and faculty. However, this positive change was still insufficient as the score was less than 2. Students' support mechanism in our college was reported to be inadequate. Thus, students must be supported by registration to be qualified and even beyond. Additionally, the college should provide a student-friendly atmosphere, which might assist in reducing the stress among the students. Sporting facilities and cultural activities should be available as well. Similarly, more emphasis should be on student-centered and cooperative faculty-student relationships (2). The lack of a support system for stressed students was noticed in other studies done using DREEM questionnaires for assessing the educational environment in different medical and dental colleges in the world (22,24,25).

The current assessment of the students in our faculty could prove to be another source of anxiety for them. Therefore, the evaluation system needs revisions. A positive assessment should have a favorable outcome. Furthermore, self-assessment on the students' part should be taken into consideration. In addition, a logbook must be prepared to help reduce the stress caused by assessment (26). Providing students with opportunities to express stressful experiences and encouraging them to participate in this program can be assistive in the overall performance of the students (27).

No significant correlation was observed between the demographic specifications of participating students and the mean total of DREEM subscales in our study. But, in a study carried out in the Faculty of Dentistry in India, it was revealed that female students obtained a higher mean total in all scales. This, however, was only significant in the SPOL (Students' perception of learning) and SPOT (Students' perception of teachers) domains. There was also a significant difference between SPOL and SPOT by the year of the study. The mean scores of SASP and SSSP were higher among the third-year students while

the lowest in the fourth year students (24). In one study conducted at a medical college in India, the mean scores of urban students were significantly lower (20). In another study in India, the mean score of eighth-grade medical students had the lowest score compared to second, fourth, and sixth-grade students (22).

This study provided some insightful evaluations regarding the learning environment from the students' perspectives, particularly in comparing two different learning approaches. Therefore, the result of this study can be used to improve the educational environment of the college and, as a result, improve the quality of graduates from the college to practice medicine in a good way and to prepare them to face different challenges in their future careers.

Limitations of the Study

Our study faced a number of limitations, even though the response rate from the students was up to 77%. Furthermore, self-reporting can always cause a bias. The mentioned items in the DREEM questionnaire were predetermined in this study. Although the above-mentioned questionnaire has been employed in various medical cultures, dentistry faculties and different other institutions present courses on medical care across the globe. The underlying factors that can have an effect on the environment could have no credibility in Iraq. Therefore, the outcomes of this study must be generalized while considering certain limitations. Primarily, the reporting concepts of the study can be an assistive factor in the participation process. Finally, the gathered data pertain to this institute only and such data should be put to test in several other institutes simultaneously.

Conclusions

In general, the students from the integrated program scored higher in the DREEM compared to the traditional group. But the learning environment and the students' perceptions of the learning curriculum were not reported to have a positive result. Thus, it is imperative to make some improvements in order to tackle such issues that are observed in a number of the items, especially the subscales of the social self-perception of the students, or their perceptions of the environment.

Finally, it is advisable that the future studies are carried out through focus groups and open-ended questions so that to obtain a deeper understanding of the issue under investigation in our study.

Conflict of Interests

The authors declare that they have no conflict of interests.

Ethical Issues

This study was approved by the Ethics Committee of the College of Medicine, Hawler Medical University, and informed consent was obtained from all participants

after providing them with the detail of the study (5.16 – 28.5.2017).

Financial Support

This study was supported by the Ministry of Higher Education and Scientific Research in the Kurdistan region, Iraq through the grant by the Kurdistan National Research Council.

References

- Bassaw B, Roff S, McAleer S, et al. Students' perspectives on the educational environment, Faculty of Medical Sciences, Trinidad. *Med Teach*. 2003;25(5):522-526. doi:10.1080/0142159031000137409
- 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(4):337-344. doi:10.1080/01421590120063330
- Roff S, McAleer S, Ifere OS, Bhattacharya S. A global diagnostic tool for measuring educational environment: comparing Nigeria and Nepal. *Med Teach*. 2001;23(4):378-382. doi:10.1080/01421590120043080
- Hutchinson L. Educational environment. *BMJ*. 2003;326(7393):810-812. doi:10.1136/bmj.326.7393.810
- 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(1):39-45. doi:10.1080/01421590310001642948
- Goldie J. AMEE Education Guide no. 29: evaluating educational programmes. *Med Teach*. 2006;28(3):210-224. doi:10.1080/01421590500271282
- 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(1):27-52. doi:10.1080/03075070120099359
- Nijhuis J, Segers M, Gijsselaers W. The interplay of perceptions of the learning environment, personality and learning strategies: a study amongst International Business Studies students. *Stud High Educ*. 2007;32(1):59-77. doi:10.1080/03075070601099457
- Alsamari AM, Abdullah MS, Latif JA, Alwan AH. Health professions education in Iraq. *Annals of Iraqi Science*. 2008;1(1).
- Richards LJ, Wall SN. Iraqi medical education under the intellectual embargo. *Lancet*. 2000;355(9209):1093-1094. doi:10.1016/s0140-6736(00)02049-3
- Hussain I. Curriculum design in medical education: theory to practice. *Gomal Journal of Medical Sciences (GJMS)*. 2011;9(2):251-253.
- Saleh AM, Al-Tawil NG, Al-Hadithi TS. Teaching methods in Hawler College of Medicine in Iraq: a qualitative assessment from teachers' perspectives. *BMC Med Educ*. 2012;12:59. doi:10.1186/1472-6920-12-59
- Malik AS, Malik RH. Twelve tips for developing an integrated curriculum. *Med Teach*. 2011;33(2):99-104. doi:10.3109/0142159x.2010.507711
- Quintero GA, Vergel J, Arredondo M, Ariza MC, Gómez P, Pinzon-Barrios AM. Integrated Medical Curriculum: Advantages and Disadvantages. *J Med Educ Curric Dev*. 2016;3. doi:10.4137/jmeccds18920
- Miles S, Swift L, Leinster SJ. The Dundee Ready Education Environment Measure (DREEM): a review of its adoption and use. *Med Teach*. 2012;34(9):e620-634. doi:10.3109/0142159x.2012.668625
- Al-Hazimi A, Al-Hyiani A, Roff S. Perceptions of the educational environment of the medical school in King Abdul Aziz University, Saudi Arabia. *Med Teach*. 2004;26(6):570-573. doi:10.1080/01421590410001711625
- 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(3):280-291. doi:10.1080/13576280400002445
- Jiffry MT, McAleer S, Fernando S, Marasinghe RB. Using the DREEM questionnaire to gather baseline information on an evolving medical school in Sri Lanka. *Med Teach*. 2005;27(4):348-352. doi:10.1080/01421590500151005
- Varma R, Tiyyagi E, Gupta JK. Determining the quality of educational climate across multiple undergraduate teaching sites using the DREEM inventory. *BMC Med Educ*. 2005;5(1):8. doi:10.1186/1472-6920-5-8
- Bavdekar S, Save S, Pillai A, Kasbe AM. DREEM study: students perceptions of learning environment in a medical college in Mumbai, India. *J Assoc Physicians India*. 2019;67(4):50-54.
- Mohd Said N, Rogayah J, Hafizah A. A study of learning environments in the Kulliyyah (Faculty) of Nursing, International Islamic University Malaysia. *Malays J Med Sci*. 2009;16(4):15-24.
- Kohli V, Dhaliwal U. Medical students' perception of the educational environment in a medical college in India: a cross-sectional study using the Dundee Ready Education Environment questionnaire. *J Educ Eval Health Prof*. 2013;10:5. doi:10.3352/jeehp.2013.10.5
- Glick SM. Cheating at medical school. *BMJ*. 2001;322(7281):250-251. doi:10.1136/bmj.322.7281.250
- Doshi D, Reddy BS, Karunakar P, Deshpande K. Evaluating student's perceptions of the learning environment in an Indian dental school. *J Clin Diagn Res*. 2014;8(11):ZC39-42. doi:10.7860/jcdr/2014/9901.5128
- Jeyashree K, Patro BK. The potential use of DREEM in assessing the perceived educational environment of postgraduate public health students. *Med Teach*. 2013;35(4):339-340. doi:10.3109/0142159x.2012.737058
- Davis MH, Harden RM. Planning and implementing an undergraduate medical curriculum: the lessons learned. *Med Teach*. 2003;25(6):596-608. doi:10.1080/0142159032000144383
- Whittle SR, Whelan B, Murdoch-Eaton DG. DREEM and beyond; studies of the educational environment as a means for its enhancement. *Educ Health (Abingdon)*. 2007;20(1):7.