

ENHANCING EDUCATION AND PRACTICE

Educational Environment in Traditional and Innovative Medical Schools: A Study in Four Undergraduate Medical Schools

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ABSTRACT Introduction: *The undergraduate curricula of medical schools in King Abdul Aziz University, Saudi Arabia, Umm Al-Qura University, Saudi Arabia and Sana'a University, Republic of Yemen are traditional, like most of the medical schools in the Middle East region. The curriculum in Dundee University Medical School, UK, claims to follow the prescriptions of the UK General Medical Council to be outcome based with three interlocking phases and students encouraged to take responsibility for their own learning.*

The aim of this study is to measure the educational environment, using the 50-item Dundee Ready Education Environment Measure (DREEM), in each medical school and to compare the educational environment as perceived by the responding students of the traditional medical schools in developing countries with that of the "modernised" medical school in Dundee University, UK.

Methods: *The DREEM was administered to 1072 medical students in the four different universities. Using SPSS, data were expressed as means of scores. Comparisons between schools, years of study and gender were made using non-parametric tests.*

Results: *For all three traditional medical schools, the mean scores of the inventory were lower compared with Dundee Medical School. Students from traditional schools rated their learning and teaching environment significantly lower than their counterparts in*

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Dundee Medical School. Similarly, they rated their academic self-perceptions, social-self perceptions and their atmosphere more poorly than the Dundee students.

Conclusion: *The DREEM provides useful diagnostic information about medical schools, whether it is in developing or western developed countries.*

KEYWORDS *Educational environment, curriculum, DREEM.*

Introduction

The undergraduate curricula of medical schools in King Abdul Aziz University, Saudi Arabia, Umm Al-Qura University, Saudi Arabia and Sana'a University, Republic of Yemen, like most medical schools in the Middle East region, are traditional, as defined by the General Medical Council (1993). In traditional medical schools, the curriculum is teacher-centred, discipline-based and hospital-based with no options or elective modules. The teaching depends mainly on information gathering, with the teacher as the main source of information. Teaching methods comprise lectures, tutorials and practical classes with a limited number of problem-based sessions. Little emphasis is placed on how the knowledge or skills will be used in later parts of the course. Students reduce what is to be learned to the status of unconnected facts to be memorized. The learning task is to reproduce the subject matter in the final exam. Generally, students see learning as something done to them by the teacher, and they view the curriculum as an aggregate of separate subjects.

In contrast, the curriculum in Dundee University Medical School, UK, seeks to conform with the prescriptions for curriculum innovation as outlined in *Tomorrow's Doctors* as mandated by the General Medical Council of the UK in 1993. It claims to be outcome-based. Teaching and learning occur in three interlocking phases. There is a core curriculum with student selected components. The educational strategies adopted include elements of problem-based and community-based approaches to teaching and learning. Students are encouraged to take more responsibility for their own learning as they progress through the curriculum. The approach to assessment emphasizes the overall outcomes of the course. In addition, the organization and management of the curriculum and allocation of resources are designed to support the educational philosophy (Harden *et al.*, 1997). The Dundee curriculum has been evaluated as being compatible with the recommendation for curriculum modernisation outlined by the UK General Medical Council in *Tomorrow's Doctors* (1993).

The educational environment makes an impact on students' learning experiences and outcomes (Roff *et al.*, 2001). Educational environment influences how, why and what students learn. It has a personality. Studying this unique personality enables faculty, administrators and students to answer the question, "what is medical education here really like?" (Genn and Harden, 1987). Positive environment and positive learning outcomes appear to go together.

Although the educational environment is a subtle and intangible concept, considerable progress has been made over the last quarter of the twentieth century in its conceptualization. The development of assessment inventories enable students' perceptions of their educational environment to be quantified and compared, either longitudinally within single health professions institutions, or between institutions (Roff *et al.*, 1997).

The present paper reports data from four undergraduate medical schools: three traditional medical schools (Medical School at King Abdul Aziz University, Saudi Arabia; Medical School, Umm Al-Qura University, Saudi Arabia and Faculty of Medicine and Health Sciences, University of Sana'a, Republic of Yemen) and one innovative medical school (Dundee University Medical School, UK). The aim of the study is to measure the educational environment, using the 50-item Dundee Ready Education Environment Measure (DREEM), in each medical school and to compare the educational environment as perceived by the responding students of the traditional medical schools in developing countries with that of the innovative medical school in Dundee University, UK. The data were also analysed for possible gender differences in perceptions of the educational environment.

The DREEM was developed by a Delphi process involving more than 80 medical and health profession educators from all continents. They generated the 50 items that they considered to be constituents of a good learning environment for undergraduate programmes in the health professions that are compatible with the General Medical Council's prescriptions in *Tomorrow's Doctors* (1993). This inventory was subsequently validated by administration to student cohorts in Bangladesh, Ethiopia and Argentina (Roff *et al.*, 1997). The 50 descriptors of the good learning environment were all developed and worded by the international Delphi panel and have been found to have universal face validity in administrations throughout the world including via translations into Chinese, Arabic, Portuguese and Spanish among other languages (Primparyon *et al.*, 2000; Bassaw *et al.*, 2003). Al-Qahtani (1999) translated the DREEM into Arabic and administered it to students in the Arab Gulf University and the Arab United Emirates University, where the mean scores were respectively 127 and 125. Roff *et al.* (2001) reported a mean score for a Nigerian medical school of 118 and a mean score of 130 for a Nepalese Institute of Health Sciences. This distribution of mean scores, together with consistently high Cronbach's alpha reliability scores, suggests that the developers achieved their intention of creating an inventory which was not "culturally specific" to a particular geographical region such as Europe or North America. Although there may be cultural and other determinants of how individuals view different qualitative aspects of a given educational environment, perceived ratings precisely report those perceptions. What one respondent might consider unduly "authoritarian" may be acceptable to another respondent. The inventory systematically collects those reported perceptions

and permits comparison between them, but cannot provide an “objective” comparison of the levels of authoritarianism in the two situations—only the reported perception of those levels. This, of course, is a common limitation of all self-reported perception inventories.

Method

The development and validation of the 50-item Dundee Ready Education Environment Measure (DREEM) has been reported (Roff *et al.*, 1997). Each item is scored 4–0 with 4=Strongly agree, 3=Agree, 2=Unsure, 1=Disagree and 0=Strongly disagree by the respondents. Nine of the 50 items (numbers 4, 8, 9, 17, 25, 35, 39, 48, and 50) are scored in reverse for analysis, so that the higher a score the more positive the reading, as with the positively-formulated items (in italics in Table 2). The inventory encompasses five subscales:

- Perceptions of learning—12 items/maximum score 48
- Perceptions of teaching—11 items/maximum score 44
- Academic self-perceptions—8 items/maximum score 32
- Perceptions of atmosphere—12 items/maximum score 48
- Social self-perceptions—7 items/maximum score 28.

The Arabic version was administered to undergraduate medical students in Yemen and Saudi Arabia, while the English version was administered to undergraduate medical students in Dundee University. In total, DREEM was administered to 1072 medical students in the four different universities. The numbers and genders of respondents from the four medical schools are summarized in Table 1.

Table 1. Numbers, genders and year’s levels of respondents from medical school in King Abdul Aziz University (KAU), Umm Al-Qura University (UQU), Sana’a University (SU) and Dundee University (DU)

Medical schools	Gender	Year						Total	Response rate (%)
		1	2	3	4	5	6		
KAU	Male	–	117	108	–	97	33	452	95
	Female		53	44	–	0	0		
UQU	Male	56	–	67	29	13	–	278	75
	Female	57	–	27	16	13	–		
SU	Male	–	30	–	29	–	35	179	81
	Female	–	29	–	31	–	24		
DU	Male	–	–	–	0	67	–	145	78
	Female	–	–	–	0	78	–		

Table 2. Item scores for educational environment for King Abdul Aziz University (KAU), Umm Al-Qura University (UQU), Sana'a University (SU) and Dundee University (DU)

Item	Statements	KAU	OAU	SU	DU
1	I am encouraged to participate	1.73*	1.96*	2.07*	2.83
2	The teachers are knowledgeable	2.70*	2.65*	2.19*	3.3
3	There is a good support system for students who get stressed	0.92*	1.08*	0.43*	1.88
4	<i>I am too tired to enjoy this course</i>	1.22*	1.19*	1.3*	2.68
5	Learning strategies which worked for me before continue to work for me now	1.71*	1.99*	1.79*	2.63
6	The teachers are patient with the patients	2.37*	2.31*	2.18*	2.92
7	The teaching is often stimulating	2.00*	2.16*	2.9*	2.61
8	<i>The teachers ridicule the students</i>	1.68*	1.96*	2.03	2.26
9	<i>The teachers are authoritarian</i>	1.45*	1.57*	1.61*	2.24
10	I am confident about my passing this year	2.24*	2.36*	2.12*	3.02
11	The atmosphere is relaxed during the ward teaching	2.11*	2.07*	1.74*	2.28
12	This school is well timetabled	1.70*	2.23	1.57*	2.46
13	The teaching is student centred	2.28*	2.43*	1.94*	2.67
14	I am rarely bored on this course	1.22*	1.51*	1.54*	2.11
15	I have good friends in this school	3.40	3.11*	3.35	3.48
16	The teaching is sufficiently concerned to develop my competence	1.85*	1.99*	1.42*	3.09
17	<i>Cheating is a problem in this school</i>	1.70*	1.95*	2.21*	3.38
18	The teachers have good communication skills with patients	2.29*	2.29*	2.06*	2.83
19	My social life is good	2.88*	3.15*	2.49*	3.31
20	The teaching is well focused	2.45*	2.68	2.33	2.68
21	I am feel I am being well prepared for my profession	2.02*	2.04*	1.59*	3.04

(continued overleaf)

Table 2. (continued)

Item	Statements	KAU	OAU	SU	DU
22	The teaching is sufficiently concerned to develop my confidence	2.03*	2.13*	1.75*	2.99
23	The atmosphere is relaxed during lectures	1.94*	2*	1.31*	3.15
24	The teaching time is put to good use	1.72*	2.49	1.39*	2.52
25	<i>The teaching over-emphasizes factual learning</i>	1.57*	1.52*	2.16*	2.92
26	Last year work has been a good preparation for this year's work	2.03*	2.16*	2.01*	2.94
27	I am able to memorize all I need	1.70*	1.78	1.73	1.93
28	I seldom feel lonely	2.25*	2.19*	2.38*	2.92
29	The teachers are good at providing feedback to students	2.52*	2.27*	1.71	1.78
30	There are opportunities for me to develop interpersonal skills	1.49*	1.39*	1.75*	3.11
31	I have learned a lot about empathy in my profession	2.93	2.76*	3.29*	3.03
32	The teachers provide constructive criticism here	1.69*	1.85*	1.46*	2.46
33	I feel comfortable in class socially	2.16*	2.27*	2.25*	3.16
34	The atmosphere is relaxed during seminars/tutorials	1.97*	2.13*	1.46*	3.02
35	<i>I find the experience disappointing</i>	2.58*	2.64*	2.59	3.01
36	I am able to concentrate well	2.41*	2.56*	2.66	2.89
37	The teachers give clear examples	2.29*	2.48*	2.12*	2.77
38	I am clear about the learning objectives of the course	1.83*	2.09*	2.16*	2.79
39	<i>The teachers get angry in class</i>	1.71*	1.79*	1.74*	3.04
40	The teachers are well prepared for their classes	2.36*	2.54	2.07*	2.68
41	My problem solving skills are being well developed here	2.11*	2.16*	2.15*	2.87
42	The enjoyment outweighs the stress of studying medicine	1.56*	1.62*	1.69*	2.91
43	The atmosphere motivates me as a learner	1.77*	1.86*	1.6*	2.65

(continued overleaf)

Table 2. (continued)

Item	Statements	KAU	OAU	SU	DU
44	The teaching encourages me to be an active learner	1.96*	2.13*	1.93*	2.79
55	Much of what I have to learn seems relevant to a career in medicine	2.26*	2.46*	2.75	3.04
46	My accommodation is pleasant	3.14	3.06	2.74*	3.22
47	Long term learning is emphasized over short term	2.29*	2.5*	2.22*	2.76
48	<i>The teaching is too teacher-centred</i>	1.53*	1.34*	1.74*	2.84
49	I feel able to ask the questions I want	1.87*	1.94*	1.67*	2.77
50	<i>The students irritate the teachers</i>	2.39*	2.47	0.26*	2.68
The total mean scores		102*	107*	100*	139

* Statistically significant compared to Dundee University.

Data were analysed using SPSS and expressed as means of scores. Comparisons between data were made using non-parametric tests.

Results

Overall Mean Scores

The item scores for the four schools are given in Table 2. For all three traditional medical schools, the total mean scores of the inventory were significantly lower (Medical School in King Abdul Aziz University (102), Umm Al-Qura University (107), Sana'a University (100)) compared with Dundee Medical School (139).

Individual Item Scores

Students at Dundee Medical School perceived their teachers as being more knowledgeable than students in the traditional medical schools. They are more encouraged to participate in their learning and had more confidence that the teaching was sufficiently concerned to develop their competence compared to students in traditional medical schools. They felt that their teachers were more patient, had better communication skills with patients and provided them with clearer learning objectives. On the other hand, students in the traditional schools, as expected, perceived the teaching as being too teacher-centred and over-emphasizing factual learning. They felt that their teachers were more

Table 3. Domain scores for medical schools in King Abdul Aziz University (KAU), Umm Al-Qura University (UQU), Sana'a University (SU) and Dundee University (DU)

Domains	KAU	UQU	SU	DU
Learning's perceptions	23*	25*	24*	34
Teaching's perceptions	23*	24*	22*	29
Academic self-perceptions	17*	18*	17*	23
Perceptions of atmosphere	23*	25*	23*	35
Social self-perceptions	14*	15*	14*	20

*Statistically significant compared to Dundee University.

Table 4. Statistically significant differences between male and female medical students at King Abdul Aziz University

Item	Statements	Male	Female
1	I am encouraged to participate	1.82	1.5
2	The teachers are knowledgeable	2.87	2.25
3	There is a good support system for students who get stressed	0.99	0.73
4	I am too tired to enjoy this course	1.34	0.90
5	Learning strategies which worked for me before continue to work for me now	1.89	1.25
6	The teachers are patient with the patients	2.44	2.12
7	The teaching is often stimulating	2.1	1.73
8	The teachers ridicule the students	1.77	1.46
10	I am confident about my passing this year	2.51	1.50
12	This school is well timetabled	1.61	1.93
15	I have good friends in this school	3.49	3.16
16	The teaching is sufficiently concerned to develop my competence	1.94	1.60
21	I am feel I am being well prepared for my profession	2.14	1.71
22	The teaching is sufficiently concerned to develop my confidence	2.15	1.7
26	Last year work has been a good preparation for this year's work	2.15	1.71
27	I am able to memorize all I need	1.89	1.19
35	I find the experience disappointing	2.77	2.1
36	I am able to concentrate well	2.56	2.01
41	My problem solving skills are being well developed here	2.25	1.74
42	The enjoyment outweighs the stress of studying medicine	1.68	1.21
43	The atmosphere motivates me as a learner	1.89	1.46
46	My accommodation is pleasant	3.2	2.96

authoritarian than their counterparts in the innovative medical school. In addition, students in the traditional medical schools were more likely than students in the innovative medical school to feel too tired, less able to memorize all they needed and less likely to enjoy the course.

The Dundee students felt they had a better support system for stressed students than the students in traditional schools and were more confident of passing the current year. They considered the teaching in all formats—lecture, tutorial, seminar and on the ward—took place in a much more relaxed environment than that perceived by the students in the traditional schools. They were markedly more pleased with their social life and felt more socially comfortable in class. They were also more satisfied with their accommodation than those in traditional schools.

Sub-scale Scores

These individual differences are reflected in the scores of all subscales of educational environment (Table 3). The students from traditional schools rated their learning and teaching environment significantly lower than their

Table 5. Statistically significant differences between male and female medical students at Umm Al-Qura University

Item	Statements	Male	Female
1	I am encouraged to participate	2.09	1.79
4	I am too tired to enjoy this course	1.28	1.07
6	The teachers are patient with the patients	2.4	2.19
7	The teaching is often stimulating	2.28	1.99
10	I am confident about my passing this year	2.49	2.17
11	The atmosphere is relaxed during the ward teaching	2.24	1.84
12	This school is well timetabled	2.38	2.0
15	I have good friends in this school	3.26	2.88
17	Cheating is a problem in this school	1.56	2.15
18	The teachers have good communication skills with patients	2.35	2.19
19	My social life is good	3.27	2.97
25	The teaching over-emphasizes factual learning	1.63	1.36
26	Last year work has been a good preparation for this year's work	2.32	1.92
27	I am able to memorize all I need	2.09	1.35
28	I seldom feel lonely	2.44	1.82
29	The teachers are good at providing feedback to students	2.43	2.04
30	There are opportunities for me to develop interpersonal skills	1.58	1.12
32	The teachers provide constructive criticism here	1.98	1.65
33	I feel comfortable in class socially	2.4	2.07
36	I am able to concentrate well	2.8	2.2
44	The teaching encourages me to be an active learner	2.27	1.92
48	The teaching is too teacher-centred	1.45	1.18

counterparts in Dundee Medical School. Similarly, they rated their academic self-perceptions, social-self perceptions and their atmosphere significantly more poorly than did the Dundee students.

Gender Differences

The items which registered statistically significant differences between the male and female students at medical schools in King Abdul Aziz University, Umm Al-Qura University, Sana’a University and Dundee University are given in

Table 6. Statistically significant differences between male and female medical students at Sana’a University

Item	Statements	Male	Female
1	I am encouraged to participate	2.28	1.86
4	I am too tired to enjoy this course	1.45	1.14
10	I am confident about my passing this year	2.66	1.5
16	The teaching is sufficiently concerned to develop my competence	1.73	1.07
21	I am feel I am being well prepared for my profession	1.96	1.19
22	The teaching is sufficiently concerned to develop my confidence	2.01	1.44
27	I am able to memorize all I need	2.04	1.39
35	I find the experience disappointing	2.97	2.13
36	I am able to concentrate well	2.94	2.34
39	The teachers get angry in class	1.98	1.45
41	My problem solving skills are being well developed here	2.48	1.78
43	The atmosphere motivate me as a learner	1.87	1.3
44	The teaching encourages me to be an active learner	2.19	1.64
45	Much of what I have to learn seems relevant to a career in medicine	2.94	2.55
49	I feel able to ask the questions I want	1.9	1.37

Table 7. Statistically significant differences between male and female medical students at Dundee University

Item	Statements	Male	Female
13	The teaching is student centred	2.56	2.83
14	I am rarely bored on this course	1.91	2.31
18	The teachers have good communication skills with patients	2.94	2.73
37	The teachers give clear examples	2.65	2.92
43	The atmosphere motivates me as a learner	2.52	2.81
46	My accommodation is pleasant	3.03	3.39
48	The teaching is too teacher-centred	2.7	2.97

Table 4, Table 5, Table 6 and Table 7 respectively. It can be seen that there are major differences in the perceptions of the male and female students in the Saudi Arabian and Yemeni schools, almost all of them reporting lower satisfaction on the part of the female students. There are considerably fewer differences between the genders' perceptions in the Dundee group, all but one of them in the opposite direction—reporting higher female satisfaction with the environment.

Discussion

Given that the mean scores reported here for two Saudi Arabian and one Yemeni medical school are significantly lower than those reported by Al-Qahtani (1999) for two other Arabic-language schools in the same region, they can be read as providing useful diagnostic information about the strengths and weaknesses of the educational environments as perceived by the student respondents. Comparison of the “profile” generated by these results of the educational environment with that from Dundee University Medical School may be instructive about the specific curriculum changes that can be made to enhance the perceived educational environment in such a way as to conform with the educational recommendations of the UK General Medical Council if it is considered to be in the national interest to do so.

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