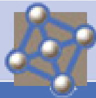

EDUCATION FOR HEALTH

ORIGINAL RESEARCH PAPER

Measuring Students' Perceptions of the Educational Climate of the New Curriculum at the Pontificia Universidad Católica de Chile: Performance of the Spanish Translation of the Dundee Ready Education Environment Measure (DREEM)

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ABSTRACT

Context: During the last decade a major curriculum reform was carried out at the Pontificia Universidad Católica de Chile Medical School. The process included changes in curriculum development, staff development and in the infrastructure. However, it is not known how students perceived the climate of their education within the new model.

Objectives: To measure students' perceptions of the educational environment of the new curriculum and to evaluate the internal consistency of the 50-item Dundee Ready Education Environment Measure (DREEM) Spanish version questionnaire.

Methods: The DREEM Spanish version questionnaire was administered to undergraduate medical students in training years 3, 4 and 5. Internal consistency of the instrument and its subscales were measured with the method described by Cronbach, and the results were expressed with alpha coefficient ranging from 0 to 1.

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Findings: Responses were received from 297 out of 328 students (90.5%). The 50-item DREEM Spanish version was found highly reliable with an alpha coefficient of 0.91. The subscale with the highest mean score was "Academic Self-Perceptions", which indicates students' perceptions of their academic achievements. Mean score of this subscale was 22.3 ± 4.1 corresponding to 69.7% of the maximum score. The lowest mean score was for the Students' Perceptions of their Social Environment: 15.9 ± 4.0 (56.8%). The overall mean score for the 50 items was 127.5 ± 20.9 (63.8% of maximum). Scores observed in students in year 5 were significantly lower for several subscales, including Students' Perceptions of Learning, Students' Perceptions of Teachers, Students' Perceptions of the Learning Atmosphere and Students' Perceptions of the Social Environment, and also lower for the overall mean score (119.3 ± 20.2) compared to scores in years 3 and 4 (128.8 ± 21 and 132.5 ± 19.7, respectively; $p<0.001$).
Conclusions: The school's educational climate was generally perceived positively by students, although they viewed the school's social environment less favorably. Specific areas identified by students as needing improvement included an overloaded curriculum and inadequate student supports. The DREEM Spanish version proved generally reliable, by internal consistency scores based on ratings by Chilean undergraduate medical students; it should be a useful tool for assessing students' perceptions of the educational environments of other Latin American medical schools.

Keywords: Educational climate, undergraduate medical students, Chile, DREEM questionnaire.

Introduction

In the 1980s, the undergraduate curriculum of the Pontificia Universidad Católica de Chile Medical School (PUCMS) was a traditional one, as defined by the General Medical Council (GMC) in the United Kingdom (UK) (1993). The curriculum was teacher-centred, discipline-based and hospital-based, without many options for students or elective modules. Despite the general perception that the educational climate of the traditional curriculum was uncomfortable, there was no measurement of the educational environment in the PUCMS at that time.

The faculty initiated a reform of the undergraduate curriculum in 1993 (Moreno & Velasco, 1994; Rosso *et al.*, 1997), addressing the educational aspects highlighted by the World Federation of Medical Education (1993) and targeting the characteristics desired of the tomorrow's physicians as developed by the Association of American Medical Colleges (AAMC) (1984) and the GMC in the UK (1993).

Curriculum changes included a reduction in the number of curriculum core contents, expansion in the number of electives, vertical and horizontal integration of the curriculum, modernization of teaching methods through use of small groups, problem-oriented teaching and more ambulatory care exposure (Sanchez *et al.*, 2007). Six education strategies have been identified (Harden *et al.*, 1984) relating to the curriculum in a medical school. Each issue can be represented as a spectrum or continuum: student-centred / teacher-centred, problem-based / information gathering, integrated /discipline-based, community-based / hospital-based, elective / uniform and systematic /apprenticeship –based. The SPICES (student-centred, problem-based, integrated, community-based, electives and systematic) model of curriculum strategy analysis can be used in curriculum planning or review. Newer schools tend to be more to the left on the continuum and if we analysed the new curriculum of the PUCMS, it incorporated most of the educational strategies highlighted by Harden *et al.* (1984) in the SPICES model. In order to meet the needs of the new curriculum, a new school of medicine building was inaugurated in 2004, which included a biomedical library with Information Communication Technology (ICT) services.

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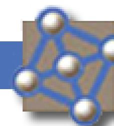

Academic performance among medical students improved after the curricular reform, with lower student failure rates, fewer promotion delays, fewer dropouts from the school and improved grades, all without changing the standards for passing within the PUCMS (Bitran *et al.*, 2002). Moreover, during the period 2003-2005 graduates from the PUCMS obtained the highest average scores among graduates of all Chilean medical schools on the National Medical Examination (Enriquez & Mena, 2005), (National Medical Examination, Chile, 2005).

There is well recognized connection between schools' educational environment and the important outcomes of students' achievement, satisfaction and success (Genn, 2001). The World Federation for Medical Education (1998) considers the learning environment as one of the areas that should be targeted when evaluating medical education programmes. In our school, students' perceptions of the educational environment within this new curriculum model were unknown.

It is important to understand students' perceptions of the learning environment of their schools because this information, gained through questionnaires, interviews and focus groups, can be used to enhance the strengths and address the weaknesses of the institution (Roff, 2005). In 1986, Genn & Harden (1986) reviewed instruments that had been developed to measure the environment and climate of higher education institutions. Several instruments were then available for assessing the environment of medical schools (Hutchins, 1961; Rothman & Ayoade, 1970; Marshall, 1978; Feletti & Clarke, 1981). These questionnaires are now out of date in that they do not address recent imperatives for curriculum changes and newer educational strategies (Hutchinson, 2003; Roff, 2005).

More recently, Roff *et al.* (1997) developed the Dundee Ready Education Environment Measure (DREEM) to assess the educational environment of a Scottish medical school as perceived by undergraduate medical students. Deza translated the 58-item preliminary DREEM questionnaire into Spanish and found it was reliable, with an internal consistency of 0.91 (Roff *et al.*, 1997). The questionnaire was subsequently refined by Roff *et al.* (1997) and the number of items was reduced from 58 to 50; the reliability of the 50-item DREEM questionnaire (Spanish version) has not been tested.

Objectives

(1) To measure students' perceptions of the educational environment of the new undergraduate curriculum of the PUCMS, and to see how perceptions varied according to students' year of training. (2) To evaluate the internal consistency of the 50-item DREEM Spanish version questionnaire.

Material and Methods

Instrument

The development and validation of the 50-item DREEM has been reported elsewhere (Roff *et al.*, 1997). Respondents score each item from 0 to 4 (4 = Strongly agree, 3 = Agree, 2 = Unsure, 1 = Disagree and 0 = Strongly disagree). Some items (4, 8, 9, 17, 25, 35, 39, 48 and 50) contain negative statements and are therefore reverse-coded when incorporated into scales. According to Roff *et al.* (1997) individual items with a mean score of 3 or greater reflect a positive educational environment and are considered areas of strength for a school; values between 2 and 3 reflect areas that are neither strengths nor weaknesses but identify areas that could be enhanced; and items with a mean score below 2 are considered areas of weaknesses for a school of medicine. The DREEM yields a

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global score of up to 200 with its 50 items combined and has five subscales proposed by Roff *et al.* (1997): (1) Students' Perceptions of Learning (items 1, 7, 13, 16, 20, 22, 24, 25, 38, 44, 47 and 48), which addresses students' views of aspects of the teaching activities, such as whether they receive clear course objectives, and whether learning is student-focused and encourages active learning rather than being teacher-centred and stresses factual learning; (2) Students' Perceptions of Teachers (items 2, 6, 8, 9, 18, 29, 32, 37, 39, 40 and 50), which address students' views of the qualities of teachers, including their communication skills, whether they provide feedback to students and patients, their level of knowledge and their level preparation for classes; (3) Students' Perceptions of their Academic Skills (items 5, 10, 21, 26, 27, 31, 41 and 45), which includes students' views of the learning strategies and problem-solving skills they have developed to prepare themselves for their profession; (4) Students' Perceptions of the Learning Atmosphere (items 11, 12, 17, 23, 30, 33, 34, 35, 36, 42, 43 and 49), which includes items addressing how relaxed the atmosphere is during lectures and ward teaching, whether teaching activities are motivating for students, and whether there are opportunities for students to develop interpersonal skills; and (5) Students' Perceptions of the Social Environment (items 3, 4, 14, 15, 19, 28 and 46), which addresses students' views of the support systems available to those who become stressed, the school's accommodations for students, the quality of campus social life, and whether students' are able to find friends at school.

Sample

The survey of the educational environment at the PUCMS was carried out in December 2005. The questionnaire was administered to undergraduate medical students of training years 3, 4 and 5. The DREEM was administered in paper form to students in years 3 and 4. Year 5 medical students were on various clinical rotations and for this reason some questionnaires were administered on paper and others through an on-line questionnaire. The questionnaires were answered anonymously by students. The study was approved by the human subjects review committee of the PUCMS.

Statistical analysis

The variables were described using means and standard deviations (SD). Comparisons of students of the various years were analysed using t tests. Variance analysis was carried out for years 3, 4 and 5 using ANOVA. Differences were considered statistically significant with a p value <0.05. The method described by Cronbach (1951) was used to measure scale reliability. The internal consistencies of the inventory and its subscales were calculated using the Statistical Package for Social Science (SPSS 11) and the results were expressed as alpha coefficients ranging from 0 to 1.

Results

Completed questionnaires were received from 108 out of 110 students (98.2%) in year 3, 106 out of 108 students (98.1%) in year 4 and 83 out of 110 students (75.5%) in year 5. The overall response rate was 90.5%. Among respondents, 159 (53.5%) were males and 138 (46.5%) were females.

Individual item scores

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The mean scores of individual items are shown in table 1. Scores for 9 out of 50 items (18%) were below 2, indicating areas of weaknesses of the PUCMS. Items 3, 17, 25, 27 and 46 had the lowest mean scores of the 50 items. The values for the majority of the items (60%) fell into the range that indicated aspects of the environment that would benefit from improvement (mean scores between 2 and 3). Eleven items (22%) had scores of 3 or greater and identified areas perceived as contributing to a good educational environment by students: items 2, 10, 15, 40 and 45 were the five that received the highest mean scores.

Mean response values for 30 (60%) of the individual items were lower for students of year 5 than for students of years 3 or 4 (Table 2).

Table 1. Mean responses to DREEM items for medical students of the various clinical years

Item number / Item	Year 3 N=108 Mean ± SD	Year 4N=106 Mean ± SD	Year 5 N=83 Mean ± SD	Total N=297 Mean ± SD
1. I am encouraged to participate in class[1].	2.46 ± 1.03	2.12 ± 1.04*	2.35 ± 0.99	2.31 ± 1.03
2. The teachers are knowledgeable[2].	3.62 ± 0.58	3.73 ± 0.47	3.59 ± 0.52	3.65 ± 0.52
3. There is a good support system for students who get stressed[5].	1.12 ± 0.94	1.43 ± 1.03	0.87 ± 0.85*	1.16 ± 0.97
4. I am too tired to enjoy the course[5].	1.52 ± 1.13	1.89 ± 1.34	1.88 ± 1.11	1.76 ± 1.21
5. Learning strategies which worked for me before continue to work for me now[3].	1.18 ± 1.24*	2.49 ± 1.12	2.39 ± 1.19	2.35 ± 1.19
6. The teachers are patient with patients[2].	3.17 ± 0.72	2.84 ± 0.89	2.61 ± 0.84*	2.9 ± 0.84
7. The teaching is often stimulating[1].	2.73 ± 0.91	2.79 ± 0.79	2.25 ± 0.94*	2.62 ± 0.9
8. The teachers ridicule the students[2].	3.08 ± 0.7	2.81 ± 0.83	2.49 ± 0.9*	2.82 ± 0.84
9. The teachers are authoritarian[2].	2.3 ± 0.95	2.06 ± 0.99*	1.89 ± 0.96*	2.1 ± 0.98
10. I am confident about my passing this year[3].	3.54 ± 0.83	3.29 ± 0.79*	3.62 ± 0.6	3.47 ± 0.77
11. The atmosphere is relaxed during the ward teaching[4].	2.85 ± 0.95	2.78 ± 0.93	2.17 ± 0.96*	2.63 ± 0.99
12. This school is well time-tabled[4].	1.82 ± 1.29*	2.28 ± 1.24	1.77 ± 1.16*	1.97 ± 1.26
13. The teaching is student-centred[1].	2.46 ± 1.03	2.46 ± 0.91	2.09 ± 1.02*	2.36 ± 1
14. I am rarely bored on this course[5].	1.72 ± 1.06*	2.22 ± 1.12	1.72 ± 1.04*	1.9 ± 1.1
15. I have good friends in this school[5].	3.64 ± 0.68	3.56 ± 0.68	3.57 ± 0.61	3.59 ± 0.66
16. The teaching is sufficiently concerned to develop my competence[1].	3.09 ± 0.96*	3.4 ± 0.64	3.18 ± 0.68	3.22 ± 0.79
17. Cheating is a problem in this school[4]	1.05 ± 1.15*	1.6 ± 1.26	0.9 ± 1.04*	1.2 ± 1.19
18. The teachers have good communications skills with patients[2].	3.15 ± 0.57	2.88 ± 0.69	2.48 ± 0.86*	2.87 ± 0.75
19. My social life is good[5].	3.28 ± 0.85	3.29 ± 0.88	2.9 ± 1.19*	3.18 ± 0.98
20. The teaching is well focused[1].	3.18 ± 0.63	3.08 ± 0.81	3.06 ± 0.85	3.11 ± 0.76
21. I feel I am being well prepared for my profession[3].	3.28 ± 0.68	3.23 ± 0.72	2.99 ± 0.71*	3.18 ± 0.71
22. The teaching is sufficiently concerned to develop my confidence[1].	2.67 ± 1.03*	2.91 ± 0.89	2.54 ± 0.94*	2.72 ± 0.97
23. The atmosphere is relaxed during lectures[4].	2.63 ± 0.93*	2.94 ± 0.85	2.73 ± 0.73	2.77 ± 0.86
24. The teaching time is put to good use[1].	2.3 ± 1.06	2.04 ± 1.12*	1.81 ± 1.04*	2.07 ± 1.09
25. The teaching over-emphasizes factual learning[1].	1.62 ± 1.01	1.26 ± 1.07*	1.19 ± 1.09*	1.37 ± 1.07
26. Last year's work has been a good preparation for this year's work[3].	2.91 ± 0.95	3.06 ± 0.85	2.87 ± 0.85	2.95 ± 0.89
27. I am able to memorize all I need[3].	1.7 ± 1.28	1.85 ± 1.26	1.3 ± 1.11*	1.64 ± 1.25
28. I seldom feel lonely[5].	2.61 ± 1.18*	2.91 ± 1.13	2.52 ± 0.98*	2.69 ± 1.12
29. The teachers are good at providing feedback to students[2].	1.95 ± 1.08	1.69 ± 1.01*	1.55 ± 0.98*	1.74 ± 1.04
30. There are opportunities for me to develop interpersonal skills[4].	2.28 ± 1.15	2.54 ± 1.2	2.21 ± 1.11	2.35 ± 1.17
31. I have learned a lot about empathy in my profession[3].	3.03 ± 0.93	2.84 ± 1.02	2.63 ± 0.96*	2.84 ± 0.98

Table 1: cont'd

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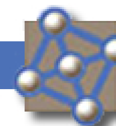

Item number / Item	Year 3 N=108 Mean ± SD	Year 4N=106 Mean ± SD	Year 5 N=83 Mean ± SD	Total N=297 Mean ± SD
32. The teachers provide constructive criticism here[2].	2.88 ± 0.77	2.83 ± 0.83	2.23 ± 1.05*	2.68 ± 0.92
33. I feel comfortable in class socially[4].	3.27 ± 0.76	3.31 ± 0.76	2.99 ± 0.77*	3.2 ± 0.77
34. The atmosphere is relaxed during seminars/tutorials[4].	3.08 ± 0.83	3.17 ± 0.77	2.86 ± 0.83*	3.05 ± 0.82
35. I find the experience disappointing[4].	3.15 ± 0.95	3.27 ± 0.86	3.01 ± 0.77	3.15 ± 0.87
36. I am able to concentrate well[4].	2.36 ± 1.15	2.6 ± 1.06	2.52 ± 1.02	2.48 ± 1.08
37. The teachers give clear examples[2].	2.78 ± 0.67	2.83 ± 0.76	2.7 ± 0.62	2.77 ± 0.69
38. I am clear about the learning objectives of the course[1].	2.42 ± 1.03	2.45 ± 1.06	2.17 ± 0.96	2.36 ± 1.03
39. The teachers get angry in class[2].	2.67 ± 0.97*	3.15 ± 0.71	2.77 ± 0.85*	2.87 ± 0.87
40. The teachers are well prepared for their classes[2].	3.36 ± 0.68	3.38 ± 0.76	3.08 ± 0.5*	3.29 ± 0.67
41. My problem solving skills are being well developed here[3].	2.53 ± 1.07	2.58 ± 0.9	2.53 ± 1.02	2.54 ± 0.99
42. The enjoyment outweighs the stress of the course[4].	2.09 ± 1.24	2.25 ± 1.25	2.11 ± 1.12	2.15 ± 1.21
43. The atmosphere motivates me as a learner[4].	2.60 ± 1.00	2.77 ± 0.91	2.42 ± 0.96*	2.61 ± 0.97
44. The teaching encourages me to be an active learner[1].	2.35 ± 1.18	2.52 ± 1.05	2.11 ± 1.06*	2.3 ± 1.11
45. Much of what I have to learn seems relevant to a career in healthcare[3].	3.47 ± 0.66	3.31 ± 0.77	3.07 ± 0.66*	3.3 ± 0.72
46. My accommodation is pleasant[5].	1.73 ± 1.44	1.81 ± 1.24	1.43 ± 1.27	1.68 ± 1.38
47. Long term learning emphasizes over short term[1].	2.25 ± 1.15	2.22 ± 1.40	1.76 ± 1.08*	2.1 ± 1.18
48. The teaching is too teacher-centred[1].	2.15 ± 1.02	2.32 ± 1.22	1.98 ± 0.96*	2.15 ± 0.99
49. I feel able to ask the questions I want[4].	2.53 ± 1.17	2.54 ± 0.96	2.66 ± 0.95	2.57 ± 1.07
50. The students irritate the teachers[2].	2.10 ± 1.14*	2.97 ± 1.05	2.86 ± 0.8	2.62 ± 1.07

* Statistically significantly lower responses than students of other years (ANOVA p value < 0.05).
The five subscales or domains included the following items:
[1] Students' Perceptions of Learning (Items 1, 7, 13, 16, 20, 22, 24, 25, 38, 44, 47 and 48)
[2] Students' Perceptions of Teachers (Items 2, 6, 8, 9, 18, 29, 32, 37, 39, 40 and 50)
[3] Students' Perceptions of Their Academic Skills (Items 5, 10, 21, 26, 27, 31, 41 and 45)
[4] Students' Perceptions of the Learning Atmosphere (Items 11, 12, 17, 23, 30, 33, 34, 35, 36, 42, 43 and 49)
[5] Students' Perceptions of the Social Environment (Items 3, 4, 14, 15, 19, 28 and 46)

Subscales and overall mean scores

The 5 subscales and overall mean scores are shown in Table 2. The subscale with the highest mean score was students' perceptions of their academic skills: 22.3 ± 4.1 out of 32, corresponding to 69.7% of the maximum score. The lowest mean score was for the students' perceptions of the school's social environment: 15.9 ± 4.0 (56.8% of the maximum score). Scores observed for year 5 students were statistically significantly lower in subscales 1,2,4 and 5 compared to years 3 and 4 (p<0.001).

The overall mean score for the 50 items was 127.5 ± 20.9 (63.8%). Students of year 4 had the highest mean score with 132.5 ± 19.7 and the lowest mean score was found for students in year 5 with 119.3 ± 20.2 (p<0.0001).

Table 2. A comparison of subscales and full DREEM inventory among undergraduate medical students

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Mean ± SD (% of maximum score) Subscales	Year 3 N=108	Year 4 N=106	Year 5 N=8	Total N=297	ANOVA (p value)
Students' perceptions of learning[1] (12 items: maximum score 48)	29.7 ± 6.2 (61.9%)	29.6 ± 5.9 (61.7%)	26.4 ± 6.0 (55%)	28.7 ± 6.2 (59.8%)	Years 3 & 4 > 5 (p<0.001)
Students' perceptions of teachers[a] (11 items: maximum score 44)	31.1 ± 4.5 (70.7%)	31.2 ± 4.7 (70.9%)	28.3 ± 4.5 (64.3%)	30.3 ± 4.7 (68.9%)	Years 3 & 4 > 5 (p<0.001)
Students' perceptions of their academic skills[3] (8 items: maximum score 32)	22.6 ± 4.1 (70.6%)	22.6 ± 4.1 (70.6%)	21.4 ± 4.1 (66.9%)	22.3 ± 4.1 (69.7%)	NS
Students' perceptions of the learning atmosphere[4] (12 items: maximum score 48)	29.7 ± 6.4 (61.9%)	32.0 ± 6.0 (66.7%)	28.3 ± 6.3 (59%)	30.2 ± 6.4 (62.9%)	Year 4 > 3 (p<0.02) Year 4 > 5 (p<0.0001)
Students' perceptions of the social environment[5] (7 items: maximum score 28)	15.6 ± 3.8 (55.7%)	17.1 ± 4.3 (61.1%)	14.9 ± 3.7 (53.2%)	15.9 ± 4 (56.8%)	Year 4 > 3 (p<0.02) Year 4 > 5 (p<0.001)
Full DREEM inventory (50 items: maximum score 200)	128.8 ± 21.0 (64.4 %)	132.5 ± 19.7 (66.3%)	119.3 ± 20.2 (59.7%)	127.5 ±20.9 (63.8 %)	Year 3 & 4 > 5 (p<0.0001)

The DREEM questionnaire has 50 items using a 5-point Likert-scale from 0=Strongly disagree to 4=Strongly agree[a].
The five subscales or domains included the following items:
[1] Students' Perceptions of Learning (Items 1, 7, 13, 16, 20, 22, 24, 25, 38, 44, 47 and 48).
[2] Students' Perceptions of Teachers (Items 2, 6, 8, 9, 18, 29, 32, 37, 39, 40 and 50).
[3] Students' Perceptions of their Academic Skills (Items 5, 10, 21, 26, 27, 31, 41 and 45).
[4] Students' Perceptions of the Learning Atmosphere (Items 11, 12, 17, 23, 30, 33, 34, 35, 36, 42, 43 and 49).
[5] Students' Perceptions of the Social Environment (Items 3, 4, 14, 15, 19, 28 and 46).

Reliability

Internal consistency findings are shown in Table 3. The 50-item DREEM Spanish version was found highly reliable, with an alpha coefficient of 0.91 in year 3, 0.9 in year 4 and 0.91 in year 5 (p=NS for difference in alphas across years). The internal consistency of the inventory among all 297 respondents was 0.91. Internal consistencies of the five subscales were found to reflect adequate reliability, although the coefficient for Perceptions of the Social Environment was lower than that of the other subscales indicating its poorer reliability (Table 3).

Table 3. Cronbach's alpha coefficients for subscales and full DREEM inventory

Subscales	N=297
Students' perceptions of learning (12 items)	0.75
Students' perceptions of teachers[a] (11 items)	0.71
Students' perceptions of their academic skills (8 items)	0.65
Students' perceptions of the learning atmosphere (12 items)	0.75
Students' perceptions of the Social Environment (7 items)	0.58
Full DREEM inventory (50 items)	0.91

Internal consistency is expressed as a Cronbach alpha coefficient ranging from 0 to 1[a].

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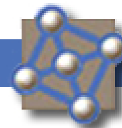

Discussion

The DREEM questionnaire was found to be an internally reliable instrument for measuring students' views of the educational climate of a Chilean university. The 50-item DREEM Spanish version was found to have a similar reliability coefficient (Cronbach alpha) to that obtained by Deza in the first Spanish version (58-item DREEM), administered in Argentina (Roff *et al.*, 1997). However, the alpha coefficients of each subscale were lower than the overall reliability, ranging from 0.58 to 0.75. The lowest reliability was obtained by the Students' Social Self-Perceptions. Mayya & Roff (2004) obtained very similar alpha coefficients for the subscales and full inventory in India. Psychometric analyses of the instrument were carried out by de Oliveira Filho *et al.* (2005) in postgraduate training programmes in Brasil. They found the DREEM inventory valid, with high discriminant and concurrent validities and high reliability with an alpha coefficient of 0.93 and generalizability coefficient of 0.95.

The individual items' mean scores offered an opportunity to improve certain areas of the PUCMS educational environment that were perceived by students as weaknesses, including the support systems for students who become stressed, cheating as a problem in the school of medicine, teaching that over-emphasized factual learning, and poor accommodations for students. Analysis of individual items also proved to be a useful tool for recognizing areas where the educational environment was good, such as the quality of the school's teachers in terms of their medical knowledge and teaching abilities.

The analysis of the subscales showed a high mean score for students' perceptions of their teachers. This finding is consistent with the item analysis and may reflect the successes of the staff development efforts of the Centre for Medical Education. The other subscales that reflected a positive educational environment were students' perceptions of their academic skills and their perceptions of the learning atmosphere. On the other hand, students' perceptions of learning and of the social environment revealed domains of the educational environment that could stand improvement. The new medical school building and the biomedical library were evaluated highly by the students. However, the students ratings challenged the medical school to provide better social activities and accommodations for students, which could be related to infrastructure deficiencies.

Four of the five subscale mean scores of students in year 5 were lower than the mean scores for students in years 3 and 4. This may be due to differences in the physical environments, proportion of clinical activities and proportion of mature students or validity of the instrument used to measure the educational environment (Wangsaturaka, 2005; Roff *et al.*, 2005). Al-Hazimi *et al.* (2004) analysed the educational environment at three schools of medicine: two with traditional curricula in Saudi Arabia and the Republic of Yemen, and a third, Scottish medical school with an innovative curriculum as defined by the GMC in the UK (1993). The Scottish medical school obtained an overall DREEM score of 139, significantly higher than the scores obtained by the traditional universities, which 100 and 107. However, an innovative curriculum design is not the only factor related to a good educational environment. Curriculum changes are usually undertaken in order to improve the overall learning environment for students; the process, however, is often stressful for both students and faculty (Roff et al, 1997; McAleer *et al.*, 1998).

The PUCMS obtained an overall mean score of 127.5, which is considered an indication of a generally positive educational environment. The DREEM scores obtained by students in year 3 and 4 were comparable with DREEM scores reported by UK medical schools with curricula aligned with the recommendations suggested by the GMC in Tomorrow's Doctors (Roff *et al.*, 1997; Al-Hazimi *et al.*, 2004; Varma *et al.*, 2005). Roff (2005) pointed out that "It remains to be established if the type of curriculum offered by a given school can be 'detected' by the DREEM". However, a higher DREEM score indicates a more

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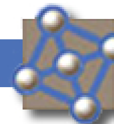

student-centred curriculum, and schools with traditional curricula commonly score less than 120 (Al-Hazimi *et al.*, 2004; Varma *et al.*, 2005).
DREEM has proven to be a useful tool for identifying the strengths and weaknesses of the PUCMS's curriculum. In 2006-2007 the core curriculum was reduced to avoid curriculum overload and the proportion of the curriculum devoted to ambulatory clinical practice was increased. In the integrated clinical course in year 4, the assessment system was improved to assess higher cognitive levels in its multiple-choice question examinations, expanded in its use of Objective Structured Clinical Examinations (OSCE) and it introduced portfolios in order to minimize assessments of students' factual recall of information. A focus group of students and teachers of the PUCMS was conducted in 2007 in the context of the school's accreditation process. The information provided by the DREEM questionnaire was analysed in depth. Focus groups were used to clarify the underlying causes for areas with poor scores, which varied by student-year group. Stress resulting from experiences on clinical placements was highlighted by some students and cheating in written examinations was confirmed as a general problem, although not for OSCE or portfolios. The qualitative data have substantially enhanced questionnaire interpretation, allowing us to undertake remedies to address common causes for student dissatisfaction. This approach of combining DREEM results and qualitative analysis using focus groups and open ended questions has been recommended by Whittle *et al.* (2007) as an approach to improving the educational environment and the overall quality of students' education. In the future, the DREEM questionnaire could again be administered in our school to measure the impact of current and future changes in the curriculum on students' perceptions of their educational environment.

Based on this study's findings, we recommend the 50-item DREEM Spanish version as a reliable instrument for other Chilean and Latin American schools of medicine with Spanish-speaking students. It can be used to identify an institution's strengths and weaknesses, make comparisons of students' perceptions of educational environments within an institution (like identifing changes in perceptions of over time) and between students of different medical schools. It can also be used to assess the correlation of the overall mean score of the DREEM questionnaire with students' academic performance reflected in their grade point averages, and serve as a tool to identify students who are likely to be academic achievers and those who are at risk of poor academic performance (Roff, 2005).

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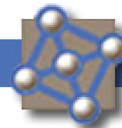

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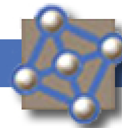

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