Original Article

Investigating the relationship between the quality of the learning environment and the progress of students of Rafsanjan University of Medical Sciences based on the Dundee Ready Educational Environment Measure (DREEM) model

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Abstract

Introduction: The learning environment is important in providing successful education for students. The present study aimed to determine the relationship between the quality of the learning environment and medical and dental students' satisfaction.

Materials and Methods: This cross-sectional descriptive study was conducted on 386 medical and dental students of Rafsanjan University of Medical Sciences, Kerman- Iran in 2021. The validated Dundee University (DREEM) questionnaire was filled out by the students of the Medicine and Dentistry faculties of the Rafsanjan University of Medical Sciences. The data analyzed using descriptive statistics, Pearson correlation coefficient, Chi-square test, t-test, ANOVA, Tukey's test, and SPSS-17 software.

Results: The mean score of the five areas of the learning environment was 113.8 for medical and 110 for dentistry students, and the average score of the total learning environment for the entire population was 113.5. Female students had higher average scores in the learning environment than males ($P < 0.05$). In addition, the highest score was related to the area of understanding of academic ability (64.11%) and understanding of learning (57.2%), and the lowest average score was related to the area of understanding of social status (56.38%). In contrast to the faculty of dentistry, students in the faculty of medicine had a positive and acceptable learning environment.

Conclusion: The present study demonstrated that the students were satisfied with all aspects of the learning environment of their university, but the attention of the professors and managers should be more focused on the dental students to create a suitable learning environment.

Keywords: Education, Dundee Ready Educational Environment Measure (DREEM) model, Learning environment

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Introduction

Motivation of students results in academic achievement and vice versa (1). Understanding students' attitudes toward their learning environment significantly impacts their academic progress and success (2). The student's understanding of their educational environment in an institution includes the physical, psychological, and emotional conditions affecting the development of a learner (3).

There are specific models designed for the evaluation of the learning environment. One of the models developed in 1997 by Sue Roff at the University of Dundee was designed to quantitatively measure the education and learning environment, which is called the Dundee Ready Educational Environment Measure (DREEM) model. This model is used as a tool to investigate educational curriculum shortcomings as well as the effectiveness of changes in education or to identify the difference between the real and desired learning environment (4). The DREEM model has been used in different countries to understand the ideal educational environment (5-8).

Since the educational and learning environment plays a significant role in creating motivation and improving learning abilities, and due to the lack of similar studies evaluating students' understanding of their educational environment in Iran, this study aims to determine the student's understanding of the quality of the educational environment of Rafsanjan University of Medical Sciences.

Material and Methods

The present research is a descriptive-cross-sectional study using the DREEM standard tool to investigate the quality of the learning environment from the perspective of the students of the medicine and dentistry faculties of the Rafsanjan University of Medical Sciences. The research sample included 386 dental students and medical students during the academic year of 2013-2014, which were chosen using a stratified probability (random) sampling method. The study was conducted following the ethical codes of the university and the declaration of Helsinki.

All personal data regarding the participants were removed from the questionnaires, and each questionnaire was coded, and the codes were used for analysis. Data were kept confidentially and anonymity was observed in all stages, including data collection, analysis, and publication of results. All participants signed the written consent. The ethical committee of Rafsanjan University of medical sciences approved the present study (IR.IAU. YAZD. REC.1400.026).

The sample size was calculated using the Cochrane sample size equation considering the precision level of 5%, the confidence level of 95%, the estimated proportion of 0.5, and a total student population of 1874 with the population correction equation $[n=n_0/(1+((n_0-1)/N))]$ (9).

The sample size was calculated as 319, which was increased to 383 participants considering the 20% dropout.

The inclusion criteria were being registered as a student in Medicine or Dentistry Faculty at the Rafsanjan University of Medical Sciences at the time of conducting the study and willingness to participate in the study. Participants were excluded if they were on leave during data collection or needed to complete the study questionnaires.

Research instruments

A) Demographic information: The demographic checklist contains gender, marital status, residence, field, level of education, and age.

B) DREEM Model: The quality of the learning environment was evaluated according to the score of the DREEM model in its five domains. Dundee Ready Educational Environment Measure (DREEM) is among the models that were developed to measure the educational environment in 1997 quantitatively. DREEM has 50 questions and five fields, including "Students' perception of learning", "Students' perception of teachers", "Students' academic self-perceptions", "Students' perception of atmosphere", and "Students' social self-perceptions". The options of the rating list are determined as completely agree (4 points), agree (3 points), not sure (2 points), disagree (1 point), and completely disagree (zero points). Questions number 9, 17, 25, 35, 39, 48, and 50 have opposite grading as completely agree (zero points), agree (1 point), not sure (2 points), disagree (3 points), and completely disagree (4 points). As a result, in each field, according to the number of questions and the maximum score for the relevant options, the maximum score of each field based on the DREEM model is calculated as follows: understanding of learning (12 questions with a maximum of 48 points), understanding of teachers' points (11 questions

with a maximum of 44 points), the students' understanding of academic ability (8 questions with a maximum of 32 points), the understanding of the atmosphere (12 questions with a maximum of 48 points) and the students' understanding of social conditions (7 questions with a maximum of 28 points). Based on the score related to the student's choice in each option or question, the score is recorded, and then by adding the points related to each field, the division is made.

Division in the first area: (0-12 points, very poor), (13-24 points, teaching is viewed negatively), (25-36 points, more positive approach), (37-48 points, teaching highly thought of)

Division in the second area: (0-11 points, abysmal), (12-22 points, in need of some retraining), (23-33 points, moving in the right direction), (34-44 points, model teachers)

Division in the third area: (0-8 points, feeling of total failure), (9-16 points, many negative aspects), (17-24 points, feeling more on the positive side), (25-32 points, confident)

Division in the fourth area: (0-12 points, a terrible environment), (13-24 points, many issues need changing), (25-36 points, a more positive atmosphere), (37-48 points, a good feeling overall)

Division in the fifth area: (0-7 points, miserable), (8-14 points, not a nice place), (15-21 points, not too bad), (22-28 points, very good socially).

The maximum score of the questionnaire is 200 points based on five graded list options for all questions, which are classified into four groups: very poor (zero to 50 points), plenty of problems (51 to 100 points), more positive than negative (101 to 150 points), and excellent (151 to 200 points).

Due to the different number of questions in each field, the average score of each field must clearly show the comparability between the fields. Therefore, by presenting the status of each area in the form of relative frequency (percentage), the ability to compare between areas and at different levels of background variables is provided. To do this, the average score in each field is divided by the maximum points that can be obtained in that field to obtain a comparable percentage (11-15). This model has been previously validated by Agha Molai et al. in the Persian language, and to facilitate a better understanding of the students, the phrases were rephrased according to the source, and the validity of the method was checked based on the opinion of experts, professors, and students. The reliability was done by the test-retest method with the help of 10 students over ten days, and an acceptable correlation coefficient (r= 0.87) was obtained (10-15).

To conduct the research, the trained people who had no affiliation with institutions were asked during non-class hours to present questionnaires to students at the colleges in the morning and at the desired time. During this period, the students had no exam samples, and necessary explanations were provided when completing questionnaires. After completing the questionnaires, the data were entered into the SPSS-17 statistical software. Analytical statistical tests used to include analysis of variance, Pearson correlation coefficient and Chi-square tests, t-test, ANOVA, and Tukey's test, which compare the means of the variables in question with α error equal to 0.05, were used. The significance level was considered 0.05.

Results

This study aimed to determine the quality of the learning environment from the point of view of medical and dental students of Rafsanjan University of Medical Sciences, using the DREEM tool. Based on the students' opinions about the quality of the learning environment, the mean score of DREEM among the students of the two faculties was 113.5 ± 21.9 out of a total of 200 and 56.75% of the students had the total highest level (100%) of an ideal learning environment. In this study, the mean understanding of students tends to be positive and is slightly higher than half of its maximum point (200 points).

Among 386 students with a mean age of 20.24 ± 2.57 years, 246 (63.7%) were female, and 140 (11.2%) students were married. Most of the students were Interns (n= 184, 47.7%), and the rest of them were studying basic science (n= 155, 40.2%) or interns (n= 47, 12.1%).

The students of Medical faculty scored higher on the DREEM model than students in Dentistry faculty (P= 0.01). Among the five subscales of the DREEM model, only the students' perception of the teachers' subscale was not significantly different among the Medical and Dentistry faculties (P= 0.10). The marital status had no significant difference in DREEM model scores (P> 0.05 for all subscales). Native students had significantly higher DREEM model scores in all subdomains than non-native students (P< 0.05). Male

students had significantly lower total scores than female students (*P*= 0.009). While all the subdomain scores were higher among female students, only the students' perception of teachers and the atmosphere was not significantly higher among females (*P*= 0.10 and *P*= 0.20, respectively).

Medical students had significantly higher "more positive than negative" scores, while the dentistry students had significantly higher "very poor" and "plenty of problems" (*P*= 0.02). 58.3% of students had "more positive

than negative" scores. Dentistry students had higher "students' perception of learning" scores (*P*= 0.10). More than half of the students in both faculties had "feeling more on the positive side" scores (*P*= 0.005). Most of the students believed that their social self-perceptions were "not a nice place" or "not too bad" (*P*= 0.20). 60.77% of the medical students and 44.9% of the dentistry students believed that the "perception of atmosphere" is "a more positive atmosphere" and "a good feeling overall" (*P*= 0.02) (Table 1).

Table 1: The mean and standard deviation of DREEM scores based on the faculties

| | | Mean ± standard deviation | | | | | |
		Students' perception of learning	Students' perception of teachers	Students' academic self-perceptions	Students' perception of atmosphere	Students' social self-perceptions	Total
Faculty	Dentistry	27.57±6.3	24.5±6.1	20.13±5.5	26.68±7.5	15.3±4.4	110.72±25.4
	Medical	27.4±5.7	24.6±3.9	20.5±4.1	26.78±5.1	15.7±3.3	113.8±17.31
	Total	27.4±5.2	24.6±5.5	26.8±6.8	20.5±7.4	15.5±4.7	113.5±21.4
	P value	0.05	0.10	0.05	0.05	0.05	0.01
Marital status	Married	25.3±4.8	23.6±6.4	20.6±5.4	26.5±7.5	14.7±4.7	111.9±21.5
	Single	26.8±5.9	24.1±5.6	19.9±4.4	26.7±8.5	15.1±4.2	113.8±20.8
	P value	0.10	0.50	0.40	0.30	0.20	0.20
Age	20 years	26.5±5.3	24.3±5.4	20.2±4.1	26.8±5.8	15.2±5.4	113.5±18.9
	20-25 years	26.3±6.9	23.5±6.3	19.3±5	26.1±5.7	14.7±4.8	110.2±24.6
	25-35	27.1±4.8	26.7±4.9	26.4±6.2	28.2±5.9	17.4±4.9	124±15.2
	>35	26.3±5.2	26.4±6.7	26.2±6.5	29.1±7.6	15.2±6.2	126.1±18.2
	P value	0.03	0.01	0.01	0.01	0.01	0.01
Mode of residence	Native	27.6±5.8	24.7±6.04	20.6±4.6	27.4±6.01	15.3±7.8	116.2±20.4
	Non-native	25.6±5.7	23.2±5.1	19.2±4.2	25.8±5.5	14.3±46	108.3±20.5
	P value	0.01	0.01	0.02	0.05	0.02	0.01

Of the 243 medical students, 23% were in the age group of 17-20 years. Their mean age was 20.52 ± 3.59 years, and they were 17 to 39 years old. 91.46% (214) were single, and 45.7% (127) were female. 43.6% (102) studied basic sciences, and the rest studied clinical science. Data analysis of the quality of learning environment questionnaires of medical students showed that the mean and standard deviation of their understanding score from the "perception of learning" was 27.4 ± 5.7. The "perception of teachers" score was 24.6 ± 3.9, and the mean and standard deviation of the "academic self-perceptions" was 20.5 ± 4.1. The mean and standard deviation of understanding the "perception of atmosphere" was 26.78 ± 5.1, and the understanding of "social self-perceptions" was 15.7 ± 3.3. The mean and standard deviation of the total quality areas of the DREEM model was 113.8 ± 17.31 out of 200. Getting 56.9% of the maximum score (200) shows an ideal educational environment. The area with the highest mean score was related to the understanding of scientific ability, which has 61.8 percent of the maximum score.

The minimum mean among the examined areas was related to understanding social status, which has 57.74 percent of the maximum ideal score. The mean score of female medical students in the dimensions of social self-perceptions and academic self-perceptions was higher than males (*P*< 0.01). However, such a difference in the total scores of all dimensions was absent. The mean score of the areas of the learning environment in the opinion of native students was higher than that of non-native students among all the subdomains (*P*= 0.05). According to marital status, the mean score of self-learning and the educational atmosphere was higher in married students. There was a significant difference between the mean score of total DREEM score and its subscales according to the student's years of education in medical school. According to the DREEM guide, medical students had "a more positive approach" to the perception of learning. The area related to "perception of teachers" was "model teachers". The "academic self-perceptions" was feeling more "on the positive side," and the "perception of atmosphere" was

placed in the category of "good feeling". In general, students from all fields in medicine had a positive point of view toward their learning environment (Table 2).

Table 2: The results of DREEM model among medical students based on year of study and marital status

		Mean ± standard deviation					
		Students' perception of learning	Students' perception of teachers	Students' academic self-perceptions	Students' perception of atmosphere	Students' social self-perceptions	Total
Years of studying medicine	1st year	26.4±5.4	26.2±3.8	18.8±3.9	25.82±4.5	13.6±2.9	111.16±16
	2nd year	26.54±5.5	25.97±2.9	22.5±3.3	30.61±5.4	1.8±4.1	124.93±16
	3rd year	23.53±4.1	21.3±1.9	17.01±3.2	26.2±4.8	14.3±2.3	102.4±10
	4th year	25.75±0.8	25.75±4.9	20.51±4.9	28.8±3.5	14.8±4.8	115.14±13
	5th year	24.8±6.2	21.9±6.8	19.7±6.1	25.2±7.6	14.3±4.2	106.21±22
	P value	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Marital status	Married	25.5±0.8	24.4±2.7	24.5±3.1	31.3±3.9	14±1.9	119.7±11.8
	Single	26.49±5.1	25.1±3.6	19.5±3.9	27.5±5.5	14.8±4.1	113.5±17.3
	P value	0.05	0.60	<0.01	0.02	0.40	0.20

The results showed that 143 students of Dentistry faculty were participated (36.4% male and 63.6% female). The age range of dentistry students was between 17 and 44 years, and their mean age was 23.5 ± 5.8 years. 40.2% of dental students were studying pathophysiology and the basic level, and 59.8% were at the clinical level. The total mean score of the quality of the learning environment of the faculty from the point of view of dental students was 110.7 ± 25.4 out of a total of 200. There was no statistically significant difference in students' understanding of the fields of the learning environment in dentistry students, and the highest score was related to the field of students' perception of the atmosphere. According to the DREEM guide, the area of understanding of learning is in the category of positive perception (25-36) and the area related to understanding of professors in the category of moving in a positive direction (23-33), and understanding of one's academic ability in a right direction (17-24). Also, students' understanding of the prevailing atmosphere in the "positive educational atmosphere" category and the social environment are placed in the category of "not a nice place". The experience and data analysis showed that the difference in the mean score of female and male dental students in the areas of understanding of their scientific ability and the area of understanding of their learning and the total score of DREEM was statistically higher among females ($P< 0.05$). Marital status and residence did not significantly affect DREEM scores ($P> 0.05$). The level of studying dentistry was significantly different among the students in different study years ($P< 0.05$) (Table 3).

Table 3: The results of DREEM model among dentistry students based on years of study

		Mean ± standard deviation					
		Students' perception of learning	Students' perception of teachers	Students' academic self-perceptions	Students' perception of atmosphere	Students' social self-perceptions	Total
Years of studying medicine	Basic science	22.6±9.3	21.6±4.4	16.5±6.1	24.6±4.5	14±4	99.24±5.4
	Intern	23.6±6.3	21.5±7.9	18.6±6	24.7±6.5	13.4±8.5	102.26±2.
	Extern	18.4±5.8	17.5±6.2	14.3±4.7	19.5±1.8	11.4±1.7	80.18±9.7
	Total	27.6±5.3	24±6.1	20.5±13.5	26.7±6.8	15.4±3.4	110.2±7.4
	P value	0.03	0.08	0.02	0.03	0.09	0.02

Discussion

One of the diagnostic tools for measuring educational quality is evaluating the condition of the educational environment. The educational environment is a determining factor in motivating learning because it promotes better learning and progress. Also, the learning environment shows the student's perception of the surrounding environment in the field of learning. The present study considered the DREEM model to evaluate the educational environment at Rafsanjan University of Medical Sciences. The DREEM model is used as a diagnostic tool for various purposes, including examining the course's problems, the effectiveness of changes in education, identifying the difference between the real and the desired learning environment and measuring the educational and learning environment (16-18).

Based on the faculties, the mean scores obtained from the five areas of the learning environment in the Dental faculty was 110.7 points, and in the Medical faculty was 113.5 points by applying the DREEM model. The learning environment in Dental faculty has a negative tendency and is slightly more than half its maximum standard. The mean score of the DREEM questionnaire in the current study was higher than the results of studies on nursing students in Ahvaz-Iran (n= 130, mean DREEM score= 105.01), Brazilian medical and health students (n= 76, mean DREEM score= 85.23), and Syrian pharmacy students (n= 269, mean DREEM score= 89.8) and was lower than the mean DREEM scores reported in studies on Saudi medical students (n= 220, mean DREEM score= 129.64) and Slovenian nursing students (n= 174, mean DREEM score=122.2) (19-23). The differences in the total scores in different countries or institutions might be related to the differences in the cultural and social environments of the countries, as well as the educational facilities of the institutions and the field of study, the experience of the students, and different teaching styles and models used in each institution. On the other hand, Hormozgan University (n= 210, mean DREEM score= 99.6), which used traditional educating methods, had a slightly lower score than our university (10).

Based on the results of these studies conducted from around the globe, students are more receptive to innovative and new programs, and their satisfaction is higher than the programs of traditional colleges as their educational programs are more student-oriented. The mean score is higher than 120 (24,25). The significant difference between the opinions of male and female students regarding the learning environment in colleges can be due to the effect of gender on the educational needs of students. Notably, other studies had gender differences in the mean score of the learning environment (20,21,26).

In a cross-sectional study by Rokhafrooz et al. on 130 nursing students in Ahvaz, Iran, nursing students' perception of their education environment was evaluated using the DREEM questionnaire. The study reported that the mean DREEM score was significantly better among female students compared to male students in the academic self-perception (23.07 in females and 108.03 in males) and social-perception (15.02 in females and 23.07 in males) domains

(20). In a cross-sectional study by Gosak et al. on 174 nursing students in Slovenia, nursing students' perception of their education environment was evaluated using the DREEM questionnaire. They reported that the mean DREEM score was significantly higher among female students (28.9) compared to male students (24.9) and the scores in the domains were as follow: the perception of teacher (29.3 in females and 28.1 in males), academic self-perception (20 in females and 19 in males), perception of the atmosphere (29.4 in females and 28.6 in males), and social self-perception (16.4 in females and 16.6 in males) domains (21). In a cross-sectional study by Al Moaleem et al. on 286 dental students in Saudi Arabia, nursing students' perception of their education environment was evaluated using the DREEM questionnaire. They concluded that the mean DREEM score was significantly lower among female students (29.7) compared to male students (30.3), only in the perception of the atmosphere domain (26).

On the other hand, female students have a more positive understanding of curriculum factors, objectives, and educational structure. Alongside the mentioned factors, cultural differences in different societies affect the results of studies and complicate the comparison of these studies. However, this issue is rare in some surveys. The results of some studies were in contrast to the results of the present study. For example, Soltani Arabshahi et al. used the DREEM questionnaire to evaluate the perception of 193 residents (n= 86) and interns (n= 107) about their education environment in four teaching hospitals in Tehran, Iran. They reported a significant difference in DREEM scores between genders (27). Similarly, Zulfaghari et al. reported no significant difference in DREEM total and domain scores between genders in a study of 116 medical students in Birjand, Iran (28).

Al-Ayed et al. also reported no significant gender difference in terms of DREEM total and domain scores between genders in a study on 222 medical students in Saudi Arabia (29). Ade-Oshifogun et al. evaluated the perception of the education environment in 298 medical students in Ghana using the DREEM questionnaire and reported no significant difference DREEM total score between genders (30). Altawaty et al. reported no effect of gender on DREEM total and domain scores in a study of 58 third-year dental students in Libya

(31). In line with the results of the present study, Sing et al. found a significant difference in the DREEM domain scores except for social self-perception between genders among 300 university students of different fields in India (32). The present study showed that the opinions of married and single students regarding the learning environment in colleges are similar, which can be concluded that marital status has little effect in determining the educational needs of students in the college. Similarly, Eslami et al. and Behkam et al. showed that marital status did not affect the total score of the DREEM questionnaire (5,33). Eslami et al. conducted their study on 427 dental students at the Mashhad University of Medical Sciences. They reported no significant difference between married and single participants in DREEM total and domain scores (5). Behkam et al. conducted a study on 90 first-year medical students at Tehran University of Medical Sciences. They found no difference in total DREEM scores between married and single participants; however, they did not compare DREEM domains between marital status groups (33). Moreover, the study showed no significant difference between the opinions of native and non-native students regarding the learning environment in colleges, which is contrary to the results of the study by Avalos et al., who conducted their study on 476 first-semester medical students in Ireland and found that the DREEM total score was significantly lower among non-Irish students compared to Irish students (34). Paying attention to quality indicators in education can effectively improve the learning environment. The use of tools like DREEM can be a valuable help in the process of changing the educational environment.

Holding educational workshops in the field of teaching and learning skills, establishing friendly meetings between professors and students outside of the official teaching hours, and guiding students on how to study and learn in a busy clinical environment, creating a favorable clinical environment in which students can acquire clinical experiences with a sense of security and peace, and mitigating the problems of the internal and external environment for students through extra-educational programs in the form of sports, recreational and artistic activities will improve the learning environment.

In general, university officials must solve the problems and try to create a quality educational environment from the student's point of view by holding group discussion sessions to understand the problems. Establish constructive interaction to create an ideal and satisfactory environment and promote the motivation and success of students.

Conclusion
In general, the perception of the medical and dental students of Rafsanjan University of Medical Sciences about their learning environment was evaluated as moderately positive. However, in all five dimensions of the educational environment, the need to improve and remove obstacles and problems is seen in all faculties.

Acknowledgements

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