Medical students' academic emotions: the role of perceived learning environment

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Introduction: Research shows that there is a relationship between students' perceptions of classroom and learning environment and their cognitive, affective, emotional and behavioral outcomes, so, in this study the relationship between medical students' perception of learning environment and academic emotions was examined.

Methods: The research method used was descriptive-correlative. The statistical population consisted of medical students of Shiraz University of Medical Sciences. Stratified sampling method was used to select 342 participants. They completed self-report questionnaires of Dundee Ready Educational Environment Measure (DREEM) and Achievement Emotions Questionnaire (AEQ). All descriptive statistics, Pearson's correlations and simultaneous multiple regression were performed using SPSS 14 software.

Results: Simultaneous multiple regression of the students' perceived learning environment on their academic achievement emotions showed that the perceived learning environment predicts the students' academic emotions.

Conclusion: The results of this study revealed that caring for and supportive learning environment can increase the students' positive emotions and decrease their academic negative emotions (i.e. anxiety, shame, and hopelessness). Implications of the results are discussed.

Keywords: Learning; Environment; Emotion; Medical students

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Introduction

For many decades, the studies which investigated the relationship between student outcomes and their perceptions of the classroom environment have shown that that there is an association between student outcomes and learning environment (1). Actually, it is stated that there is a relationship between students' perceptions of classroom and learning environment and their cognitive, affective, emotional and behavioral outcomes.

Learning environment consists of more than merely physical space; rather, it embodies the whole learning setting, such as and instructional processes, teacher-student relationships, student-student relationships, and student attitudes. In fact, learning environment can be conceptualized in terms of observable characteristics, such as school buildings, materials used for instruction, and externally observed interactions between and among learners and instructors. Alternatively, learning environment can be conceptualized as the teachers' or students' subjective perceptions of their learning setting (2). In other words, the phrase "learning environment" is most frequently defined as the psychosocial, psychological, or

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social environment in which learning or teaching takes place (3). Specifically, Bloom described the educational or learning environment concept as "the conditions, forces, and external stimuli which challenge on the individual. These may be physical, social, as well as intellectual forces and conditions". Bloom regarded the environment as providing a network of "forces and factors which surround, engulf, and play on the individual". Genn explained the learning environment as "the curriculum's most significant manifestation and conceptualization, educational and organizational, which embraces everything that is happening in the medical school" (4).

Research has revealed that the student's perceived and assessment of learning environment is associated with a range of important outcomes for them (5). Numerous studies have demonstrated that the perceived learning environment is significantly related to the student achievement (6, 7), as well as emotional and social outcomes (8-11). For example, research has shown the relationship between the students' perceived environment and academic achievement emotions (2).

Achievement emotions are defined as those that are directly dependent on achievement activities and achievement outcomes (12, 13). In the past research, studies on achievement outcomes emotions have received considerable attention in the literature of educational psychology including emotions that follow success, failure, and test anxiety (13). The segregation of activity versus outcome emotions is the object focusing on these emotions. Moreover, both activity and outcome emotions were grouped based on their valence and the degree of activation. Positive emotions known as desirable enjoyment, in terms of valence, can be distinguished from negative emotions including unpleasant anxiety. Psychologically, activating emotions such as activating hope, considered as activation, can be differentiated from deactivating emotions known as deactivating hopelessness. Dimensions such as valence and activation shape the 2×2 taxonomy of achievement emotions (13-15). Pekrun et al. (13) state that enjoyment, anger, and boredom are examples of activity emotions (positive and negative), and pride, hope, shame, hopelessness, and anxiety are examples of positive and negative outcome emotions.

Relationship between perceived learning environment and academic achievement emotions

Achievement has been the number one variable considered as an outcome of perceived classroom environment. Numerous studies have demonstrated that the perception of learning environment is significantly related to student achievement (6, 7). Comparatively, little is known about affective correlates of perceived classroom environment. The few studies that explore emotions in relation to perception of classroom environments mostly concentrate on anxiety, and other emotions having received sparse attention (2). But some studies have explored achievement emotions beyond anxiety. For example, Goetz et al. (16) examined students' perception of learning environment and emotions experienced within the subject of Latin. In their study, teacher enthusiasm, individually perceived positive reinforcement of achievement, and elaborative instruction in Latin were positively related to individual reports of pride and enjoyment, and negatively related to individual reports of boredom and anger. But achievement pressure from the teacher proved to be positively related to student anger and anxiety, and negatively related to pride and enjoyment in Latin. In addition, Fraser and Fisher (17) in their study on affective and cognitive outcomes of the perceived classroom environment found positive correlations between perceptions of participation, affiliation, involvement, order and organization, task orientation and rule clarity in the class and the students' average enjoyment of science lessons.

In this connection, the goal of this study was to examine the effects of students' perceived learning environment on their academic achievement emotions. On the basis of the theory and research summarized above, we hypothesized that the perceived learning environment predicts the students' academic emotions.

Methods

The research method used was descriptive-correlative. The statistical population consisted of medical students of Shiraz University of Medical Sciences (Table 1). To select 342 participants stratified sampling method was used. They completed two self-report questionnaires.

A) The Dundee Ready Educational Environment Measure (DREEM). This tool was originally designed in English by Roff and colleagues in 1997 (18). It contains 50 statements related to a range of topics directly relevant to educational climate. This tool can be administered by postal survey or face to face in the teaching session's room. Registrars were asked to read each statement carefully and respond them using a 5 point Likert-type scale ranging (Items were scored: 4 for strongly agree, 3 for agree, 2 for uncertain, 1 for disagree and 0 for strongly disagree). It is important that each registrar applies the items to their own current

learning situation and response to all 50 (19). The 50-item DREEM has a maximum score of 200 that, indicating the ideal educational environment as perceived by the registrar. A score of 0 is the minimum and would be a very worrying result for any medical educator. Also, the following is an approximate guide to interpreting the overall score (20):

    0-50 Very Poor
    51-100 Plenty of Problems
    101-150 More Positive than Negative
    151-200 Excellent

One of the important implications of DREEM is that it provides a standardized way method of international comparisons between medical schools, allowing them to benchmark their educational climate (21). In addition, it may locate areas of concern shared by the majority of students that might be unintentionally neglected by educators.

In addition to the total DREEM score, this tool has five subscales: 1) Registrars' perceptions of learning, 2) Registrars' perceptions of course organizers, 3) Registrars' academic self-perceptions, 4) Registrars' perceptions of atmosphere, and 5) Registrars' social self-perception (22). However, in this study the total DREEM score was examined.

The initial psychometric evaluation carried out by its developer showed that DREEM is a valid tool to measure educational environments (19). Also, the internal consistency of a tool is commonly measured based on a single administration while the stability of a tool is measured based on multiple administrations on different occasions or times (23). The DREEM has been reported to have a high level of internal consistency with the overall Cronbach's alpha coefficient of more than 0.7 (18; 21; 22; 24). It was also found to have a high level of stability with a test-retest correlation coefficient of more than 0.8 (24).

In Iran, Mohammadi and Mohammadi (25) translated this tool into Persian for the first time. In their study, the researchers investigated the content validity of the DREEM. Content validity for use in Iran was approved by experts and scholars in this field. Also, Cronbach's alpha coefficient for 5 dimensions (mentioned above) was 0.75, 0.72, 0.71, 0.73, and 0.71, respectively.

In this study, for determining the reliability, Cronbach's alpha coefficient for the total score was examined. The result is reported in Table 2.

B) The learning-related emotions scales of the AEQ were used to assess the students' achievement emotions and their emotions prior to the exam. Pekrun et al. made this questionnaire in 2005 (13). The AEQ consists of 196 statements in total, including learning, taking a test and class parts, with 75 items related to learning used in the present study. The items refer to both outcome-related and activity-related emotions. In this scale, the participants were asked to describe their emotions while preparing for the exam in order to measure their emotions. The items estimate eight distinct emotions: a) Positive emotions include pride including 8 items on "I am proud of myself", hope including 5 items on "I feel confident when studying", and enjoyment consisting of 9 items on "I enjoy dealing with the exam material".

b) Negative emotions include anger including 10 items on "I get angry while studying", boredom indicated by 11 items on "studying for the exam bores me", anxiety presented by 11 items on "I get tense and nervous while studying", shame comprising 11 items on "I feel ashamed", and hopelessness related to 10 items on "I feel hopeless when I think about studying". The participants' response to the items was based on the Likert scoring procedure ranging from 1 (not at all) to 5 (very much). Regarding the reliability of the scale, Pekrun et al. calculated Cronbach's alpha coefficient, which were 0.85 for pride, 0.85 for hope, 0.83 for enjoyment, 0.88 for anger, 0.85 for boredom, 0.88 for anxiety, 0.90 for shame, and 0.93 for hopelessness, a scale with adequate validity (15). In this study, for determining the reliability, Cronbach's alpha coefficients were examined. The results are reported in Table 2. Also, the principle components analysis, for examining the validity of the scale in the study, showed desirable results.

The inclusion criteria were medical students at Shiraz University and willingness to participate in the study. Also, exclusion criteria included incomplete response to the questionnaires and lack of willingness to participate in the study.

The first ethical consideration was permission of the study subjects before performing the survey. Another one was maintaining anonymity of the participants, and the third ethical consideration was accurate reporting of research results, and making valid conclusions that we considered. Finally, all descriptive statistics, Pearson's correlations and simultaneous multiple regression were performed using SPSS 14 software.

Results
Descriptive statistics

Using SPSS 14, demographic characteristics of the population and descriptive statistic such as means, standard deviations, minimum and maximum values, and Cronbach's alpha coefficients for all of the variables used in the study were examined and the results are shown in Tables 1 and 2.

Table 1: Demographic characteristics of the subjects

Variable	N	%
Gender		
Female	177	51.75
Male	165	48.25
Educational grade		
Physiopathology	132	38.60
Externship	113	33.04
Internship	97	28.36

N=342

According to the results shown in Table 2, the mean score of total DREEM (perceived learning environment) was 125.96. Based on the DREEM guide to interpreting the overall score, the mean score of this tool is in the range of 101-150 and that means perceived learning environment of medical students' of Shiraz University is more

positive than negative.

Correlations

An examination of zero-order correlations among variables shown in Table 3 demonstrated that students' perceptions of learning environment variables were related to their academic emotions.

Regression analysis

To investigate the prediction of academic emotions by perceived learning environment, we performed simultaneous multiple regression. The results showed that "perceived learning environment" was a significant positive predictor of the "enjoyment" and "pride". In addition, "perceived learning environment" negatively predicted "anxiety", "shame" and "hopelessness". The results are summarized in Table 4.

Table 2: Descriptive statistics of variables

Variables	N	M	SD	Min	Max	α
Perceived learning environment	342	125.96	0.42	64	168	0.89
Enjoyment	342	2.47	0.38	1.78	4.89	0.79
Pride	342	2.78	0.29	2	3.63	0.85
Hope	342	2.27	0.32	1.60	3	0.76
Anger	342	2.15	0.31	1.5	3.30	0.71
Anxiety	342	3.15	0.26	2.55	3.82	0.77
Boredom	342	2.35	0.39	1.73	3.27	0.73
Shame	342	2.72	0.25	2.09	3.27	0.86
Hopelessness	342	1.76	0.44	1.10	3.20	0.78

Table 3: Correlations between perceived learning environment and positive and negative academic emotions

Variable	1	2	3	4	5	6	7	8	9
1. Perceived learning environment	1								
2. Enjoyment (P.A.E)	0.35**	1							
3. Pride (P.A.E)	0.45**	0.17**	1						
4. Hope (P.A.E)	0.18**	0.09	0.57**	1					
5. Anger (N.A.E)	-0.37**	-0.07	0.08	-0.04	1				
6. Anxiety (N.A.E)	0.11*	-0.03	-0.11	-0.07	0.41**	1			
7. boredom (N.D.E)	-0.32**	-0.07	-0.07	-0.09	0.37**	0.09	1		
8. Shame (N.A.E)	-0.19**	-0.05	-0.02	-0.02	0.36**	0.46**	0.34**	1	
9. Hopelessness (N.D.E)	-0.61**	-0.06	-0.04	-0.09	0.32**	0.27**	0.41**	0.21**	1

** $p<0.001$ * $p<0.05$ P.A.E.: Positive Activating Emotion; N.A.E.: Negative Activation Emotion; N.D.E.: Negative Deactivating emotion

Table 4: Multiple regressions of perceived learning environment on positive and negative emotions

Variables			Non-standardized coefficients		Standardized coefficients	p<
	Adjusted R²	R²	B	Std. Error	β	
Constant	0.72	0.72	1.92	0.18		0.01
Enjoyment			0.30	0.03	0.30	0.01
Hope			0.02	0.04	0.01	0.59
Pride			0.46	0.05	0.35	0.01
Anger			0.05	0.07	0.04	0.439
Anxiety			0.29	0.06	0.20	0.01
Shame			-0.18	0.05	-0.12	0.01
Boredom			-0.02	0.03	-0.02	0.54
Hopelessness			-0.60	0.04	-0.69	0.01

Discussion

Although academic emotions represent important outcomes in their own right due to their impact on well-being, quality of learning, achievement, and social interaction in the classroom, little is known about the antecedents of these emotions and their occurrence in specific academic subject areas. Further, the antecedents of academic emotions are likely to play an important role in the evaluation and development of educational practices with respect to the effects that students' academic environment has on their emotional experiences and consequent learning and achievement outcomes. In order to fill this knowledge gap in emotion research, the present study examined the students' academic emotions (26), i.e. emotions that are directly linked to learning, classroom instruction, and learning atmosphere.

The results have shown that students, who have a greater sense of control of their learning, perceive their learning environment and atmosphere as a place that supports their learning and fosters autonomy, and find their education to be useful and relevant experience positive emotions more. These results are consistent with the findings of other research (2, 16-17). Actually, by encouraging the teachers to become more aware of how to foster competencies, autonomy, social relatedness in their students, their own achievement expectations, goal structures, and performance feedback, it may be possible to have a positive influence on the students' emotional experiences.

The results of this study have practical implications for teachers because they provide more understanding about the different aspects of the learning environment and how these aspects predict the students' academic emotions. Actually, students will experience positive emotions more (such as enjoyment, pride and hope) when they view their course interesting, relevant, and supportive. Of course, these goals are difficult to achieve with the use of top-down approach to teaching, because this approach is mostly controlled by the teacher. While some level of teacher-controlled didactic strategies are necessary for achieving his or her instructional goals, the results of our study suggest that a bottom-up approach that involves teaching strategies that increase the student engagement and take into account their needs and interests (or in general student-centered teaching) could be more appropriate.

This study had some limitations. At first, although the sample size of the study statistically was adequate to conduct the analysis, the study was limited to 342 medical students. Sample size of the study could be increased and larger data could provide different results.

Second, although this study examined the students' academic emotions as dependent variables and learning environmental variables as predictors, the cross-sectional nature of the data did not permit cause-effect relationships to be inferred. Actually, we can assume reciprocal connections between aspects of the environment and students' academic emotions. In fact, the student's academic emotions may also cause him/her to behave in a certain way, which in turn shapes his environment accordingly.

Conclusion

In general, academic emotions have received relatively little attention within educational research. The results of this study showed that academic emotions are differentially affected by perceived learning environment by students. These findings are of particular value for educators, for whom the affective well-being of their students should be a desired educational goal in itself.

Conflict of Interest: None declared.

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