



## Predicting Students' Academic Achievement Based on the Classroom Climate, Mediating Role of Teacher-Student Interaction and Academic Motivation

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**Introduction.** The present study aims to predict students' academic achievements based on the classroom climate, the mediating role of teacher-student interaction and academic motivation among Semnan University students.

**Materials and Methods.** This study relied on correlation-and-description method of data collection. The sample population consisted of all undergraduate and postgraduate students at the Faculty of Engineering of Semnan University in the academic year of 2017–2018. Using a random stratified method, 200 subjects were selected as the sample (135 undergraduate and 65 master). Questionnaires of Patrick, Kaplan and Ryan's classroom climate, Hernandez-Lopez' teacher-student scale, Vallerand's academic motivation questionnaire and Pace and Kuh's student academic achievement scale were used. Reliability of the questionnaires was confirmed using Cronbach's alpha test.

**Results.** There is significant positive relationship between academic achievement and classroom climate, teacher-student interaction and academic motivation. Classroom climate has a direct and meaningful effect on students' academic achievements. Also, the climate of the classroom by mediating the teacher-student interaction has indirect and significant effects on students' academic achievements. Classroom climate by mediating educational motivation has an indirect and significant effect on students' academic achievement.

**Discussion and Conclusion.** The results of this study suggest the importance of openness to the classroom climate, interaction between teacher-student and academic motivation is to increase students' academic achievements.

**Keywords:** classroom climate, teacher-student interaction, academic motivation, academic achievement, Lisrel, Path analysis

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## Прогнозирование успеваемости студентов на основе климата в классе, посреднической роли взаимодействия преподавателей со студентами и мотивации к учебе

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**Введение.** Настоящее исследование нацелено на прогнозирование академических достижений студентов с учетом психологического климата в учебной группе, посреднической роли взаимодействия преподавателя и студента, а также академической мотивации студентов на примере Семнанского университета.

**Материалы и методы.** Данное исследование опирается на корреляционно-описательный метод сбора данных. В состав выборки вошли все студенты уровней бакалавриата и магистратуры инженерного факультета Семнанского университета в 2017–2018 учебном году. С помощью метода случайной стратификации в качестве выборки было отобрано 200 студентов (135 бакалавров и 65 магистров). Использованы анкеты Х. Патрика, А. Каплана и А. Райана по изучению психологического климата в учебной группе, шкала взаимодействия преподаватель – студент Л. Эрнандеса-Лопеса, анкета академической мотивации Р. Валлеранда и шкала академической успеваемости студента Пэйса и Куха. Надежность анкет была подтверждена с помощью коэффициента  $\alpha$  (альфа) Кронбаха.

**Результаты исследования.** Имеется существенная положительная связь между академической успеваемостью и климатом в учебной группе, взаимодействием преподавателя со студентом и академической мотивацией. Климат в аудитории оказывает прямое и значимое влияние на успеваемость учащихся. Кроме того, климат учебной группы, посредничающий во взаимодействии преподавателя и студентов, оказывает косвенное и существенное влияние на их успеваемость.

**Обсуждение и заключение.** Статья представляет интерес для специалистов в области методики обучения, университетских психологов и студенческих активистов.

**Ключевые слова:** микроклимат в группе, взаимодействие преподавателя и студента, академическая мотивация, успеваемость, программа Lisrel, анализ путей развития

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### Introduction

Higher education in any country is one of the most important institutions that play an undeniable role in the development of societies. From the University as a knowledgeable and innovative thinker in society, it is expected that by fulfilling its missions in the three areas of education, research and the provision of scientific and social services, it will be able to take more effective steps towards the realization of the aspirations of society and will always lead the country to progress [1]. In this regard, one of the important issues in higher education institutions is to evaluate and improve the achievements of students.

This concern about academic achievement has created a national emphasis on the assessment of the outcomes of universities, which was first introduced in the early 1980s and considered in the guidelines of today's evaluation as a criterion. For this reason, activities related to the assessment of achievements in many higher education institutions are considered as external demands for accountability. Considering that students are customers of educational institutions, they can pay attention to their beliefs and expectations and provide feedback to them. As an acceptable tool for evaluating the quality of educational centers. Studying academic achievements can



be the basis for guidance for students and an indicator for improving the performance and show the success of the university. Student achievements include their degree of achievement in achieving major educational goals and one of the determinant factors in the assessment of educational excellence [2].

Obviously, the academic achievements of learners play a very important role in creating the best graduate qualifications that make up national capital and contribute to the economic and social progress of society [2]. Pace and Kuh argue that academic achievement has four components: 1) professional achievement (results that lead to the learning of art and applied technology); 2) individual achievement achievements (results that enhance individual personality traits); 3) educational achievements (results that promote the knowledge of the individual); and 4) mental achievements (results that lead to intellectual and intellectual growth)<sup>1</sup>. Obviously, in order to achieve these achievements, we must focus on two important factors of individual characteristics and academic experiences of students<sup>2</sup>. Many academic experiences are learned in the classroom, so the factors that can affect academic achievement are classroom climate. The climate of the classroom and the atmosphere surrounding the learning environment, which relates more to the implementation of curriculum, attitudes and educational and educational attitudes towards learning and the behavioral and organizational culture of the educational institution, is of particular importance [3]. The status and importance of the learning environment and the classroom atmosphere are considered to be the forefront of educa-

tion and training in educational institutions and universities [4].

### Literature Review

The researches in various fields of education have come up with various definitions of classroom climate, each of which refers to one or more aspects of classroom climate. Hoy and Miskel argue that the classroom climate is a general concept for describing, explaining and explaining the quality of classroom sustainability that provides context and learning [5]. In another definition, Adelman and Taylor describe the classroom atmosphere as the perceived quality of a set, that in this climate, to some extent, the fluid state of the complex interactions of environmental factors associated with the class, such as physical, material, operational, organizational and social variables<sup>3</sup>. Also, Deci described the classroom climate as a set of features that indicate the specific condition and state of the class, so it can be said that the class climate and its desirability are largely a function of the texture<sup>4</sup>, demographics and quality of individual and collective action of class members as a community.

Accordingly, classrooms as a social system consist of different people from the point of view of experience, culture, personality, etc.<sup>5</sup> Each of the individuals can bring positive or negative characteristics into the classroom, which can affect the creation of an optimal or undesirable climate. Based on the results of previous studies, the classroom climate was influenced by factors such as motivation of learners [6–8]; social skills and competencies [9]; development and academic achievement [10]. It is clear that in order

<sup>1</sup> Pace R., Kuh G. College Student Experiences Questionnaire. India University; 2002.

<sup>2</sup> Williams J.M. College Student Experiences Questionnaire Research Program. In: 47<sup>th</sup> Annual Forum of the Association for Institutional Research. Kansas: MO; 2007. Available at: <https://pdfs.semanticscholar.org/90fa/73ed4058d29d40ea0cf0f400850f7158487e.pdf> (accessed 20.11.2019).

<sup>3</sup> Adelman H.S., Taylor L. Classroom Climate. In: S.W. Lee, P.A. Lowe & E. Robinson (eds.). Encyclopedia of School Psychology. Thousand Oaks, CA: Sage; 2005. Available at: [http://smhp.psych.ucla.edu/publications/46classroom climate.pdf](http://smhp.psych.ucla.edu/publications/46classroom%20climate.pdf) (accessed 20.11.2019).

<sup>4</sup> Deci E.L. Intrinsic Motivation and Self-Determination in Human Behavior. New York: Kluwer; 2003.

<sup>5</sup> Pintrich P.R., Schunk D.H. Motivation in Education: Theory, Research, and Applications. Englewood Cliffs, NJ: Prentice-Hall; 1996.

for the teaching and learning to be done in a good way, there should be a favorable and appropriate climate in the classroom since the classroom climate's utility can be based on the learning process, the optimal use of educational time [11; 12], teacher and student interaction, and finally the academic achievement of students [13; 14] have constructive effects.

Student-teacher interaction is another issue that can affect students' academic achievement. Students' interactions and communication with teachers is one of the main areas of communication in higher education and one of the most important academic assets [15]. In this regard, one of the most important elements of the higher education system and universities is university professors who play a decisive and undeniable role in achieving the goals and missions of higher education in quantitative and qualitative terms. Therefore, scrutiny their competency and performance in different dimensions, especially in the field of their interaction with students in order to motivate them through the classroom's favorable climate, can play an important role in increasing the quality of learners learning and their achievements in education. The involvement of inclusive activists during teaching and interactions between them leads to the growth of individual students and affects students' professional, mental, educational and individual achievements [16–18]. In the other words, the involvement of students during teaching and the activities between the teacher and the student leads to individual student growth<sup>6</sup>; increasing confidence and academic motivation [19; 20] and academic achievements [16–18]. On the other hand, a motivational factor can also affect students' academic achievements. Motivation plays an important role in all activities of the person's life, including study, education and research [21]. The motive is the direction and the level of behavior that guides the fulfillment of the

goals set and provides a sign of the quality and quantity of the effort<sup>7</sup>.

Motivation is a three-dimensional phenomenon that includes the person's beliefs about the ability to perform the desired activity, the reasons or goals of the individual to do it and the emotional response associated with it, and is the most important foundation for academic achievement in students [22]. Students are burdened by extreme pressure from cultural expectations of high academic success and future occupational concerns; therefore, motivation is a factor that can lead students to a higher social position and greater success [23]; therefore, academic motivation, while providing the student's educational and educational interest, contributes to the academic achievement of students [24].

Several studies have shown that classroom climate can be a significant determinant of academic motivation and learning outcomes<sup>8</sup>. Maurer et al. [25] pointed out in their research that significant differences in motivation during the study for learners were created, which depended on the role of the teacher [26; 27], attachment to the university [28], the quality of learning experiences [29], the existence of a learning system [30], and the relationship between learners and factors affecting the learning environment [31]. Lee pointed out the significant positive effects of educational quality on learners' learning success [23]. Also, Gottfredson et al. [32] and Waters, Cross and Runions [33] in their research concluded that it was found that school context and climate can affect the educational quality and academic achievement. Other research suggests that feedback from the teacher's interaction with students increases internal motivation and academic achievement [34; 35].

Guay et al. [36] and Agbaria [37] have shown the significant impact of motivation on behavioral performance and academic achievement. Also, according to the results of Ugoani's research [38], there

<sup>6</sup> Wentzel K. Part III commentary: Socio-Cultural Contexts, Social Competence, and Engagement at School. In: Handbook of Research on Student Engagement. Boston, MA: Springer; 2012. p. 479-488.

<sup>7</sup> Dörnyei Z., Ushioda E. Teaching and Researching Motivation. New York, NY: Routledge; 2011.

<sup>8</sup> Dörnyei Z. Teaching and Researching Motivation. London: Longman; 2007.

is a positive relationship between the competencies of teachers and improving the improvement of classroom teaching management and academic achievement. Academic motivation is a key determinant of academic performance and success [39]. Researchers Reindl et al., also found that even with the control of the gender as a mediator, the classroom's unfavorable climate has a negative impact on learner's learning motivation [40]. As a result, the classroom climate can have an impact on learner's learning motivation. Some findings suggested that students' perceptions of competence of faculty members could directly affect students' academic achievements [41]. Bahador et al., conducted research on effective factors in establishing between the teacher and the student [42]. The results show that maintaining student respect and dignity, respect for justice in dealing with students, criticism and flexibility are the most effective factors in Communication a teacher with a student.

Findings of Salimi, Heidari and Keshavarz's research indicate that there is a great gap between the existing and desirable faculty member competencies; this in itself can affect the academic achievement of the students [43]. In his research, Mosavi acknowledged the significance of the relationship between the dimensions

of academic engagement and academic achievement<sup>9</sup>. Nabavi et al. argue that the professional competency of faculty members has a direct and significant effect on students' academic achievement [44]. Regarding what has been posed and studying the history of the research, it is clear that although several studies have been done on the variables of the classroom climate, teacher-student interaction, academic motivation and academic achievement, but so far, research that deals with the relationship of these variables simultaneously has not taken place. Therefore, the present study has considered a relationship between these variables with respect to the above mentioned issues. In the conceptual model, the classroom climate as an exogenous variable directly affects students' academic achievement as an intrinsic variable. Also, teacher-student interaction and academic motivation in relation to classroom interactions play a mediating role with student achievement (Fig. 1).

*Research questions.* In line with the purpose of the research and according to the conceptual model and theoretical foundations, the following questions were considered and followed up.

1. Is the classroom climate is a direct and significant predictor of students' academic achievement?

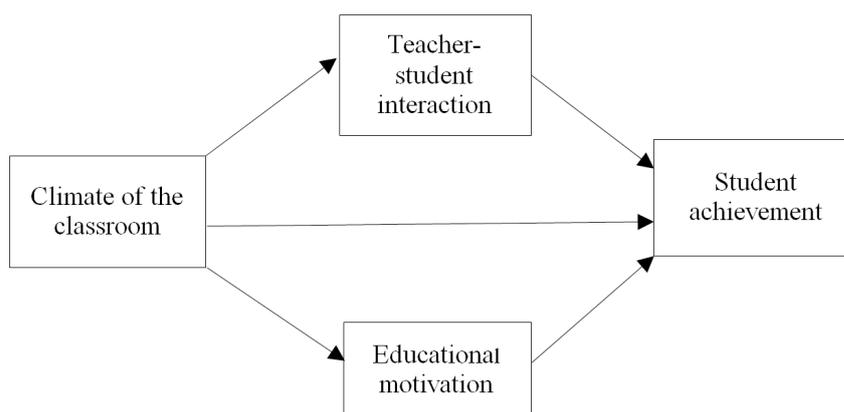


Fig. 1. The conceptual model of the effect of the classroom climate on student achievements with the mediators of interaction between teacher-student and educational motivation

<sup>9</sup> Mousavi S.M. Educational Psychology. Tehran: Savalan; 2015.

2. Is the classroom climate by mediating teacher-student interaction is an indirect and significant predictor of students' academic achievement?

3. Is the classroom climate by mediating academic motivation is an indirect and significant predictor of students' academic achievement?

### Materials and Methods

Considering that the present study aims to predict the academic achievement of students based on the classroom climate by mediating the teacher-student interaction and the academic motivation of undergraduate and postgraduate students at the Faculty of Engineering of Semnan University in the academic year 2017–2018, the research methodology is used for the purpose of the applied and Depending on the method of data collection, is a descriptive- correlational.

*Statistical population, sample size and sampling method.* The statistical population of this study consisted of all undergraduate and postgraduate students at the Faculty of Engineering of Semnan University (4 100 students) in the academic year of 2017–2018, of which 2 757 were undergraduate and 1 343 were graduate students. Given the assumed paths, there are 9 parameters (3 parameters in the gamma matrix, 2 parameters in the beta matrix, 3 parameters in the phi matrix and 1 parameter in the Sai matrix). In this way, the sample size should be at least 5 to 50 times the parameters<sup>10</sup>. Accordingly, a sample of 200 people was considered. Participants of 200 students from the University of Semnan (135 people equivalent to 67.5% in undergraduate degree, 65 in 32.22% in master's degree) were selected by stratified random sampling method in terms of their degree.

#### Research tools

A. Classroom climate: To measure classroom climate, the classroom climate questionnaire Patrick et al. has been used that includes 12 items [45]. The question-

naire is a 5-degree Likert scale, totally disagree (1) to completely agree (5). Reliability of the questionnaire was calculated by the researcher with Cronbach's alpha test (0.870). The items correlated with the total score were 0.49 to 0.66 at a significance level of 0.001.

B. Teacher-student interaction: Hernandez Lopez et al. teacher-student interaction questionnaire was used to measure the interaction between the teacher and students [46]. The questionnaire consists of 4 items and it is a 5-degree Likert scale, totally disagree (1) to completely agree (5). Reliability of this questionnaire was calculated by the researcher by Cronbach's alpha (0.87). The items correlated with the total score were 0.48 to 0.60 at a significance level of 0.001.

C. Educational motivation: In order to measure the students' academic motivation, Vallerand et al. has used the motivation questionnaire, which it is a 5-degree Likert scale, totally disagree (1) to completely agree (5) [47]. The reliability of this questionnaire was calculated by the researcher by Cronbach's alpha test (0.91). The items correlated with the total score were 0.68 to 0.80 at a significance level of 0.001.

D. Educational Achievements: According to the purpose of the study, the Pace & Kuh Achievement Inventory Questionnaire was used to measure the academic achievement of the students; this questionnaire was presented in a 5-degree Likert scale, from very low (1) to Too much (5)<sup>11</sup>. The reliability of this questionnaire was obtained by the researcher through Cronbach's alpha (0.90). The items correlated with the total score were 0.68 to 0.80 at a significance level of 0.001.

*Data analyzing.* Statistical analysis was used to analyze the data by using the Statistical Package for the Social Sciences (SPSS V.19) and Linear Structural Relations (LISREL V.8.5). Descriptive indices including mean, standard deviation and correlation coefficients were calculated.

<sup>10</sup> Mueller R.A. Basic Foundations for Structural Equation Modeling Introducing LISREL and EQS Software. Translated by Siavash Tale-Pasand, Semnan: Semnan University; 1996.

<sup>11</sup> Pace R., Kuh G. College Student Experiences Questionnaire.



The hypothetical structural relations were tested with the path analysis model and the final model of fitness was reported.

### Results

Descriptive mean, standard deviation and correlation matrices were used to determine the mean variables in classroom climate, teacher-student interaction, academic motivation and academic achievement (Table 1). In the sample, the average students' achievement score was ( $M = 3.47$ ) that they have assessed their academic achievement above the average ( $M = 3$ ). As well as the average classroom climate, teacher-student interaction, and academic motivation were higher than average. Student achievement with classroom climate, teacher-student interaction, and academic motivation has a meaningful relationship. The intensity of the academic achievement of academic motivational students is higher than other variables ( $r = 0.552, p < 0.05$ ). Students' academic achievements have a significant relationship with classroom climate ( $r = 0.524, p < 0.05$ ). Also, students' academic achievements have a meaningful relationship with teacher-student interaction ( $r = 0.435, p < 0.05$ ). The climate of the classroom is more related to the student-student interaction than academic motivation.

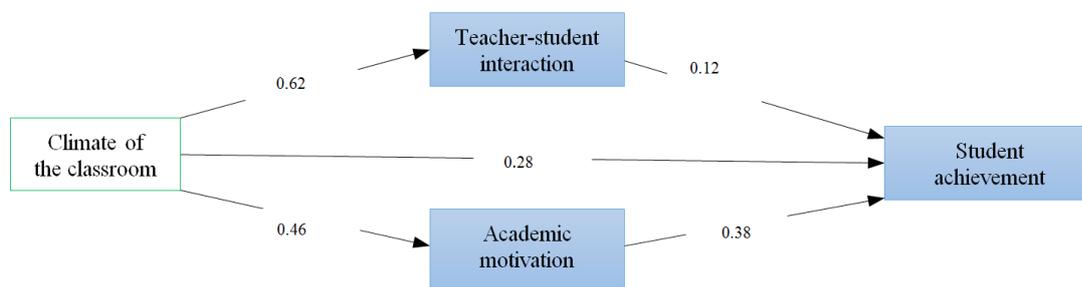
To test the hypothesized model of this study, a correlation between the variables model has been used. First, Skewness and Kurtosis were checked. The degree of Kurtosis of the classroom climate was (0.445) and the amount of skewness was (-0.018); the Kurtosis of the teacher-student interaction was (-0.85) and the amount of

skewness was (-0.077); the Kurtosis of academic motivation was (0.423) and the degree of skewness was (-0.537); the Kurtosis of the student's academic achievement was (0.968) and the degree of skewness was (-0.417), and they are in the range of -2 to +2. This shows that the distribution of variables is normal in Kurtosis and skewness. Thus, the fit index of the hypothesized model was investigated. The findings show that the hypothesized model is a meta-model. That is, the number of measurable parameters of the model is smaller than the number of variance-covariance observed ( $c > p$ ). Therefore, for determining the fitness of the hypothesized model, the path coefficients and their significance were examined.

Fitting the data-model has been investigated and the final model is reported in Figure 2. In the final model, classroom climate is a predictor of students' academic achievement ( $\gamma_{11} = 0.28, t = 3.67, p < 0.05$ ). The social climate of the class is a direct and significant predictor of interaction between the teacher and the students ( $\gamma_{12} = 0.62, t = 11.20, p < 0.05$ ). Also, student-teacher interaction is a significant predictor of students' academic achievement ( $\beta_{11} = 0.12, t = 2.55, p < 0.05$ ) (fig. 3). Based on these results, classroom climate by mediating teacher-student interaction is indirect, positive and significant predictor of the academic achievement of the students. The finding implies that the classroom climate is directly and indirectly interacting with the teacher-student interaction on the student's academic achievement. Also, the results indicate that classroom climate is a significant predictor of stu-

Table 1. Mean, standard deviation and correlation coefficients between research variables

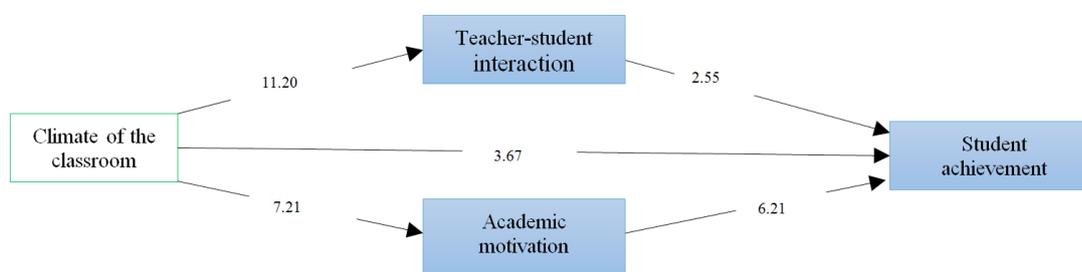
Variables	M	SD	1	2	3
1. Classroom climate	3.482	0.633	–	–	–
2. Teacher-student interaction	3.450	0.800	0.623**	–	–
3. Academic motivation	3.641	0.693	0.456**	0.377**	–
4. Academic achievement	3.407	0.686	0.524**	0.435**	0.552**



Note: Chi-square = 1.55, df = 1, P-value = 0.059, RMSEA = 0.053.

\* Standard coefficients are reported.

Fig. 2. The final model of the climate of the classroom on student achievement with the mediating role of teacher-student interaction and academic motivation



Note: Chi-square = 1.55, df = 1, P-value = 0.059, RMSEA = 0.053.

Fig. 3. Final model of the effect of classroom climate on student achievement with the mediating role of teacher-student interaction and academic motivation

ffects students' academic achievements by mediating academic motivation. Table 2 shows the fitting indices of the model indicating that the final model has a good fit with the data. The direct, indirect and total effects are reported in Table 3.

Climate of the classroom has a significant effect on students' academic achievements ( $\beta_{13} = 0.46$ ,  $t = 7.21$ ,  $p < 0.05$ ) and academic motivation is a significant predictor of students' academic achievement ( $\beta_{21} = 0.38$ ,  $t = 6.21$ ,  $p < 0.05$ ). Based on these results, classroom climate with the mediation of academic motivation have indirect, positive and significant effects (0.15) and a significant coefficient (4.24) on students' academic achievements. According to the findings, in addition to the fact that classroom climate directly affects students' academic achievements, it indirectly af-

ffects students' academic achievements by mediating academic motivation.

Table 2 shows the fitting indices of the model indicating that the final model has a good fit with the data.

The direct, indirect and total effects are reported in Table 3.

### Discussion and Conclusion

The academic achievements of students indicate a successful and effective educational system, with various factors and variables related to it. The knowledge

Table 2. Model Fitness Indicators

Index	Value	Acceptable range	Results
X2	1.55	$0.05 \leq P$	Accepted
X2/df	1.55	1-3	Accepted
RMSEA	0.053	$0.08 \geq RMSEA$	Accepted
GFI	0.99	$0.90 \leq GFI$	Accepted
AGFI	0.91	$0.90 \leq AGFI$	Accepted
NFI	0.99	$0.90 \leq NFI$	Accepted
CFI	0.99	$0.90 \leq CFI$	Accepted
IFI	0.99	$0.90 \leq IFI$	Accepted



Table 3. Direct, indirect and total effects of classroom climate, teacher-student interaction and academic motivation on students' academic achievements

Effect	Path	Direct effects	Indirect effects	Total effects
Exogenous to the endogenous	Classroom climate on student achievement	0.28**	0.27*	0.55**
	Classroom climate on teacher-student interaction	0.62**	–	0.62**
	Classroom climate on academic motivation	0.46**	–	0.46**
Endogenous to the exogenous	Teacher-student interaction on students' academic achievements	0.12**	–	0.12**
	Educational motivation on student achievement	0.38**	–	0.38**

Note:  $P < 0.01^{**}$ ;  $P < 0.05^{*}$ .

the classroom climate can provide valuable feedback to teachers and help them recognize the strengths and weaknesses of class results. Also, one of the most important elements of the higher education system and universities is university professors who play a decisive and undeniable role in achieving the goals and missions of higher education in quantitative and qualitative terms. Therefore, the study of their competency and mastery in different dimensions, especially in the field of their interaction with students is important. Driving motivation through the classroom climate can play a key role in improving the quality of learners' learning and their achievements in education. In this study, a hypothesized model of structural relations between classroom climate and student achievement was developed and the role of the mediating role of teacher-student interaction and academic motivation in structured relationships was highlighted. The first finding of the research indicated that classroom climate had a direct and significant effect on students' academic achievements. The result of this research is consistent with some of the results of the researches [33; 37]. Another finding of the study indicated that the classroom climate has a direct and indirect effect on academic achievement by interacting with the student's teacher. Finally, the latest findings from the research indicated that the climate of the classroom by mediating academic motivation has an indirect and significant effect on students' academic achievement.

In the first justification, one can admit that the climate of the classroom is through respect for students' ideas, the recognition of their needs and feelings, the importance of what they are taught, paying attention to their efforts to do righteousness, and to keep the student's respect for other classmates can help students grow independently, self-reliance, values and ethical standards, and they can acquire knowledge and practical skills, expertise, and general information in a wide range of scientific fields. It is also necessary to develop social relations, the aggregation of ideas, attention to communications, similarities and differences between beliefs, independent learning, the pursuit of ideas and information, and thereby affect the academic achievement of students.

In the second justification, it can be stated that the classroom climate is a unique atmosphere governing each classroom, and in order for the teaching and learning to be done in a good manner, there must be a favorable climate in the classes, because the utility or the lack of classroom climate can affect student and teacher interaction, learn learning process, optimal use of educational time and productive or destructive effects. In addition, the existence of positive and targeted relationships between the teacher and the student as well as students with each other, increasing student participation, reducing destructive behavior, increasing satisfaction and interest in the course and learning, creating a sense of self-esteem in the student, and can play

a determining role and undeniable in achieving the goals and objectives of higher education in quantitative and qualitative terms, as well as improving the quality of students' learning and, ultimately, their academic achievements. Finally, it can be concluded that constructive and targeted interactions between the teacher and the student can create a climate of relative trust in the classroom, reduce classroom stress, and provide a better student base for classroom and classroom discussions. And the result of such an exercise will increase the motivation, progress, academic satisfaction and academic achievement of the students.

Eventually, due to the fact that the motivation behind the individual's educational and academic interest and his/her academic achievement is contributing to this progress, many factors are due to the fact that, according to the research done in the classroom climate with its own characteristics, including the perception of students' feelings and needs, the importance of learning and training them properly, maintaining students' respect and can create the right relationships and, ultimately, increase students' motivation. The motive is that of the direction and behavior that the individual follows in relation to his/her goals. This motivation marks a sign of the quality and quantity of this effort, s/he

has clearly revealed the belief and reasons for his/her coming to university and doing his/her activities and will be considered as the most important foundation for inclusive educational achievement. As a result, he has a sense of self-satisfaction and, in his own words, will increase his academic achievement and will help him in his/her future career direction.

The limitation of this study is related to its design. The role of classroom climate by mediating the role of teacher-student interaction and academic motivation is not a causal relationship to the student's academic achievement, in the best of terms, these relationships are a kind of concurrent relationship. The second limitation of this study is related to measuring instruments. The measurement tool was a questionnaire with a number of inherent limitations (measurement error, non-compliance, social acceptance responses, and lack of attention and accuracy of some students in answering questions), so in future research, other methods, such as interview, should also be considered. Finally, it is suggested that professors should raise the level of student's academic motivation in order to increase the academic achievement of students by providing the necessary conditions. To this end, professors should be flexible in their classroom programs and avoid drastic, ineligible programs.

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