Original Article

The relationship between concentration factors in the classroom and academic achievement motivation in medical students

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Abstract

Background & Objective: One of the key factors influencing the quality of education is the effective teaching practices of professors, which are closely linked to the concentration levels of students in the classroom. Additionally, academic motivation plays a crucial role in enhancing the learning experience. This study aims to investigate the relationship between classroom concentration factors and academic achievement motivation among medical students at Zahedan University of Medical Sciences.

Materials & Methods: In this cross-sectional study, 273 students from basic science and preparatory clinical courses completed questionnaires from 22 October to November 20, 2023. The data collection tools included two questionnaires: one focused on classroom concentration and the other on academic motivation. The data were analyzed using independent t-tests, Analysis of Variance (ANOVA), and Pearson's correlation coefficient.

Results: The study found that the total mean concentration score in the classroom was 61.5 ± 7.9. The Pearson correlation coefficient analysis revealed a direct and significant relationship between mean concentration scores related to environmental factors and professor characteristics and the academic motivation of students. Additionally, there was a direct and significant correlation between the overall concentration score in class and academic motivation ($r = 0.174$, $p = 0.004$).

Conclusion: It appears that as academic achievement motivation in students increases, their concentration in class also improves. Therefore, to enhance the quality of teaching and learning through various methods, efforts should be made to boost academic achievement motivation.

Keywords: medical, student, academic performance, motivation

Introduction

Improving the quality of education in universities is not a new concern, but it has gained significant attention in recent years [1]. Enhancing the education of medical students is especially important, as their training directly impacts the health of individuals and society at large [2]. One key factor influencing educational quality is how effectively professors engage students, which is closely related to the concentration levels of students in the classroom [3]. Concentration is both a behavioral and cognitive process, involving the selection and focus on a desired goal while ignoring irrelevant information. In essence, concentration means directing the mind to a specific target amidst various distractions [4]. It is crucial for ensuring that learning occurs effectively, leading to academic progress. A common issue in education is the lack of concentration during classes, seminars, and conferences. Many attendees who initially show enthusiasm often lose focus and become distracted [5]. Various studies have identified factors that affect students' concentration, including teacher characteristics, teaching methods, sleep disorders, class timing, and participation levels [6]. Notably, evidence indicates that students tend to be most focused when seated in the front row of the classroom [7]. Studies indicate that academic success is influenced by the interaction of various situational variables, such as class schedules, teaching

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methods, physical and emotional conditions, students' attitudes toward educational issues, and their motivation to advance. A combination of internal and external motivations plays a crucial role in guiding students' behaviors and academic activities [8]. Research consistently shows a strong relationship between academic motivation and performance among students [9]. Motivated behavior is characterized by high energy, goal orientation, and a structured approach. For medical students, motivation is especially vital, driving them to persist in achieving their goals and attaining higher levels of success [10]. Academic achievement motivation refers to behaviors that promote learning and advancement. Common indicators of academic motivation include persistence in completing challenging assignments, diligent effort toward mastering material, and choosing tasks that require significant effort [11]. Consequently, motivation for academic progress—often referred to as internal motivation—is a psychological state that arises when individuals believe they possess the necessary skills and autonomy to succeed [12]. A study conducted in New Zealand found that students who reported a higher quality of life and a greater motivation to learn achieved better academic outcomes, highlighting the importance of a supportive learning environment [13]. Similarly, research from South Korea indicated that intrinsic motivation was significantly higher among female students, positively influencing their perceived academic performance [14]. Cross-cultural studies suggest that Malaysian students display greater intrinsic motivation than their U.S. counterparts, indicating that cultural factors play a crucial role in shaping academic motivation [15]. So far, no studies have investigated the relationship between classroom concentration and academic achievement motivation among Iranian students. Given the crucial role medical students play in ensuring and promoting public health, and considering the existing gap in research on the factors affecting classroom concentration and the academic motivation of medical students, the present study aims to explore this relationship at Zahedan University of Medical Sciences.

Materials & Methods

Design and setting(s)

The present research is designed as a cross-sectional correlational study. Data were collected from medical students at Zahedan University of Medical Sciences from 22 OCT to November 20, 2023. Medical students participate in four distinct phases of education: Basic Sciences, Preparatory Clinical Course, Stager, and Internship. This study focused on students in the Basic Sciences and Preparatory Clinical Course.

Participants and sampling

Eligible participants were selected using a convenience sampling method. The inclusion criteria required that participants be students enrolled in basic sciences or preparatory clinical courses at Zahedan University of Medical Sciences in the professional doctorate program, and they must express a desire to participate in the research. Written informed consent was obtained from all participants, and the study's procedures and objectives were explained in detail. The total population studied consisted of 498 individuals, comprising 363 students in the basic science course and 132 students in the preparatory clinical course. Based on the parameters r = 0.2 [13], $\alpha = 0.05$, and $\beta = 0.05$, the minimum sample size was calculated to be 221 students. However, for the present study, a total of 273 participants were included.

$$n = \frac{(Z_{1-\frac{\alpha}{2}} + Z_{1-\beta})^2}{0.5 \times Ln(\frac{1+r}{1-r})^2} = 221$$

Tools/Instruments

In the present study, two questionnaires were utilized, along with a form to collect demographic variables such as age, gender, educational level, and place of residence. The instruments included Mehralizadeh's questionnaire on classroom concentration [29] and the academic motivation questionnaire [21]. The classroom concentration questionnaire consisted of 21 questions formatted in a 5-point Likert scale, ranging from "very little" to "very much." It was divided into three dimensions:

Professor-related factors (10 questions, scoring range 10 to 50), with scores categorized as weak (10 to 23), medium (24 to 36), and good (37 to 50). *Student-related factors* (8 questions, scoring range 8 to 40), with scores classified as weak (8 to 20), medium (21 to 30), and good (31 to 40). *Environmental factors* (3 questions, scoring range 3 to 15), with scores divided into weak (3 to 7), medium (8 to 11), and good (12 to 15).

This questionnaire was developed by Mehralizadeh et al., and its validity and reliability were confirmed with 273 medical students [29]. The test-retest reliability was verified using Spearman correlation regression, yielding a coefficient of r = 0.77 [16].

The academic motivation questionnaire consists of 43 questions designed to measure four higher-level goals:

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ability, performance, social goals, and external goals. Each of these four goals is further divided into two sub-goals. The sub-goals include: *Ability Orientation*, this encompasses task completion and effort. *Performance*, this includes competition and the pursuit of recognition. *Social Goals*, these focus on social dependence and altruism. *External Goals*, this covers encouragement and rewards.

The questionnaire also addresses eight general components related to academic motivation: *Interest in Homework*, assessing choices of assignments in free conditions and motivation to complete homework (4 items). *Effort*, evaluating the amount of effort put into difficult course materials (7 items). *Competitiveness*, examining the drive to compete (6 items). *Social Power*, measuring the desire for influence in social settings (6 items). *Consistency in Group Work*, looking at the effectiveness in collaborative tasks (3 items). *Social Interest*, investigating engagement with peers (5 items). *Gaining Praise*, assessing motivation related to receiving acknowledgment (5 items). *Exemplary Student Motivation*, evaluating traits of motivated students (7 items). The grading method employed was a Likert scale, where a score of 1 indicates "completely disagree" and a score of 5 indicates "completely agree." The reliability of the original version of the academic motivation scale has been assessed in various studies, with Cronbach's α coefficients ranging from 0.67 to 0.82 (mean = 0.76) (17-20). The validity and reliability of the Persian version of the academic motivation questionnaire were evaluated by Barzgar et al. in a previous study, confirming its validity with a Cronbach's alpha of 0.81 [21].

In scoring the questionnaire, scores below 60 indicate low motivation, scores from 60 to 99 indicate moderate motivation, and a score of 100 indicates high motivation [17]. After the data was collected by the researcher, it was entered into SPSS software version 24.0 for analysis.

Data analysis

The data were described using descriptive statistics, including frequency, percentage, mean, central indices, dispersion, tables, and statistical charts. For data analysis, Pearson's correlation coefficient was used to assess the relationship between two variables, while independent t-tests were employed to compare mean scores. Additionally, analysis of variance was used to compare the average scores of concentration in class and the academic motivation scale across multiple groups. The Kolmogorov-Smirnov test was applied to check for normality, and the data were found to be normally distributed.

Results

The mean age of the students was 20.46 ± 1.95 years, with a range from 18 to 28 years. **Table 1** summarizes the scores of factors affecting classroom concentration from the medical students' perspective across different dimensions based on demographic characteristics.

Table 1. The scores of factors influencing concentration in class, as perceived by medical students across various dimensions based on demographic characteristics

Variables	n (%)	Professor-related factors Mean ± SD	Student-related factors Mean ± SD	Environment-related factors Mean ± SD
Gender				
Male	131 (48.5)	30.55 ± 4.14	22.08 ± 4.77	9.85 ± 2.54
Female	142 (51.5)	28.92 ± 4.93	21.60 ± 4.27	10.08 ± 2.60
p-value		0.004**	0.386	0.467
Course level				
Basic science	156 (57.1)	29.95 ± 4.56	21.67 ± 4.81	9.46 ± 2.57
Preparatory clinical	117 (42.9)	29.40 ± 4.71	22.05 ± 4.09	10.64 ± 2.42
p-value		0.325	0.484	0.0001***
Marital status				
Single	241 (88.3)	29.91 ± 4.40	22.10 ± 4.54	10.10 ± 2.55
Married	32 (11.7)	28.18 ± 5.93	19.87 ± 3.80	9 ± 2.54
p-value		0.040*	0.009**	0.021*
Residential status				
University's dormitory	109 (39.9)	30.02 ± 4.22	21.82 ± 4.27	10.31 ± 2.67
Individual housing	69 (25.3)	30.38 ± 4.28	21.40 ± 5.12	9.24 ± 2.38
Family housing	95 (34.8)	28.87 ± 5.20	22.17 ± 4.33	10.11 ± 2.50
p-value		0.081	0.542	0.023*

Note: One-way ANOVA test was used to compare participants based on quantitative demographic variables. The significance levels are indicated as follows: *p < 0.05, **p < 0.01, ***p < 0.001.

Abbreviations: n, number of participants; SD, standard deviation; Sig, statistical significance; p, probability-value.

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The mean scores for concentration in class across all dimensions were higher for single students compared to married students ($p < 0.05$). Additionally, the mean scores for factors influencing concentration in class were significantly higher for boys than for girls in the dimension related to the professor ($p = 0.004$).

The results indicated that the overall mean concentration in class was 61.5 ± 7.9, with a range from 41 to 87. Specifically, the mean concentration in class for factors related to the professor was 29.7 ± 4.6, ranging from 19 to 41. For dimensions related to the students, the mean was 21.8 ± 4.5, with a range from 11 to 37. In the dimension of factors related to the environment, the mean was 9.9 ± 2.5, ranging from 3 to 15. Lastly, the mean achievement motivation for the students was 84.4 ± 7.2, with a range from 64 to 99.

Figure 1 illustrates the frequency distribution of academic achievement motivation across low, medium, and high-scoring groups among medical students. **Table 2** presents the mean scores of academic achievement motivation for students in different dimensions based on demographic characteristics. The mean score of academic achievement motivation is significantly related to marital status ($p = 0.001$).

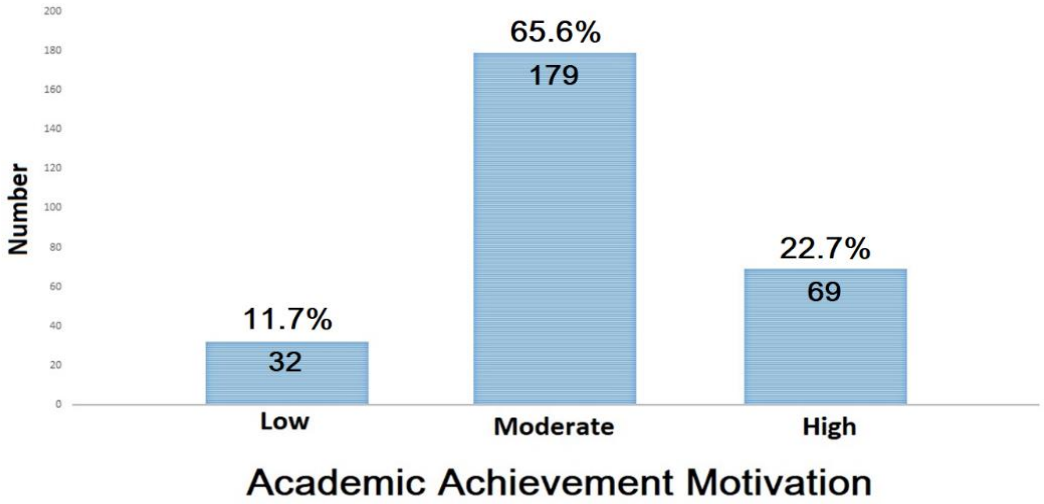

Figure 1. The frequency distribution of students based on their academic achievement motivation, categorized into low, moderate, and high score groups.

Table 2. The scores of the school motivation inventory among medical students across different dimensions, categorized by demographic characteristics

Variables Mean±SD	n (%)	Inventory of School Motivation Mean ± SD	p-value
Gender			
Male	130 (48.2)	84.76 ± 7.92	0.445
Female	140 (51.8)	84.09 ± 6.63	
Course level			
Basic science	153 (56.6)	83.67 ± 7.33	0.052*
Preparatory clinical	117 (43.4)	85.40 ± 7.11	
Marital status			
Single	239 (88.5)	84.92 ± 7.30	0.001***
Married	31 (11.5)	80.51 ± 5.88	
Residential status			
University's dormitory	106 (39.3)	84.47 ± 7.83	0.361
Individual housing	69 (25.5)	83.43 ± 7.72	
Family housing	95 (35.2)	85.07 ± 6.22	

Note: One-way ANOVA test was used to compare participants based on quantitative demographic variables. The significance levels are indicated as follows: *p < 0.05, ***p < 0.001.
Abbreviations: n, number of participants; SD, standard deviation; p, probability-value.

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In this study, the Pearson correlation coefficient indicated a direct and significant relationship between academic achievement motivation scores and effective factors of concentration in class across two dimensions. The total score also demonstrated significance (**Table 3**). Additionally, the relationship between the scores of effective factors of concentration in class across different dimensions and the academic achievement motivation scores of medical students was significant (p = 0.004).

Table 3. Correlation coefficients and the relationships between the scores of factors affecting concentration in class across different dimensions and the scores of academic achievement motivation among medical students

Factors affecting concentration in the class		Total Score	Professor-related Factors	Student-related Factors	Environment-related Factors
Academic Achievement Motivation	n	269	269	270	270
	r	0.174	0.162	0.053	0.150
	p-value	0.004**	0.008**	0.384	0.014*

Note: The significance level is indicated as follows: *p < 0.05, **p < 0.01.
Abbreviations: n, number of participants; r, correlation coefficient.

Discussion

This study revealed that factors related to the professor have the greatest impact on concentration in the classroom, followed by factors related to the students themselves, which can also disrupt concentration. Furthermore, most students exhibited a moderate level of academic motivation for progress. This finding aligns with the previous research conducted by Marzban et al. in 2019 [22] and the study by Abdulrahman et al. in the United Arab Emirates [23].

Therefore, it appears that the teaching methods and classroom management practices of professors significantly affect students' levels of concentration. In this context, it is essential to conduct workshops and gather feedback from professors to enhance classroom focus. Regarding academic motivation, the results suggest that students may not possess a high level of motivation. Further studies should be conducted to explore the underlying causes of this lack of motivation, and the findings should be communicated to higher authorities.

In a study by Servatyari Karo et al. in 2018, conducted on high school students, the mean scores were as follows: 28.98 ± 5.79 for factors related to the teacher, 29.07 ± 5.76 for factors related to the student, and 8.20 ± 2.00 for environmental factors. These results are consistent with the present study regarding the levels of scores obtained in each category. It is important to note that the research population in their study consisted of high school students [8].

A study by Ballard et al. in the United States [24] demonstrated that academic motivation in students is linked to the motivation and justification provided by professors. This study also found that motivation for academic progress significantly affects students' concentration in class. Therefore, to enhance student concentration and subsequently improve learning, it is crucial not only to address factors that disrupt concentration but also to motivate students through various means.

According to previous studies [8, 25], one key factor that increases student motivation is the behavior and explanations of the respective professor, suggesting that professors should strive to be more justifiable in their teaching methods. In contrast, the study by Mellard et al. in the United States [25] found that most students had high academic achievement motivation, which differs from the findings of the present study.

According to the results of the present study [25], the mean scores for classroom concentration related to factors associated with the professor were significantly higher in male students compared to female students. Other aspects of classroom concentration did not show significant differences between genders. This finding contrasts with the study by Marzban et al. [22], which revealed a statistically significant difference in students' opinions about environmental factors between the two genders, with females deeming these environmental factors more important than their male counterparts.

It appears that male students in this study may perceive the teacher's ethics and behavior as more influential in fostering concentration than females do. Although this difference was not statistically significant, female students reported that environmental factors played a greater role in enhancing focus in class. This aligns with findings from studies by Aliabadi et al. in Iran [26] and Silva et al. in Brazil [27], which also suggested that females place greater emphasis on environmental factors in relation to classroom concentration.

Another finding of this study was that mean scores for classroom concentration across all dimensions were

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higher in single students compared to married students. The analysis of variance indicated that the mean concentration scores for students living alone were significantly lower than those of other students, particularly regarding environmental factors. Previous studies have not focused on these specific variables; however, it appears that unmarried students view all three environmental factors as more significant contributors to their lack of concentration in class than married students do. This perception may indicate that single students experience a lower level of concentration, as they identify numerous factors as distractions. One possible explanation for this could be the higher levels of intellectual concerns and issues faced by unmarried students compared to their married counterparts [28].

In this study, the mean scores of motivation for academic progress in the students of the preparatory clinical course are higher than the basic science students. Considering that basic science students come from a newer group of students, it seems that the academic motivation of students decreases year by year and this issue should be considered more. They have adapted to the environment and given that they have completed a course, they have more hope and with the influence of higher-year students, they have better academic motivation. However, this result is not consistent with Mehralizadeh et al.'s previous study in Iran [29].

Pearson's correlation coefficient analysis revealed that mean scores for classroom concentration, specifically regarding environmental factors and professor-related elements, have a direct and significant relationship with students' academic achievement motivation. Additionally, the present study indicated a direct and significant correlation between the total concentration score in class and academic achievement motivation. This finding aligns with Wu et al.'s previous study in China, which found that students lacking academic motivation tend to neglect concentration in class and may even prefer a crowded and disorganized classroom environment [30].

In summary, recognizing that concentration is a skill that can be developed suggests that modifying certain student behaviors could be beneficial. This includes implementing daily planning to ensure adequate rest, as well as conducting psychological workshops aimed at addressing low concentration levels in class [31, 32]. Furthermore, professors should focus on the relevance of course topics to create greater motivation during their teaching [33]. Improving environmental factors, such as the physical conditions of the classroom, could also be an effective step in enhancing concentration [33]. Given the importance of this topic, it is crucial to conduct specific studies to investigate the causes of low academic motivation among medical students, especially in recent years. If necessary, this information should be communicated to relevant administrators and officials to help improve the well-being of these students, particularly those who are far from their families.

Academic performance encompasses not only academic progress but also the ability to plan, motivate oneself, manage anxiety, set effective goals, and engage in relevant activities [34, 35]. Numerous studies indicate that depression and anxiety can negatively impact academic performance and exacerbate learning difficulties [36, 37].

Involving mental health specialists, employing trained personnel to assist students in challenging situations, providing both material and psychological incentives, and offering essential information about mental health should be key components of the authorities' plans. These initiatives can help reduce anxiety and stress, which in turn can boost academic motivation and improve the overall support services available to students. Such actions can effectively enhance students' focus and motivation.

In discussing the limitations of this research, it is important to note that motivation is influenced by various factors, including income, overall health, and family socio-economic status. Another limitation concerns the generalizability of the results to other university students and fields of study; such generalization should be approached with caution. Our sample consisted solely of medical students enrolled in the Basic Sciences and Preparatory Clinical Course.

Conclusion

It appears that as academic motivation in students increases, so too does their concentration in class. Therefore, to enhance the quality of teaching and learning through various methods, it is essential to foster academic motivation. In addition to providing educational resources and a conducive learning environment, a safe and calm atmosphere, and experienced professors, positive and constructive interactions grounded in social skills are crucial. Effective interpersonal relationships between students and professors can create a pleasant environment characterized by satisfactory communication, guiding us toward achieving meaningful educational goals. Recognizing that concentration is a skill that can be

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developed, it is possible to strengthen students' focus in class by changing certain behavioral patterns. This can be achieved through effective time management to ensure adequate rest, emphasizing the practicality of course topics, fostering motivation among students, and improving environmental factors, including the physical conditions of the classroom. These steps can significantly enhance concentration in the classroom.

Ethical considerations

The present study was conducted in accordance with the Declaration of Helsinki and the Ethical Guidelines for Medical and Health Research established by the Ministry of Health and Medical Education and the Ministry of Science, Research and Technology in Iran. We received approval from the Ethics Review Committee of Zahedan University of Medical Sciences, Iran (Registration No. IR.ZAUMS.REC.1401.184).

Artificial intelligence utilization for article writing

The authors declare that they have not utilized any form of generative artificial intelligence in the writing of this manuscript, nor for the creation of data, tables, or their captions.

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Conflict of interest statement

The authors declare that they have no conflict of interest.

Author contributions

M.N. designed and conducted the study and co-wrote the paper. A.A. and Sh.N. contributed to research planning, analyzed the data, and drafted the manuscript with input from all authors. M.N. collected the data and worked on the initial draft of the manuscript. All authors reviewed and approved the final version of the manuscript.

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Data availability statement

The data that support the findings of this study are available on request from the corresponding author.

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