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Relationship between Learning Styles and Academic Engagement in Medical Students: A Cross-Sectional Study

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A B S T R A C T

Background: Learning styles, as a personal and distinct approach that each person employs to understand and process information, play a significant role in academic success. On the other hand, academic engagement, which refers to the active participation of students in the educational processes, is considered one of the key indicators of academic progress. Therefore, the present study was conducted with the aim of examining the relationship between learning styles and academic engagement among medical students at Ilam University of Medical Sciences.

Methods: This descriptive-analytical and cross-sectional study was conducted in 2023 among medical students in the basic sciences and pathophysiology phases at Ilam University of Medical Sciences. All students were invited to participate in the study by census (N = 178). Ultimately, 153 students entered the study by completing the questionnaire. To collect data, the VARK learning styles questionnaire and the Holgado academic engagement questionnaire including three dimensions: Vigor, Dedication, and absorption were used. Data analysis was conducted using mean and standard deviation, chi-square, independent t-test, and Mann-Whitney test with $SPSS_{24}$.

Results: The results indicated that the average score of academic engagement and its dimensions among medical students at Ilam University of Medical Sciences is at a moderate level, with the best situation related to the dimension of Dedication (13.9 ± 4.34) and the weakest situation related to the dimension of absorption (10.27 ± 3.97). Most students (30.1%) prefer the VARK learning style (quad modal), and among various single learning styles, the auditory learning style has the highest prevalence (17.6%). A significant positive correlation was observed between the scores of the dimensions of academic engagement for male and female students. The average score of the dimension of absorption among pathophysiology students was significantly higher than that of the basic sciences. (*P-values* ≤ 0.001). Finally, no significant difference was found between the dimensions of academic engagement and the single-style and multi-style learning preferences.

Conclusion: The results of the study indicate that academic engagement among medical students is not at a desirable level, and learning styles do not have a statistically significant relationship with the level of academic engagement. Examining the variables that influence academic engagement and striving to strengthen this key variable can have a significant impact on learning outcomes Therefore, it is recommended to pay greater attention to improving the educational environment, enhancing students` motivation, and diversifying teaching methods. Additionally, examining structural factors such as academic workload and psychological support can help strengthen academic engagement.

Keywords: Learning style, Academic engagement, Students, Medical.

Introduction

Learning is defined as the process of creating a relatively permanent change in behavior resulting from experience (1). This process is not only the foundation of individual and social growth but also facilitates the development of human knowledge and skills, leading to scientific and technological achievements (2, 3). In this context, universities and higher education institutions, as the main pillars of

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sustainable development in countries, have a multidimensional responsibility for educating specialized forces and contributing to scientific advancements (4). Therefore, identifying factors that influence learning has always been a focus of researchers and educators, especially in higher education environments. The factors affecting learning are extensive, among which learning styles and intrinsic motivation of learners have been identified as two key elements in students' academic success (2).

Learning styles are a combination of cognitive, emotional, and physiological patterns that each individual employs to collect, organize, understand, and process information, playing a significant role in academic success and improving the quality of education (2, 5). These styles reflect the diversity and individual differences in how educational content is perceived and responded to (2). For example, some students learn better by seeing and hearing information, while others require action or analysis and imagination (5). Failure to acknowledge the diversity of students' learning styles and the mismatch between teaching styles of instructors and students' learning styles can be one of the reasons for ineffective learning among some students despite having access to the best instructors and appropriate educational resources (5, 6).

Among the numerous models for determining learning styles, the VARK (Visual, Auditory, Reading/Writing, Kinesthetic) learning style model developed by Lincoln University in New Zealand In 1998 has gained attention from researchers due to its simplicity and practical application (7, 8). This model is based on three principles: 1- Every individual has the ability to learn academic material, but each person has their own specific method; 2- When different learning styles of learners are taken into account, their motivation to learn increases; and 3- Educational content is best learned through engaging various senses and perceptions (9). In general, VARK learning styles are divided into four main categories: visual, auditory, reading-writing, and kinesthetic (10). Each of these styles has its own characteristics, and individuals may use a combination of them based on their personal preferences and inclinations.

Academic engagement is a key determinant of students' academic success (11, 12), and refers to their active involvement in educational processes (13). It is a multidimensional concept encompassing behavioral, cognitive, and emotional components. (14-17). The behavioral component includes actions such as participation in class, timely assignment completion, and attendance; the cognitive component refers to the use of deep learning strategies, and intellectual Vigor; and the emotional component involves interest, motivation, and sense of responsibility (18). While Finn's (1992) early model emphasized behavioral and emotional engagement, later research established cognition as a core dimension (10,16,17).

Therefore, awareness among students about their dominant learning style and its relationship with their level of academic engagement can significantly impact their learning process and academic success. On the other hand, awareness among instructors and educational trainers about the profile of students' learning styles and academic engagement can enhance the teaching process and facilitate the use of innovative and appropriate educational strategies and methods. Hence, this study was conducted to examine the relationship between learning styles and academic engagement among medical students at Ilam University of Medical Sciences in 2023.

Materials and methods

This was a cross-sectional study conducted among medical students at Ilam University of Medical Sciences in the year 2023. The study population included students in the basic sciences program (2nd semester) and students in the physiopathology program (7th semester). Due to the limited size of the research population, sampling was not performed, and all the 187 students were considered for the study using a census method. Inclusion criteria consisted of students currently enrolled in the 2nd semester (basic sciences) and students in the 7th semester (physiopathology) who had registered

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for courses in the first semester of the academic year 2023-2024. The exclusion criteria included students who did not consent to participate in the study or did not fully complete the questionnaire.

Data collection was carried out using two standard questionnaires: the VARK learning styles questionnaire (10) and the Holgado academic engagement questionnaire (19). Additionally, personal information about the participants, including age, gender, living situation, and educational level, was also collected. To assess learning styles, the VARK questionnaire was utilized, which has been validated for medical students in the country by Javadinia et al. (20). This questionnaire categorizes students into four groups based on their interaction with and response to the learning environment: 1. Visual learners, who learn better by seeing and presenting visuals (images, charts, figures) and visualizing content. These individuals typically learn faster and better because the human brain processes images more quickly than text; 2. Auditory learners who learn through listening to lectures, podcasts, and oral instruction and perform better in group discussions and interactive environments; 3. Reading/Writing learners, who learn better by reading printed texts, summarizing, and taking notes. This style aligns with traditional education systems, and these individuals generally perform better in written exams; 4. Kinesthetic learners who learn through hands-on experiences and simulating concepts in the real world, finding laboratory work or group activities to be their best learning opportunities (10). This questionnaire consists of 16 four-option questions based on individual performance in various situations, where each option measures one of the main dimensions of learning styles, allowing participants to select more than one option.

To assess academic engagement, the standard Holgado academic engagement questionnaire developed in 2013 was used. This questionnaire was translated and localized by Sadeghifar et al. (21) for medical students in Iran, with its validity and reliability confirmed. It assesses three dimensions: Vigor (5 questions), Dedication (5 questions), and Absorption (4 questions), using a five-point Likert scale ranging from 0 (never) to 4 (always).

Before distributing the questionnaires, ethical approval was obtained from the Ethics Committee of Ilam University of Medical Sciences, and a necessary introduction letter was acquired from the educational vice-presidency of the medical school. The paper-based questionnaires were distributed anonymously by the researcher in person among students at the medical school. After explaining and guiding the students regarding the overall content of the study and obtaining their verbal consent, the questionnaires were collected after a specified period. Participation in this study was entirely voluntary. Furthermore, confidentiality of the collected data was strictly maintained.

The data were coded and entered into $SPSS_{24}$ for statistical analysis. Descriptive statistics were reported using mean and standard deviation. Frequency tables and graphs were also employed to present descriptive information. For inferential statistics, a one-sample t-test, chi-square test, and correlation model were utilized.

Results

Out of a total of 178 questionnaires distributed among medical students, 153 questionnaires were completed and returned (response rate: 86%). Of these, 93 individuals (60.8%) were studying in the physiopathology program. In terms of gender, 83 Individuals (54.2%) were female. The age range of the students was between 18 and 39, with the majority being 23 years old (22.31 ± 2.8). Additional information regarding the demographic characteristics of the students is presented in Table 1.

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Table 1. Demographic characteristics of the studied students

Variable		Frequency	Percentage
Gender	Female	83	54.2
	Male	70	45.8
Field of study	Basic sciences	60	39.2
	Physiopathology	93	60.8

Based on the results obtained from the VARK questionnaire, the predominant learning style among students was the quad-modal (VARK), which includes visual, auditory, reading-writing, and kinesthetic-motor styles. This style was reported by 46 participants (30.1%). Among the unimodal learning styles, the auditory learning style (17.6%) was the most common among the participating students (Chart 1). These findings indicate that most students utilize a combination of different styles for learning.

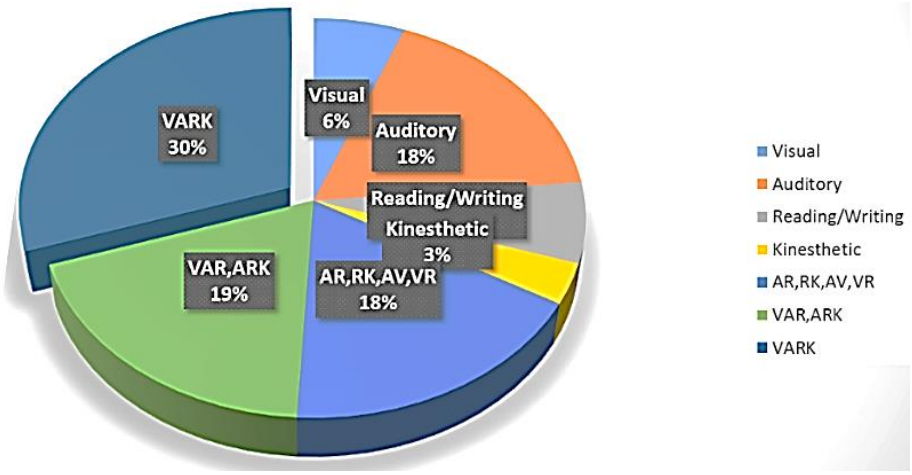

Chart 1. Results of learning styles based on the VARK questionnaire

Table 2 presents the frequency distribution of students' responses, along with the mean and standard deviation of scores in the areas of Vigor, Dedication, and Absorption. The mean scores for the Vigor and Dedication areas were 13.73 and 13.90, respectively, while the engagement area had the lowest score with a mean of 10.27, indicating a moderate level of academic engagement among students.

Table 3 examines the relationship between gender and educational level and the three areas of academic engagement. A significant relationship was observed between participants' gender and the areas of academic engagement (*P-values* $\leq$ 0.05). Additionally, the results of the comparison of mean scores showed that there was a significant difference in scores between female and male students in all three areas of academic engagement, with female students achieving higher scores in Vigor, Dedication, and absorption compared to male students. Analyzing the areas of academic engagement based on educational level revealed that there was only a significant difference in the absorption area between students in basic sciences and those in physiopathology; specifically, the mean scores for the absorption area were significantly higher among physiopathology students than those in basic sciences.

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Table 2. Frequency distribution of students' responses to questions about academic engagement

Academic Engagement Domain	Question	Always		Often		Sometimes		Rarely		Never		Mean± SD
		%	Freq	%	Freq	%	Freq	%	Freq	%	Freq	
Vigor	I feel strong mentally when studying.	45	29.4	43	28.1	45	29.4	16	10.5	4	2.6	13.73±3.90
	I am able to continue studying for long periods of time.	44	28.8	58	37.9	38	24.8	10	6.5	3	2.0	
	When studying, I am full of energy and enthusiasm.	40	26.1	58	37.9	40	26.1	13	8.5	2	1.4	
	When studying, I feel powerful and assertive.	36	23.5	50	32.7	45	29.4	16	10.5	6	3.9	
	In the morning when I wake up, I feel eager to go to class.	41	26.9	53	34.6	45	29.4	12	7.8	2	1.3	
Dedication	My enthusiasm for studying is very purposeful and meaningful.	45	29.4	44	28.8	44	28.8	14	9.1	6	3.9	13.90±4.34
	My studies make me more eager to learn.	41	26.8	48	31.4	48	31.4	11	7.1	5	3.3	
	I am enthusiastic about learning the scientific material of my courses.	39	25.5	51	33.3	41	26.8	16	10.5	6	3.9	
	I take pride in studying my field of study.	37	24.1	61	39.9	33	21.6	15	9.8	7	4.6	
	The materials I read make me think deeply.	77	50.3	38	24.8	25	16.3	6	3.9	7	4.7	
Absorption	When studying, I lose track of time due to my immersion in the material.	47	30.7	33	21.6	41	26.8	18	11.8	14	9.1	10.27±3.97
	When studying, nothing distracts me.	50	32.7	51	33.3	31	20.3	14	9.1	7	4.6	
	When studying, I feel a deep sense of pleasure.	41	26.8	46	30.1	38	24.8	21	13.7	7	4.6	
	I become absorbed in the material when studying.	36	23.5	31	20.3	46	30.1	27	17.6	13	8.5	

Based on independent t-tests and their non-parametric equivalent, as well as the Mann-Whitney test, no statistically significant relationship was observed between learning styles (unimodal and multimodal) and dimensions of academic engagement (Vigor, Dedication, and absorption). This result indicates that students' learning styles are not directly related to their level of academic engagement. The results of these tests can be seen in Table 4.

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Table 3. The relationship between gender and educational level with dimensions of academic engagement

Variable	Academic engagement domain	Mean± standard deviation		P
Gender	Vigor	Female	14.90±3.80	< 0.001
		Male	12.32±3.57	
	Dedication	Female	14.90±4.32	0.001
		Male	12.70±4.09	
	Absorption	Female	11.23±3.99	0.001
		Male	9.13±3.65	
Educational level	Vigor	Basic sciences	12.98±3.77	0.074
		Physiopathology	14.22±3.93	
	Dedication	Basic sciences	13.28±4.51	0.186
		Physiopathology	14.29±4.21	
	Absorption	Basic sciences	8.72±3.65	< 0.001
		Physiopathology	11.27±3.86	

Table 4. The relationship between dimensions of academic engagement and learning styles

Variable	Learning styles	Mean	SD	P
Vigor	Unimodal	13.32	3.84	0.243
	Multimodal	13.93	3.94	
Dedication	Unimodal	13.37	4.70	0.406
	Multimodal	14.16	4.15	
Absorption	Unimodal	9.98	3.79	0.528
	Multimodal	10.41	4.07	

Discussion

The results of this study indicate that the predominant learning style among medical students at Ilam University of Medical Sciences is the quad-modal learning style (VARK), with approximately 30.1% of students preferring this style; they primarily tend to utilize a combination of different learning styles (visual, auditory, reading-writing, and kinesthetic) to enhance their learning efficiency. This finding aligns with previous studies, including those by Ahmadnia et al. (22), Cho Han et al. (23), Eunbyul et al. (24), which have reported a greater tendency among students to use multimodal learning styles. The existence of this pattern may stem from the diversity of educational resources in the academic environment and the need to interact with various educational materials. Therefore, aligning teaching methods with learners' needs will not only improve the quality of education and learning but also create opportunities for training physicians with stronger clinical skills and critical thinking abilities. However, many educators do not pay sufficient attention to the importance of identifying students' learning styles in designing educational programs.

It was also found that among the unimodal learning styles, the auditory style with a frequency of 38% is the most common type. This finding is consistent with some previous studies, including those by Nuzhat et al. (25) and Javadinia et al. (20), which have reported auditory style as the dominant learning style among medical students. Auditory learners are often more social and can master complex concepts through listening and verbal interactions such as lectures, discussions, and oral explanations. Effective learning methods for them include listening to lectures and podcasts, participating in group discussions and debates, recording and replaying educational notes, and converting text to speech. This learning style is particularly effective in-patient interactions, teaching, and teamwork in hospitals. Medical students with an auditory style learn diagnoses more quickly by listening to patients and colleagues and better

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retain material by turning lessons into conversations. This result may be due to the educational nature of the medical curriculum, where seminar presentations, lecture-based classes, and clinical discussions play a major role in knowledge transfer. In studies such as those by Habibpour et al. (26), the reading-writing style has been more prominent in other (non-medical) fields, which may be attributed to differences in teaching methods, academic environments, fields of study, individual and cultural differences, or even sample sizes in different studies. Additionally, no significant difference was observed in the use of the multimodal VARK learning style between genders. This finding aligns with results from some previous studies that also reported no impact of gender on students' learning styles (27, 28), indicating that learning styles are not influenced by gender.

In terms of academic engagement, the average scores in the Vigor and Dedication dimensions were higher than absorption, indicating a moderate level of academic engagement among students. This may suggest opportunities for improving student participation and motivation in the learning process. This finding is consistent with the studies by Carmona et al. (29) in Chile and Holgado et al. (19) in Spain, where absorption was also reported as a weaker dimension of academic involvement. This may indicate that students experience the least enjoyment and immersion in educational activities; factors such as academic pressures, the large volume of course content, or a mismatch between educational content and practical needs can explain this situation. Academic engagement not only facilitates interaction between learners and instructors and other students but also plays a significant role in deepening their learning and cognitive growth, steering them away from a passive approach towards active participation in the learning process. This participation can also contribute to the development of problem-solving skills and clinical decision-making. However, the state of academic engagement among medical students in this study indicates the presence of challenges in their learning process and academic success. Based on the results of the study by Hosseini and Jafarzadeh (30), academic pressures, the large volume of course content and stress are among the factors reported to negatively Impact academic engagement. Therefore, designing educational activities based on the motivations and values of students can help increase their engagement and academic productivity (31).

In examining the relationship between gender and academic engagement, female students scored higher than male students in all domains (Vigor, Dedication, and absorption). This finding is consistent with several studies that have reported that girls are more engaged in academic activities compared to boys and show greater motivation and commitment. The reasons for this difference may include greater responsibility, higher intrinsic motivation, and more social support among female students, which require further investigation (18,32-34). Additionally, girls may be better able to cope with academic stress and play a more active role in classroom activities. Therefore, considering that gender is an influential factor in determining the level of academic engagement among students, program designers should pay more attention to the specific needs of each gender. In comparing educational levels, a significant difference was observed only in the domain of absorption, with students in the pathophysiology program scoring higher than those in basic sciences. This difference may be due to pathophysiology students being at more advanced stages of their medical education and feeling a greater sense of success in their professional practice through direct involvement in clinical settings and practical skills. They typically demonstrate greater engagement and motivation for learning, which may lead to increased absorption. In contrast, basic science students, who are still focused on learning fundamental concepts, may have lower levels of absorption due to inexperience or lack of interest in the material. These findings align with previous research

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indicating that students in specialized and clinical fields, especially at the graduate level, perform better in various aspects of academic engagement, particularly absorption (18). Therefore, the design of strategies and educational programs should consider the specific needs and characteristics of each educational level to enhance motivation and absorption among students across all levels.

Finally, the findings of this study indicated that there is no statistically significant relationship between learning styles (unimodal and multimodal) and domains of academic engagement (Vigor, Dedication, and absorption). This may be because academic engagement is influenced by multiple other factors such as personal motivation, students' intelligence quotient, social support, and the educational environment, and does not necessarily correlate with an individual's learning style. This finding is consistent with the study by Frederick et al. (18), which emphasized the role of environmental and motivational factors in determining the level of academic engagement. Therefore, focusing on environmental and social factors in designing educational programs may be more effective than solely concentrating on learning styles to improve students' academic engagement. It is suggested that future studies should examine the variables, especially academic engagement, in more depth with a longitudinal approach and the use of qualitative methods in addition to quantitative methods.

Conclusion

The results of this study indicate that the multimodal (VARK) learning style is the most prevalent learning pattern among medical students at Ilam University of Medical Sciences, with the majority of students utilizing a combination of visual, auditory, reading-writing, and kinesthetic methods for learning. Additionally, among unimodal learning styles, the auditory style was the most common, likely due to the lecture-based academic structure, clinical discussions, and verbal interactions that dominate the educational environment. However, no significant statistical relationship was found between learning styles and levels of academic engagement, suggesting that factors beyond individual learning preferences play a more determining role in students' activity and involvement in the educational process.

In this regard, students demonstrated moderate to high levels of academic engagement in terms of Vigor and Dedication, but the absorption dimension showed the lowest level of engagement, indicating a lack of deep concentration and enjoyment in academic activities. Furthermore, female students scored higher than male students in all dimensions of academic engagement, and students in the pathophysiology phase showed greater absorption compared to those in the basic sciences. These findings suggest that motivational factors, social support, clinical experience, and educational stage have a stronger influence on student engagement than their individual learning styles. To enhance academic engagement, it is recommended that educational programs be designed not only to accommodate diverse learning styles but also to strengthen environmental and motivational factors. This includes creating interactive learning opportunities, increasing early clinical exposure, implementing problem-based learning strategies, and providing psychosocial support particularly for students in the basic sciences to improve their absorption and deeper engagement. Additionally, training educators about individual student differences and addressing gender-specific and stage-specific needs can contribute significantly to improving the quality of medical education.

Limitations of the Study

The limitations of this research include the descriptive-correlational nature of the study, which prevents the examination of causal relationships. Additionally, sampling limited to a single university may restrict the generalizability of the findings to other academic disciplines and universities in the country. The data obtained from the research questionnaire may be influenced by factors such as participant fatigue, lack of honesty in responses (especially regarding the level of

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academic engagement), or non-cooperation from some students. This could affect the accuracy of the findings.

Ethical considerations

This article is the result of a doctoral thesis in the field of general medicine, approved by the Ethics Committee of Ilam University of Medical Sciences with ethics code: IR.MEDILAM.REC.1402.182.

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Authors' contributions

AH.P, J.S, M.A and AA.A contributed to the design of the study; AH.P collected the data; KH.N analyzed and interpreted the data; F.B wrote the first draft of the manuscript; J.S reviewed the manuscript and critically revised the manuscript. All authors read and approved the submitted version.

Conflict of interests

The authors declared no conflict of interests.

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References

1. De Houwer J, Barnes-Holmes D, Moors A. What is learning? On the nature and merits of a functional definition of learning. Psychonomic bulletin & review. 2013; 20:631-42
2. Javadi A, Mohammadi Y, Akbari N. The Condition of Learning styles, Student Engagement and its Relationship with Academic Progress in Birjand University of Medical Sciences. Future of medical education journal. 2017;7(2).
3. Armandeh A, Momeni Z, Arabi M. Evaluation of the Relationship between Learning Style and Academic Achievement of Dental Students at Alborz University of Medical Sciences. Journal of Medical Education Development. 2021;14(42):67-77.
4. Abdi H, Mirshah Jafari SI, Nili MR, Rajaipour S. A Study of the Visons and Missions of Iran's Higher Education in 2025 Plan: An Analysis of Priorities and Opportunities. Strategy for Culture. 2020;13(49):223-50.
5. Hakimzadeh R, Ghasemi M, Moghadamzadeh A. Examining the mediating role of academic engagement in relation to participation styles in learning and academic performance of students. Research in educational systems. 2015;10(34):109-32.
6. McLeod M. They all learn the same... don't they?: an evaluation of the learning style preferences of the NZ Dairy Industry. 2005.
7. Boyde M, Tuckett A, Peters R, Thompson DR, Turner C, Stewart S. Learning style and learning needs of heart failure patients (The Need2Know-HF patient study). European Journal of Cardiovascular Nursing. 2009;8(5):316-22.
8. BlueJurnes W, Gurdner DL. Learning styles: Implications for distance learning. New directions for adult and continuing education. 1995;67.
9. Hashemi Z, Latifian M. An investigation of the relationship between the five factor of personahity and learning styles among HE students of humanities and engineering in shiraz university. 2010.
10. Fleming ND, Mills C. Not another inventory, rather a catalyst for reflection. To improve the academy. 1992;11(1):137-55.
11. Lei H, Cui Y, Zhou W. Relationships between student engagement and academic achievement: A meta-analysis. Social Behavior and Personality: an international journal. 2018;46(3):517-28.
12. Tao Y, Meng Y, Gao Z, Yang X. Perceived teacher support, student engagement, and academic achievement: A meta-analysis. Educational Psychology. 2022;42(4):401-20.
13. Hammill J, Nguyen T, Henderson F. Student engagement: The impact of positive psychology interventions on students. Active Learning in Higher Education. 2022;23(2):129-42.
14. Archambault I, Janosz M, Fallu J-S, Pagani LS. Student engagement and its relationship with early high school dropout. Journal of adolescence. 2009;32(3):651-70.
15. Abbasi M, Dargahi S, Pirani Z, Bonyadi F. Role of procrastination and motivational self-regulation in predicting students' academic engagement. Iranian Journal of Medical Education. 2015; 15:160-9.

[DOI: 10.18502/jebhpme.v9i2.20200]

16.Bear GG, Minke KM. Children's needs III: Development, prevention, and intervention: National Association of School Psychologists; 2006.
17. Jimerson SR, Campos E, Greif JL. Toward an understanding of definitions and measures of school engagement and related terms. The California School Psychologist. 2003; 8:7-27.
18. Fredricks JA, Blumenfeld PC, Paris AH. School engagement: Potential of the concept, state of the evidence. Review of educational research. 2004;74(1):59-109.
19. Casuso-Holgado MJ, Cuesta-Vargas AI, Moreno-Morales N, Labajos-Manzanares MT, Barón-López FJ, Vega-Cuesta M. The association between academic engagement and achievement in health sciences students. BMC medical education. 2013; 13:1-7.
20. Javadinia A, Sharifzade G, Abedini M, Khalesi M, Erfaniyan M. Learning Styles Of Medical Students In Birjand University Of Medical Sciences According To VARK Model. Iranian Journal of Medical Education. 2012;11(6):584-9.
21. Sadeghifar J, Bahadori M, Raadabadi M, Shariati M. Exploring the Relationship between Academic Engagement and Achievement among Nursing Students of Ilam University of Medical Sciences. Iranian Journal of Medical Education. 2020; 20:205-13.
22. Ahmadinia H, Pakzad P, Rezaeian M. Survey of learning models in medical students of Rafsanjan University of Medical Sciences in 2019: A descriptive study. Journal of Rafsanjan University of Medical Sciences. 2022;20(12):1357-70
23. Cho E, Hong J, Nam Y, Shin H, Kim J-H. Development of teaching and learning manual for competency-based practice for Meridian & acupuncture points class. Korean Journal of Acupuncture. 2022;39(4):184-90.
24. Eunbyul C, Jiseong H, Yeonkyeong N, Haegue S. Development of teaching and learning manual for competency-based practice for Meridian & acupuncture points class. Korean Journal of Acupuncture. 2022;39(4):184-90.
25. Nuzhat A, Salem RO, Quadri MS, Al-Hamdan N. Learning style preferences of medical students: a single-institute experience from Saudi Arabia. Int J Med Educ. 2011; 2:70-3.
26. Habibpour Sedani S, Abdeli Sultan Ahmadi J, Faeedfar Z. A study on the learning styles of the students of urmia university of medical sciences based on "VARK" developing critical thinking, liveliness and achievement motivation. Nursing And Midwifery Journal. 2016;13(12):1089-96.
27. Mirfazli SS, Movhedkor E, Mirzabeigi P, Ahmadi Teymourlouy SA. Examining the Learning Styles of the International Students at the Faculty of Pharmacy in the International Campus of Iran University of Medical Sciences. Educational Development of Judishapur. 2021;12(1):88-95.
28. Buowari DY, Joe AI, Erekosima I. Learning style preference and its correlation with gender. Nigerian Medical Journal. 2025; 66(1): 303-313.
29. Carmona-Halty M, Marín-Gutierrez M, Mena-Chamorro P, Sepulveda-Páez G, Ferrer-Urbina R. Flourishing Scale: Adaptation and evidence of validity in a Chilean high school context. Frontiers in Psychology. 2022; 13:795452.
30. Hosseini S. Jafarzadeh MR. Comparison of the effectiveness of inverted teaching and lecture methods (traditional) on students' learning in industrial-organizational psychology. Educational researches. 2022;71(17):0-.
31. Wang MT, Degol J. Staying engaged: Knowledge and research needs in student engagement. Child development perspectives. 2014;8(3):137-43.
32. Wang MT, Eccles JS. Social support matters: Longitudinal effects of social support on three dimensions of school engagement from middle to high school. Child development. 2012;83(3):95-877.
33. Elhampour F, Ganji H, Abolmaali Alhosani K. Comparing academic achievement, academic engagement, hardiness and perceived classroom environment among female and male students. Journal of School Psychology. 2019;8(3):7-25.
34. Momeni K, Radmehr F. Prediction of academic engagement Based on Self-Efficacy and Academic Self-handicapping in Medical Students. Research in Medical Education. 2019;10(4):41-50

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