



# Factors Affecting Concentration and Attendance in the Classroom from Students' Point of View in Qom University of Medical Sciences (2018)

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## Abstract

**Background:** Concentration is relative, and it can be improved and strengthened by changing some of the existing factors, and students' active participation due to positive interaction with professors, in addition to motivation, leads to more concentration and better learning.

**Objectives:** The present study aimed to determine the factors affecting concentration and attendance in the classroom from students' perspective.

**Methods:** This cross-sectional study was performed in 2018. A total of 300 students were selected by quota sampling, and completed a three-part questionnaire including demographic characteristics, factors affecting concentration in the classroom and factors affecting attendance in the classroom. Data were analyzed using descriptive statistics, Spearman correlation coefficient in SPSS.

**Results:** From the viewpoint of 81.7% of female students, "sufficient information and knowledge of the professor on the subject matter" (mean:  $4.40 \pm 0.63$ ) in the domain of the factors related to the professor, "drowsiness in the classroom" (mean:  $4.31 \pm 0.78$ ) in the domain of factors related to the students and "the presence of noise pollution" (mean:  $4.31 \pm 0.78$ ) in the area of environmental factors played the most important roles among the factors influencing concentration. "Mastery of the professor on the content" (mean:  $4.52 \pm 0.71$ ) and "participation in the class as a duty" (mean:  $3.52 \pm 1.12$ ) played the most and least important roles among the factors affecting attendance in classrooms, respectively.

**Conclusions:** According to the study results, capabilities of professors in attending to students' status are important for the creation of concentration and motivation in students to attend classrooms.

**Keywords:** Attendance, Concentration, Effective Factors, Classroom, Student

## 1. Background

Currently, educational processes are part of essential development programs for human resources, and cover students of each community. Improving the quality of education in universities is not a new phenomenon. It explains academic performance of university planners, and helps design strategies to improve the functioning of universities. Educational factors include various physical, financial and human factors that facilitate education in the community by establishing coordination and appropriate activities (1, 2). Many elements in the existing educational system have a special place that cannot be ignored in education. Since teaching is not easy, professors in the course of teaching are not comparable with none of the

other elements (including managers, deputies, and etc.) because the professors, considering the individual characteristics of the students in the classroom, through the appropriate combination, the use of creative teaching methods and techniques, and the equipping of classes in the educational system, can move them to the transcendental goals or disappoint them. Most of the feedback from these activities is visible in classrooms where thoughts are displayed, analyzed, or criticized. The most common teaching style is oral communication between professors and students and among students (3, 4). In the past, the purpose of students' presence in classrooms was merely learning rather than enjoying, while the creation of appropriate educational environments and better learning conditions for students are necessary for a more positive attitude toward

attending in classrooms and learning (3). Therefore, one of the increasing problems is the lack of students' presence in theoretical classrooms (4). However, no presence at a dynamic classroom disrupts learning and teaching (5). Some experts believe that the presence of students in the classroom should be supervised, encouraged or even enforced. The sense of lack of control over the classroom environment by students decreases the probability of their active participation and attendance in classrooms (6). The importance of attendance and absenteeism for professors, the attractiveness of content, the ability to take notes in class, the correlation of materials with the student's major, the creation of sense of curiosity in the early lectures, feedback, class content, and faculty behavior are among the most critical factors affecting the attendance of students in the classroom (7-9). The results of a study at Queensland University have shown that attending a classroom is the main way by which students can acquire scientific and practical knowledge, skills, and professional ability (8). In addition to attending classrooms to learn subject matters, the prerequisites for students' learning are doing correct tasks and academic achievement that increase students' level of concentration (9). Concentration is acquirable and is referred to the mental state in which all the senses and mind of the human are focused on a particular subject (10). The lack of concentration in classrooms, especially student seminars and conferences is among common educational problems. Usually, most people who eagerly attend a session lose focus and sidetrack over time, while individual's concentration increases if distraction factors reduce and mental and environmental conditions change (11). Various studies have mentioned some of the factors influencing concentration including nutrition, intellectual conflicts, sufficient knowledge and information of professors, mastery of the subject, classroom teaching method, the use of teaching aids, the light, and ventilation of the classroom (12). Also, according to the video data collected by Raca and Dillenbourg, even the placement and seating of students in classrooms and the use of visual technologies can play an important role in increasing concentration (13). In addition, studies conducted by Servatyari et al. and Haresabadi et al. showed that multiple and effective strategies can be used by planners and teachers to increase student concentration (14, 15).

Concentration is relative, and nobody can claim that they are completely distracted, or are always concentrated, but it can be improved and strengthened by changing some of the existing factors (16). Active presence of students due to positive interaction with professors not only increases their motivation for concentration on learning, but also affects their activities in future.

## 2. Methods

This cross-sectional study was carried out in 2018. A three-part questionnaire was used for collecting demographic characteristics, factors affecting concentration in the classroom theory including three sections (25 items) and 2 questions related to the place in the classroom and the course presentation time and questions about the factors affecting attendance in classroom from the student's point of view. The study population consisted of all students studying in Qom University of Medical Sciences. Based on a pilot study, and parameters of  $\alpha = 0.05$ ,  $P = 0.35$ ,  $d = 0.05$ , the sample size was determined as 322 students. A total of 300 students were selected by quota sampling from all educational departments, and completed the questionnaire, including 75 from medical faculty, 24 from dentistry faculty, 45 from nursing and midwifery faculty, 76 from paramedical faculty and 80 from health faculty. The questions are scored based on a five-point Likert scale from zero for totally effective to four for ineffective. Maximum total score for each domain was 4.

The students completed the questionnaires with informed consent through self-reporting. The questionnaire was validated through face and content validity by seven experts. After ten eligible students filled the questionnaire out, its reliability was calculated as Cronbach's alpha of 0.85 for factors affecting concentration, and 0.87 for factors affecting attendance. Fasihi Harandy et al. and Mehrizadeh et al. previously confirmed the validity and reliability of the questionnaire (4, 17).

This study was adopted by the research department of Shahid Beheshti University of Medical Sciences (reg. 1396.899). It was approved by the University Ethics Committee (IR.SBMU.RETECH.REC.1396.899). Kolmogorov-Smirnov test showed that the data of the present study were not normally distributed ( $P = 0.0001$ ). Data were statistically analyzed with descriptive statistics, Mann-Whitney U test, chi square test, and Spearman correlation coefficient in SPSS software version 16.

## 3. Results

The mean age of the students was  $21.26 \pm 4.75$  years, and mean of educational score was  $16.88 \pm 1.44$ . Most students were single ( $n = 155$ , 75.3%) with BS degree ( $n = 118$ , 60.2%). Generally, students believed factors related to professors played the most effective role and factors related to students played the least effective role. The mean and standard deviation of the factors related to concentration and factors related to attendance in the classroom were also determined (Tables 1 and 2).

Most female students (81.7%) believed the most important factors influencing concentration were "sufficient in-

**Table 1.** Comparison of Female and Male Scores for Factors Related to Concentration in the Classroom from the Viewpoint of Students<sup>a</sup>

Items	Female	Male	Total	P Value
<b>Factors Related to the Professor</b>				
Skill of the professor in creating motivation	4.31 ± 0.91	4.26 ± 0.95	4.29 ± 0.91	0.56
Proper time management of professors in the presentation of content	4.08 ± 0.80	3.79 ± 0.91	4.03 ± 0.82	0.0001
Use of PowerPoint	3.63 ± 1.04	3.37 ± 0.91	3.59 ± 1.01	0.04
Large volume of teaching materials in a session	4.14 ± 0.92	3.89 ± 1.10	4.08 ± 0.97	0.007
Students' positive mental history	4.11 ± 0.80	4 ± 0.85	4.09 ± 0.80	0.23
Professor's proper teaching speed	4.07 ± 0.76	3.69 ± 0.93	4.01 ± 0.80	0.01
Monotonous teaching	3.88 ± 0.91	3.40 ± 0.69	3.79 ± 0.89	0.0001
Professor ethics	4.34 ± 0.68	3.80 ± 0.96	4.23 ± 0.78	0.0001
The ability of the professor to bring students together	4.32 ± 0.76	3.88 ± 0.96	4.24 ± 0.78	0.0001
Sufficient knowledge and information of the professor about the subject	4.40 ± 0.64	3.89 ± 1.10	4.30 ± 0.76	0.004
The difference between the professor's and the student's gender	3.24 ± 1.51	2.76 ± 1.53	3.16 ± 1.52	0.05
<b>Student-Related Factors</b>				
Eating before the class starts	4.29 ± 0.80	3.74 ± 1.12	4.19 ± 0.88	0.03
Drowsiness in the classroom	4.46 ± 0.71	4.06 ± 0.93	4.39 ± 0.76	0.01
Having a base on the topics presented	3.70 ± 0.84	3.77 ± 0.80	3.77 ± 0.83	0.86
Other students' focus	3.55 ± 0.98	3.40 ± 1.16	3.53 ± 1.02	0.77
Interest in the subject matter	4.36 ± 0.73	4.23 ± 0.87	4.34 ± 0.76	0.97
Having individual intellectual conflicts	4.33 ± 0.71	4 ± 1.04	4.27 ± 0.79	0.01
Active presence in class	4.03 ± 0.97	3.89 ± 0.99	4.02 ± 0.97	0.34
Belief in learning the content while teaching	3.97 ± 0.86	3.83 ± 0.85	3.95 ± 0.85	0.14
Relying on leaflets	1.27 ± 0.53	1.43 ± 0.72	1.31 ± 0.58	0.69
Coeducational classes	3.05 ± 1.01	3.03 ± 1.15	3.07 ± 1.04	0.05
Read the prepared pamphlets or reference books before class	1.87 ± 0.87	1.44 ± 0.78	1.79 ± 0.87	0.79
<b>Environmental Factors</b>				
Noise pollution	4.13 ± 0.79	3.77 ± 1.08	4.07 ± 0.85	0.27
Proper light and ventilation in the classroom	4.09 ± 0.80	3.69 ± 0.86	4.02 ± 0.82	0.03
A large number of students in the classroom	3.55 ± 1.10	3.40 ± 1.11	3.54 ± 1.10	0.80

<sup>a</sup>Values are expressed as mean ± SD.

formation and knowledge of the professor on the subject" (mean: 4.40 ± 0.63) in the domain of factors related to professors, "drowsiness in the classroom" (mean: 4.31 ± 0.78) in the domain of factors related to students and "the presence of noise pollution" (mean: 4.31 ± 0.78) in the domain of environmental factors. Most students (57.4%) believed that sitting in the front rows of the classroom increases concentration. They reported the highest concentration occurs at 10-12 (45.2%) and then at 8-10 (40.6%) in the morning. From the students' point of view, a significant relationship existed between gender and factors influencing concentration ( $P=0.005$ ), but no significant difference existed between factors affecting concentration and the variables

of discipline ( $P=0.88$ ), academic year ( $P=0.20$ ) and residence ( $P=0.32$ ).

Among the factors affecting attendance in classrooms, "professor's mastery of the content" (4.52 ± 0.71), "interest in the subject" (4.47 ± 0.71), and "appropriate teaching method" (4.45 ± 0.73) played the most important roles and "participation in the class as a duty" (3.52 ± 1.12) and "active involvement of students in the classroom" (3.54 ± 1.14) played the least important roles in the presence of students.

**Table 2.** Comparison of Scores of Female and Male Students for the Factors Related to the Attendance in the Classroom from the Viewpoint of Students<sup>a</sup>

No.	Items	Female	Male	P Value
1	Professor's mastery of the content	1.41 ± 0.64	1.74 ± 0.75	0.0001
2	Interest in the subject matter	1.46 ± 0.64	1.79 ± 0.84	0.0001
3	Appropriate teaching method	1.49 ± 0.67	1.73 ± 0.76	0.002
4	Clinical application of presented course	1.71 ± 0.78	2 ± 0.98	0.001
5	The importance of presence in understanding course	1.73 ± 0.75	1.94 ± 1.01	0.01
6	Professors' class management	1.64 ± 0.83	2.18 ± 0.93	0.0001
7	Necessity and importance of the lesson	1.73 ± 0.75	2 ± 0.98	0.01
8	Influence of textbooks on answering exam questions	1.85 ± 0.84	1.94 ± 0.95	0.17
9	Professors' answers to questions	1.84 ± 0.85	2.24 ± 0.98	0.004
10	Previous acquaintance with the course outline	2.01 ± 0.97	2.15 ± 0.89	0.04
11	Professor's moral and physical characteristics	2.04 ± 1.04	2.21 ± 1.20	0.16
12	Possibility of taking notes	2.03 ± 0.94	2.21 ± 1.06	0.01
13	Appropriate number of students in class	2.43 ± 1.16	2.59 ± 1.04	0.08
14	Physical conditions	2.09 ± 0.88	2.18 ± 0.90	0.05
15	Use of tools, audiovisual and educational aids	2.16 ± 0.97	2.24 ± 1.01	0.61
16	Having another class the same day	2.18 ± 1.08	2.47 ± 0.99	0.005
17	Continuous evaluation	2.18 ± 0.99	2.52 ± 1.22	0.03
18	Professor's not giving course notes	2.32 ± 1.31	2.35 ± 1.12	0.04
19	Active involvement of students in the classroom	2.12 ± 0.97	2.12 ± 0.91	0.93
20	Participation in class as a task	2.43 ± 1.13	2.74 ± 0.93	0.008

<sup>a</sup>Values are expressed as mean ± SD.

#### 4. Discussion

The female participants of the current study believed among the factors influencing concentration, "sufficient knowledge and information of the professor about the subject" had the most important role in the domain of factors related to professors, and "drowsiness in the classroom" had the most important role in the domain of student-related factors. Meanwhile, male students believed among the factors influencing concentration, "skill of the professor in creating motivation" in the domain of factors related to professors had the most important role and "interest in the subject" had the most important role in the domain of student-related factors. From female and male students' point of view, "noise pollution" in the domain of environmental factors had the most important role. Because students consider "sufficient knowledge and information of the professor about the subject" as the most important factor, it is imperative that professors have sufficient mastery of the subjects, which mandates continuous studying. Mehralizadeh et al. reported "the skill in practicalizing materials" as the most important factor from the viewpoint of medical students (17). This discrepancy can be

attributed to the fact that the present study was conducted on the views of different groups of students and that teaching methods of professors were different in the two universities.

"Drowsiness in the classroom", recognized as the most important factor in the current study, has also been emphasized in numerous studies (18-20). Since medical students may suffer insomnia or delay in falling asleep, poor quality sleep can disrupt their concentration, as well as their ability to think in the classroom (20). The professor's skill in creating motivation was the most important factor affecting concentration from the viewpoint of male students. The studies of Firouznia et al. and Asadi Noghabi are consistent with the current study (8, 20). In fact, motivation is one of the essential factors in learning. Effective learning will not occur by reduced motivation of students in the process of teaching (21). Therefore, professors can motivate students to have more tendency for learning and ultimately have better concentration. "Interest in the subject" is another factor, which is particularly important in focusing on the subject from the male students' viewpoint, which is supported by numerous studies (15).

"Interest in the subject" can be increased through hav-

ing basic information and studying beforehand. As a result, students have more information about the subject, are more attracted to learning, participate in discussions, and concentrate better. Meanwhile, professors can make their teaching method more attractive.

Among environmental factors, noise pollution followed factors related to professors and students in order of significance in the present research. Therefore, by decreasing environmental distractors, it is possible to increase concentration alongside other factors (22, 23). Differences in the results of studies can be attributed to environmental conditions and educational settings of medical sciences.

Also, most students reported sitting in the front row increased concentration. Furthermore, they had the highest level of concentration at 10 - 12 and then 8 - 10 in the morning. A study reported the same result for higher concentration in the front rows of the classroom (23). The relationship between students and professors appears to increase concentration. Students also pointed out their higher concentration in the early hours of the morning because they had more concentration and were more likely to understand the subject matter in the morning classes.

Among the factors influencing attendance in classrooms, “professor’s mastery of content”, “interest in the subject”, and “appropriate teaching method” played the most important roles from students’ point of view. Several studies emphasize the importance of professor’s mastery of content (2). Mastery of the content and subject matter due to the permanent studies can play an important role in enhancing the quality of the teaching-learning process and creating motivation to attend classes in addition to empowering professors. In fact, if professors do not master the subject matter adequately, they cannot easily answer students’ questions and resolve ambiguities even if they are ready to present the materials. In addition to mastery, professors should be skilled in transferring concepts, mentioning the supplementary points and strengthening motivation to attend classes so that students better understand the subject matter. Interest in the subject was the second factor affecting student attendance, which is consistent with studies of Fasihi Harandy et al., Mattick et al., and Hughes (4, 24, 25). Since interest can attract students to the subject, professors can use creativity and different teaching methods to intrigue students. Another effective factor in attendance in the present study is the appropriate teaching method. Studies in this regard suggest that, according to the present conditions, effective teaching occurs when professors can correctly use the combination of several methods in a class to increase students’ attendance through attractiveness and effectiveness (4, 26, 27). According to the participants in the study, “active engagement of students in the classroom” and “use of audiovisual devices and educational aids” have the lowest importance.

This finding is consistent with the results of Fasihi Harandy et al. (4), Naderi et al. (28) and Harris et al. (29). In the current study, some of the factors affecting attendance and concentration in the classroom were explained, but there are still unknown factors which require further studies in other universities because students’ viewpoints are different. One of the limitations of the present study is the sample bias due to unequal number of males and females. Also, the use of only one quantitative method is the other limitation. Since changes in research objectives make it possible to use qualitative methods such as semi-structured in-depth interviews to achieve more comprehensive results, it is advised to use it in the future studies.

#### 4.1. Conclusions

According to the results of the study, professors should pay attention to students’ status and increase their concentration and motivation to attend classrooms. Therefore, the following recommendations can help eliminate the problem of drowsiness, lack of concentration or motivation: attractiveness of the provided content, professors’ choice of words, students’ participation in the classroom discussions, and holding classes at appropriate hours.

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#### Footnotes

**Authors’ Contribution:** All authors contributed in all stages.

**Conflict of Interests:** It is not declared by the authors.

**Ethical Approval:** It was approved by the University Ethics Committee (IR.SBMU.RETECH.REC.1396.899).

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**Patient Consent:** The students completed the questionnaires with informed consent through self-reporting.

## References

1. Tabarsa G, Hasanvand Mofrad M, Arefnezhad M. [Analysis and ranking factors affecting the improving educational quality with a case study in the University of Isfahan]. *Q J Interdiscipl Stud Humanit*. 2012;**4**(16):53-74. Persian.
2. Karami M, Amanat A, Rasekh Jahromi A, Sotoodeh Jahromi AR. [The evaluation of effective factors on attendance and nonattendance in theoretical classrooms, from the Viewpoints of Medical students of Jahrom's University of Medical Sciences]. *Pars Jahrom Univ Med Sci*. 2013;**11**(1):7-14. Persian. doi: [10.29252/jmj.11.1.2](https://doi.org/10.29252/jmj.11.1.2).
3. Sleigh MJ, Ritzer DR. Encouraging student attendance. *APS Observ*. 2001;**14**(9):19-20.
4. Fasihi Harandy T, Azizzade Forouzi M, Mohammad Alizadeh S, Ghazanfari Z. [Effective factors on theoretical class attendance according to nursing and midwifery students' point of view, Kerman Razi School of Nursing and Midwifery]. *Strides Dev Med Educ*. 2008;**4**(2). Persian. e58514.
5. Umpleby G. *Towards an understanding of presence in teaching: Having and being [dissertation]*. University of Exeter; 2014.
6. Lipscomb M, Snelling PC. Student nurse absenteeism in higher education: An argument against enforced attendance. *Nurse Educ Today*. 2010;**30**(6):573-8. doi: [10.1016/j.nedt.2009.12.003](https://doi.org/10.1016/j.nedt.2009.12.003). [PubMed: [20056298](https://pubmed.ncbi.nlm.nih.gov/20056298/)].
7. Gump SE. Keep students coming by keeping them interested: Motivators for class attendance. *Coll Stud. J*. 2004;**38**(1):157-61.
8. Asadi Noghabi AA. [Learning process and principles of patient education]. Tehran: Bashari; 2004. Persian.
9. Mangal SK. *Advanced educational psychology*. 2nd ed. New Delhi: Prentice-Hall of India Pvt. Limited; 2004.
10. Kumar S. An innovative method to enhance interaction during lecture sessions. *Adv Physiol Educ*. 2003;**27**(1-4):20-5. doi: [10.1152/advan.00043.2001](https://doi.org/10.1152/advan.00043.2001). [PubMed: [12594070](https://pubmed.ncbi.nlm.nih.gov/12594070/)].
11. Nojomi M, Ghalhe Bandi MF, Kaffashi S. Sleep pattern in medical students and residents. *Arch Iran Med*. 2009;**12**(6):542-9. [PubMed: [1987745](https://pubmed.ncbi.nlm.nih.gov/1987745/)].
12. Ozturk C, Muslu GK, Dicle A. A comparison of problem-based and traditional education on nursing students' critical thinking dispositions. *Nurse Educ Today*. 2008;**28**(5):627-32. doi: [10.1016/j.nedt.2007.10.001](https://doi.org/10.1016/j.nedt.2007.10.001). [PubMed: [18054412](https://pubmed.ncbi.nlm.nih.gov/18054412/)].
13. Raca M, Dillenbourg P. System for assessing classroom attention. *J ACM*. 2013:1-5. doi: [10.1145/2460296.2460351](https://doi.org/10.1145/2460296.2460351).
14. Servatyari K, Mardani N, Servatyari B, Yazdanpanah H. The study of factors affecting concentration in classroom among high school students in Divandarreh city, Iran, in 2018. *Chron Dis J*. 2019;**7**(3):153-9. doi: [10.22122/cdj.v7i3.425](https://doi.org/10.22122/cdj.v7i3.425).
15. Haresabadi M, Raofian H, Akhlaghi D, Jamchi H, Salehi M. [Factors affecting student concentration in classroom: Students' viewpoints in North Khorasan University of Medical Sciences]. *J North Khorasan Univ Med Sci*. 2016;**8**(2):237-44. Persian. doi: [10.18869/acad-pub.jnkums.8.2.237](https://doi.org/10.18869/acad-pub.jnkums.8.2.237).
16. *Tasnim News*. 2017, [cited 2017 June 15]. Available from: <https://www.tasnimnews.com/fa/news/1396/03/15/1428223>.
17. Mehralizadeh S, Ghorbani R, Zolfaghari S, Shahinfar H, Nikkhab R, Pourazizi M. [Factors affecting student concentration in classroom: Medical students' viewpoints in Semnan University of Medical Sciences]. *Iran J Med Educ*. 2013;**13**(8):663-71. Persian.
18. Hershner SD, Chervin RD. Causes and consequences of sleepiness among college students. *Nat Sci Sleep*. 2014;**6**:73-84. doi: [10.2147/NSS.S62907](https://doi.org/10.2147/NSS.S62907). [PubMed: [25018659](https://pubmed.ncbi.nlm.nih.gov/25018659/)]. [PubMed Central: [PMC4075951](https://pubmed.ncbi.nlm.nih.gov/PMC4075951/)].
19. Ng EP, Ng DK, Chan CH. Sleep duration, wake/sleep symptoms, and academic performance in Hong Kong Secondary School Children. *Sleep Breath*. 2009;**13**(4):357-67. doi: [10.1007/s11325-009-0255-5](https://doi.org/10.1007/s11325-009-0255-5). [PubMed: [19377905](https://pubmed.ncbi.nlm.nih.gov/19377905/)].
20. Firouznia S, Yousefi A, Ghassemi G. [The Relationship between Academic Motivation and Academic Achievement in Medical Students of Isfahan University of Medical Sciences]. *Iran J Med Educ*. 2009;**9**(1):79-84. Persian.
21. Brewer EW, Burgess DN. Professor's role in motivating students to attend class. *J Ind Prof Educ*. 2005;**42**(23):23-47.
22. Aliabadi M, Mahdavi N, Farhadian M, Shafie Motlagh M. [Evaluation of noise pollution and acoustic comfort in the classrooms of Hamadan University of Medical Sciences in 2012]. *J Ergon*. 2013;**1**(2):19-27. Persian.
23. Silva L, Santos R. Acoustical comfort in primary school classrooms in the city of João Pessoa, Paraíba, Brazil. *J Ergonomics S*. 2013;**1**:2.
24. Mattick K, Crocker G, Bligh J. Medical student attendance at non-compulsory lectures. *Adv Health Sci Educ Theory Pract*. 2007;**12**(2):201-10. doi: [10.1007/s10459-005-5492-1](https://doi.org/10.1007/s10459-005-5492-1). [PubMed: [17041787](https://pubmed.ncbi.nlm.nih.gov/17041787/)].
25. Hughes SJ. Student attendance during college-based lectures: A pilot study. *Nurs Stand*. 2005;**19**(47):41-9. doi: [10.7748/ns2005.08.19.47.41.c3925](https://doi.org/10.7748/ns2005.08.19.47.41.c3925). [PubMed: [16101085](https://pubmed.ncbi.nlm.nih.gov/16101085/)].
26. Solamani Asl H, Mehrannia K. [Assessment of Tehran Medical University opinion on the classes attendance and causes of absenteeism]. *Iran J Med Educ*. 2001;(Special issue):73. Persian.
27. Rahal Zadeh R. [Teaching ways, study in educational plan]. Tehran: Terme; 1997. 49 p. Persian.
28. Naderi Z, Aein F, Nazari Vanani R. [Factors affecting classroom participation; the viewpoints of students in Shahre Kord University of Medical Sciences in 2013]. *Iran J Med Educ*. 2014;**14**(3). Persian.
29. Harris JL, Al-Bataineh MT, Al-Bataineh A. One to one technology and its effect on student academic achievement and motivation. *Contemp Educ Technol*. 2016;**7**(4):368-81.