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# Investigating the reasons for students' attendance in and absenteeism from lecture classes and educational planning to improve the situation

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## Abstract:

**BACKGROUND:** This study investigated the reasons for the students' attendance in and absenteeism from lecture classes from the perspective of professors, students, and educational planning to change the unsatisfactory status quo.

**MATERIALS AND METHODS:** The present study was a narrow needs assessment survey which was performed on students ( $n = 70$ ) of the Faculty of Dentistry, Tehran University of Medical Sciences, in four stages. In the first stage, the opinions of professors and students about the reasons for absenteeism from the lecture classes were collected. In the second stage, the results of the first stage were discussed by an expert panel to find solutions for the problem. The results of the survey were tabulated, summarized, and discussed. In the third stage, online classes were held as one of the solutions and evaluated in the fourth stage.

**RESULTS:** The results showed that various factors, such as professor empowerment, evaluation system, audiovisual equipment of the classes, educational curriculum, and class schedules, are associated with the students' attendance in the classes. Along with these factors, one of the most important reasons for students' absenteeism from classes in recent years might be the generational differences of students. The evaluation of online classes showed that the ratio of the number of students who actively participated in the online classes to the number of students participating in the online classes varied from 30% to 64% ( $P < 0.05$ ).

**CONCLUSION:** In addition to improving the factors associating students' attendance in classes, online education is a proper solution for reducing absenteeism in lecture classes and increasing students' active participation from the perspective of professors and students.

## Keywords:

Absenteeism, dental student, medical education

## Introduction

Academic performance is one of the most critical issues of students in higher education. Since learning requires attendance and active participation in classes, attendance in classes is thought to be an essential factor in students' academic performance.<sup>[1-3]</sup> Previously, it was believed that students with a high attendance rate

were more successful at the end of their course.<sup>[4]</sup> Students' absenteeism from the classes significantly reduces academic achievement, which in turn disrupts the expected learning goals.<sup>[2]</sup> Class attendance and learning have received much attention, and there is a well-established positive relationship between class attendance and academic grades.<sup>[5]</sup> According to researchers, class attendance is a predictor

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of student success and reflects a student's positive learning habits, skills, and attitudes, all of which are directly related to their ultimate success.<sup>[6]</sup> Absenteeism is an essential issue in the medical and health sciences despite the strictness of attendance policies, affecting students' performance around the world. Students who attend classes regularly receive useful information and use medical skills more professionally than others throughout their lives.<sup>[7]</sup> For example, nursing students' absenteeism from classes adversely affects their performance and prolongs their duration of the study.<sup>[8]</sup> Absenteeism also prevents them from accessing relevant information and contact with relevant materials (clinical skills, lectures, and practical sessions) necessary for active learning.<sup>[9]</sup> Medical physiology education also states that classroom lectures should be considered an essential component.<sup>[10]</sup>

Although there is a high rate of absenteeism from classes, the students' presence in the classes is significant to educational institutes because providing resources for this type of education is costly and challenging.<sup>[3]</sup> On the other hand, with the emergence of new educational technologies and new online learning methods, the level of interest and the presence of students in classes have decreased even more. Today, the world is affected by the widespread availability of the Internet, which paves the way for a revolution in education. Conventional classes have been replaced by smart classes with the latest technology.<sup>[11]</sup> The children of this generation are not confined to traditional textbooks and have more opportunities to access online education.

In recent years, in the Faculty of Dentistry, Tehran University of Medical Sciences, the low attendance rate of students in some lectures has attracted the attention of education planners in this faculty. This nonattendance has invoked protests by some faculty members in recent years. Therefore, to solve this problem, this study examined the root causes of the problem to provide plans to solve the problem.

## Materials and Methods

The present study was a narrow needs assessment survey which was performed on students ( $n = 70$ ) of the Faculty of Dentistry, Tehran University of Medical Sciences, in four stages. We had a preset list of questions to be answered by a predetermined sample of the professors ( $n = 24$ ) and students ( $n = 70$ ) to answer these questions chosen in advance. In the first stage, the opinions of professors and students about the reasons for absenteeism from the lecture classes were collected. In the second stage, the results of the first stage were discussed by an expert panel to find solutions for the problem. The results of the survey were tabulated, summarized, and discussed.

In the third stage, online classes were held as one of the solutions and evaluated in the fourth stage

The research steps were designed as follows:

- Step 1: Investigation of the factors associating with the attendance and absenteeism of students from classroom lectures
- Step 2: Provision of solutions to increase students' attendance in classes
- Step 3: Implementation of the proposed solutions based on the set implementation priorities
- Step 4: Evaluation.

After the study protocol was approved by the Faculty Ethics Committee, the study was instituted.

### Step 1: Evaluation of the factors affecting the attendance and absenteeism of students from classes from the perspective of professors and students

At this stage, the students' opinions were collected both qualitatively and quantitatively by the "focus group" method, and the data were collected through a regional standard questionnaire. In this way, since face-to-face sessions with students and discussing open-end questions might help better identify the factors that associate with students' attendance in classes, a focus group was formed, consisting of student representatives (approximately 10 from each academic year). Then, two faculty members on behalf of the Vice-Chancellor for Education interviewed these students and collected their opinions and views. In the next step, to quantify the students' opinions, a valid and reliable questionnaire (Cronbach's  $\alpha = 0.86$ ) was submitted to all the clinical students. The questionnaire was designed in two parts: the study of factors associating with the presence and absence, each of which was based on 12 questions. The questions were scored on a five-point Likert scale and explained to the students before completing the questionnaire.

The professors' views were also qualitatively examined by the "focus group" method. The young professors were only a few years older than the students, belonging almost to the same generation. Therefore, it was expected that the opinions of young professors would be different from those of experienced professors. As a result, two professors from each department of the faculty (including 12 departments), as young professors and experienced professors, were selected. Then, the opinions of these two groups of professors on the subject were examined in two separate sessions in the presence of the Vice-Chancellor for Education. In each of these sessions, 12 professors, project managers, and statistical consultants were present. This stage was carried out to analyze the reasons for students' absence from the

classes so that the results would be a basis for educational programming.

### Step 2: A meeting of experts and provision of solutions to increase student attendance in classes for theoretical lessons

A meeting was held in the Educational Deputy Office with the project managers' presence to determine proper strategies and plans. After reviewing the results of the students' and professors' opinions and summarizing the issues raised in the Educational Council Meeting, the project managers presented their strategies to increase the students' attendance.

### Step 3: Implementation of solutions based on executive priorities

Finally, one of the solutions was adopted by the Vice-Chancellor for Education of the Faculty of Dentistry and implemented.

### Step 4: Evaluation

In this stage, to evaluate the proposed solution after its implementation, a meeting was held with the project managers and professors to collect the professors' opinions. Besides, a reliable and valid regional standard questionnaire was designed to collect students' opinions ( $n = 70$ ). With the cooperation of the University Development Office and the use of the e-poll system, a survey of students was conducted through the web. To get the results, data were analyzed using McNemar's test.

## Results

### Step 1: Evaluation of the factors affecting the attendance and absenteeism of students from classes from the perspective of professors and students

In the first stage, which included the evaluation of factors affecting attendance, 85 questionnaires were completed in the group with 70 students (71% response rate). Tables 1 and 2 present the results of the survey of clinical dental students of Tehran University of Medical Sciences on the reasons for attending and not attending the classes for theoretical courses, respectively.

Factors which were responsible for attendance or absenteeism of students from the classes basis of the young and experienced professors' evaluation showed in Table 3.

In addition, the following were some of the highlights of the differences between the views of young and experienced professors:

- Both groups of young and experienced professors emphasized the development of virtual education

**Table 1: Prioritizing the factors affecting the absence of lecture classes from the students' perspectives**

Rank	Subject	Score out of 100
1	Decreased class efficiency	78.57
2	Fatigue resulting from previous classes	74.92
3	Inappropriate teaching methods	72.54
4	The inappropriate physical condition of the classroom	66.19
5	The repetitive nature of the topics discussed by the professor	54.72
6	Having to attend another class on the same day	54.60
7	A lack of participation of students in the class discussions	51.59
8	The law of four permissible absences from the class	48.80
9	Crowded classes	48.41
10	A lack of prior knowledge of the subject	47.36
11	Booklet group activity	47.04
12	Repetitious examination questions	32.22

**Table 2: Prioritizing the factors affecting the attendance of lecture classes from the students' perspectives**

Rank	Subject	Score out of 100
1	Being interested in the subject	75.81
2	The applicability of the provided content in the clinic	75.56
3	The importance and necessity of the subject	73.92
4	Professor's mastery of the subject	72.22
5	Attendance in class as a prerequisite of the final score	71.52
6	The importance of attendance in understanding the content	66.67
7	Constant and serious roll call	66.34
8	Professor's appearance and moral characteristics	60.32
9	Use of a new teaching method	55.69
10	The unavailability of the professor's note for the student	53.39
11	The ability to take notes	51.38
12	Mixed-gender class lectures	35.00

- In both groups, some professors believed in mandatory attendance, while others considered mandatory attendance useless, disturbing the classroom's peace
- Young professors laid greater emphasis on the practical and clinical nature of the material presented as an essential factor in attracting students, compared to experienced professors
- Young professors emphasized the rotational nature of the teaching curriculum of professors as an essential factor in attracting students and increasing the ability of professors
- Young professors believed that the exciting topics and chapters of the course that attract students are always in the experienced professors' teaching

**Table 3: Factors responsible for attendance or absenteeism of students from the classes basis of the young and experienced professors 's evaluation**

Factors	Explanation
1. Generational differences	The necessity of changing in conventional teaching methods and the use of new teaching methods The necessity of transition toward digital technology The necessity of using virtual learning in some topics
2. Differences in the nature of the educational content	Lack of students' need to attend classes due to the recording of professors' lectures The applied nature of some contents and the basic nature of others The necessity to present and describe clinical cases to attract students The necessity to revise the curriculum and some educational topics
3. Inappropriate physical space and audio and visual facilities of some classes	
4. Improving educational programming	Improper time of some classes
5. Modifying of the roll-calling method	The need for random roll call by professors in addition to registering attendance by tools Technical problems in the faculty roll-calling tools Disruption of the classroom activities by uninterested students as a result of mandatory class attendance
6. Professor empowerment	Failure to persuade professors to spend time to improve the educational system due to incorrect policies for the promotion of faculty members The necessity to increase the computer capabilities of professors The necessity for professors to provide educational content using a rotational system
7. Modifications in the evaluation system	Examination questions should be designed so that class attendance would be useful in answering them The necessity to evaluate students in teaching sessions Changing the style of faculty examinations from multiple-choice tests to conceptual and descriptive questions

agenda, and teaching entirely theoretical and unattractive topics is usually the responsibility of young professors

- Young professors emphasized presenting new educational methods, such as PBL, to increase students' active learning
- Young professors pointed to the critical role of university policies in this regard and mentioned the gap in incentive policies for active professors in the education development compared to the incentive policies for research activities.

### Step 2: A meeting of experts and provision of solutions to increase student attendance in classes for theoretical lessons

In stage 2, the project managers summarized the strategies for increasing student attendance in the following six areas after evaluating the students' and professors' points of view:

1. Empowerment of professor
2. Paying attention to the characteristics of the new generation (the need to benefit from new technologies and developments and promotion of virtual education)
3. Improving the evaluation system
4. Improving audiovisual equipment in classrooms
5. Improving educational curricula
6. Improving class schedules.

The project managers reviewed the six areas mentioned above, and the following points were raised about these areas:

1. Professor empowerment requires policy-making and fundamental and long-term planning. It should be noted that although the faculty members might have higher capabilities for educating the learners compared to that in the past due to scientific developments, the mean abilities of current professors have not increased significantly over time
2. The use of new technologies in the educational field has not improved significantly by considering the significant changes in the characteristics of the current generation compared to the students of previous decades
3. The evaluation system performs better than that previously; however, fundamental changes and reforms are necessary
4. The audio and visual equipment of the classes is undoubtedly more better and more numerous compared to previous years
5. Concerning educational planning, the curriculum has improved in many cases. However, the timing and presentation of some topics are undesirable, necessitating a review of the new dental curriculum by the Ministry of Health and Medical Education, which is beyond the jurisdiction of the faculty
6. In some cases, the class schedule poses problems for students, with highly crowded classes on some days owing to a lack of time.

During the meeting, the project managers analyzed the points mentioned above and realized that although essential factors, such as the empowerment of professors, evaluation system, audiovisual equipment of the classes, educational curriculum, and class schedules, still need to be revised, they have improved to a great deal during the past decade. Therefore, they cannot be considered as the main reasons for students' decreased desire to attend theoretical classes in recent years. Therefore, one of the most critical factors in reducing the presence of students in recent years could be a change in students' generational preferences and ideals. In other words, today's students are more familiar with digital technology than ever before and benefit from them. The development of education is not possible without considering the developments in the present age, mainly in the field of information technology. E-learning is expanding globally, and many of the world's leading universities are taking advantage of it. The use of new technologies is not limited to virtual education, and virtual education, despite having many benefits, exhibits a lower rate of interaction between the professors and students than in conventional classes. However, this interaction forms the basis of learning in some educational topics. Therefore, virtual education could be used in cases where the simultaneous interaction of students and professors is needed at a low rate.

On the other hand, online classes, by taking advantage of virtual education, make it possible for professors and students to interact simultaneously on the web. Therefore, although it is not an in-person educational system (physical presence), it requires a kind of presence in the new world field, a presence that will become more acknowledged over time. It seems that online classes, like computers, would soon expand significantly. Therefore, it was suggested that online experimental educational classes should be held.

### Step 3: Implementation of solutions based on executive priorities

Finally, the project managers prioritized their planning and implementation to solve the problem of three issues, consisting of improving the capabilities of professors in using virtual education and digital technologies, paying more attention to virtual education and improving its quality, and holding online classes which is one of the new educational technologies with many benefits of in-person and non-in-person education.

The Vice-Chancellor for Education of the Faculty placed the online experimental educational classes on its agenda to develop new educational technologies in the faculty. The design and planning of the educational classes were carried out online; after coordination and education, the professors and students held online classes for at

least 1 h for each of the four theoretical lessons. Online classes were selected so that students from four different academic years participated in the study.

### Step 4: Evaluation

#### *Project managers' evaluation of the online class attendance*

Due to mandatory attendance, many students attend university classes reluctantly. Therefore, they only have a physical presence in the classroom, and in many cases, they interfere with the learning process of other students by disturbing the peace of the class. Therefore, the effective presence of students and their active participation in classes is necessary and vital. Since holding online classes for the first time was experienced by students and participating in it required some software measures for students, there were fears that many students would not be interested if they are not forced to attend the classes. Therefore, attending these classes, like conventional classes, was considered mandatory, and in the evaluation, their active presence in the classes was measured. The classes were held beyond the working hours of the faculty by coordination between the instructors and students.

Due to the mandatory attendance in conventional and online classes, the official attendance of students in both classes was almost the same. As mentioned, students' active participation and level of activity are vital for the learning process. Therefore, the project managers considered the participation of students in online classes as an indicator of their active presence in such classes. The students' answers to the questions posed by the professors in class and the students' scientific questions were considered the students' active participation. The classes were recorded to estimate the ratio of students with active participation to the total number of students present, which was estimated at 30%–64%, depending on the teaching method used, the number of questions and answers, and students' engagement in scientific discussions. It should be noted that many students had more than one scientific activity and active participation in class, which was not calculated in the students' participation percentage.

#### *Professors' opinions on the impact of online classes on student attendance*

After holding the online classes, a meeting was held with the project managers and instructors involved to collect the comments and suggestions of the professors. After expressing their desire to hold these classes again, the professors evaluated the active participation of students in the classes as desirable and mentioned the role of online classes in increasing students' active participation. The professors mentioned positive aspects of this project, including the possibility of roll call (which

means physical presence and not necessarily active participation) in online classes like conventional classes, the possibility of re-using the classes by students since they were allowed to record the class, the impossibility of disturbing the class peace by students who are reluctant to benefit from the class, resulting in more active participation of interested students, and creating a useful environment for students with lower self-esteem who were not active in conventional classes.

### *Students' feedback assessment about attending online classes*

To collect the opinions of the students, a reliable and valid questionnaire was designed, and with the cooperation of the University Development Office and using the e-poll system, the students completed it through the web. Table 4 presents the results of this questionnaire. The results showed that the majority of the students were satisfied with attending online classes and the learning process in these classes. The students were eager to continue taking part in such classes, and the vast majority (80%) were reluctant to attend conventional classes with roll calls. The majority of the students (about 90%) considered recording the classroom content an essential advantage for online classes.

In another survey conducted as a focus group of 30 students participating in online classes, the students were asked if their active participation in online classes

was more effective compared to conventional classes. This survey results showed that 73.4% of students believed that active participation and attention to educational content in online classes were better than those of conventional classes. Some students believed that the comfort of online classes, the lack of noise from other students, and the focus on the computer screen and the professor's lecture were the most important factors. However, 16.6% believed that their attention was better in conventional classes, and 10% considered conventional and online classes the same from this perspective. Most of the students' criticisms of online classes were related to unconventional hours, stating that they were interested in attending classes during the regular hours, if possible. Students also found attending online classes easier than attending conventional classes due to the lack of commuting.

After reviewing the evaluations (reviewing by the project executives of the professors' and students' opinions), the active participation of students in online classes was deemed as effective, and according to the surveys, the active participation of students and their desire to attend these classes were higher compared to conventional classes.

## Discussion

Students' absenteeism is a significant concern for higher and academic education around the world.

**Table 4: Student survey results about online classes based on the questionnaire**

Question	Strongly Agree	Moderate	Disagree	Strongly Disagree	The percentage of those who agree	The percentage of those who disagree
Online classes could be a good alternative to traditional education	52	24	14	5	76	10
I feel that nothing could replace the presence of a professor in the classroom	10	16	21	37	26	53
If the online class is held correctly, this method is not different from the conventional method	40	10	15	30	50	35
I like to learn many lessons online	38	24	28	5	62	10
I enjoy online communication with the professor	30	25	25	20	55	20
Mandatory class attendance is better for my educational planning	0	5	15	50	5	80
I suggest continuing the online class method, along with the conventional method	28	43	19	0	71	10
Repeating the parts of the class that I did not understand using the recorded content is an important advantage of the online class	55	30	10	0	85	5
I believe recording the class and its ease of use, whenever I want to, is an essential advantage of the online class method	62	28	5	5	90	5
I think it is essential to expand online classes for better learning	33	48	9	5	81	10
My motivation for studying in an online class is lower compared to that in the conventional class	5	5	10	50	10	80
I understand the professor's teaching in conventional classes better than that in online classes	9	10	19	38	16	62

One of the most important reasons for a decrease in students' attendance classes in recent years might be their generational differences choices. As a limitation of our study, we did not try out the survey on a test group. A test group could let us know if our instructions are clear and if our questions make sense. Therefore, we did not revise the survey on the basis of our test group feedback.

Various studies have suggested many reasons for this. Magobolo and Dube<sup>[9]</sup> considered the reasons for the absence of nursing students as illness and not receiving payment for working in their study. Desalegn *et al.*<sup>[12]</sup> reported that the main reasons in the questionnaire completed by students for missing classes were preparing for an examination, an unfavorable class schedule, a lack of interest in the subject, a lack of interest in the teaching style, and ease of understanding the subject without guidance. They believed that not only the behavior of the students but also the characteristics of the teachers and the teaching methods to be effective in the absenteeism of the students from the lectures. In the present study too, the teaching method was considered as the main reason for missing classes due to generational preferences and was further reviewed. Abdelrahman and Abdelkader<sup>[8]</sup> showed that nursing students too attributed the main reasons for their absenteeism to educational factors, including a lack of staff in the clinical field and a lack of understanding of the lecture's content. The present study considered another factor to be more critical by considering the empowerment of the professors. A study by Bati *et al.*<sup>[13]</sup> on dental, medical, pharmaceutical, and nursing students showed that the factors that prevent students from attending class lectures are mainly individual (insomnia, lack of health, and the like) and the inefficiency of lecturing in a crowded hall. It is essential to improve the coaching and mentoring system by considering individual and external factors that have a critical impact on students' attendance. In the present study, the educational aspect was the main reason for absenteeism, and factors such as fatigue and poor classroom conditions were the other less important reasons. Rawlani *et al.*<sup>[14]</sup> stated that the main reason for not attending lectures is the lack of motivation of students to learn. They said that new teaching styles need to be looked into. As in our study, a new way of teaching online was proposed as a solution.

So far, various solutions have been suggested to solve the problem of students' absenteeism from class lectures. Sharmin *et al.*<sup>[1]</sup> showed that the use of strict roll call policies might affect students' attendance, and medical schools should reinforce this policy to improve their students' academic performance. However, according to the present study, it is important to note that this policy does not lead to active student attendance and

probably does not improve their academic performance. Al-Shammari<sup>[15]</sup> showed that using management techniques and class attendance rules (such as assigning a portion of the total score, extra points to attend classes, and more assignments, or deducing grades for not attending or attending classes with delay) significantly increased the attendance of higher education students and on-time arrival at the class. These improvements were significantly correlated with students' academic achievement. Thekedam and Kottaram<sup>[16]</sup> too reported that, to eradicate the problem of absenteeism, efforts must be made to address all factors in broader social, economic, and political environments, rather than focusing merely on students or faculties. They cited early interventions and preventative measures, positive reinforcement, and rewards for students who improved their attendance as practical factors in reducing chronic absenteeism and advised establishing programs for staff development, workshops, conferences, and symposiums to improve the professors' performance by the faculty management. Professors who have tried interactive and innovative lecturing methods, by giving better and more engaging lectures, could change students' attitudes and provide an environment that can reduce student absenteeism.

In the present study, the most important reason for the absence of dental students was the generational characteristics and subsequent changes in students' learning passion and preferences. In the definition of generations, individuals born in 1995 or later are referred to as Generation Z.<sup>[17]</sup> These individuals are indeed our current students. Over the years, this generation has been given various names, such as Generation Z, Internet Generation, and iGeneration, because they are mainly characterized by computer addiction as well as addiction to any other type of technology. What sets this generation apart from previous generations is that they are the "most electronic generation" in history and have grown up with technology. They are growing with the Internet, cell phones, laptops, iPods, tablets, and other electronic devices that have become part of their daily lives.<sup>[18]</sup> Generation Z prefers nontraditional teaching methods and likes to use logic-based and practical learning approaches.<sup>[17]</sup> Instead of taking notes, Generation Z students rely on computer records, are more inclined to ask questions online, and do not like to wait for answers. Instead, they prefer immediate information and communication. Generation Z students do now fill our classrooms and expect an educational environment in which they can interact in the same way they do in their virtual world. This means the demand for immediate information, visual forms of learning, and the replacement of "communication" with "interaction."<sup>[19]</sup> Active learning classes, such as flipped classrooms or problem-based learning methods, are more popular with this younger generation.<sup>[20]</sup>

In this study, holding online classes was proposed and implemented to solve the problem of student absenteeism. The results showed that the ratio of the students with active participation in the online class to the total number of participating students varied from 30% to 64%. Besides, the results of a survey of students' opinions showed that the majority of the students were satisfied with attending online classes and the quality of learning in these classes. Similar results have been achieved in other studies on dental students.<sup>[21-25]</sup> Changiz *et al.*<sup>[26]</sup> observed that students showed good readiness in all components of e-learning. Hence, the instructional designer can trust the e-learning strategies and build the course based on them. Dalmolin *et al.*<sup>[17]</sup> showed that in addition to the positive attitude of dental students toward e-learning, the use of websites as a supportive tool for learning was significantly different between different age groups. Younger students believed that websites were a better tool to help them learn compared to older students.

Rensburg carried out a systematic review of the data from 36 articles on online classes and reported results consistent with the present study. It can be concluded from the similar results of these two studies that online teaching and learning has positive results, such as increasing student satisfaction and motivation, improving problem-solving skills, increasing flexibility for learning, and increasing student participation for undergraduate health sciences educators and students. Rensburg<sup>[27]</sup> reported that unstable Internet connectivity, inadequate Internet access, technological problems, and concerns about useful and fast feedback to students as challenges to online teaching and learning. Ochs<sup>[28]</sup> also showed that the online classes were more efficient in some teaching areas compared to classroom instruction; therefore, determining the teaching topics in online class planning is one of the most critical topics in organizing and designing these classes. Kwok *et al.*<sup>[29]</sup> and Tse and Ellman<sup>[30]</sup> reported that a combination of online education with conventional class-based teaching might play an essential role in improving students' scientific knowledge and increasing their skills in clinical areas. A review by Tang *et al.*<sup>[31]</sup> showed that the integration of online lectures in undergraduate medical education is more acceptable by students and leads to improved knowledge and clinical skills. The results of the present study are consistent with many studies focusing on medical education.<sup>[32-39]</sup>

Fadol *et al.*<sup>[40]</sup> showed that both online and flipped classes were held better than the conventional classes, and flipped classes were held better than the online classes. Furthermore, students who had access to online content missed fewer classes and performed better. All these studies are consistent with the current study. However,

there are studies with different results, such as that by Fish and Snodgrass,<sup>[41]</sup> which advocated conventional education (face to face) of students. The reasons for this preference were reported to be motivation and discipline in conventional teaching and concerns about learning in online courses. The study suggested that taking a course in online classes and preparing for them could help students gain a realistic understanding of online classes and produce a positive impact. A meta-analysis in 2015 also found that students performed better in conventional classes. It considered that online classes were not affordable for institutions, and reported that the possibility for students to leave online courses and changes in existing technologies were the weak points of online classes.<sup>[42]</sup> Some of the problems in the present study were a lack of sufficient funding due to the impossibility of holding classes during the regular hours, a lack of sufficient experience of some professors in holding classes (which was solved with the help of the support system), and a lack of access to laptops for all the students (some students shared their laptops with classmates).

Finally, e-learning makes it possible for students to tailor the educational content to their individual learning styles with visual media, charts, digital content, interactive videos, or web-based interactions. This is facilitated by the use of mobile devices that provide easy access. Learning online could be an excellent option to help university professors teach future dentists. Teachers need to acknowledge that by introducing e-learning courses, they can encourage students to use online tools to educate and communicate with their professors and peers. Typically, teaching in dentistry relies more on visual techniques; therefore, students are more interested in visual transmission than text transmission.<sup>[17]</sup>

Undoubtedly, with the rapid advances in educational technologies and virtual teaching methods around the world, and with generational preferences of students, soon, the physical space of most universities will become centers merely for program coordination for educational courses. Theoretical classes will be held only with new and online methods. With the advances in online classroom software, a complete simulation of conventional classes will be possible virtually so that each individual will sit in a specific chair in the virtual classroom and will be trained. Clearly, at that time, having the skills to use these technologies and using new methods of virtual learning for professors will be an essential measure of excellence and success.

## Conclusion

The results showed that various factors, such as the empowerment of professors, evaluation system,



audiovisual equipment of the classes, educational curriculum, and class schedules, affect the attendance of students in the classroom. However, significant progress has been made in many of these factors over the past decade. Therefore, along with these factors, one of the most important reasons for the decrease in the attendance of students in recent years could be related to the change of generation and preferences of students. Since the new generation is more inclined to use educational technologies, in the present study, online classes were used as a solution to increase the active participation of students in the classrooms. The results showed that online classes are suitable from the perspective of professors and students and could significantly increase the participation of students in class lectures.

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### Conflicts of interest

There are no conflicts of interest.

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