ORIGINAL ARTICLE

## Medical Students' Attitudes and Learning Outcomes Regarding Virtual versus Traditional Teaching Methods in a General English Course

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**Background:** Virtual education methods are rapidly increasing as the most prevalent approaches to teaching and learning globally. This study investigated medical students' attitudes and learning outcomes regarding virtual versus traditional teaching methods in a general English course.

**Method:** This cross-sectional study was conducted at Mashhad University of Medical Sciences during 2022-2023. The sample (n = 107) consisted of all students enrolled in a general English course and selected through convenience sampling. Fifty percent of the English lessons were delivered virtually via Adobe Connect, the NAVID system, and, to a lesser extent, WhatsApp and Telegram App. The remaining lessons were presented in-person. Then, students completed an attitude questionnaire comparing virtual and traditional teaching methods. The collected data were analyzed using descriptive and inferential statistics with SPSS software V.21.

**Results:** The results showed the mean attitude score towards traditional and virtual education methods were 96.30 ± 11.11 and 96.66 ± 11.74, respectively. There was no significant difference in attitude scores between male and female students in both methods ($p < 0.05$). Similarly, there was no significant difference in English test scores between genders ($p = 0.59$). The Wilcoxon test indicated no significant difference between students' attitudes towards virtual and traditional education ($p = 0.52$). Additionally, no significant correlation was found between students' grades and their attitudes towards either of the teaching methods ($p = 0.63$).

**Conclusion:** The findings suggest that students' attitudes towards virtual education were slightly more favorable than towards traditional education although the difference was not statistically significant. Therefore, virtual education can be considered a viable option for teaching theoretical courses.

**Keywords:** Attitude, Teaching English, Medical students, Traditional education, Virtual education

## مواقف طلاب الطب ونتائج التعلم المتعلقة بطرق التدريس الافتراضية مقابل التقليدية في مقرر اللغة الإنجليزية العامة

**الخلفية:** تتزايد أساليب التعليم الافتراضي بسرعة باعتبارها أكثر المناهج انتشاراً للتدريس والتعلم على مستوى العالم. استقصت هذه الدراسة مواقف طلاب الطب ونتائج تعلمهم فيما يتعلق بطرق التدريس الافتراضية مقابل التقليدية في مقرر اللغة الإنجليزية العامة.

**الطريقة:** أجريت هذه الدراسة المستعرضة في جامعة مشهد للعلوم الطبية خلال العام ٢٠٢٣-٢٠٢٢. تكونت العينة (n=١٠٧) من جميع الطلاب المسجلين في مقرر اللغة الإنجليزية العامة والذين تم اختيارهم عبر العينة الميسرة. تم تقديم خمسين بالمائة من دروس اللغة الإنجليزية افتراضياً عبر Adobe Connect، و نظام "نويد" (NAVID)، وبدرجة أقل عبر تطبيقي واتساب وتيليجرام. أما الدروس المتبقية فقد قُدمت حضورياً. بعد ذلك، أكمل الطلاب استبياناً للمواقف يقارن بين طرق التدريس الافتراضية والتقليدية. حُللت البيانات التي تم جمعها باستخدام الإحصاء الوصفي والاستدلالي عبر برنامج SPSS الإصدار ٢١.

**النتائج:** أظهرت النتائج أن متوسط درجة الموقف تجاه أساليب التعليم التقليدي والافتراضي كانت ٩٦.٣٠ ± ١١.١١ و ٩٦.٦٦ ± ١١.٧٤ على التوالي. لم يكن هناك فرق معنوي في درجات الموقف بين الطلاب الذكور والإناث في كلا الطريقتين ($p<0.05$). وبالمثل، لم يكن هناك فرق معنوي في درجات اختبار اللغة الإنجليزية بين الجنسين ($p=0.59$). أشار اختبار "ويلكوكسون" إلى عدم وجود فرق معنوي بين مواقف الطلاب تجاه التعليم الافتراضي والتقليدي ($p=0.52$). بالإضافة إلى ذلك، لم يتم العثور على ارتباط معنوي بين درجات الطلاب ومواقفهم تجاه أي من طريقتي التدريس ($p=0.63$).

**الخلاصة:** تشير النتائج إلى أن مواقف الطلاب تجاه التعليم الافتراضي كانت أكثر إيجابية قليلاً منها تجاه التعليم التقليدي، على الرغم من أن الفرق لم يكن دالاً إحصائياً. لذلك، يمكن اعتبار التعليم الافتراضي خياراً قابلاً للتطبيق لتدريس المقررات النظرية.

**الكلمات المفتاحية:** الموقف؛ تدريس اللغة الإنجليزية؛ طلاب الطب؛ التعليم التقليدي؛ التعليم الافتراضي

## نگرش دانشجویان پزشکی و پیامدهای یادگیری آن ها در ارتباط با روش‌های تدریس مجازی و سنتی در درس زبان انگلیسی عمومی

**زمینه و هدف:** استفاده از آموزش مجازی به عنوان رایج‌ترین روش آموزشی در حال افزایش می باشد. مطالعه حاضر به بررسی نگرش دانشجویان پزشکی و یادگیری آنها با روش‌های تدریس مجازی و سنتی در درس زبان انگلیسی پرداخت.

**روش:** این مطالعه مقطعی در دانشگاه علوم پزشکی مشهد در سال تحصیلی ۱۴۰۱-۱۴۰۲ انجام شد. نمونه مورد مطالعه دانشجویان پزشکی بودند که درس زبان انگلیسی عمومی را می گذراندند و از طریق نمونه گیری در دسترس انتخاب شدند(۱۰۷ = n). پنجاه درصد از درس زبان انگلیسی به صورت مجازی از طریق Adobe Connect، سامانه نوید، واتس اپ و تلگرام و پنجاه درصد دیگر درس بصورت حضوری ارائه شد. برای مقایسه نگرش دانشجویان نسبت به روش مجازی و حضوری، آنها پرسشنامه نگرش را تکمیل کردند. داده‌ها از طریق آمار توصیفی و استنباطی با نرم‌افزار SPSS تحلیل شدند.

**یافته‌ها:** میانگین نمره نگرش نسبت به روش‌های آموزش سنتی و مجازی به ترتیب (۱۱/۱۱ ± ۹۶/۳۰) و (۱۱/۷۴ ± ۹۶/۶۶) بود. تفاوت معناداری در نمرات نگرش دانشجویان دختر و پسر در هر دو روش وجود نداشت ($p < 0.05$). همچنین، تفاوت معناداری در نمرات آزمون زبان انگلیسی بین دو جنس مشاهده نشد (۰/۵۹ =p). آزمون ویلکاکسون نشان داد که تفاوت معناداری بین نگرش دانشجویان نسبت به آموزش مجازی و سنتی وجود ندارد (۰/۵۲ =p). بعلاوه، همبستگی معناداری بین نمرات دانشجویان و نگرش آنها نسبت به روش‌های تدریس مشاهده نشد (۰/۶۳ =p).

**نتیجه گیری:** نگرش دانشجویان نسبت به آموزش مجازی اندکی مطلوب‌تر از آموزش سنتی بوده است، هرچند این تفاوت از نظر آماری معنادار نبود. بنابراین، آموزش مجازی می‌تواند گزینه مناسبی برای آموزش دروس نظری در نظر گرفته شود.

**واژه های کلیدی:** نگرش، آموزش زبان انگلیسی، دانشجویان پزشکی، آموزش سنتی، آموزش مجازی

## جنرل انگلش کورس میں ورچوئل بمقابلہ روایتی تدریسی طریقوں کے بارے میں میڈیکل طلبا کے رویے اور سیکھنے کے نتائج

**پس منظر:** عالمی سطح پر ورچوئل تعلیمی طریقے تدریس اور سیکھنے کے سب سے زیادہ رائج طریقوں کے طور پر تیزی سے بڑھ رہے ہیں۔ اس مطالعے میں جنرل انگلش کورس میں ورچوئل بمقابلہ روایتی تدریسی طریقوں کے حوالے سے میڈیکل طلباء کے رویوں اور سیکھنے کے نتائج کی تحقیقات کی گئی ہے۔

**طریقہ:** یہ عرضی مطالعہ (cross-sectional study)۲۰۲۳-۲۰۲۲ کے دوران مشہد یونیورسٹی آف میڈیکل سائنسز میں کیا گیا۔ نمونے (n=107) میں جنرل انگلش کورس میں داخل تمام طلباء شامل تھے جن کا انتخاب 'سہولت کے نمونے' (convenience sampling) کے ذریعے کیا گیا۔ انگریزی کے پچاس فیصد اسباق Adobe Connect، نوید (NAVID) سسٹم، اور کسی حد تک واٹس ایپ اور ٹیلی گرام کے ذریعے ورچوئل طور پر پڑھائے گئے۔ باقی اسباق حضوری (in-person) طور پر پیش کیے گئے۔ اس کے بعد، طلباء نے ورچوئل اور روایتی تدریسی طریقوں کا موازنہ کرنے والا ایک رویہ جاتی سوالنامہ مکمل کیا۔ جمع شدہ ڈیٹا کا تجزیہ SPSS سافٹ ویئر (ورژن ۲۱) کے ذریعے وضاحتی اور استخراجی شماریات کا استعمال کرتے ہوئے کیا گیا۔

**نتائج:** نتائج سے پتہ چلا کہ روایتی اور ورچوئل تعلیمی طریقوں کے بارے میں اوسط رویہ بالترتیب ۹۶.۳۰ ± ۱۱.۱۱ اور ۹۶.۶۶ ± ۱۱.۷۴ رہا۔ دونوں طریقوں میں لڑکوں اور لڑکیوں کے رویوں کے اسکور میں کوئی نمایاں فرق نہیں تھا ($p<0.05$)۔ اسی طرح، جنس کی بنیاد پر انگریزی ٹیسٹ کے اسکور میں بھی کوئی نمایاں فرق نہیں پایا گیا ($p=0.59$)۔ 'ولکوکسن ٹیسٹ' (Wilcoxon test) نے ورچوئل اور روایتی تعلیم کے تئیں طلباء کے رویوں کے درمیان کسی نمایاں فرق کی نشاندہی نہیں کی ($p=0.52$)۔ مزید برآں، طلباء کے درجات اور تدریسی طریقوں کے بارے میں ان کے رویوں کے درمیان کوئی نمایاں تعلق نہیں پایا گیا ($p=0.63$)۔

**نتیجہ:** نتائج سے معلوم ہوتا ہے کہ ورچوئل تعلیم کی طرف طلباء کا رویہ روایتی تعلیم کے مقابلے میں قدرے بہتر تھا، اگرچہ یہ فرق شماریاتی طور پر نمایاں نہیں تھا۔ لہٰذا، نظریاتی (theoretical) کورسز پڑھانے کے لیے ورچوئل تعلیم کو ایک موزوں آپشن سمجھا جا سکتا ہے۔

**کلیدی الفاظ:** رویہ؛ انگریزی کی تدریس؛ میڈیکل طلباء؛ روایتی تعلیم؛ ورچوئل تعلیم

## INTRODUCTION

Throughout history, humans have continually sought to learn and acquire knowledge. With the development of technology, education has evolved alongside it, becoming increasingly integrated and enhanced by technological advancements. However, as the global population grows, societies often struggle to provide adequate education for all individuals. Therefore, strategies must be developed to make education accessible to everyone at the lowest possible cost.

Distance education, particularly with the aid of computers, offers a promising solution to this challenge and represents one of the undeniable advantages of modern educational methods. In Iran, virtual education via the Internet, often referred to as electronic education, is a relatively new field within the broader domain of distance education technology (1). This includes various innovative approaches such as electronic education, computer-based education, and web-based education (2).

Currently, the most well-known computer communication tools include email, bulletin boards, Internet-based platforms, audio and telephone conferences, and video conferences utilizing one or two-way video and audio through recorders, telephone cables, optical fibers, satellites, and microwave technology (3).

Electronic education offers several significant advantages over traditional education. One of the most important of these features concerns its flexibility, which eliminates the need for unnecessary and costly travel to attend educational courses. Additionally, e-learning presents other benefits, such as lower costs for course delivery and the use of existing software and tools. Learners have the freedom to set their own learning pace according to their individual needs, and most e-learning programs can be accessed on demand (4).

The learning speed in electronic education is significantly higher than in traditional education, leading to at least a 50% improvement in both learning efficiency and speed. Learners in these courses can bypass familiar materials and focus directly on new content. E-learning allows for communication with the audience that is independent of uniform messages and free from constraints of time and place. When content is presented through texts, images, sound, and movement, there is less need for taking notes with paper and pen, which reduces the demand for these materials. Furthermore, such multimedia programs are more engaging for learners.

In online universities, learning methods are given great importance, with a strong emphasis on research. The use of information and communication technology is crucial in these institutions, as it plays a vital role in transforming opportunities and national resources into wealth (5).

E-learning enhances learners' ability to retain information by utilizing various elements such as audio, visuals, short-term assessments, and interactive activities to reinforce targeted learning. Additionally, it is easy to monitor the educational progress of individuals and track their development (2).

In part of his book, William Horton highlights that virtual education has advantages even in internships. To fully benefit from these advantages, fundamental changes are necessary in the following areas: (6) Modifying the packaging and delivery of internship courses, Changing the individuals involved in the process, and Shifting attitudes towards internships.

Unlike other distance education methods, e-learning uniquely combines three traditional modes of education—visual, audio, and text—into a single, integrated experience. Another distinctive feature of this educational method, enabled by technological advancements, is its enhanced efficiency and the ability to reach audiences that are not confined to a specific region or country but are dispersed globally. Furthermore, as web-based education gradually becomes the standard for e-learning, the costs associated with publishing and distributing educational programs have significantly decreased.

E-learning also offers the opportunity for personalized tutoring, something that is not feasible with print media and can be prohibitively expensive in person. Additionally, e-learning allows students to set the pace of course progress according to their preferences and learning abilities. In this system, students with a higher level of knowledge can quickly move through simpler material, while those who need more time can spend additional effort on mastering the same content (3).

Among the disadvantages and limitations of virtual education, the primary concern is the potential drift away from human relationships towards a more isolated virtual world. This can lead to reduced face-to-face communication with teachers, which may cause anxiety in some learners. Additionally, the quality of current e-learning programs is not often appropriate. In addition, the insufficient infrastructure for virtual education, such as limited bandwidth, reduces the effectiveness of audio, video, and animated content, leading to significant time loss (2).

In both virtual and traditional educational methods, the teacher plays a crucial role. In traditional education, the teacher serves as the central and key figure, whereas in virtual education the teacher's role shifts to that of a facilitator. One of the most important benefits of this shift is the move from teacher-centered to student-centered learning. In virtual education, students take on more responsibility, managing their own learning process, including course selection, study hours,

evaluation, etc. (7). However, a significant drawback of virtual education is the subordination of emotional and supportive aspects, partly due to the absence of face-to-face interaction with teachers.

Traditional education at universities has usually been teacher-oriented, with students physically present in the classroom. Typically, the instructor delivers course material at a scheduled time, and students receive the information. The advantages of traditional, face-to-face education include direct interaction, practical experience, combining skills, and increased motivation. On the other hand, its disadvantages include time and place constraints, less flexibility, higher costs, limited access to resources, and exposure to social issues (8).

In general, the choice between virtual and traditional education depends on individual needs, personal circumstances, the type of educational material, and personal preferences. Both types of education have their own advantages and disadvantages, which should be carefully considered based on specific goals and conditions (9). Nowadays, the use of virtual and electronic education methods is increasing and has become one of the most widely adopted approaches in teaching and learning both in Iran and globally. Therefore, examining the attitudes and perceptions of learners regarding these educational methods is crucial for determining their continuation or discontinuation.

Objectives

This study aims to explore the following research questions:

1. What is the medical students' attitudes towards virtual method of teaching general English course?
2. What is the medical students' attitudes towards traditional method of teaching general English course?
3. What is the attitudes of medical students towards virtual education method in comparison to the traditional in teaching general English course?
4. How is the students' attitude towards virtual and traditional education method regarding their performance at the final English exam?

## METHODS

### Design and setting(s)

This cross-sectional study was conducted during the first half of the academic year 2022-2023 at the faculty of medicine, Mashhad University of Medical Sciences (MUMS), Mashhad, Iran, using traditional education methods in classroom settings and virtual education methods via Adobe Connect and the NAVID system (which operates under the university's Internet network).

### Participants and sampling

The study included 131 male and female medical students who enrolled in the faculty of medicine at Mashhad University of Medical Sciences (MUMS) in October 2022 and took the general English course for the semester. Exclusion criteria were as follows: incomplete responses to the attitude questionnaires (if less than 80% of questions were answered), failure to participate in the final exam, or withdrawal from the general English course. The sample selection method was census-based; therefore, there was no need to determine the sample size using statistical formulas. The participants were informed that their data would be used in coded forms without mentioning their names and that their information would remain confidential, ensuring their personal privacy.

### Tools/Instruments

1. The virtual education attitude questionnaire, comprising 34 items with a four-point Likert scale (completely disagree/disagree/agree/completely agree), validated for reliability and validity by Shourcheh et al. (10),
2. The traditional education attitude questionnaire, also consisting of 34 items with a four-point Likert scale (completely disagree/disagree/agree/completely agree), with its reliability and validity confirmed by Shourcheh et al. (10),
3. A midterm exam with 36 multiple-choice questions covering general vocabulary, specialized vocabulary, grammar, and reading comprehension, and
4. A final exam with 48 multiple-choice questions, also addressing general vocabulary, specialized vocabulary, grammar, and reading comprehension

### Data collection methods

With the start of the first academic semester of 2022-2023, all male and female students (n=131) enrolled in the general English course (3 credits) were included in the study. The 131 male and female medical students were divided into 4 groups of approximately 33 students each (31, 32, 33, and 35), with each group was assigned to a single teacher. Out of the total 24 sessions of the course (2 hours each, totaling 48 hours), 50% of the sessions (12 sessions) were conducted virtually, and 50% of the remaining sessions (12 sessions) were performed traditionally (face-to-face/in person) in class.

In the virtual education method, instruction was through Adobe Connect and the NAVID system. WhatsApp and Telegram were also used for coordinating with students and notifying them about virtual class schedules. In the virtual method, questions & answers, teaching, and roll calls were managed online via Adobe Connect. Notifications, assignment submissions, feedback, resource sharing, and testing were handled through the NAVID system. Following the completion of the course, students filled out an attitude questionnaire

regarding their experience with the method.

Fifty percent of the remaining sessions (12 sessions) were conducted in a traditional and face-to-face manner in the physical classroom environment at the faculty of medicine. In the traditional teaching method, lessons were delivered through lectures, interactive questions & answers, and problem-solving exercises. Following the twelfth session, students completed the attitude questionnaire on the method in person.

Upon completing each 12 sessions and filling out the above-mentioned attitude questionnaires on paper following each 12 sessions, the students participated in the midterm exam, and also took part in a paper-based English exam at the end of the semester.

**Data analysis**

The obtained data were analyzed using SPSS V.21 through descriptive and inferential statistics. Regarding the descriptive statistics, frequency, percentage, mean, and standard deviation (SD) were employed, and with regard to inferential statistics, Wilcoxon and sample paired t-test as well as correlation were used. The P-value was considered statistically significant at 0.05.

## RESULTS

Out of the 131 participants, 24 were excluded from the study due to incomplete questionnaire responses, failure to participate in the final exam, or withdrawal from the general English course. Consequently, the analyzed data covered 107 participants, comprising 58 male (54.2%) and 49 female (45.8%) students.

Significant results were obtained regarding the first and second research questions, which explored the attitudes of first-year medical students towards virtual and traditional teaching methods in the general English course. These findings are presented in Tables 1 and 2, showing frequency and percentage for each of the questionnaire items. The questionnaires addressed 7 components: success (questions 1 to 4), negative affect (questions 5 to 9), course instructor (questions 10 to 14), self-motivation in learning (questions 15 to 19), opportunity (questions 20 to 24), solidarity or social cohesion (questions 25 to 29), and overall satisfaction (questions 30 to 34).

In the virtual education method, surveys showed that in the success component, 89.7% of the students could handle the tasks (table 1). In the negative emotion component, only 26.1% did not feel good. In the course instructor component, 97.2 percent felt that the course instructor respected them. Also, in the component of self-motivation in learning, 81.3% liked that they were more active during the course. As for the component of opportunity, 84.2% believed that the things they learned prepared them for success at work. Regarding the component of solidarity or social cohesion, 88.8% had friendly interactions with learners. Lastly, in the overall satisfaction component, 82.2 percent really liked it.

In the traditional education method, regarding the component of success, 88.8% percent of the students could handle the tasks (table 2). In the negative emotion component, only 14% felt lonely, and 43.9% felt worried. In the of component course instructor, 99% felt that the course instructor respected them. Regarding the self-motivation in learning component, 87.9% liked that they were more active during the course. As for the component of opportunity, 87% believed that what they learned prepared them for success at work. Also, in the component of social cohesion or solidarity, 97.2% had friendly interactions with the learners. Finally, in the overall satisfaction component, 83.2 percent really liked it.

Further, to clearly show the students' attitudes towards these two educational methods (the traditional and virtual teaching methods), the results for each component of the virtual and traditional methods are presented in Figure 1.

Regarding the third research question, the students' attitude mean scores in the components of success and negative affect were significantly higher in virtual education than those in traditional education ($p < 0.05$) (Table 3). In contrast, the mean of the social cohesion or solidarity in the traditional method was significantly higher than that in the virtual method ($p = 0.04$). The Wilcoxon test comparing students' attitudes towards virtual and traditional education indicated no significant difference between the two methods in this regard ($p = 0.52$).

In terms of the fourth research question, the performance scores of the medical students in the final general English exam were as follows: the lowest score was 7.25, and the highest was 19.75, with a mean of 14.77 and a standard deviation of 3.31. The average attitude score towards the traditional method was 96.00 ± 11.11, and the average attitude score towards the virtual method was 96.66 ± 11.74 (Table 4). Furthermore, no significant correlation was found between attitudes (in-person or virtual) and students' grades in the final exam (The correlation between the students' final exam score and attitudes towards traditional ($r = 0.047$; $p = 0.631$) and virtual ($r = -0.002$; $p = 0.985$) teaching methods).

Also, there was no significant difference between the gender regarding the students' attitudes towards virtual and traditional teaching methods ($p > 0.05$), there was also no significant difference in test scores between female and male students ($p = 0.59$), (Table 5).

## DISCUSSION

Overall, our study focused on comparing the attitudes of medical students towards virtual

**Table 1. Frequency and percentage of students' attitudes towards virtual education**

| Components | Items | Completely Disagree | Disagree | Agree | Strongly Agree |
|---|---|---|---|---|---|
| | | Frequency (%) | Frequency (%) | Frequency (%) | Frequency (%) |
| Success | 1. The class I attended was where I felt successful. | 4 (3.7) | 17 (15.9) | 65 (60.7) | 21 (19.6) |
| | 2. The class I attended was where I felt capable of managing my tasks. | 5 (4.7) | 18 (16.8) | 58 (54.2) | 26 (24.3) |
| | 3. The class I attended was one where I was successful in doing my homework. | 3 (2.8) | 9 (8.4) | 61 (57) | 34 (31.8) |
| | 4. The class I attended was a place where I could take care of my work. | 3 (2.8) | 8 (7.5) | 67 (62.6) | 29 (27.1) |
| Negative Affect | 5. The class I attended was a place where I did not feel good. | 31 (29) | 48 (44.9) | 18 (16.8) | 10 (9.3) |
| | 6. The class I attended was a place where I felt alone. | 25 (23.4) | 41 (38.3) | 31 (29) | 10 (9.3) |
| | 7. I felt anxious during the class. | 27 (25.2) | 36 (33.6) | 34 (8.31) | 10 (3.9) |
| | 8. I used to get angry during class. | 28 (26.2) | 44 (41.1) | 25 (23.4) | 10 (9.3) |
| | 9. I felt restless during the class. | 31 (29) | 44 (41.1) | 27 (25.2) | 5 (4.7) |
| Course Instructor | 10. The instructor was respectable to me. | 2 (1.9) | 1 (0.9) | 55 (51.4) | 49 (45.8) |
| | 11. The teacher helped me solve problems. | 1 (0.9) | 5 (4.7) | 62 (57.9) | 39 (36.4) |
| | 12. The course instructor paid attention to my messages. | 0 (0) | 3 (2.8) | 56 (52.3) | 48 (44.9) |
| | 13. The teacher was friendly with me. | 0 (0) | 3 (2.8) | 56 (52.3) | 48 (44.9) |
| | 14. The teacher helped me do my work in the best way. | 0 (0) | 1 (0.9) | 60 (56.1) | 46 (43) |
| Self-motivation in Learning | 15. I would have liked to be more active during the class. | 1 (0.9) | 19 (17.8) | 63 (58.9) | 24 (22.4) |
| | 16. Learning was like a hobby for me. | 7 (6.5) | 28 (26.2) | 48 (44.9) | 24 (22.4) |
| | 17. I enjoyed what I did during the class. | 10 (9.3) | 36 (33.6) | 46 (43) | 15 (14) |
| | 18. What I was doing was interesting. | 7 (6.5) | 25 (23.4) | 51 (47.7) | 24 (22.4) |
| | 19. I got excited doing the work related to this class. | 7 (6.5) | 26 (24.3) | 58 (54.2) | 16 (15) |
| Opportunity | 20. Everything I learned during this class will help me in the future. | 9 (8.4) | 33 (30.8) | 53 (49.5) | 12 (11.2) |
| | 21. During the class, everything I learned was useful. | 6 (5.6) | 26 (24.3) | 50 (46.7) | 25 (23.4) |
| | 22. I learned what I needed during the class. | 7 (6.5) | 24 (22.4) | 60 (56.1) | 16 (15) |
| | 23. The things I learned there prepared me for the next classes. | 7 (6.5) | 20 (18.7) | 55 (51.4) | 25 (23.4) |
| | 24. Doing homework during class has prepared me for success in my work. | 5 (4.7) | 12 (11.2) | 68 (63.6) | 22 (20.6) |
| Solidarity or Social Cohesion | 25. I felt good about the students. | 5 (4.7) | 25 (23.4) | 58 (54.2) | 19 (17.8) |
| | 26. I felt good with other learners. | 4 (3.7) | 13 (12.1) | 68 (63.6) | 22 (20.6) |
| | 27. The teacher and classmates trusted me. | 2 (1.9) | 11 (10.3) | 65 (60.7) | 29 (27.1) |
| | 28. I had friendly interactions with students. | 2 (1.9) | 10 (9.3) | 71 (66.4) | 24 (22.4) |
| | 29. I felt relaxed interacting with my classmates. | 6 (5.6) | 18 (16.8) | 59 (55.1) | 24 (22.4) |
| Overall Satisfaction | 30. I really liked it. | 4 (3.7) | 15 (14) | 59 (55.1) | 29 (27.1 ) |
| | 31. I would like to participate in similar classes again. | 7 (6.5) | 29 (27.1) | 47 (43.9) | 24 (22.4) |
| | 32. I felt happy during the class. | 13 (12.1) | 28 (26.2) | 43 (40.2) | 23 (21.5) |
| | 33. I felt somehow proud to be in class. | 10 (9.3) | 28 (26.2) | 51 (47.7) | 17 (15.9) |
| | 34. I enjoyed participating in this class. | 12 (11.2) | 53 (49.5) | 29 (27.1) | 13 (12.1) |

education versus traditional (face-to-face) education. The results indicated that students had a slightly higher attitude score towards virtual education compared to traditional and face-to-face methods. However, this difference was not statistically significant. This suggests that student satisfaction levels were relatively similar between the two methods, and the effectiveness of virtual education appeared comparable to that of face-to-face instruction. Additionally, no significant differences were observed when comparing the attitudes of male and female students towards

**Table 2. Frequency and percentage of students' attitudes towards traditional education**

| Components | Items | Completely Disagree | Disagree | Agree | Strongly Agree |
|---|---|---|---|---|---|
| | | Frequency (%) | Frequency (%) | Frequency (%) | Frequency (%) |
| Success | 1. The class I attended was where I felt successful. | 0 (0) | 23 (21.5) | 70 (65.4) | 14 (13.1) |
| | 2. The class I attended was where I felt capable of managing my tasks. | 0.25 (23.4) | 69 (64.5) | 13 (12.1) | 0 (0) |
| | 3. The class I attended was one where I was successful in doing my homework. | 1 (0.9) | 24 (22.4) | 62 (57.9) | 20 (18.7) |
| | 4. The class I attended was a place where I could take care of my work. | 1 (0.9) | 11 (10.3) | 80 (74.8) | 15 (14) |
| Negative Affect | 5. The class I attended was a place where I did not feel good. | 31 (29) | 53 (49.5) | 19 (17.8) | 4 (3.7) |
| | 6. The class I attended was a place where I felt alone. | 45 (42.1) | 47 (43.9) | 15 (14) | 0 (0) |
| | 7. I felt anxious during the class. | 24 (22.4) | 36 (33.6) | 35 (32.7) | 12 (11.2) |
| | 8. I used to get angry during class. | 37 (34.6) | 51 (47.7) | 14 (13.1) | 5 (4.7) |
| | 9. I felt restless during the class. | 31 (29) | 47 (43.9) | 23 (21.5) | 6 (5.6) |
| Course Instructor | 10. The instructor was respectable to me. | 0 (0) | 1 (0.9) | 53 (49.5) | 53 (49.5) |
| | 11. The teacher helped me solve problems. | 1 (0.9) | 5 (4.7) | 61 (57) | 40 (37.4) |
| | 12. The course instructor paid attention to my messages. | **0 (0)** | **6 (5.6)** | **65 (60.7)** | **36 (33.6)** |
| | 13. The teacher was friendly with me. | 0 (0) | 6 (5.6) | 65 (60.7) | 36 (33.6) |
| | 14. The teacher helped me do my work in the best way. | 1 (0.9) | 5 (4.7) | 58 (54.2) | 43 (40.2) |
| Self-motivation in Learning | 15. I would have liked to be more active during the class. | 1 (0.9) | 12 (11.2) | 66 (61.7) | 28 (26.2) |
| | 16. Learning was like a hobby for me. | 5 (4.7) | 32 (29.9) | 46 (43) | 24 (22.4) |
| | 17. I enjoyed what I did during the class. | 5 (4.7) | 36 (33.6) | 52 (48.6) | 14 (13.1) |
| | 18. What I was doing was interesting. | 2 (1.9) | 29 (27.1) | 58 (54.2) | 18 (16.8) |
| | 19. I got excited doing the work related to this class. | 3 (2.8) | 28 (26.2) | 58 (54.2) | 18 (16.8) |
| Opportunity | 20. Everything I learned during this class will help me in the future. | 5 (4.7) | 46 (43) | 45 (42.1) | 11 (10.3) |
| | 21. During the class, everything I learned was useful. | 6 (5.6) | 22 (20.6) | 55 (51.4) | 24 (22.4) |
| | 22. I learned what I needed during the class. | 3 (2.8) | 24 (22.4) | 61 (57) | 19 (17.8) |
| | 23. The things I learned there prepared me for the next classes. | 3 (2.8) | 18 (16.8) | 61 (57) | 25 (23.4) |
| | 24. Doing homework during class has prepared me for success in my work. | 2 (1.9) | 12 (11.2) | 71 (66.4) | 22 (20.6) |
| Solidarity or Social Cohesion | 25. I felt good about the students. | 5 (4.7) | 20 (18.7) | 69 (64.5) | 13 (12.1) |
| | 26. I felt good with other learners. | 2 (1.9) | 10 (3.9) | 69 (64.5) | 26 (24.3) |
| | 27. The teacher and classmates trusted me. | 1 (0.9) | 10 (3.9) | 69 (64.5) | 27 (25.2) |
| | 28. I had friendly interactions with students. | 0 (0) | 3 (2.8) | 77 (72) | 27 (25.2) |
| | 29. I felt relaxed interacting with my classmates. | 1 (0.9) | 9 (8.4) | 62 (57.9) | 35 (32.7) |
| Overall Satisfaction | 30. I really liked it. | 2 (1.9) | 16 (15) | 58 (54.2) | 31 (29) |
| | 31. I would like to participate in similar classes again. | 6 (5.6) | 21 (19.6) | 55 (51.4) | 25 (23.4) |
| | 32. I felt happy during the class. | 6 (5.6) | 32 (29.9) | 52 (48.6) | 17 (15.9) |
| | 33. I felt somehow proud to be in class. | 6 (5.6) | 38 (35.5) | 47 (43.9) | 16 (15) |
| | 34. I enjoyed participating in this class. | 12 (11.2) | 43 (40.2) | 37 (34.6) | 15 (14) |

virtual and traditional education. The test scores between the two methods also did not show a significant difference.

Interestingly, the findings revealed that students generally considered the virtual method more favorable for teaching English. In contrast, a study by Atwa et al., found that the average satisfaction score for students was higher with face-to-face and blended methods than with purely virtual methods (11). Moreover, their study showed that 53.1% of students preferred traditional or face-to-face instruction, while 60.6% of faculty members

**Table 3. Comparison of students' attitudes towards virtual and traditional education**

| Attributes | Traditional Education Mean (SD) | Virtual Education Mean (SD) | P value |
|---|---|---|---|
| Success | 11.76 (1.83) | 13.65 (3.6) | 0.035* |
| Negative affect | 9.92 (3.19) | 10.77 (3.57) | < 0.001** |
| Course instructor | 16.54 (2.43) | 16.57 (2.33) | 0.83* |
| Self-motivation in Learning | 13.82 (2.98) | 13.71 (3.14) | 0.98* |
| Opportunity | 14.71 (2.95) | 14.43 (3.20) | 0.49* |
| Solidarity or social cohesion | 15.80 (2.41) | 15.23 (2.72) | 0.04 * |
| Overall consent | 13.73 (3.50) | 13.65 (3.59) | 0.69 * |

Note: Wilcoxon test was used to compare the students' attitudes towards virtual and traditional education. Paired t-test sample was employed to compare the students' attitudes towards virtual and traditional education.

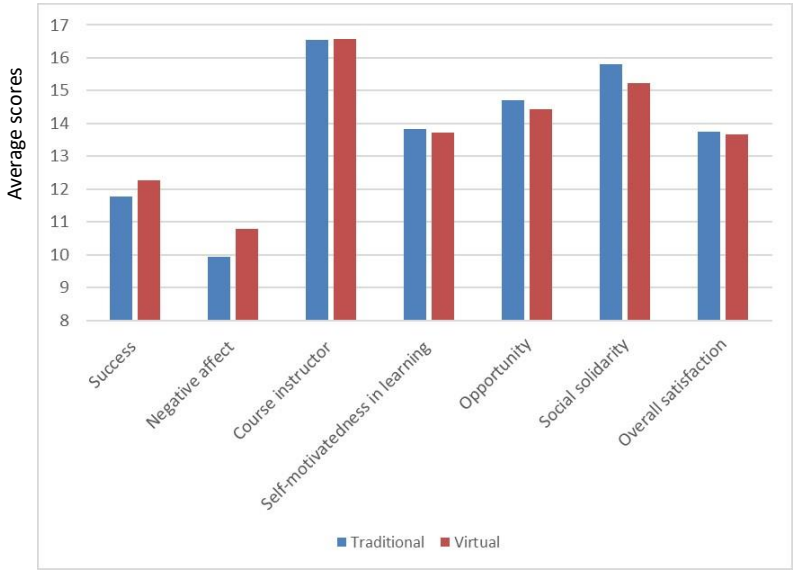


**Figure 1. Comparison of the average scores of the components of the attitude questionnaire for virtual and traditional methods**

**Table 4. The performance scores of the medical students in the final English exam**

| Attribute | Minimum | Maximum | Mean (SD) |
|---|---|---|---|
| The Final exam score | 7.25 | 19.75 | 14.77 (3.31) |
| Attitude towards the traditional method | 69.00 | 123.00 | 96.00 (11.11) |
| Attitude towards the virtual method | 66.00 | 121.00 | 96.66 (11.74) |

favored the blended approach (11). These differences may be attributable to the nature of the courses being taught. For instance, many courses in the general medical curriculum require direct interaction between the professor and students on the one hand and patients on the other. This interaction in turn necessitates bedside learning, which is less applicable in subjects like language teaching.

In another study by Toji et al., 51.8% of students expressed that while virtual instruction alone might not be sufficient, the teaching method could be enhanced by integrating virtual components with face-to-face learning (12). This contrasts with the results of our study, where only general English lessons were delivered virtually, without the inclusion of laboratory-based or clinical contents.

In our study, attitudes towards virtual education were more favorable compared to face-to-face education, particularly in the context of the general

**Table 5. The students' attitudes towards virtual and traditional teaching methods regarding gender and their score in the final exam**

| Attribute | Male | Female | p value |
|---|---|---|---|
| Attitude towards the traditional method | 96.50 (10.5.00*, 92.00**) | 95.00 (100.00, 87.00) | 0.14 |
| Attitude towards the virtual method | 7.27 ± 12.63 | 15.25 (17.5, 11.25) | 0.56 |
| The Final Exam Score | 15.50 (17.50*, 12.75**) | 15.25 (17.50, 11.25) | 0.59 |

*First quartile
**Third quartile

English course, which is primarily theoretical. This finding is in line with the results reported by Tayem et al., who showed that most students believed that while distance education was suitable for theoretical content, practical education was better suited to face-to-face instruction (9). Furthermore, their study indicated that there was no significant relationship between age and attitude towards the educational method, a result that is consistent with our findings (9). Additionally, as in the study by Tayem et al., we found no relationship between students' gender and their attitude towards the educational method.

Regarding performance outcomes, our research showed no significant difference in language test scores between the traditional and virtual methods. Similarly, consistent with our findings, Osman et al. reported that there was no significant difference in students' scores when comparing face-to-face and virtual methods (13).

However, it is worth noting that Shourcheh et al. found that, on average, grades were significantly higher in face-to-face settings compared to those in virtual ones. The conclusion drawn from their study was that the higher test scores in face-to-face education likely reflect the synergistic role of both the professor and the student in the learning process (10).

In our study, while attitudes towards the non-attendance (virtual) method were generally more favorable than the attendance (face-to-face) method, the difference between these two methods was not statistically significant. This contrasts with the findings of Elnour et al., who reported that students' attitudes towards the non-attendance (virtual) method were significantly better than those towards the attendance (traditional) method (14).

Overall, the importance of virtual education and the growing student preference for this method cannot be overlooked. However, it is crucial to recognize that virtual education requires specific infrastructure and strategies to maximize interaction between students and professors. The value of face-to-face education becomes particularly apparent when implementing practical education via an online approach, which necessitates extensive research and careful consideration. Nevertheless, virtual education could be effectively employed for theoretical courses at the very least (15).

The findings of our study offer insights on two levels. Firstly, based on the results, the current virtual teaching method can be adopted for teaching theoretical courses to medical students. Secondly, in terms of research contributions, our study adds to the existing literature and provides a methodological framework that can serve as a model for future studies in this area.

In summary, our study assessed medical students' attitudes towards virtual education compared to traditional face-to-face education. The results indicated that while students' attitudes towards virtual education were more favorable, this difference was not statistically significant. This observation suggests that student satisfaction levels between these two methods are comparable, and the effectiveness of virtual education is on a par with face-to-face education. No significant differences were observed in terms of gender or test scores between the two methods.

One notable limitation of the current study is the withdrawal of some of the students between semesters due to COVID-19 pandemic, which, to some extent, reduced the study sample size. Also, the sample was only selected from medical students taking a general English course at Mashhad University of Medical Sciences, so the findings should be generalized cautiously to other medical students at other universities. Nevertheless, our study's strength lies in its investigation of the impact of distance (virtual) education on teaching general English to medical students, a relatively underexplored area.

## CONCLUSION

Our findings revealed that, from the students' perspective, both traditional and virtual teaching methods are similarly effective, with virtual education potentially offering some more advantages. The findings primarily suggest that the virtual teaching method can be recommended as an effective approach for instructing theoretical courses to medical students, and by addressing the research gaps identified in this study, our methodology can serve as a model for future research. Future research should also address this gap by examining both theoretical and practical courses for medical students. Additionally, it would be beneficial to gather both students and professors' perspectives to fully understand the educational dynamics. Finally, given that our study focused

solely on a general English course, it may be interesting to conduct further research in other theoretical and practical courses in this context.

**Ethical Considerations:**

Ethical issues, including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc., have been completely observed by the authors. This study was conducted with ethical approval from the Ethics Committee of Mashhad University of Medical Sciences under Number IR.MUMS.REC.1401.256 on August 5, 2022.

## Declaration:

We used Grammarly for editing the manuscript to some extent.


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**Conflict of Interest:** The authors declare that there is no conflict of interests.


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