



ORIGINAL ARTICLE

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## Comparison of online, face-to-face and video-based teaching methods in anatomy education of medical faculty students

Muhammed Furkan Arpacı<sup>1</sup>, Gokce Bagci Uzun<sup>1</sup>, Mine Argali Deniz<sup>2</sup>, Hidir Pekmez<sup>1</sup>

<sup>1</sup>Malatya Turgut Özal University, Department of Anatomy, Malatya, Türkiye

<sup>2</sup>Süleyman Demirel University Research and Application Hospital, Department of Physical Therapy and Rehabilitation, Isparta, Türkiye

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### Abstract

There are many opinions on the effectiveness of the methods used in anatomy education. The aim of the study is to determine the superiority of online, video-based, and face-to-face education methods over each other. A total of 80 students, 41 female, and 39 male, participated at Malatya Turgut Özal University Faculty of Medicine to study. A questionnaire consisting of 20 questions, seven questions questioning demographic information and internet activity, and 13 queries about anatomy education was applied by online submission. The students consider that video-recorded education is effective in terms of time management with %75, three-dimensional digital resources are effective with 47.5%, more concentrated in face-to-face education than online education with 48.8%, face-to-face education is sufficient in professionalism in medical applications with 58.8%. The students stated that both face-to-face and video-recorded education were effective at a high rate, with 73.8%. In addition, anatomy lectures should be based on theory and practice, and face-to-face&video-recorded education to be together with practical education 70%. The correlation results demonstrate that the benefit of teaching method, concentration, and benefit on professionalism have the highest level of correlation with other educational landmarks. Face to face method is effective in concentration and community, and the video-recorded education method is effective in time management in anatomy education. Therefore both face-to-face and video-based education called the hybrid education method, is effective in anatomy education.

**Keywords:** Anatomy, distance anatomy education, medicine education, online anatomy education

### Introduction

Human anatomy is the oldest medical science that examines the typical structure of the human body, organs, organ locations, and the relationship between them [1]. Anatomy is one of the first areas encountered in medical student education, the basis for medical terminology and clinic [2]. In our country, traditional anatomy education is routinely given face-to-face, theoretically and practically. In practical training, materials such as cadavers and models are used together with theoretical lessons, and these techniques are important for students to reinforce the subject

[3,4]. The rapidly implemented education type, during the pandemic period which is called distance education, has presented advantages and disadvantages. Subsequently the post-pandemic period, routine traditional anatomy education was continued [5]. After these periods, the together application of some lessons opinion was emerged. Therefore, the view of medical student's about the superiority of these methods were needed.

Evaluating the opinion and contribution of the medical student is priorly essential in the topic of education methods for updating the education model in the future. Therefore, the student's

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**Corresponding Author:** Muhammed Furkan Arpacı, Malatya Turgut Özal University, Department of Anatomy, Malatya, Türkiye  
Email: [furkan.arpaci@ozal.edu.tr](mailto:furkan.arpaci@ozal.edu.tr)

feedback is necessary to increase the quality of education and to develop education systems with new regulations in the changing developing world [6]. In this context, the aim of our study is to investigate the advantages of online, video-based, and face-to-face education, to determine the effectiveness of hybrid education, which will support face-to-face education in the future, and to form an opinion about this education.

Materials and Methods

Our study was carried out with the prospective survey method on students studying in Malatya Turgut Özal University Faculty of Medicine term 2, between 01.05.2022-01.06.2022. Students who gave incomplete answers to the questions and refused to participate were excluded from the study. The study was conducted on a total of 80 volunteer students, 41 females, and 39 males.

Ethics committee approval was obtained from Malatya Turgut Özal University Non-Invasive Clinical Research Ethics Committee before the study (2022/93). A total of 20 questions, consisting of 7 questions (Table 1) questioning "the demographic information and internet activity of the participants" and 13 questions consisting of the "opinion form about the anatomy lesson" (Table 2), were applied to the volunteer participants in online platform with the google survey. In order to ensure the reliability of the feedback in the data collected online and for the

students to express their opinions freely without being pressured, they were asked not to write their names, surnames, and student numbers on the questionnaire.

Statistical analysis

In the study, the sample size was determined to be at least 75 with a 0.48 effect size, 0.05 margin of error, 0.95 confidence level, and 0.95 universe representation power, using the G\*power 3.1 program [7]. Data were analyzed and interpreted in SPSS 22.5 windows version. Values of the variables were given as a number, percentage, mean, standard deviation, and median. Kolmogorov-Smirnov and Shapiro-Wilk test for normal distribution, chi-square analysis was used for comparisons between data. In the analysis of categorical data, cross tables were created, and chi-square analysis was applied. P<0.05 was evaluated as statistically significant in the tests.

Results

The questions were asked under two headings to the participants and the results were evaluated.

**1. Evaluation of internet activity with demographic information of the students participating in the survey:** The questions and answers in the "Demographical information and internet activity of the participants" participating in the survey are shown in Table 1 as numbers and percentages.

Table 1. Demographical information and internet activity of the participants

| Variable                                                                                            | Group                                                                                      | Number | Percentage |
|-----------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|--------|------------|
| 1.Age                                                                                               | 19                                                                                         | 12     | 15.0       |
|                                                                                                     | 20                                                                                         | 32     | 40.0       |
|                                                                                                     | 21                                                                                         | 22     | 27.5       |
|                                                                                                     | 22                                                                                         | 14     | 17.5       |
| 2. Gender                                                                                           | Male                                                                                       | 41     | 51.2       |
|                                                                                                     | Female                                                                                     | 39     | 48.8       |
| 3. Did you voluntarily choose the department you have educated?                                     | Yes                                                                                        | 68     | 85.0       |
|                                                                                                     | No                                                                                         | 12     | 15.0       |
| 4. What age did you start using the internet?                                                       | Preschool                                                                                  | 5      | 6.3        |
|                                                                                                     | Primary school                                                                             | 28     | 35.0       |
|                                                                                                     | Middle school                                                                              | 31     | 38.8       |
|                                                                                                     | High school                                                                                | 16     | 20.0       |
| 5. How many hours a day do you spend for educational internet usage?                                | 0-2 hours                                                                                  | 46     | 57.5       |
|                                                                                                     | 2-3 hours                                                                                  | 20     | 25.0       |
|                                                                                                     | 3-4 hours                                                                                  | 10     | 12.5       |
|                                                                                                     | 4-6 hours                                                                                  | 2      | 2.5        |
|                                                                                                     | 6 hours and over                                                                           | 2      | 2.5        |
| 6. How many hours a day do you spend for entertainment internet usage?                              | 0-2 hours                                                                                  | 19     | 23.8       |
|                                                                                                     | 2-3 hours                                                                                  | 22     | 27.5       |
|                                                                                                     | 3-4 hours                                                                                  | 17     | 21.3       |
|                                                                                                     | 4-6 hours                                                                                  | 13     | 16.3       |
|                                                                                                     | 6 hours and over                                                                           | 9      | 11.3       |
| 7. Have you ever faced any difficulties in terms of internet connection during the online training? | I had problems with internet connection when I was in rural settlements.                   | 17     | 21.3       |
|                                                                                                     | I didn't have any problems with internet connection, since I'm usually in the city center. | 63     | 78.8       |

**2. Evaluation of the students opinions about the anatomy course:** The questions, including "Students' views on anatomy course" of the students participating in the survey and the numbers with percentage, has shown in Table 2, and the correlations according to chi-square analysis has shown in Table 3.

According to the 1st question; "Is the course you spend the most time in online medical education?" The students answered "yes" with 72.5% and "no" with 27.5%. According to the chi-square analysis, there was no statistically significant relationship between this question with the other questions ( $p<0.05$ ).

According to the 2nd question; "Do you think that practical application in anatomy education is less necessary than other laboratory-based courses?" The students answered "yes" with 27.5% and "no" with 72.5%. According to the chi-square analysis, we found a statistically significant relationship in the evaluation of the 5th question (benefit of teaching theoretical) and the 6th question (time management) ( $p=0.012$ ,  $p=0.016$ ).

According to the 3rd question; "Is the instructor who teaches online education important to you?" The students answered "yes" with 98.8% and "no" with 1.3%. According to the chi-

square analysis, there was no statistically significant relationship between this questioning of the students and the other questions ( $p<0.05$ ).

According to the 4th question; "Effectiveness of the teaching method of an anatomy lesson?" The students found that both face-to-face and video-recorded education were effective at a high rate (73.8%). In contrast, only video-recorded education (10%), only face-to-face education (6.3%) and face-to-face&online education (5%) are effective at low rates. The mentioned questioning, has a statistically significant relationship with the 5th question, (anatomy practical necessity) ( $p=0.001$ ), the 6th question (time management) ( $p<0.001$ ), and the 12th question (benefit of professional) ( $p<0.001$ ).

According to the 5th question; "Inquiry on the benefits of teaching methods in the theoretical anatomy education method?" 48.8% of the students found the face-to-face method more beneficial than other methods, while 42.5% found the video-recorded education more beneficial than face-to-face education. In contrast, students stated that they found online education more beneficial than face-to-face education at a low rate (8.8%).

**Table 2.** The opinions of the students about the anatomy course

| Variable                                                                                                                                 | Group                                                                                                                        | Number | Percentage |
|------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|--------|------------|
| <b>1. Is the Anatomy course that you spend the most time in online medical education?</b>                                                | Yes                                                                                                                          | 58     | 72.5       |
|                                                                                                                                          | No                                                                                                                           | 22     | 27.5       |
| <b>2. Do you think that practical application in anatomy education is less necessary than other laboratory-based courses?</b>            | Yes                                                                                                                          | 22     | 27.5       |
|                                                                                                                                          | No                                                                                                                           | 58     | 72.5       |
| <b>3. Is the instructor on online education important for you?</b>                                                                       | Yes                                                                                                                          | 79     | 98.8       |
|                                                                                                                                          | No                                                                                                                           | 1      | 1.3        |
| <b>4. How would you evaluate the effectiveness of the teaching method of the anatomy course?</b>                                         | I find it productive to listen to online anatomy lessons "Online"                                                            | 4      | 5.0        |
|                                                                                                                                          | I find it productive to listen to anatomy lessons with video-recorded training.                                              | 8      | 10.0       |
|                                                                                                                                          | I find it productive to listen to anatomy lessons that are only received "Face to Face".                                     | 5      | 6.3        |
|                                                                                                                                          | I find it productive to listen to both "Face-to-face" and "Video-recorded training" lessons.                                 | 59     | 73.8       |
|                                                                                                                                          | I find it productive to listen to both "Face to Face" and "Online" anatomy lessons.                                          | 4      | 5.0        |
| <b>5. Please tick one of the following options closest to you according to the subject of utility of the teaching methods?</b>           | Conducting theoretical anatomy lessons with "Video-recorded education" may be more beneficial than "face-to-face" education. | 34     | 42.5       |
|                                                                                                                                          | Conducting theoretical anatomy lessons "Online" may be more beneficial than "face-to-face" training.                         | 7      | 8.8        |
|                                                                                                                                          | Conducting theoretical anatomy lessons face-to-face can be more beneficial than other types of education.                    | 39     | 48.8       |
| <b>6. Please tick the option closest to you when you evaluate the Anatomy course in terms of time management from the options below.</b> | Conducting theoretical anatomy lessons with "Video recorded training" can be beneficial in terms of time management.         | 60     | 75.0       |
|                                                                                                                                          | Conducting theoretical anatomy lessons with "Online" can be beneficial in terms of time management.                          | 8      | 10.0       |
|                                                                                                                                          | Conducting theoretical anatomy lessons with "Face to face" can be beneficial in terms of time management.                    | 12     | 15.0       |

**Table 2.** The opinions of the students about the anatomy course

|                                                                                                                                                                                 |                                                                                                                                                              |    |      |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|----|------|
| <b>7. Please tick the option closest to you when you evaluate the anatomy education type in terms of the use of anatomy resources from the options below.</b>                   | In "face-to-face" education, I had to make more use of all the anatomy-related resources available on the Web.                                               | 17 | 21.3 |
|                                                                                                                                                                                 | In "online" education, I had to make more use of all the anatomy-related resources available on the Web.                                                     | 17 | 21.3 |
|                                                                                                                                                                                 | In "video recorded" education, I had to make more use of all the anatomy-related resources available on the Web.                                             | 8  | 10.0 |
|                                                                                                                                                                                 | In my opinion, three-dimensional digital resources should be widely used in Anatomy course learning.                                                         | 38 | 47.5 |
| <b>8. Please select the option closest to you when evaluating the Anatomy course in terms of concentration from the options below.</b>                                          | For the theoretical anatomy lesson, I concentrate more on the "Online" education compared to the "Video recorded education".                                 | 13 | 16.3 |
|                                                                                                                                                                                 | For the theoretical anatomy lesson, I concentrate more on the "Face to face" education compared to the "Video recorded education".                           | 5  | 6.3  |
|                                                                                                                                                                                 | For the theoretical anatomy lesson, I concentrate more on the "Face to face" education compared to the "Online education".                                   | 39 | 48.8 |
|                                                                                                                                                                                 | I concentrate on the best face-to-face training in anatomy class.                                                                                            | 23 | 28,7 |
| <b>9. How would you evaluate your thoughts on the role of regular weekly quizzes in the theoretical and practical applications of the anatomy course in effective learning?</b> | The lack of regular weekly quizzes in "online" and "video-recorded education" reduces the quality of learning.                                               | 17 | 21.3 |
|                                                                                                                                                                                 | The absence of regular weekly quizzes in 'face-to-face' education does not affect the quality of learning.                                                   | 27 | 33.8 |
|                                                                                                                                                                                 | Regular weekly quizzes in 'face-to-face' education increase the quality of learning.                                                                         | 36 | 45.0 |
| <b>10. Please tick the closest option to you about the communication of the students with the lecturers and classmates regarding the course during the anatomy course.</b>      | During the "face-to-face" education process, my opportunity to communicate with my lecturer and friends about the course has increased.                      | 69 | 86.3 |
|                                                                                                                                                                                 | During the "Online" education process, my opportunity to communicate with my lecturer and friends about the course has increased.                            | 6  | 7.5  |
|                                                                                                                                                                                 | During the "video recorded" education process, my opportunity to communicate with my lecturer and friends about the course has increased.                    | 5  | 6.3  |
| <b>11. If there was a new medical Anatomy training, what would you like the content of the training to be?</b>                                                                  | Anatomy lecture should be only theoretical and I would like this training to be "Online" only.                                                               | 5  | 6.3  |
|                                                                                                                                                                                 | Anatomy lecture should be only theoretical and I would like this education to be only "Video recorded education".                                            | 2  | 2.5  |
|                                                                                                                                                                                 | Anatomy lecture should be only theoretical and I would like this education to be only "Face to face education".                                              | 4  | 5    |
|                                                                                                                                                                                 | Anatomy lecture should be based on theory and practice, and I would like practical training to be "Face to Face" only.                                       | 8  | 10   |
|                                                                                                                                                                                 | Anatomy lecture should be based on theory and practice, and I would like 'Face to Face' and 'Video-recorded education' to be together in practical training. | 56 | 70   |
|                                                                                                                                                                                 | Anatomy lecture should be based on theory and practice, and I would like the practical training to be only "Video recorded training".                        | 5  | 6.3  |
| <b>12. Please tick the option that best suits you in terms of the benefit of the Anatomy education type taken from the options below for your profession.</b>                   | I think that "Online" education in theoretical courses is sufficient for my medical applications.                                                            | 8  | 10.0 |
|                                                                                                                                                                                 | I think that 'Video recorded training' in theoretical courses is sufficient in my medical practices.                                                         | 25 | 31.3 |
|                                                                                                                                                                                 | I think that 'Face to face training' in theoretical courses is sufficient in my medical practices.                                                           | 47 | 58.8 |
| <b>13. What are your observations (deficiencies, suggestions or ideas) about distance anatomy education activities?</b>                                                         | face-to-face and video-based training should be managed together                                                                                             | 2  | 2.5  |
|                                                                                                                                                                                 | there may be video recordings in theoretical lessons                                                                                                         | 10 | 5    |
|                                                                                                                                                                                 | online and video-based and face-to-face training can be mixed                                                                                                | 2  | 12.5 |
|                                                                                                                                                                                 | video recorded method is more important in terms of time                                                                                                     | 4  | 2.5  |
|                                                                                                                                                                                 | online education is not useful enough, nothing concrete remains                                                                                              | 1  | 1.3  |
|                                                                                                                                                                                 | No idea                                                                                                                                                      | 61 | 76.3 |

Table 3. Chi-square correlation analysis of questions asked to students (p)

| Variable                            | 1. Time spend on anatomy | 2. Anatomy practical necessity | 3. The importance of the instructor | 4. Effect of teaching method | 5. Benefit of teaching theoretical | 6. Time management | 7. Resource usage | 8. Concentration | 9. Regular quiz  | 10. Communication tutorial/friends | 11. Novel anatomy education | 12. Benefit professionalism | 13. Anatomy suggestion |
|-------------------------------------|--------------------------|--------------------------------|-------------------------------------|------------------------------|------------------------------------|--------------------|-------------------|------------------|------------------|------------------------------------|-----------------------------|-----------------------------|------------------------|
| 1. Time spend on anatomy            | ×                        | 0.054                          | 0.094                               | 0.995                        | 0.461                              | 0.659              | 0.833             | 0.767            | 0.355            | 0.389                              | 0.219                       | 0.315                       | 0.662                  |
| 2. Anatomy practical necessity      | 0.054                    | ×                              | 0.094                               | 0.599                        | <b>0.012</b>                       | <b>0.016</b>       | 0.225             | 0.719            | 0.139            | 0.112                              | 0.057                       | 0.245                       | 0.066                  |
| 3. The importance of the instructor | 0.094                    | 0.094                          | ×                                   | 0.204                        | 0.074                              | 0.086              | 0.375             | 0.650            | 0.337            | 0.863                              | 0.969                       | 0.589                       | 0.992                  |
| 4. Effect of teaching method        | 0.995                    | 0.599                          | 0.204                               | ×                            | <b>0.001</b>                       | <b>&lt;0.001</b>   | 0.433             | 0.066            | 0.564            | 0.196                              | 0.241                       | <b>0.001</b>                | 0.828                  |
| 5. Benefit of teaching theoretical  | 0.461                    | <b>0.012</b>                   | 0.074                               | <b>0.001</b>                 | ×                                  | <b>&lt;0.001</b>   | <b>0.039</b>      | <b>0.008</b>     | <b>&lt;0.001</b> | 0.075                              | <b>0.03</b>                 | <b>&lt;0.001</b>            | 0.535                  |
| 6. Time management                  | 0.659                    | <b>0.016</b>                   | 0.086                               | <b>&lt;0.001</b>             | <b>&lt;0.001</b>                   | ×                  | 0.075             | 0.117            | 0.253            | 0.498                              | 0.726                       | <b>0.005</b>                | 0.583                  |
| 7. Teching method on Resource usage | 0.833                    | 0.225                          | 0.375                               | 0.433                        | <b>0.039</b>                       | 0.075              | ×                 | <b>&lt;0.001</b> | <b>0.006</b>     | 0.410                              | <b>0.012</b>                | <b>0.006</b>                | 0.433                  |
| 8. Concentration                    | 0.767                    | 0.719                          | 0.650                               | <b>0.066</b>                 | <b>0.008</b>                       | 0.117              | <b>&lt;0.001</b>  | ×                | <b>&lt;0.001</b> | 0.155                              | <b>&lt;0.001</b>            | <b>&lt;0.001</b>            | 0.849                  |
| 9. Regular quiz                     | 0.355                    | 0.139                          | 0.337                               | 0.564                        | <b>&lt;0.001</b>                   | 0.253              | <b>0.006</b>      | <b>&lt;0.001</b> | ×                | 0.540                              | <b>0.01</b>                 | <b>&lt;0.001</b>            | 0.112                  |
| 10. Communication tutorial/friends  | 0.389                    | 0.112                          | 0.863                               | 0.196                        | 0.075                              | 0.498              | 0.410             | 0.155            | 0.540            | ×                                  | 0.093                       | <b>0.026</b>                | 0.888                  |
| 11. Novel anatomy education         | 0.219                    | 0.057                          | 0.969                               | 0.241                        | <b>0.03</b>                        | 0.726              | <b>0.012</b>      | <b>&lt;0.001</b> | <b>0.01</b>      | 0.093                              | ×                           | <b>&lt;0.001</b>            | 0.581                  |
| 12. Benefit on professionalism      | 0.315                    | 0.245                          | 0.589                               | <b>0.001</b>                 | <b>&lt;0.001</b>                   | <b>0.005</b>       | <b>0.006</b>      | <b>&lt;0.001</b> | <b>&lt;0.001</b> | <b>0.026</b>                       | <b>&lt;0.001</b>            | ×                           | 0.826                  |
| 13. Anatomy suggestion              | 0.662                    | 0.066                          | 0.992                               | 0.828                        | 0.535                              | 0.583              | 0.433             | 0.849            | 0.112            | 0.888                              | 0.581                       | 0.826                       | ×                      |

It was determined that this question has a statistically significant correlation with the 2nd (anatomy practical necessity), 4th (effect of teaching method), 6th question (time management) ( $p<0.001$ ), the 8th question (concentration) ( $p=0.008$ ), the 9th question (regular weekly quiz) ( $p<0.001$ ), the 11th question (novel anatomy education) ( $p=0.03$ ), and the 12th question (benefit on professionalism) ( $p<0.001$ ). The benefit of theaching theoretical with these questions demonstrates that this question has the prior effectiveness in determining anatomy education.

According to the 6th question; "Evaluation of anatomy lesson teaching methods in terms of time management?" Students stated that video-recorded education was effective in terms of time management with %75, while face-to-face education with %15 and online education with 10%. According to the chi-square analysis, this question has a statistically significant relationship between the 2nd (anatomy practical necessity), 4th (effect of teaching method), 5th (benefit of teaching theoretical), and 12th (benefit on professionalism) questions (Tables 2,3).

According to the 7th question; "Please tick the option closest to you when you evaluate the anatomy education type in terms of the use of anatomy resources from the options below?" Students stated that 47.5% three-dimensional digital resources should be widely used in anatomy education. 21.3% of the students need necessity to the three-dimensional digital resources on face-to-face method, 21.3% necessity on online method, and 10% necessity on video-recorded method. According to the chi-square analysis, this question has a statistically significant relationship with the 5th question (benefit of teaching theoretical), 8th question (concentration), the 9th question (regular weekly quiz), the 11th question (novel anatomy education) and the 12th question (benefit on professionalism) ( $p=0.006$ ) (Tables 2,3).

According to the 8th question; "Which is the question of evaluating the anatomy lesson in terms of concentration in the applied education types? The students demonstrated that 48.8% concentrated more on face-to-face education than online education and 28.7% concentrated on the best face-to-face training. On the

other hand, 16.3% of the students concentrated better on online education than video-recorded education, 6.3% of the students concentrated video-recorded education more than face-to-face education. As a result of these evaluations, it is seen that face-to-face training is the most effective in terms of concentration, and the possibility of re-watching in video-recorded training affects concentration negatively. According to the chi-square analysis, this question has a statistically significant relationship between the 4th question (effect of teaching method) ( $p=0.066$ ), the 5th question (benefit of teaching theoretical) ( $p=0.008$ ), 7th question (using anatomy resource on method) ( $p<0.001$ ), 9th question (regular weekly quiz) ( $p<0.001$ ), the 11th question (novel anatomy education) ( $p<0.001$ ), and the 12th question (benefit on professionalism) ( $p<0.001$ ). The correlation of concentration with these questions demonstrates that this question has the prior effectiveness in determining anatomy education.

According to the 9th question; "The role of regular weekly quizzes in the theoretical and practical applications of the anatomy course in effective learning?" 45% of the students consider that weekly quizzes in the face-to-face education method increase the quality of learning, while 33.8% consider that the absence of regular weekly quizzes does not affect the quality of learning. In addition, 21.3% of students think that not having regular weekly quizzes with online and video-recorded education methods does not reduce the quality of education. In this question, we see that there is no consensus in the students' view of regular weekly quizzes in all three educational methods. According to the chi-square analysis, this question has a statistically significant relationship between the 5th question, (benefit of teaching theoretical) ( $p<0.001$ ), 7th question, (using anatomy resource on method) ( $p=0.006$ ), 8th question (concentration) ( $p<0.001$ ), 11th question (novel anatomy education) ( $p=0.01$ ), 12th question (benefit on professionalism) ( $p<0.001$ ) (Tables 2,3).

According to the 10th question; "inquiring about the communication with the lecturers and classmates," the students stated that the communication opportunity increased at a high rate (86.3%) in the face-to-face education process. In contrast, 7.5% of the students stated that this communication increased during the online education process and 6.3% during the video-recorded education process. In this question, we realized that students' communication with lecturers and classmates increases at a high rate during face-to-face education. According to the chi-square analysis, there was a statistically significant relationship between the 12th question (benefit on professionalism) ( $p=0.026$ ), but there was no significant relationship with the other questions (Tables 2,3).

According to the 11th question; "What would you like the content of the education if there was a new medical anatomy education?" 70% of the students answered, "Anatomy lecture should be based on theory and practice, besides face-to-face and video-recorded education to be together in practical education." has given. There is a statistically significant relationship with the 12th question (benefit on professionalism) ( $p<0.001$ ), and there is no significant

relationship with the other questions (Tables 2,3).

According to the 12th question; "The benefit of the anatomy education type for the professionalism" 58.8% of the students thought that face-to-face education was sufficient in medical applications. On the other hand, 31.3% of the students in video-recorded education and 10% students in online education type, medical applications are sufficient. According to the chi-square analysis, this question has a statistically significant relationship between the 4th question (effect of teaching method) ( $p=0.001$ ), the 5th question (benefit of teaching theoretical) ( $p<0.001$ ), and the 6th question (time management) ( $p=0.005$ ), 7th question (using anatomy resource on method) ( $p=0.006$ ), 8th question (concentration) ( $p<0.001$ ), 9th question (regular weekly quiz) ( $p<0.001$ ), 10th question (communication with the teacher and friends) ( $p=0.005$ ), and 11th question (novel anatomy education) ( $p<0.001$ ) (Tables 2, 3). This result demonstrates that the highest level of influence "professionalism in education" is highly correlated with other criteria.

According to the 13th question; "Open-ended question about distance education activities and observations" 76.3% of the students had no idea, and 12.5% stated that online, video-based, and face-to-face education models could be beneficial, 5% of the students suggested the video lectures of the theoretical lessons, 2.5% stated that face-to-face and video-recorded methods could be applied together, 2.5% stated that the video-recorded method is more important in terms of time, and 1.3% stated that online education is not useful enough. According to the chi-square analysis, the answers to this question did not have a significant correlation with the answers to the other questions ( $p>0.05$ ) (Tables 2,3).

## Discussion

In the evaluation of anatomy education style in terms of time management in the literature, Yoo et al. [8] indicated that most of the students gained more time with education in online classes (strongly agree, 65.8%; agree, 23.7%) and reported that the students evaluated this time in self-learning (strongly agree, 35.5%; agree, 39.5%) and replaying the recorded videos (agree 76.3%). Ortadeveci et al. [4] reported that the distance learning isn't effective in time gaining, however the students stated that online education offers many opportunities to students, and this education style demonstrates a weak level of satisfaction. In our study %, 75 of the students consider that conducting theoretical lessons with video-recorded training is beneficial in terms of time management. Therefore we consider that the time management factor was effective in the opinion of the %73.8 of the students who found face-to-face and video-recorded education effective.

Since concentration is a very important phenomenon in education, studies in the literature have focused on this element. Yoo et al. [8] stated that they preferred traditional education because face-to-face education was superior in terms of concentration (93.8%) and the opportunity to ask questions to the trainer (56.3%). Singal et al. [9] stated that most of the students in distance education

have difficulties in time management and concentration (focusing) due to the uncomfortable or overly comfortable home environment. For this reason, they reported that 69% of the students were exposed to self-motivation damage. In our study, 48.8% of the students reported that they were more concentrated on face-to-face education. Indicating the highest correlation of concentration factor with other questions in anatomy teaching methods inquiries (effectiveness, benefit, resource use, weekly quiz, a new educational idea, and professional benefit) shows that concentration in education is essential for students.

The interactive barrier in education is the other problem in education. There are three interactives in education; these are learner-content interaction, learner-instructor interaction, and learner-learner interaction [10]. A chat window is not an active interaction between the students and the teacher, and a discussion stage should be provided after the lesson. Attardi et al. [11] reported that online education reduces the interaction between students and teachers. Another study reported that student-teacher interaction should be increased in online education [12]. In our study, 86.3% of the students stated that the communication opportunities with the lecturer and their friends increased during the face-to-face anatomy education process.

There are many studies in the literature comparing the traditional method and the online method since the pandemic period. Totlis et al. [13] reported that 56% and 52.5% of the students were satisfied with the rates of online and pre-recorded video education, respectively. Yoo et al. [8] reported that there are opportunities for replaying the recorded videos on online education. Corte-Real et al. [14] reported that web-based education is a more effective learning method. Besides, Kim et al. [15] and Srinivasan et al. [16] reported that the students were more satisfied with online education. There are various studies that online and video-based education have effectiveness. For instance, Viswasom et al. [17] reported that video-supported traditional education increased the effectiveness of education, distance education improves the ability to use online resources and promotes the independence of self-learning [18], and supports the students on critical and high-level consideration [19]. Students who receive online education at Edinburgh University reported that videos are effective and enjoyable in anatomy education and paid attention to the importance of the feature of rewinding and forwarding the video [20].

We are aware that traditional anatomy education is still the most accepted method in the literature. Totlis et al. [13] reported that the students were satisfied with traditional anatomy education with a high ratio (%73.5) and stated that all three distance education styles could not replace traditional education. Zhang et al. [21] reported that the %54.17 of the students preferred traditional education more than online education, Singh et al. [22] stated that traditional anatomy courses are the preferred teaching method at 50.9%, Ortadeveci et al. [4] reported that distance education is less effective to traditional education, stated that they were not satisfied with distance education in theoretical and practical

terms. Totlis et al. [13] reported that theoretical education in online classes could be effective, but anatomy education is not available in this method owing to the requirements of the three dimension perception [23].

Some studies supported the blended education style in anatomy education and stated that this style improves student grades [24,25]. Yoo et al. [8] stated that the approach of the blended learning method is effective in learning and has advantages in self-learning with online education, Totlis et al. [13] reported that the traditional education method is the most effective and most preferred method in anatomy education and stated that the students preferred the online and video recorded videos at second place, Pereira et al. [24] reported that the students were increasingly satisfied with blended education, on the other hand, a few studies supported that there was no difference with other methods [11,26]. In our study, the students stated that face-to-face is more effective with %48.8 and hybrid education methods, which face-to-face and video-recorded education were effective with 73.8% regarding education in questioning the benefit and effectiveness of education methods. In addition, the fact that the questioning of teaching method effectiveness and benefit is correlated with many factors indicates that students attach importance to this subject.

Practical education in the laboratory is the main factor in anatomy. Turmanalar et al. stated that %61 of the students were not preferred theoretical and practical education with an online method and stated that the practical anatomy lessons should be given face-to-face in the laboratory [27]. Shahrivini et al. [28] reported that the students consider negative in distance anatomy education regarding the practical requirement lessons like anatomy. However, Ortadeveci et al. [4] stated that they were worried about not being physically present in the laboratory environment and that they felt the lack of face-to-face anatomy education. Uzun et al. [29] reported that the students were satisfied from having anatomy practical education in laboratory with %87.9. In addition the students consider that having auxiliary course tools such as model applications is effective. In our study, the %70 of the students supported that anatomy education should perform theoretical and practical and stated that practical education should be given with the method of both face-to-face and video-recorded education.

Many e-learning training is performed in anatomy laboratories. The studies regarding multimedia sources in anatomy education stated that adding various materials support effectiveness of anatomy education for the students [24,30]. Iwanaga et al. [5] reported that 3D VR systems provide the students with the anatomy and supported that these effects increased consideration of anatomical structures and surgical procedures. Özen et al. [31] stated that the face-to-face anatomy education period could be reduced and students can add videos to the theoretical lessons. Thus, the students can raise their learning quality with more usage time on 3D and digital sources.

The usage of anatomy resources such as 3D and digital resources was questioned in our study, and the majority of the students (47.5%) stated that three-dimensional digital resources should be used widely in Anatomy teaching and reported that this issue is important at the education style. The correlation of this questioning (teaching method benefit, concentration, regular quiz, a new anatomy lesson, professional benefit) with many questions indicates that this factor is essential for students.

These anatomy education styles are ultimately essential in their reflection on postgraduate clinical skills. Regarding this situation, Shahrivini et al. [28] reported that distance education students lost their clinical skills and stated that laboratory-based education was negatively affected. On the other hand, Turamanlar et al. [27] stated that 61% of the students did not agree that the online application of theoretical anatomy education would be effective in their medical professionalism with 26% ratio.

In our study, 58.8% of the students consider that face-to-face education in theoretical courses is sufficient in medical applications in questioning the professional benefit of the anatomy education style. The fact that this questioning (teaching method benefit, effectiveness, concentration, time management, resource use, regular quiz, a new anatomy lesson, communication with the lecturer and friends) is correlated with many questions and these wide correlations demonstrate that the effect of anatomy at the clinical stage is essential for students.

### Limitations of the study

The fact that the number of medical faculty students was not higher is one of the limitations of our study.

### Conclusions

Face to face method is effective in concentration and community, and the video recorded education method is effective in time management in anatomy education. Therefore both face-to-face and video-based education, called the hybrid education method, is effective in anatomy education.

### Conflict of Interests

*The authors declare that there is no conflict of interest in the study.*

### Financial Disclosure

*The authors declare that they have received no financial support for the study.*

### Ethical Approval

*Ethics committee approval was obtained from Malatya Turgut Özal University Non-Invasive Clinical Research Ethics Committee before the study (2022/93).*

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