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# Students taking anatomy courses and their thoughts on anatomy education

## Anatomi dersi alan öğrenciler ve anatomi eğitimi hakkındaki düşünceleri

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**ABSTRACT**

**Aim**: This study aimed to identify factors associated with students' perceptions of and approaches to anatomy education and to provide information that may contribute to curriculum development and teaching practices.
**Materials and Methods**: A total of 159 students participated in the study and completed questionnaires addressing demographic characteristics and their views on the anatomy course.
**Results**: Academic department was significantly associated with the perceived adequacy of course hours, preferred learning method, studying before class, preference for anatomy as an elective course, and perceived contribution of anatomy to the profession ($p<0.05$). Willingness to pursue anatomy in the future was significantly associated with interest in anatomy, perceived difficulty, adequacy of course hours, difficulty in learning, studying before class, preference for anatomy as an elective course, and perceived professional contribution ($p<0.05$). Interest in anatomy was significantly associated with perceived difficulty, the importance of practical sessions, the usefulness of supplementary resources, difficulty in learning, and preference for anatomy as an elective course ($p<0.05$). Difficulty in learning was not significantly associated with studying before class ($p=0.165$) but was significantly associated with suggestions for improving course efficiency ($p=0.011$).
**Conclusion**: The findings indicate that students' perceptions of anatomy education vary according to several educational and learning-related factors. Students particularly emphasized practical sessions, visual materials, and understandable and engaging teaching approaches. Considering student feedback when planning anatomy education may contribute to the development of more effective and student-centered teaching strategies.

**Keywords:** *Anatomy, Education, Student, Feedback*

**ÖZ**

**Amaç**: Bu çalışma, öğrencilerin anatomi eğitimine ilişkin algıları ve yaklaşımlarıyla ilişkili faktörleri belirlemeyi; ayrıca müfredat geliştirme ve öğretim uygulamalarına katkı sağlayabilecek bilgiler sunmayı amaçlamıştır.
**Gereç ve Yöntem**: Çalışmaya toplam 159 öğrenci katılmış; öğrenciler demografik özelliklerini ve anatomi dersine dair görüşlerini içeren anketleri doldurmuştur.
**Bulgular**: Akademik bölüm; ders saatlerinin yeterliliği, tercih edilen öğrenme yöntemi, ders öncesi çalışma, anatominin seçmeli ders olarak tercih edilmesi ve anatominin mesleğe katkısı algısı ile anlamlı düzeyde ilişkili bulunmuştur ($p<0,05$). Gelecekte anatomi alanına yönelme isteği; anatomiye duyulan ilgi, algılanan zorluk derecesi, ders saatlerinin yeterliliği, öğrenme güçlüğü, ders öncesi çalışma, anatominin seçmeli ders olarak tercih edilmesi ve mesleki katkı algısı ile anlamlı düzeyde ilişkili saptanmıştır ($p<0,05$). Anatomiye duyulan ilgi; algılanan zorluk derecesi, uygulama derslerinin önemi, yardımcı kaynakların yararlılığı, öğrenme güçlüğü ve anatominin seçmeli ders olarak tercih edilmesi ile anlamlı düzeyde ilişkili bulunmuştur ($p<0,05$). Öğrenme güçlüğü ile ders öncesi çalışma arasında anlamlı bir ilişki saptanmazken ($p=0,165$), ders verimliliğini artırmaya yönelik önerilerle anlamlı bir ilişki bulunmuştur ($p=0,011$).
**Sonuç**: Bulgular, öğrencilerin anatomi eğitimine ilişkin algılarının çeşitli eğitimsel ve öğrenme ile ilgili faktörlere göre farklılık gösterdiğini ortaya koymaktadır. Öğrenciler özellikle uygulama derslerini, görsel materyalleri ve anlaşılır, ilgi çekici öğretim yaklaşımlarını vurgulamışlardır. Anatomi eğitimi planlanırken öğrenci geri bildirimlerinin dikkate alınması, daha etkili ve öğrenci odaklı öğretim stratejilerinin geliştirilmesine katkı sağlayabilir.

**Anahtar Kelimeler**: *Anatomi, Eğitim, Öğrenci, Geri bildirim*

## INTRODUCTION

Anatomy is a branch of science that studies the structure, function, position, and relationships of the organs that make up the body (1). The use of foreign-origin terminology (Latin, Greek, English, etc.) makes anatomy one of the most difficult sciences to learn within the basic medical sciences. Systematic and topographical teaching methods are mostly used in anatomy; this education is supported by model and cadaver training in laboratories. Nowadays, in addition to these methods, the use of 3D programs and digital cadaver dissection tables is becoming increasingly common (2, 3). However, regardless of the method used, the most appropriate methods for the learners should be chosen to ensure effective education. During the educational process, students are taught specific knowledge and skills that they can use in their lives (4).

Education is an interactive, dynamic process between teacher and learner. The continuous changes in education during this process have made it necessary to research anatomy education. In research, students' opinions regarding education are taken into account, and the evaluation results are considered important as a guide in shaping education (5, 6). In this regard, students' opinions about the course are of great importance. Whether theoretical and practical course hours are sufficient, the teaching methods used, and the inclusion of innovative additional applications should be considered according to students' expectations (7). Especially in the Faculty of Health Sciences, given the variability of theoretical and practical course hours between departments, it is necessary to choose the most appropriate method according to the relevant department and students. This will ensure that the effectiveness of the education students receive when they work in clinics in the future is increased. Studies on this subject highlight the importance of this issue (8, 9, 10).

Recent studies have shown that students' socio-demographic characteristics (gender, type of education, employment status, academic motivation, etc.) directly affect their learning approaches and academic success (11, 12). In particular, the convergence between the teaching methods used in anatomy courses and students' individual learning preferences is one of the important factors determining the quality of learning outcomes. Numerous studies in the literature indicate that anatomy courses are perceived by students as "difficult" or "high-stress" (13, 14). This perception is said to be related to the scope of the course content, teaching methods, assessment approaches, and students' individual learning characteristics. Specifically, spatial ability level, study habits, and the learning materials used are among the important factors affecting anatomy success (15).

For academics, anatomy education is a challenging process requiring both the preservation of scientific accuracy and the comprehensibility of complex structures to the student. Although traditional teaching methods have been used as the basic approach in anatomy education for many years, increasing student numbers, limitations in class hours, and changes in learning expectations have necessitated a re-evaluation of teaching approaches (16). This situation has brought about the diversification of teaching methods and the adoption of student-centered approaches in anatomy education. Recent studies show that the congruence between teaching methods and students' learning processes in anatomy education is a determining factor in academic success (17). The use of active learning-based methods, visual aids and structured educational environments was positively correlated with anatomy students improved conceptual understanding (18). However, even if a student is exposed to the appropriate teaching method, the following characteristics influence a student's academic success: socio-demographic characteristics, study duration, and learning style (19). Specifically, the duration of the anatomy course for these faculties at our university is: 2 hours (theory) for Nutrition & Dietetics; 3 hours (theory) and 2 hours (practical) for Nursing; 3 hours (theory) and 2 hours (practical) for Midwifery; 2 hours (theory) for Pharmacy; 2 hours (theory) for Coaching Education; 4 hours (theory) for Physical Education Teaching. A survey was used to evaluate students' opinions and learning approaches regarding anatomy education across the Faculty of Health Sciences, Faculty of Pharmacy, and Faculty of Sports Sciences.

This study examined students' perceptions of anatomy education and their associations with selected sociodemographic characteristics and learning-related factors.

The primary aim was to identify factors associated with students' approaches to anatomy education and to provide information that may contribute to curriculum development and teaching practices.

## MATERIALS AND METHODS

Approval was obtained from the Ağrı İbrahim Çeçen University Scientific Research Ethics Committee on 29/02/2024 with number 99. A total of 159 students aged 18-25 participated in the study, 46 (28.93%) of whom were male and 113 (71.07%) were female. The study included first and second-year students studying Pharmacy, Dietetics, Coaching, Nursing, Physical Education and Sports Teaching, and Midwifery programs. After completing an informed consent form, students were asked to complete an 8-question questionnaire containing demographic information, as well as a 14-question questionnaire regarding their opinions on the Anatomy course. To create the questionnaire for this study, researchers reviewed literature related to both anatomy education and students' perceptions, then created items reflective of the context of their specific study population rather than using any existing validated instrument. They utilized expert review of the language of the draft questionnaire to assess content validity and conducted a pilot study with a small group of students to ensure that the item wording was clear, understandable, and relevant. Necessary revisions were made prior to the main data collection. These procedures supported the content

validity and reliability of the measurement tool. The questionnaires were administered via Google Surveys. The students' names and surnames were not included in the study.

***Sample***

An a priori sample size calculation was performed using G*Power 3.1 for the chi-square test of independence. Based on an effect size of $w = 0.41$, a significance level of $\alpha = 0.05$, and a statistical power of 0.95, the minimum required sample size was calculated as 118 participants (20). The final study sample consisted of 159 students, exceeding the minimum required sample size.

***Statistical Analysis***

Statistical analyses were performed using IBM SPSS Statistics version 28.0. Categorical variables were summarized as frequencies and percentages. Six missing responses were imputed using the modal category. Associations between categorical variables were evaluated using the two-sided Fisher–Freeman–Halton exact test with Monte Carlo estimation. Pearson chi-square ($\chi^2$) statistics and p values were reported. Statistical significance was set at $p < 0.05$.

## RESULTS

The demographic information of the participants included in the study is given in Table 1. The distribution of answers to the anatomy course questions is shown in Table 2. No significant difference was found in the answers given to the questions according to gender ($p>0.05$) (Table 3). There is a statistically significant relationship between the sufficiency of the course hours, the method chosen for learning, coming to class prepared, preference for anatomy as an elective course, whether the course contributes to the profession, and the departments ($p<0.05$) (Table 4). Statistical associations were found between interest in the anatomy course, perceived difficulty, sufficiency of the course hours, learning difficulties, coming to class prepared, preference for anatomy as an elective course, perceived professional contribution, and willingness to pursue anatomy in the future ($p<0.05$) (Table 5). Suggestions for course efficiency were not significantly related to willingness to pursue anatomy in the future ($p=0.058$). There is a statistically significant association ($p<0.05$) between the perception that anatomy is difficult, the importance of practical lessons, the usefulness of supplementary resources, experiencing learning difficulties, not choosing anatomy as an elective, and interest in anatomy (Table 6). No statistically significant difference was found in the relationship between studying for class and experiencing learning difficulties ($p>0.05$). The highest rate was observed in those who did not study before class. In addition, it was found that those who experienced learning difficulties did not study before class (Table 7). There is a statistically significant association ($p<0.05$) between experiencing learning difficulties in anatomy and suggestions for the course. Whether or not lessons are reviewed was found to be the least effective category in experiencing learning difficulties. Those who experience learning difficulties want more visuals and lesson reviews in class, lessons to be taught in a more fun and understandable way, and more emphasis to be placed on practical lessons (Table 8). The distribution of answers to the questions is shown in Figure 1.

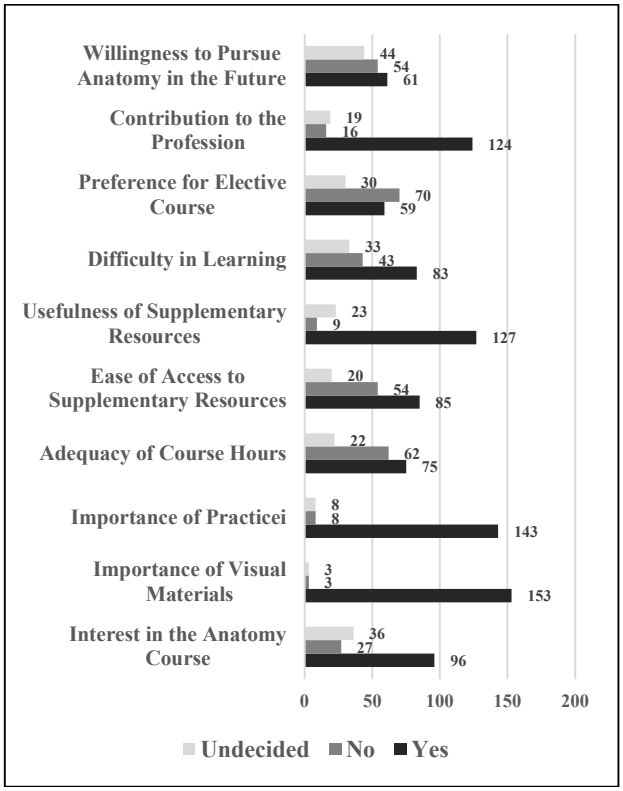



**Figure 1.** Distribution of responses to the questions values updated after categorical missing-value imputation.

## DISCUSSION

Taking student opinions into account is important for improving teaching processes and enhancing the quality of education. Anatomy is a core course for many healthcare professions and provides an essential foundation for understanding other professional subjects (21). The present study evaluated students' perceptions and expectations regarding anatomy education and examined their associations with selected educational and learning-related factors.

The findings showed that students' responses regarding anatomy education did not differ significantly according to gender ($p>0.05$). In contrast, significant associations were observed between academic department and the perceived adequacy of course hours, preferred learning method, studying before class, preference for anatomy as an elective course, and perceived contribution of the course to the profession ($p<0.05$).

**Table 1:** Demographic information of participants

| Variable | Group | Number | Percentage |
|---|---|---|---|
| **Gender** | Male | 46 | 28.93 |
| | Female | 113 | 71.07 |
| **Age** | 18-20 | 13 | 8.18 |
| | 20-22 | 85 | 53.46 |
| | 22-24 | 38 | 23.9 |
| | 24 and above | 23 | 14.47 |
| **Mother's Educational Level** | Illiterate | 46 | 28.93 |
| | Primary education | 68 | 42.77 |
| | High school | 21 | 13.21 |
| | University | 22 | 13.84 |
| | Master's/Doctorate | 2 | 1.26 |
| **Father's Educational Level** | Illiterate | 6 | 3.77 |
| | Primary education | 97 | 61.01 |
| | High school | 31 | 19.5 |
| | University | 23 | 14.47 |
| | Master's/Doctorate | 2 | 1.26 |
| **Graduated High School Type** | General high school | 11 | 6.92 |
| | Anatolian High School | 98 | 61.64 |
| | Vocational high school | 21 | 13.21 |
| | Science high school | 10 | 6.29 |
| | Other | 19 | 11.95 |
| **Department** | Pharmacy | 2 | 1.26 |
| | Nutrition and Dietetics | 77 | 48.43 |
| | Coaching Education | 17 | 10.69 |
| | Nursing | 45 | 28.3 |
| | Physical Education and Sports Teaching | 15 | 9.43 |
| | Midwifery | 3 | 1.89 |
| **Liking the Department** | Yes | 115 | 72.33 |
| | No | 19 | 11.95 |
| | Undecided | 25 | 15.72 |
| **Person Who Chose the Department** | Myself | 124 | 77.99 |
| | My teachers | 8 | 5.03 |
| | My family | 27 | 16.98 |

These findings suggest that students from different academic programs may evaluate anatomy education within the context of their respective curricula and educational experiences. Differences in theoretical and practical course hours and learning environments across departments may contribute to these variations. Previous studies have similarly indicated that course organization and teaching methods may influence students' perceptions and learning experiences. The absence of significant gender-related differences in the present study is also consistent with studies suggesting that gender may have a limited influence on students' perceptions and achievement in anatomy education (22). Interest in anatomy was another important factor associated with students' perceptions of the course. Sargın et al. (2022) reported that 59.6% of students were interested in anatomy (23). In the present study, 60.38% of students reported an interest in the anatomy course. Interest in anatomy was significantly associated with perceived difficulty, the importance attributed to practical sessions, the usefulness of supplementary resources, difficulty in learning, and preference for anatomy as an elective course ($p<0.05$). These findings indicate that students' interest in anatomy is associated with several dimensions of their learning experience. Previous research has also emphasized the importance of student interest and motivation in anatomy learning (24). A considerable proportion of the students perceived anatomy as a challenging course. In the present study, 39.62% rated the difficulty level as three on a five-point scale, while 28.30% rated it as four and another 28.30% as five. Previous studies have similarly reported that students often perceive anatomy as difficult because of its extensive content and complex or abstract concepts (25). Bolatlı (2021) reported that 56.9% of students considered anatomy difficult or very difficult and that 69% considered the course hours sufficient (5), whereas Demir et al. (2014) reported that 79.1% of students described anatomy as difficult or very difficult (27). Özcan et al. also reported that midwifery students generally considered the number of anatomy course hours sufficient (9). In the present study, perceptions of the adequacy of course hours differed significantly among academic departments, indicating that perceptions of course duration may vary according to the curricular context of each program.

Visual and practical components were highly valued by the participants. Most students considered visual materials (96.23%) and practical sessions (89.94%) important for anatomy education. Previous studies have also emphasized the role of visual materials and practical approaches in facilitating anatomy learning. Elvan et al. (2021) reported a strong demand for visual and auditory resources among students (28), and recent studies have similarly supported the use of diverse and interactive educational materials in anatomy teaching (29). In the present study, 38.36% of students indicated that greater emphasis should be placed on practical sessions, while 25.16% suggested using more visual materials. These findings reflect students' preference for teaching approaches that incorporate practical and visual components. Difficulty in learning anatomy was reported by 52.20% of the students. Importantly, the updated analysis showed a statistically significant association between difficulty in learning and suggestions for improving course efficiency ($p=0.011$). Students experiencing learning difficulties expressed preferences for greater use of visual materials, additional course review, more understandable and engaging teaching, and greater emphasis on practical sessions. These findings suggest that students who experience difficulty may perceive a need for more diverse and supportive instructional approaches. However, because the present study is observational and based on student perceptions, these findings should be interpreted as associations rather than evidence that any particular teaching strategy directly reduces learning difficulties. In contrast, no statistically significant association was found between difficulty in learning and studying before class ($p=0.165$). Although students who did not study before class constituted the largest group among those reporting learning difficulties, this descriptive pattern did not reach statistical significance. Therefore, the findings do not support a statistically significant relationship between

**Table 2.** Distribution of responses to anatomy course questions

| Variable | Group | Number | Percentage |
|---|---|---|---|
| **Interest in the Anatomy Course** | Yes | 96 | 60.38 |
| | No | 27 | 16.98 |
| | Undecided | 36 | 22.64 |
| **Perceived Difficulty Level of Anatomy** | One | 3 | 1.89 |
| | Two | 3 | 1.89 |
| | Three | 63 | 39.62 |
| | Four | 45 | 28.30 |
| | Five | 45 | 28.30 |
| **Importance of Visual Materials** | Yes | 153 | 96.23 |
| | No | 3 | 1.89 |
| | No idea | 3 | 1.89 |
| **Importance of Practice** | Yes | 143 | 89.94 |
| | No | 8 | 5.03 |
| | No idea | 8 | 5.03 |
| **Adequacy of Course Hours** | Yes | 75 | 47.17 |
| | No | 62 | 38.99 |
| | Undecided | 22 | 13.84 |
| **Ease of Access to Supplementary Resources** | Yes | 85 | 53.46 |
| | No | 54 | 33.96 |
| | No idea | 20 | 12.58 |
| **Usefulness of Supplementary Resources** | Yes | 127 | 79.87 |
| | No | 9 | 5.66 |
| | Undecided | 23 | 14.47 |
| **Difficulty in Learning** | Yes | 83 | 52.20 |
| | No | 43 | 27.04 |
| | Undecided | 33 | 20.75 |
| **Preferred Learning Method** | Reading / individual study | 93 | 58.49 |
| | Using supplementary materials (videos, flashcards, etc.) | 26 | 16.35 |
| | Listening to lectures | 36 | 22.64 |
| | Group study | 4 | 2.52 |
| **Studying Before Class** | Yes | 28 | 17.61 |
| | No | 77 | 48.43 |
| | Sometimes | 54 | 33.96 |
| **Suggestions for Improving Course Efficiency** | More visual materials should be used | 40 | 25.16 |
| | More revision should be provided | 21 | 13.21 |
| | Greater emphasis on practical sessions | 61 | 38.36 |
| | Lessons should be more understandable and engaging | 37 | 23.27 |
| **Preference for Elective Course** | Yes | 59 | 37.11 |
| | No | 70 | 44.03 |
| | No idea | 30 | 18.87 |
| **Contribution to Profession** | Yes | 124 | 77.99 |
| | No | 16 | 10.06 |
| | No idea | 19 | 11.95 |
| **Willingness to Pursue Anatomy in the Future** | Yes | 61 | 38.36 |
| | No | 54 | 33.96 |
| | No idea | 44 | 27.67 |

Six missing responses in four categorical variables were imputed using the modal category (equal to the coded median); all percentages are based on N=159.

**Table 3.** Comparison of responses by gender

| Variable | Group | Male n (%) | Female n (%) | Total n (%) | $\chi^2$ (Chi-Square) | p |
|---|---|---|---|---|---|---|
| **Interest in the Anatomy Course** | Yes | 27 (58.70%) | 69 (61.06%) | 96 (60.38%) | 1.524 | 0.468 |
| | No | 6 (13.04%) | 21 (18.58%) | 27 (16.98%) | | |
| | Undecided | 13 (28.26%) | 23 (20.35%) | 36 (22.64%) | | |
| **Perceived Difficulty Level of Anatomy** | One | 2 (4.35%) | 1 (0.88%) | 3 (1.89%) | 8.985 | 0.062 |
| | Two | 0 (0.00%) | 3 (2.65%) | 3 (1.89%) | | |
| | Three | 14 (30.43%) | 49 (43.36%) | 63 (39.62%) | | |
| | Four | 19 (41.30%) | 26 (23.01%) | 45 (28.30%) | | |
| | Five | 11 (23.91%) | 34 (30.09%) | 45 (28.30%) | | |
| **Importance of Visual Materials** | Yes | 42 (91.30%) | 111 (98.23%) | 153 (96.23%) | 4.318 | 0.076 |
| | No | 2 (4.35%) | 1 (0.88%) | 3 (1.89%) | | |
| | No idea | 2 (4.35%) | 1 (0.88%) | 3 (1.89%) | | |
| **Importance of Practice** | Yes | 39 (84.78%) | 104 (92.04%) | 143 (89.94%) | 4.636 | 0.133 |
| | No | 5 (10.87%) | 3 (2.65%) | 8 (5.03%) | | |
| | No idea | 2 (4.35%) | 6 (5.31%) | 8 (5.03%) | | |
| **Adequacy of Course Hours** | Yes | 18 (39.13%) | 57 (50.44%) | 75 (47.17%) | 2.511 | 0.289 |
| | No | 19 (41.30%) | 43 (38.05%) | 62 (38.99%) | | |
| | Undecided | 9 (19.57%) | 13 (11.50%) | 22 (13.84%) | | |
| **Ease of Access to Supplementary Resources** | Yes | 27 (58.70%) | 58 (51.33%) | 85 (53.46%) | 1.143 | 0.584 |
| | No | 15 (32.61%) | 39 (34.51%) | 54 (33.96%) | | |
| | No idea | 4 (8.70%) | 16 (14.16%) | 20 (12.58%) | | |
| **Usefulness of Supplementary Resources** | Yes | 38 (82.61%) | 89 (78.76%) | 127 (79.87%) | 0.348 | 0.947 |
| | No | 2 (4.35%) | 7 (6.19%) | 9 (5.66%) | | |
| | Undecided | 6 (13.04%) | 17 (15.04%) | 23 (14.47%) | | |
| **Difficulty in Learning** | Yes | 22 (47.83%) | 61 (53.98%) | 83 (52.20%) | 1.023 | 0.639 |
| | No | 15 (32.61%) | 28 (24.78%) | 43 (27.04%) | | |
| | Undecided | 9 (19.57%) | 24 (21.24%) | 33 (20.75%) | | |
| **Preferred Learning Method** | Listening to lectures | 12 (26.09%) | 24 (21.24%) | 36 (22.64%) | 5.290 | 0.112 |
| | Group study | 2 (4.35%) | 2 (1.77%) | 4 (2.52%) | | |
| | Reading / individual study | 21 (45.65%) | 72 (63.72%) | 93 (58.49%) | | |
| | Using supplementary materials (videos, flashcards, etc.) | 11 (23.91%) | 15 (13.27%) | 26 (16.35%) | | |
| **Studying Before Class** | Yes | 11 (23.91%) | 17 (15.04%) | 28 (17.61%) | 3.728 | 0.150 |
| | No | 17 (36.96%) | 60 (53.10%) | 77 (48.43%) | | |
| | Sometimes | 18 (39.13%) | 36 (31.86%) | 54 (33.96%) | | |
| **Suggestions for Improving Course Efficiency** | More visual materials should be used | 11 (23.91%) | 29 (25.66%) | 40 (25.16%) | 0.283 | 0.967 |
| | More revision should be provided | 7 (15.22%) | 14 (12.39%) | 21 (13.21%) | | |
| | Lessons should be more understandable and engaging | 11 (23.91%) | 26 (23.01%) | 37 (23.27%) | | |
| | Greater emphasis should be placed on practical sessions | 17 (36.96%) | 44 (38.94%) | 61 (38.36%) | | |
| **Preference for Elective Course** | Yes | 21 (45.65%) | 38 (33.63%) | 59 (37.11%) | 2.546 | 0.268 |
| | No | 16 (34.78%) | 54 (47.79%) | 70 (44.03%) | | |
| | No idea | 9 (19.57%) | 21 (18.58%) | 30 (18.87%) | | |
| **Contribution to the Profession** | Yes | 38 (82.61%) | 86 (76.11%) | 124 (77.99%) | 1.815 | 0.453 |
| | No | 5 (10.87%) | 11 (9.73%) | 16 (10.06%) | | |
| | No idea | 3 (6.52%) | 16 (14.16%) | 19 (11.95%) | | |
| **Willingness to Pursue Anatomy in the Future** | Yes | 21 (45.65%) | 40 (35.40%) | 61 (38.36%) | 2.999 | 0.217 |
| | No | 11 (23.91%) | 43 (38.05%) | 54 (33.96%) | | |
| | No idea | 14 (30.43%) | 30 (26.55%) | 44 (27.67%) | | |

n: number; %: percentage; $\chi^2$: Pearson chi-square test statistic; p values were obtained using the two-sided Fisher-Freeman-Halton exact test with Monte Carlo estimation; *$p < 0.05$.

**Table 4.** Comparison of responses by department

| Variable | Group | Coaching Education n (%) | Physical Education and Sports Teaching n (%) | Nutrition and Dietetics n (%) | Midwifery n (%) | Pharmacy n (%) | Nursing n (%) | Total n (%) | $\chi^2$ (Chi-Square) | p |
|---|---|---|---|---|---|---|---|---|---|---|
| **Interest in the Anatomy Course** | Yes | 10 (58.82%) | 8 (53.33%) | 47 (61.04%) | 1 (33.33%) | 2 (100.00%) | 28 (62.22%) | 96 (60.38%) | 4.386 | 0.920 |
| | No | 3 (17.65%) | 2 (13.33%) | 15 (19.48%) | 1 (33.33%) | 0 (0.00%) | 6 (13.33%) | 27 (16.98%) | | |
| | Undecided | 4 (23.53%) | 5 (33.33%) | 15 (19.48%) | 1 (33.33%) | 0 (0.00%) | 11 (24.44%) | 36 (22.64%) | | |
| **Perceived Difficulty Level of Anatomy** | One | 0 (0.00%) | 0 (0.00%) | 1 (1.30%) | 0 (0.00%) | 0 (0.00%) | 2 (4.44%) | 3 (1.89%) | 13.602 | 0.785 |
| | Two | 0 (0.00%) | 0 (0.00%) | 2 (2.60%) | 0 (0.00%) | 0 (0.00%) | 1 (2.22%) | 3 (1.89%) | | |
| | Three | 6 (35.29%) | 4 (26.67%) | 35 (45.45%) | 1 (33.33%) | 0 (0.00%) | 17 (37.78%) | 63 (39.62%) | | |
| | Four | 5 (29.41%) | 5 (33.33%) | 18 (23.38%) | 1 (33.33%) | 0 (0.00%) | 16 (35.56%) | 45 (28.30%) | | |
| | Five | 6 (35.29%) | 6 (40.00%) | 21 (27.27%) | 1 (33.33%) | 2 (100.00%) | 9 (20.00%) | 45 (28.30%) | | |
| **Importance of Visual Materials** | Yes | 14 (82.35%) | 14 (93.33%) | 75 (97.40%) | 3 (100.00%) | 2 (100.00%) | 45 (100.00%) | 153 (96.23%) | 14.936 | 0.103 |
| | No | 1 (5.88%) | 1 (6.67%) | 1 (1.30%) | 0 (0.00%) | 0 (0.00%) | 0 (0.00%) | 3 (1.89%) | | |
| | No idea | 2 (11.76%) | 0 (0.00%) | 1 (1.30%) | 0 (0.00%) | 0 (0.00%) | 0 (0.00%) | 3 (1.89%) | | |
| **Importance of Practice** | Yes | 14 (82.35%) | 15 (100.00%) | 66 (85.71%) | 3 (100.00%) | 2 (100.00%) | 43 (95.56%) | 143 (89.94%) | 7.119 | 0.658 |
| | No | 2 (11.76%) | 0 (0.00%) | 5 (6.49%) | 0 (0.00%) | 0 (0.00%) | 1 (2.22%) | 8 (5.03%) | | |
| | No idea | 1 (5.88%) | 0 (0.00%) | 6 (7.79%) | 0 (0.00%) | 0 (0.00%) | 1 (2.22%) | 8 (5.03%) | | |
| **Adequacy of Course Hours** | Yes | 4 (23.53%) | 0 (0.00%) | 54 (70.13%) | 2 (66.67%) | 2 (100.00%) | 13 (28.89%) | 75 (47.17%) | ***58.901*** | ***<0.001**** |
| | No | 7 (41.18%) | 12 (80.00%) | 12 (15.58%) | 1 (33.33%) | 0 (0.00%) | 30 (66.67%) | 62 (38.99%) | | |
| | Undecided | 6 (35.29%) | 3 (20.00%) | 11 (14.29%) | 0 (0.00%) | 0 (0.00%) | 2 (4.44%) | 22 (13.84%) | | |
| **Ease of Access to Supplementary Resources** | Yes | 7 (41.18%) | 10 (66.67%) | 43 (55.84%) | 2 (66.67%) | 2 (100.00%) | 21 (46.67%) | 85 (53.46%) | 9.676 | 0.542 |
| | No | 9 (52.94%) | 5 (33.33%) | 22 (28.57%) | 1 (33.33%) | 0 (0.00%) | 17 (37.78%) | 54 (33.96%) | | |
| | No idea | 1 (5.88%) | 0 (0.00%) | 12 (15.58%) | 0 (0.00%) | 0 (0.00%) | 7 (15.56%) | 20 (12.58%) | | |
| **Usefulness of Supplementary Resources** | Yes | 13 (76.47%) | 13 (86.67%) | 59 (76.62%) | 2 (66.67%) | 2 (100.00%) | 38 (84.44%) | 127 (79.87%) | 9.000 | 0.550 |
| | No | 2 (11.76%) | 1 (6.67%) | 4 (5.19%) | 1 (33.33%) | 0 (0.00%) | 1 (2.22%) | 9 (5.66%) | | |
| | Undecided | 2 (11.76%) | 1 (6.67%) | 14 (18.18%) | 0 (0.00%) | 0 (0.00%) | 6 (13.33%) | 23 (14.47%) | | |
| **Difficulty in Learning** | Yes | 9 (52.94%) | 6 (40.00%) | 38 (49.35%) | 1 (33.33%) | 1 (50.00%) | 28 (62.22%) | 83 (52.20%) | 10.196 | 0.422 |
| | No | 4 (23.53%) | 6 (40.00%) | 21 (27.27%) | 0 (0.00%) | 0 (0.00%) | 12 (26.67%) | 43 (27.04%) | | |
| | Undecided | 4 (23.53%) | 3 (20.00%) | 18 (23.38%) | 2 (66.67%) | 1 (50.00%) | 5 (11.11%) | 33 (20.75%) | | |
| **Preferred Learning Method** | Listening to lectures | 5 (29.41%) | 5 (33.33%) | 13 (16.88%) | 0 (0.00%) | 0 (0.00%) | 13 (28.89%) | 36 (22.64%) | ***40.632*** | ***<0.001**** |
| | Group study | 1 (5.88%) | 0 (0.00%) | 3 (3.90%) | 0 (0.00%) | 0 (0.00%) | 0 (0.00%) | 4 (2.52%) | | |
| | Reading / individual study | 2 (11.76%) | 5 (33.33%) | 56 (72.73%) | 2 (66.67%) | 2 (100.00%) | 26 (57.78%) | 93 (58.49%) | | |
| | Using supplementary materials (videos, flashcards, etc.) | 9 (52.94%) | 5 (33.33%) | 5 (6.49%) | 1 (33.33%) | 0 (0.00%) | 6 (13.33%) | 26 (16.35%) | | |
| **Studying Before Class** | Yes | 9 (52.94%) | 3 (20.00%) | 8 (10.39%) | 0 (0.00%) | 1 (50.00%) | 7 (15.56%) | 28 (17.61%) | ***29.918*** | ***<0.001**** |
| | No | 2 (11.76%) | 4 (26.67%) | 41 (53.25%) | 1 (33.33%) | 1 (50.00%) | 28 (62.22%) | 77 (48.43%) | | |
| | Sometimes | 6 (35.29%) | 8 (53.33%) | 28 (36.36%) | 2 (66.67%) | 0 (0.00%) | 10 (22.22%) | 54 (33.96%) | | |
| **Suggestions for Improving Course Efficiency** | More visual materials should be used | 6 (35.29%) | 3 (20.00%) | 17 (22.08%) | 0 (0.00%) | 1 (50.00%) | 13 (28.89%) | 40 (25.16%) | 15.731 | 0.566 |
| | More revision should be provided | 3 (17.65%) | 2 (13.33%) | 10 (12.99%) | 2 (66.67%) | 0 (0.00%) | 4 (8.89%) | 21 (13.21%) | | |
| | Lessons should be more understandable and engaging | 3 (17.65%) | 6 (40.00%) | 20 (25.97%) | 0 (0.00%) | 0 (0.00%) | 8 (17.78%) | 37 (23.27%) | | |
| | Greater emphasis should be placed on practical sessions | 5 (29.41%) | 4 (26.67%) | 30 (38.96%) | 1 (33.33%) | 1 (50.00%) | 20 (44.44%) | 61 (38.36%) | | |
| **Preference for Elective Course** | Yes | 10 (58.82%) | 7 (46.67%) | 19 (24.68%) | 2 (66.67%) | 1 (50.00%) | 20 (44.44%) | 59 (37.11%) | **15.971** | **0.037*** |
| | No | 3 (17.65%) | 5 (33.33%) | 44 (57.14%) | 0 (0.00%) | 1 (50.00%) | 17 (37.78%) | 70 (44.03%) | | |
| | No idea | 4 (23.53%) | 3 (20.00%) | 14 (18.18%) | 1 (33.33%) | 0 (0.00%) | 8 (17.78%) | 30 (18.87%) | | |
| **Contribution to the Profession** | Yes | 15 (88.24%) | 12 (80.00%) | 49 (63.64%) | 2 (66.67%) | 2 (100.00%) | 44 (97.78%) | 124 (77.99%) | ***26.125*** | ***<0.001**** |
| | No | 1 (5.88%) | 3 (20.00%) | 12 (15.58%) | 0 (0.00%) | 0 (0.00%) | 0 (0.00%) | 16 (10.06%) | | |
| | No idea | 1 (5.88%) | 0 (0.00%) | 16 (20.78%) | 1 (33.33%) | 0 (0.00%) | 1 (2.22%) | 19 (11.95%) | | |
| **Willingness to Pursue Anatomy in the Future** | Yes | 7 (41.18%) | 5 (33.33%) | 32 (41.56%) | 1 (33.33%) | 2 (100.00%) | 14 (31.11%) | 61 (38.36%) | 10.931 | 0.358 |
| | No | 4 (23.53%) | 3 (20.00%) | 30 (38.96%) | 1 (33.33%) | 0 (0.00%) | 16 (35.56%) | 54 (33.96%) | | |
| | No idea | 6 (35.29%) | 7 (46.67%) | 15 (19.48%) | 1 (33.33%) | 0 (0.00%) | 15 (33.33%) | 44 (27.67%) | | |

n: number; %: percentage; $\chi^2$: Pearson chi-square test statistic; p values were obtained using the two-sided Fisher-Freeman-Halton exact test with Monte Carlo estimation; *p < 0.05.

**Table 5.** Comparison of responses according to willingness to pursue anatomy in the future

| Variable | Group | Yes n (%) | No n (%) | No idea n (%) | Total n (%) | $\chi^2$ (Chi-Square) | p |
|---|---|---|---|---|---|---|---|
| **Interest in the Anatomy Course** | Yes | 55 (90.16%) | 14 (25.93%) | 27 (61.36%) | 96 (60.38%) | ***67.715*** | ***<0.001**** |
| | No | 2 (3.28%) | 24 (44.44%) | 1 (2.27%) | 27 (16.98%) | | |
| | Undecided | 4 (6.56%) | 16 (29.63%) | 16 (36.36%) | 36 (22.64%) | | |
| **Perceived Difficulty Level of Anatomy** | One | 3 (4.92%) | 0 (0.00%) | 0 (0.00%) | 3 (1.89%) | ***21.060*** | ***0.005**** |
| | Two | 2 (3.28%) | 0 (0.00%) | 1 (2.27%) | 3 (1.89%) | | |
| | Three | 28 (45.90%) | 13 (24.07%) | 22 (50.00%) | 63 (39.62%) | | |
| | Four | 17 (27.87%) | 16 (29.63%) | 12 (27.27%) | 45 (28.30%) | | |
| | Five | 11 (18.03%) | 25 (46.30%) | 9 (20.45%) | 45 (28.30%) | | |
| **Importance of Visual Materials** | Yes | 59 (96.72%) | 52 (96.30%) | 42 (95.45%) | 153 (96.23%) | 3.815 | 0.388 |
| | No | 2 (3.28%) | 0 (0.00%) | 1 (2.27%) | 3 (1.89%) | | |
| | No idea | 0 (0.00%) | 2 (3.70%) | 1 (2.27%) | 3 (1.89%) | | |
| **Importance of Practice** | Yes | 57 (93.44%) | 45 (83.33%) | 41 (93.18%) | 143 (89.94%) | 6.811 | 0.120 |
| | No | 3 (4.92%) | 5 (9.26%) | 0 (0.00%) | 8 (5.03%) | | |
| | No idea | 1 (1.64%) | 4 (7.41%) | 3 (6.82%) | 8 (5.03%) | | |
| **Adequacy of Course Hours** | Yes | 31 (50.82%) | 28 (51.85%) | 16 (36.36%) | 75 (47.17%) | ***11.503*** | ***0.025**** |
| | No | 27 (44.26%) | 19 (35.19%) | 16 (36.36%) | 62 (38.99%) | | |
| | Undecided | 3 (4.92%) | 7 (12.96%) | 12 (27.27%) | 22 (13.84%) | | |
| **Ease of Access to Supplementary Resources** | Yes | 32 (52.46%) | 25 (46.30%) | 28 (63.64%) | 85 (53.46%) | 4.005 | 0.419 |
| | No | 20 (32.79%) | 23 (42.59%) | 11 (25.00%) | 54 (33.96%) | | |
| | No idea | 9 (14.75%) | 6 (11.11%) | 5 (11.36%) | 20 (12.58%) | | |
| **Usefulness of Supplementary Resource** | Yes | 49 (80.33%) | 40 (74.07%) | 38 (86.36%) | 127 (79.87%) | 3.125 | 0.579 |
| | No | 3 (4.92%) | 5 (9.26%) | 1 (2.27%) | 9 (5.66%) | | |
| | Undecided | 9 (14.75%) | 9 (16.67%) | 5 (11.36%) | 23 (14.47%) | | |
| **Difficulty in Learning** | Yes | 23 (37.70%) | 41 (75.93%) | 19 (43.18%) | 83 (52.20%) | ***21.592*** | ***<0.001**** |
| | No | 25 (40.98%) | 5 (9.26%) | 13 (29.55%) | 43 (27.04%) | | |
| | Undecided | 13 (21.31%) | 8 (14.81%) | 12 (27.27%) | 33 (20.75%) | | |
| **Preferred Learning Method** | Listening to lectures | 12 (19.67%) | 10 (18.52%) | 14 (31.82%) | 36 (22.64%) | 7.595 | 0.319 |
| | Group study | 1 (1.64%) | 3 (5.56%) | 0 (0.00%) | 4 (2.52%) | | |
| | Reading / individual study | 38 (62.30%) | 34 (62.96%) | 21 (47.73%) | 93 (58.49%) | | |
| | Using supplementary materials (videos, flashcards, etc.) | 10 (16.39%) | 7 (12.96%) | 9 (20.45%) | 26 (16.35%) | | |
| **Studying Before Class** | Yes | 16 (26.23%) | 8 (14.81%) | 4 (9.09%) | 28 (17.61%) | ***11.382*** | ***0.022**** |
| | No | 21 (34.43%) | 33 (61.11%) | 23 (52.27%) | 77 (48.43%) | | |
| | Sometimes | 24 (39.34%) | 13 (24.07%) | 17 (38.64%) | 54 (33.96%) | | |
| **Suggestions for Improving Course Efficiency** | More visual materials should be used | 16 (26.23%) | 11 (20.37%) | 13 (29.55%) | 40 (25.16%) | *12.637* | *0.058* |
| | More revision should be provided | 8 (13.11%) | 7 (12.96%) | 6 (13.64%) | 21 (13.21%) | | |
| | Lessons should be more understandable and engaging | 8 (13.11%) | 21 (38.89%) | 8 (18.18%) | 37 (23.27%) | | |
| | Greater emphasis should be placed on practical sessions | 29 (47.54%) | 15 (27.78%) | 17 (38.64%) | 61 (38.36%) | | |
| **Preference for Elective Course** | Yes | 36 (59.02%) | 9 (16.67%) | 14 (31.82%) | 59 (37.11%) | ***44.846*** | ***<0.001**** |
| | No | 19 (31.15%) | 39 (72.22%) | 12 (27.27%) | 70 (44.03%) | | |
| | No idea | 6 (9.84%) | 6 (11.11%) | 18 (40.91%) | 30 (18.87%) | | |
| **Contribution to the Profession** | Yes | 58 (95.08%) | 31 (57.41%) | 35 (79.55%) | 124 (77.99%) | ***25.075*** | ***<0.001**** |
| | No | 1 (1.64%) | 12 (22.22%) | 3 (6.82%) | 16 (10.06%) | | |
| | No idea | 2 (3.28%) | 11 (20.37%) | 6 (13.64%) | 19 (11.95%) | | |

n: number; %: percentage; $\chi^2$: Pearson chi-square test statistic; p values were obtained using the two-sided Fisher-Freeman-Halton exact test with Monte Carlo estimation; *p < 0.05.

**Table 6.** Comparison of responses according to interest in the anatomy course

| Variable | Group | Yes n (%) | No n (%) | Undecided n (%) | Total n (%) | $\chi^2$ (Chi-Square) | p |
|---|---|---|---|---|---|---|---|
| **Perceived Difficulty Level of Anatomy** | One | 3 (3.12%) | 0 (0.00%) | 0 (0.00%) | 3 (1.89%) | ***40.670*** | ***<0.001**** |
| | Two | 3 (3.12%) | 0 (0.00%) | 0 (0.00%) | 3 (1.89%) | | |
| | Three | 46 (47.92%) | 5 (18.52%) | 12 (33.33%) | 63 (39.62%) | | |
| | Four | 30 (31.25%) | 2 (7.41%) | 13 (36.11%) | 45 (28.30%) | | |
| | Five | 14 (14.58%) | 20 (74.07%) | 11 (30.56%) | 45 (28.30%) | | |
| **Importance of Visual Materials** | Yes | 94 (97.92%) | 25 (92.59%) | 34 (94.44%) | 153 (96.23%) | 6.101 | 0.105 |
| | No | 2 (2.08%) | 1 (3.70%) | 0 (0.00%) | 3 (1.89%) | | |
| | No idea | 0 (0.00%) | 1 (3.70%) | 2 (5.56%) | 3 (1.89%) | | |
| **Importance of Practice** | Yes | 90 (93.75%) | 24 (88.89%) | 29 (80.56%) | 143 (89.94%) | ***10.873*** | ***0.030**** |
| | No | 3 (3.12%) | 3 (11.11%) | 2 (5.56%) | 8 (5.03%) | | |
| | No idea | 3 (3.12%) | 0 (0.00%) | 5 (13.89%) | 8 (5.03%) | | |
| **Adequacy of Course Hours** | Yes | 41 (42.71%) | 15 (55.56%) | 19 (52.78%) | 75 (47.17%) | 6.596 | 0.162 |
| | No | 44 (45.83%) | 9 (33.33%) | 9 (25.00%) | 62 (38.99%) | | |
| | Undecided | 11 (11.46%) | 3 (11.11%) | 8 (22.22%) | 22 (13.84%) | | |
| **Ease of Access to Supplementary Resources** | Yes | 57 (59.38%) | 10 (37.04%) | 18 (50.00%) | 85 (53.46%) | 5.176 | 0.235 |
| | No | 30 (31.25%) | 12 (44.44%) | 12 (33.33%) | 54 (33.96%) | | |
| | No idea | 9 (9.38%) | 5 (18.52%) | 6 (16.67%) | 20 (12.58%) | | |
| **Usefulness of Supplementary Resources** | Yes | 82 (85.42%) | 17 (62.96%) | 28 (77.78%) | 127 (79.87%) | ***10.859*** | ***0.031**** |
| | No | 6 (6.25%) | 1 (3.70%) | 2 (5.56%) | 9 (5.66%) | | |
| | Undecided | 8 (8.33%) | 9 (33.33%) | 6 (16.67%) | 23 (14.47%) | | |
| **Difficulty in Learning** | Yes | 36 (37.50%) | 23 (85.19%) | 24 (66.67%) | 83 (52.20%) | ***25.796*** | ***<0.001**** |
| | No | 37 (38.54%) | 2 (7.41%) | 4 (11.11%) | 43 (27.04%) | | |
| | Undecided | 23 (23.96%) | 2 (7.41%) | 8 (22.22%) | 33 (20.75%) | | |
| **Preferred Learning Method** | Listening to lectures | 20 (20.83%) | 6 (22.22%) | 10 (27.78%) | 36 (22.64%) | 1.927 | 0.860 |
| | Group study | 2 (2.08%) | 1 (3.70%) | 1 (2.78%) | 4 (2.52%) | | |
| | Reading / individual study | 59 (61.46%) | 14 (51.85%) | 20 (55.56%) | 93 (58.49%) | | |
| | Using supplementary materials (videos, flashcards, etc.) | 15 (15.62%) | 6 (22.22%) | 5 (13.89%) | 26 (16.35%) | | |
| **Studying Before Class** | Yes | 20 (20.83%) | 4 (14.81%) | 4 (11.11%) | 28 (17.61%) | 4.592 | 0.356 |
| | No | 42 (43.75%) | 17 (62.96%) | 18 (50.00%) | 77 (48.43%) | | |
| | Sometimes | 34 (35.42%) | 6 (22.22%) | 14 (38.89%) | 54 (33.96%) | | |
| **Suggestions for Improving Course Efficiency** | More visual materials should be used | 29 (30.21%) | 4 (14.81%) | 7 (19.44%) | 40 (25.16%) | 10.760 | 0.092 |
| | More revision should be provided | 11 (11.46%) | 5 (18.52%) | 5 (13.89%) | 21 (13.21%) | | |
| | Lessons should be more understandable and engaging | 15 (15.62%) | 9 (33.33%) | 13 (36.11%) | 37 (23.27%) | | |
| | Greater emphasis should be placed on practical sessions | 41 (42.71%) | 9 (33.33%) | 11 (30.56%) | 61 (38.36%) | | |
| **Preference for Elective Course** | Yes | 48 (50.00%) | 3 (11.11%) | 8 (22.22%) | 59 (37.11%) | ***27.401*** | ***<0.001**** |
| | No | 29 (30.21%) | 22 (81.48%) | 19 (52.78%) | 70 (44.03%) | | |
| | No idea | 19 (19.79%) | 2 (7.41%) | 9 (25.00%) | 30 (18.87%) | | |
| **Contribution to the Profession** | Yes | 81 (84.38%) | 17 (62.96%) | 26 (72.22%) | 124 (77.99%) | 6.887 | 0.104 |
| | No | 6 (6.25%) | 5 (18.52%) | 5 (13.89%) | 16 (10.06%) | | |
| | No idea | 9 (9.38%) | 5 (18.52%) | 5 (13.89%) | 19 (11.95%) | | |

n: number; %: percentage; $\chi^2$: Pearson chi-square test statistic; p values were obtained using the two-sided Fisher-Freeman-Halton exact test with Monte Carlo estimation; *$p < 0.05$.

**Table 7.** Relationship between experiencing learning difficulty and studying before class

| Variable | Group | Studying Before Class | | | **Total n (%)** | **$\chi^2$ (Chi-Square)** | **p** |
|---|---|---|---|---|---|---|---|
| | | Yes **n (%)** | No **n (%)** | Sometimes **n (%)** | | | |
| Difficulty in Learning | Yes | 13<br>46.4% | 47<br>61.0% | 23<br>42.6% | 83<br>52.2% | 6.612 | 0.165 |
| | No | 10<br>35.7% | 18<br>23.4% | 15<br>27.8% | 43<br>27.0% | | |
| | Undecided | 5<br>17.9% | 12<br>15.6% | 16<br>29.6% | 33<br>20.8% | | |
| | Total | 28<br>100.0% | 77<br>100.0% | 54<br>100.0% | 159<br>100.0% | | |

n: number; %: percentage; $\chi^2$: Pearson chi-square test statistic; p value was obtained using the two-sided Fisher-Freeman-Halton exact test with Monte Carlo estimation.

**Table 8.** Relationship between experiencing learning difficulty and suggestions for course efficiency

| Variable | Group | Suggestions for Course Efficiency | | | | **Total n (%)** | **$\chi^2$ (Chi-Square)** | **p** |
|---|---|---|---|---|---|---|---|---|
| | | More visual materials should be used n (%) | More revision should be provided n (%) | Lessons should be more understandable and engaging n (%) | Greater emphasis should be placed on practical sessions n (%) | | | |
| Difficulty in Learning | Yes | 19<br>47.5% | 12<br>57.1% | 22<br>59.5% | 30<br>49.2% | 83<br>52.2% | **16.008** | **0.011*** |
| | No | 19<br>47.5% | 4<br>19.1% | 6<br>16.2% | 14<br>22.9% | 43<br>27.0% | | |
| | Undecided | 2<br>5.0% | 5<br>23.8% | 9<br>24.3% | 17<br>27.9% | 33<br>20.8% | | |
| Total | | 40<br>100.0% | 21<br>100.0% | 37<br>100.0% | 61<br>100.0% | 159<br>100.0% | | |

n: number; %: percentage; $\chi^2$: Pearson chi-square test statistic; p value was obtained using the two-sided Fisher-Freeman-Halton exact test with Monte Carlo estimation; *$p < 0.05$.

pre-class study and learning difficulty in this sample. Nevertheless, pre-class preparation may remain relevant to the broader learning process and warrants further investigation in studies specifically designed to evaluate its effect.

Regarding preferred learning methods, 58.49% of the students reported reading or individual study as their preferred approach, whereas group study was preferred by only 2.52%. This finding suggests that individual learning methods were more commonly preferred by the participants. However, the low preference for group study should not be interpreted as evidence of its ineffectiveness. Rather, it highlights the importance of considering students' learning preferences when developing educational strategies. Most students (77.99%) believed that anatomy would contribute to their professional lives. This finding is consistent with the observations reported by Uygur et al. (2013) (30). In addition, willingness to pursue anatomy in the future was significantly associated with interest in anatomy, perceived difficulty, adequacy of course hours, difficulty in learning, studying before class, preference for anatomy as an elective course, and perceived professional contribution ($p<0.05$). In contrast, suggestions for improving course efficiency were not significantly associated with willingness to pursue anatomy in the future ($p=0.058$). These findings indicate that students' future orientation toward anatomy is associated with multiple aspects of their current perceptions and learning experiences.

Current educational research indicates that integrating anatomy with clinically relevant applications may support student learning and motivation (31). In this context, educational approaches that appropriately combine theoretical instruction, practical activities, visual materials, and student participation may better address students' learning needs. Overall, the present findings emphasize the importance of considering student feedback when evaluating and developing anatomy curricula. Previous research has similarly highlighted the relevance of student perceptions to educational outcomes and the development of teaching strategies (32, 33).

## CONCLUSION

In conclusion, the findings of this study indicate that students' perceptions of anatomy education are associated with several educational and learning-related factors. Students particularly emphasized the importance of practical sessions, visual materials, and understandable and engaging teaching approaches. Therefore, incorporating practical activities, audiovisual materials, and student-centered approaches into anatomy education may help address students' learning needs. Considering student feedback in the planning and continuous evaluation of educational programs may contribute to the development of more effective and student-centered anatomy education.

### Ethical Approval

Ethical approval for this study was provided by the Research Ethics Committee of the Ağrı İbrahim Çeçen University Scientific Research Ethics Committee with number 99.

### Conflict of Interest

No conflict of interest was declared by the authors.

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### Authors' Contributions

AA, HO: Conceptualization and design of the study. Execution of surveys. Analysis of the results. Writing of the manuscript. Literature research. Execution of surveys. Review of the manuscript.

### Data Sharing Statement

The dataset used and analyzed in the study is available from the corresponding author upon reasonable request.

### Declaration of generative AI and AI-assisted technologies in the writing process

During the preparation of this manuscript, the authors used ChatGPT (OpenAI) solely for English language editing. The authors reviewed and edited the final text and take full responsibility for the content of the manuscript.

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