Medical Education

Original Article

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Is cadaveric dissection essential in medical education? A qualitative survey comparing pre-and post-COVID-19 anatomy courses

Abstract

Context: With the surge of the novel coronavirus (SARS-CoV-2 [COVID-19]), the modality of teaching anatomy has shifted from in-person cadaveric dissection to virtual lessons for incoming first-year medical students. As a result, we aim to assess the impact that this curriculum change has on student perspectives.

Objectives: This study aims to understand the relative effect of a virtual anatomy course implemented during the pandemic (2019–2020) on the confidence, skills, and perspectives of first-year medical students compared to medical students who had traditional in-person anatomy at Rowan University School of Osteopathic Medicine (Rowan SOM) in Stratford, New Jersey.

Methods: The authors developed a 14-question survey to target gross anatomy students of the Classes of 2023 and 2024 at Rowan SOM. The Class of 2024 had a virtual anatomy lab compared to the Class of 2023, who had an in-person anatomy lab in their first year of medical school. The responses were analyzed to understand the difference between a hands-on cadaver lab and a virtual anatomy lab utilizing SPSS.

Results: The survey was administered to approximately 400 people, from which we received 149 responses (37.3%). Among all responses, 36.2% (n=54) belonged to the Class of 2023 who encountered hands-on cadaver experience, whereas 63.8% (n=95) belonged to the Class of 2024 who gained virtual anatomy lab experience. An independent t-test statistical analysis was utilized. Under the confidence domain, when students were asked about the understanding of trauma after their respective anatomy labs, 64.0% of the Class of 2023 (n=50) showed significantly higher confidence with p<0.001, compared to 15.4% for the Class of 2024 (n=78). Under the skills domain, the Class of 2023 (n=50) felt more comfortable with ultrasound (64.0%), identifying all of the pertinent anatomical structures and their respective locations on imaging (72.0%), and identifying the pathology (90.0%) with respective p values of <0.001, <0.001, and 0.004. Only 36.9% of Class of 2024 respondents shared similar comfort with ultrasound (n=84), 30.9% identifying pertinent anatomical structures (n=84) and 65.4% in identifying pathology (n=84). Under the attitude domain, the Class of 2023 (n=50) had more respect toward the human body with their hands-on cadaver experience (88.0%) than the Class of 2024 (n=89, 33.3%).

Conclusions: Based on current results, it can be established that medical students who had in-person cadaveric dissection had a favorable attitude toward their anatomy course compared to students who had virtual anatomy during the COVID-19 pandemic.

Keywords: anatomy; cadaver dissection; COVID-19; medical education.

Due to the rapid spread of SARS-CoV-2 (COVID-19) throughout the world in 2019, many states responded with a mandatory stay-at-home order to reduce the spread of the virus [1]. Undergraduate medical education rapidly transitioned their entire preclerkship curriculum, which includes basic sciences and health sciences, from in-person to online [2]. Remote learning required cancellation of interactive small group sessions and transition to prerecorded lectures [3]. How this remote learning impacts student perspectives is still under investigation. In a survey distributed to first– and second-year medical students at the University of California San Diego School of Medicine (n=104), the majority showed dissatisfaction with the quality of instruction and their inability to participate [4]. In a fully tangible course like gross anatomy, which

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requires hands-on cadaveric dissection, one can predict how the shift in delivering content remotely can be disengaging for students.

Prior to COVID-19, alternate ways of teaching anatomy that are engaging and interactive but are done in a shorter amount of time were strategically discussed among instructors [5, 6]. Medical schools, such as the one at the University of Michigan, implemented a shortened anatomy curriculum with cadaveric dissection as an optional part of their education. Although there was no statistical difference between the old and the new curriculum outcomes, respondents felt that a more robust anatomy dissection was important to their residency preparation [7]. Similarly, the continued reduction of contact hours and the lack of mandatory cadaveric dissection in medical education has led many doctors to report inadequate anatomical knowledge in junior doctors [8]. In a questionnaire-based study among practicing surgeons (n=42), 65% of respondents shared that they view cadaver-based teaching as the most beneficial method of teaching anatomy and that it should be enhanced in medical education [9].

Unfortunately, the traditional anatomy course was forced to temporarily forgo in-person cadaveric dissection in medical education. Anatomy instructors integrated digital teaching resources, which included in-house created content, recording of prosected cadavers, and virtual anatomy software [8, 10]. Like many medical schools across the United States, Rowan University School of Osteopathic Medicine (Rowan SOM) transitioned from an in-person anatomy lab under the supervision of multiple instructors to a completely online platform of self-directed learning in 2020. This research study aims to identify the impact that this curriculum transition had on the students' perspectives of the knowledge and proficiency of anatomy among students with in-person cadaveric dissection experience prior to COVID-19 (Class of 2023) in comparison to students who had virtual anatomy without any hands-on cadaveric dissection post–COVID-19 (Class of 2024).

The Class of 2023 has an anatomy course composed of in-person cadaveric dissection three times per week. Their course was supplemented with in-person practicals, in which they were asked to identify anatomical structures in a physical cadaver. Subsequently they had the opportunity to identify common structures utilizing point-of-care ultrasound and computed tomography (CT) images. Together with knowledge and skills, students had the opportunity to develop a respectful attitude toward the human body. The entire anatomy course was conducted over an 8 week period.

On the other hand, the Class of 2024 had an anatomy course that was completely virtual including cadaveric dissection. Students had detailed handouts with labeled cadaver images and had access to optional dissection videos. For the practical exam replacement, students worked in groups of six to complete Cadaver-Assisted Learning Activities (CALAs) per week. A typical CALA had a series of cases/problems that needed to be solved by the groups and then submitted by a deadline each week. They too had the opportunity to identify structures on point-of-care ultrasound and CT images; however, these sessions were done remotely. Their entire anatomy course was also conducted over an 8 week period.

Based on the curriculum, the survey measured three essential domains: confidence, skills and attitude gained from respective anatomy courses, and the impact it had on the student's ability to implement those skills in imaging modality and future medical careers. It was distributed to Problem-Based Learning (PBL) and Synergistic Guided Learning (SGL) curriculum students of both classes. The PBL curriculum utilizes a self-directed group-learning strategy, whereas the SGL curriculum follows traditional lecture-based learning. Both curricula traditionally had in-person cadaver dissection prior to COVID-19. The results were utilized to test the hypothesis: in-person cadaveric dissection skills acquired in the anatomy lab are necessary in medical school education in developing well-rounded physicians who are confident and adept in decision making. Therefore, we propose that the Class of 2023 will be more adept in all three domains from an in-person cadaveric dissection lab.

Methods

The study was classified as exempt by the Institutional Review Board at the Rowan SOM (protocol #PRO-2021-474). The data compiled for this study was acquired through the distribution of an electronic survey through Qualtrics XM. The survey was developed by the authors and piloted prior to distribution. The target audience was students from the Classes of 2023 and 2024 at Rowan SOM. The Class of 2024 was part of a virtual anatomy lab as compared to the Class of 2023, which had an in-person anatomy lab in their first year of medical school. All of the participants were 18 years or older and completed the informed consent prior to filling out the survey. The Classes of 2023 and 2024 both have approximately 200 students in each cohort. The survey did not collect any name, sex, or age identifiers, and all of the data were confidential. Anatomy is the first course that medical students at Rowan SOM cover over 8 weeks for both the Classes of 2023 and 2024. The difference between the cohorts was that the Class of 2023 had practical, hands-on dissection followed by three in-person practical, hands-on dissections to test the students' knowledge, whereas the Class of 2024 received online videos and group exercises to substitute for the in-person dissection, which was followed by weekly quizzes and written exams with dissection pictures to test the students' understanding. For both classes, the quizzes and exams were a part of the grade that they needed to pass the course.

Data collection process and data items

The survey can be found in Appendix A. The first five questions of the survey collected demographical data about the year and track in medical school as well as their interest in certain specialties, with the answers being in the binary form of "yes" or "no." The next nine questions assessed the confidence, skills, and attitude regarding the anatomy lab and their perceived likes/dislikes on a Likert scale from 1 to 5, with 1 being "definitely yes" to 5 being "definitely no." In the survey, questions 6, 7, and 8 measured confidence, questions 9, 10, and 11 measured skills, and lastly, questions 12, 13, and 14 measured attitude regarding anatomy lab.

Statistical analysis

Descriptive analysis was performed utilizing proportions (percentages) for categorical variables and mean and standard deviation for continuous variables. Comparisons between the two classes were analyzed utilizing a t-test for Equality of Means. The questions were based on the three categories to understand the areas in which these classes differed. The significance level was set at $\alpha < 0.05$. All statistical analyses were performed utilizing the SPSS statistical package, version 26 (IBM Corp., Armonk, NY).

Results

The survey was administered to a total of 400 students from the two classes with different curricula for the anatomy lab before and during COVID-19. The response rate for the survey was 37.3% (n=149); 36.2% (n=54) belonged to the Class of 2023 and 63.8% (n=95) belonged to the Class of 2024. Among the participants, 70.5% (n=149) had no prior cadaver experience before entering medical school. Only 38.9% (n=58) of the students wanted to specialize in surgery and 7.4% (n=11) wanted to specialize in radiology before coming to medical school. Further breakdown of the demographic data based on class groups is shown in Table 1. Table 4 shows a large effect size for the data collected as measured by Cohen's d.

Regarding Tables 2 and 3, when students were asked about the likelihood of specializing in surgery after taking the anatomy lab, the data showed no difference between the two classes. The achieved p value was 0.329 with a mean of 3.37 (Class of 2023) and 3.28 (Class of 2024). Similarly, the two cohorts did not differ in their preference for specializing in radiology after taking the anatomy lab, with a p value of 0.400. When asked about the understanding of trauma after their respective anatomy labs, the Class of 2023 showed a significantly higher confidence, with a p value of <0.001 and a mean of 2.26 for the Class of 2023 and 3.49 for the Class of 2024. These results represent students' perspectives of their training, which is assessed through imaging-

Table 1: Responses to demographic questions expressed in the number of responses and percentages.

Variable	Year	Frequencies	
What year are you graduating?	2023	36.2% (n=54)	
	2024	63.8% (n=95)	
What track are you in?		PBL	SGL
(PBL/SGL)	2023	6.0% (n=9)	30.2% (n=45)
	2024	9.4% (n=14)	54.4% (n=81)
Did you have any hands-on		Yes	No
cadaver experience before	2023	15.4% (n=23)	20.8% (n=31)
coming to medical school?	2024	14.1% (n=21)	49.7% (n=74)
Did you want to specialize in		Yes	No
surgery before coming to	2023	12.1% (n=18)	24.2% (n=36)
medical school?	2024	26.8% (n=40)	36.9% (n=55)
Did you want to specialize in		Yes	No
radiology before coming to	2023	2.0% (n=3)	34.2% (n=51)
medical school?	2024	5.4% (n=8)	58.4% (n=87)

PBL, problem-based learning; SGL, synergistic guided learning.

and trauma-related questions throughout the anatomy curriculum Table 4.

Skills

In assessing skills, students were asked to rate their adeptness in point-of-contact ultrasound after the anatomy lab, which showed a statistically significant difference between both the Classes of 2023 and 2024 with means of 2.26 and 2.96, respectively, both p<0.001 (Tables 2 and 3). The Class of 2023 also felt more skilled in identifying all of the pertinent anatomical structures and their respective locations on imaging with a mean of 2.38 compared to 3.13 for the Class of 2024, with a significance of p<0.00. Similarly, the Class of 2023 expressed relatively more comfort in identifying pathology on radiographic imaging with a mean of 3.38, as compared to Class of 2024 with a mean of 3.82 and a significance of p=0.004.

Attitude

In assessing attitude, students were asked to rate their point of view regarding their respective anatomy courses (Tables 2 and 3). The Class of 2023 gained immense respect toward the human body after their anatomy class, with a mean of 1.46, compared to the class of 2024, with a mean of 2.86 (both with a significance of p<0.001). Both of the classes felt that cadaver experience is important to their understanding of anatomy, with means of 1.29 (Class of 2023) and 1.45 (Class of 2024), but the difference in the means was not significant

Table 2: The statistical distribution of the Classes of 2023 and 2024.

Group statistics	What year are you graduating?	n	Mean	Standard deviation	Standard error mean
1. How likely are you to specialize in surgery after taking anatomy lab?	2023	52	3.37	1.314	0.182
	2024	88	3.28	0.857	0.091
2. How likely are you to specialize in radiology after taking anatomy lab?	2023	52	3.90	0.934	0.130
	2024	87	3.86	0.942	0.101
3. Do you think cadaver experience is important in understanding anatomy?	2023	52	1.29	0.800	0.111
	2024	89	1.45	0.784	0.083
4. Did anatomy lab enhance your skill in point-of-contact ultrasound?	2023	50	2.26	1,103	0.156
	2024	84	2.96	1,265	0.138
5. If you were given an X-ray or a CT, will you be able to identify all of the pertinent anatomical structures and their respective location?	2023	50	2.38	0.923	0.131
	2024	84	3.13	0.991	0.108
6. How confident are you in identifying pathology in radiographical images?	2023	50	2.62	0.945	0.134
	2024	84	2.18	0.880	0.096
7. My anatomy lab provided me understanding of effects of trauma	2023	50	2.46	1,110	0.157
	2024	78	3.49	0.964	0.109
8. My anatomy lab enhanced my respect toward the human body	2023	50	1.46	0.885	0.125
	2024	78	2.86	1,181	0.134
9. My anatomy lab was not engaging in the way it was carried out	2023	50	3.70	1,374	0.194
	2024	78	2.31	1,262	0.143

Questions 1–3, 5, and 6 utilize likert scale ratings as follows: 1=Definitely, 2=Probably, 3=Might or might not, 4=Probably not, and 5=Definitely not (Cronbach's alpha=0.795 for n=5). Questions 4 and 7–9 utilize likert scale ratings as follows: 1=Strongly agree, 2=Somewhat agree, 3=Neither agree nor disagree, 4=Somewhat disagree, and 5=Strongly disagree (Cronbach's alpha=0.667 for n=4).

Table 3: Independent t-test showing the variance between the Class of 2023 and 2024 stating the significance and confidence interval.

		Independent samples test				
		t-test for equality of means				
Equal variance		**Significance one-sided p-Value**	**Mean difference**	**Standard error difference**	**95% confidence interval of the difference lower**	**95% confidence interval of the difference upper**
How likely are you to specialize in surgery after taking anatomy lab?	Assumed	0.329	0.081	0.184	−0.282	0.444
	Not assumed	0.346	0.081	0.204	−0.325	0.487
How likely are you to specialize in radiology after taking anatomy lab?	Assumed	0.400	0.042	0.165	−0.284	0.367
	Not assumed	0.400	0.042	0.164	−0.284	0.367
My anatomy lab provided me understanding of effects of trauma	Assumed	<0.001	−1.027	0.185	−1.394	−0.660
	Not assumed	<0.001	−1.027	0.191	−1.407	−0.648
Did anatomy lab enhance your skill in point-of-contact ultrasound?	Assumed	<0.001	−0.704	0.216	−1.131	−0.278
	Not assumed	<0.001	−0.704	0.208	−1.117	−0.292
How confident are you in identifying pathology in radiographical images?	Assumed	0.004	−0.441	0.162	−0.761	−0.122
	Not assumed	0.004	−0.441	0.165	−0.768	−0.115
If you were given an X-ray or a CT, will you be able to identify all of the pertinent anatomical structures and their respective locations?	Assumed	<0.001	−0.751	0.173	−1.092	−0.409
	Not assumed	<0.001	−0.751	0.170	−1.087	−0.415
My anatomy lab enhanced my respect toward the human body	Assumed	<0.001	−1.399	0.195	−1.785	−1.013
	Not assumed	<0.001	−1.399	0.183	−1.762	−1.036
Do you think cadaver experience is important in understanding anatomy?	Assumed	0.122	−0.161	0.138	−0.434	0.112
	Not assumed	0.124	−0.161	0.139	−0.436	0.114
My anatomy lab was not engaging in the way it was carried out	Assumed	<0.001	1.392	0.237	0.924	1.861
	Not assumed	<0.001	1.392	0.241	0.914	1.871

Table 4: Standardized mean difference Cohen's d showed a large effect size for all of the variables.

Cohen's d independent-samples effect sizes	Standardizer[a]	Point estimate	95% confidence interval	
			Lower	Upper
How likely are you to specialize in surgery after taking anatomy lab?	1,049	0.077	−0.266	0.420
How likely are you to specialize in radiology after taking anatomy lab?	0.939	0.044	−0.299	0.388
My anatomy lab provided me understanding of the effects of trauma	1,023	−1.004	−1,378	−0.626
Did anatomy lab enhance your skill in point-of-contact ultrasound?	1,208	−0.583	−0.939	−0.225
How confident are you in identifying pathology in radiographical images?	0.905	−0.488	−0.842	−0.132
If you were given an X-ray or a CT, will you be able to identify all of the pertinent anatomical structures and their respective locations?	0.967	−0.777	−1,138	−0.413
My anatomy lab enhanced my respect toward the human body	1,076	−1.300	−1,688	−0.908
Do you think cadaver experience is important in understanding anatomy?	0.790	−0.204	−0.546	0.139
My anatomy lab was not engaging in the way it was carried out	1,307	1.066	0.685	1,442

[a]The denominator utilized in estimating the effect sizes.
Cohen's d utilizes the pooled standard deviation.

(p=0.122). The Class of 2024 reported relatively more disengagement with their anatomy lab compared to the Class of 2023, with means of 2.31 and 3.70, respectively (p<0.001), but the result was not statistically significant because the confidence interval lied between 0.924 and 1.86.

Discussion

With the surge of the novel coronavirus, the modality of teaching anatomy has shifted from in-person cadaveric dissection to virtual lessons for incoming first-year medical students. Considering this, the magnitude of the impact that this change has caused is still under investigation. In a study conducted by Dharamsi et al. [11], no significant difference was found in score outcomes in the groups (n=54) that received only the video-based muscle model vs. groups (n=53) that received standard cadaveric dissection. Furthermore, students expressed a favorable outlook on the video-based muscle model as a complement to their anatomy course. Similarly, in a meta-analysis evaluating the effectiveness of augmented reality in anatomy education, no statistically significant difference was seen in the pre– and posttest scores. However, the students overall expressed decrease motivation due to the complexity of utilizing augmented reality and adjusting to a new digital platform. The study concluded that a lack of statistical difference between test scores can place augmented reality as an alternate teaching method in the traditional cadaveric lab [5]. With this information, we evaluated the obligatory integration of virtual anatomy at Rowan SOM through a qualitative survey received from a total of 149 medical students, with a response rate of 36.24% from the Class of 2023 and 63.76% from the Class of 2024. The overall response number in each group was above the number of responses (n=50) needed to reach statistical significance.

Among the three domains evaluated in the survey, the confidence domain included the questions "*How likely are you to specialize in surgery after taking anatomy lab?*" and "*How likely are you to specialize in radiology after taking anatomy lab?*" as well as the statement "*My anatomy lab provided me with an understanding of the effects of trauma.*" There is no statistically significant difference between the two classes when assessing their interest in pursuing surgery and radiology after taking their corresponding anatomy course, as evident by the nonsignificant p values. This similarity was pronounced because both classes expressed responses that produced a relative equivalent mean for the first two questions. Similarly, when asked about specializing in radiology, both cohorts showed higher inclination toward the negative spectrum of the Likert scale with means of 3.90 (Class 2023) and 3.86 (Class of 2024). We believe that this stems from the low popularity of both surgery and radiology among medical students. Unlike our study, past studies have found that cadaver dissection produced more graduates favoring surgical programs, but to our knowledge, no studies have correlated radiology to cadaver experience [12]. However, when asked about understanding the effects of trauma after taking their respective courses, the Class of 2023 had a beneficial correlation (mean, 2.46), whereas the Class of 2024 had an unfavorable outcome (mean, 3.49). A study done by Dissabandara et al. [13] also found similar results of positive correlation between cadaver experience and understanding of trauma. The significant difference between the means proves that the Class of 2023 is more confident in understanding the effects of trauma in comparison to their counterpart (Class of 2024). Although both cohorts shared a mutual rejection of pursuing anatomy-concentrated fields,

the increased confidence demonstrated by the Class of 2023 substantiates the importance of cadaveric dissection. This is probably due to better conceptualization of how the effect of external forces, such as supervised scalpel insertion in an anatomy lab, can be translated to real-life trauma to anatomical structures. Although it can certainly be seen through virtual dissection, it does not provide the level of confidence achieved when done with one's own hands.

In the skills domain, students' clinical engagement in common imaging modalities were assessed through the following three questions: (1) "*Did the anatomy lab enhance your skill in point-of-contact ultrasound?*"; (2) "*If you were given an X-ray or a CT, would you be able to identify all the pertinent anatomical structures and their respective locations?*"; and; (3) "*How confident are you in identifying pathology in radiographic images?*" Presumably, an acquaintance with anatomical structures through physical touch in a cadaver dissection assists in understanding their spatial relationship in radiological images. Indeed, the survey results confirm this notion because all three questions provide a statistically significant p value, accentuating the difference in experience between the two classes. The average mean of responses for all three questions was of a lower value on the Likert scale for the Class of 2023 than that of the Class of 2024. In general terms, it can be deduced that the Class of 2023 is more likely to identify pertinent anatomical structures in an X-ray or a CT, is able to recognize pathology in radiographic images, and has an enhanced skill in point-of-care ultrasound when compared to the Class of 2024. This finding is congruent with similar studies that demonstrate the importance of cadaver dissection even during surgical residency. In a study conducted by the UCLA Department of Surgery, surgical interns, when exposed to cadaveric dissection focusing on teaching procedure-related anatomy and surgical techniques, had an increase in their practical scores from 50.5 to 83.5% [14]. Even so, 96% of the participants reported that the implementation of cadaveric dissection enhanced their knowledge in anatomy and improved their technical skills [14, 15]. While these favorable results reassure the aptitude of medical students who had an opportunity for in-person dissection, the skills gained via the virtual platform by incoming medical students during the pandemic are certainly under scrutiny. To ensure the appropriate attainment of technical skills, an in-person cadaveric dissection may be offered with caution prior to the end of their medical education.

With the following statements, "*My anatomy lab enhanced my respect towards the human body*" and "*My anatomy lab was not engaging in the way it was carried out*" and the question "*Do you think cadaver experience is important in understanding anatomy?*" the attitude of each class toward its respective anatomy course was explored. Both classes strongly believed in the importance of cadaver dissection in gaining anatomical knowledge, as supported by the lack of statistically significant difference between the cohort's responses (p>0.05). More so, the mean response values for both classes indicated a positive meaningful attitude toward the importance of cadaver dissection. However, when asked if their respective anatomy courses enhanced their attitude toward the human body, a significant difference demonstrated that the Class of 2023 had a more positive outcome in comparison to its counterpart. Why the Class of 2023 expressed a stronger attitude toward respecting the human body can surely be attributed toward its in-person cadaver experience, as corroborated by past research [16, 17]. However, when asked to comment on the engagement of the anatomy lab, no statistically significant difference was achieved between the two classes due to the 95% confidence interval carrying the value one. While the response mean value for the Class of 2023 was slightly toward the disagreement spectrum (mean=3.70) and the response mean value for the Class of 2024 was toward the agreement spectrum (mean=2.31), the lack of significant difference calls for exploration of why the classes are not finding anatomy engaging enough. Evidently, the Class of 2024 had an anatomy course with virtual lessons and no hands-on experience, justifying the disengagement they expressed with the course. Chapman et al. [18] reported that innovative approaches such as computer programs, models, and radiological anatomy alone scored comparatively lower than traditional methods of dissection. However, a plausible explanation as to why the Class of 2023 did not express a strong attitude toward its anatomy lab could be the class size. A Class of 160 SGL medical students divided into groups of five to a single cadaver and supervised by a total of five instructors in a limited time frame per week can certainly think that cadaveric dissection is disengaging. In fact, further study can be performed between PBL and SGL students to understand how smaller cadaveric dissection groups impact the engagement level in the anatomy course. Overall, based on current results, it can be established that medical students who had in-person cadaveric dissection had a favorable attitude toward their anatomy course compared to students who had virtual anatomy during the COVID-19 pandemic.

Based on the domains of confidence, skills, and attitude, it is evident that the presence of an in-person cadaver dissection is integral in shaping the finest physicians of the future. The results are consistent with this hypothesis while bringing attention to the effects of virtual learning during the pandemic. However, there are a few limitations of the study that must be considered. Primarily, the number of

students who responded to the survey was comparatively lower in the Class of 2023 compared to the Class of 2024. Furthermore, the survey only included students from a single medical institution, thus limiting the generalizability of its results. Nevertheless, the technical skills of the instructor involved in the creation of the virtual anatomy course may also contribute to the student's experience. Perhaps, if the anatomy course was carried differently than watching optional dissection videos and completing CALAs, the student responses may have shown no difference relative to the previous classes. To overcome these drawbacks, the study can be expanded to other medical schools, which can compare the different modalities of virtual anatomy and the impact that the study had on the student population. More so, with results from multiple schools and a greater sample size, cadaveric dissection in anatomy can be shaped accordingly for the best student learning experience.

Conclusions

The findings of the current study demonstrate the importance of cadaveric dissection in the delivery of an anatomy curriculum in a medical program. Our study showed by quantitative methods the value that students place on an in-person dissection course as compared to a virtual anatomy course. The students with cadaver dissection overall were more self-assured in their skill, perception, and confidence in the anatomy after being trained with hands-on cadaver experience. Further research needs to be conducted to identify what specific anatomy teaching resources are most effective beyond cadaveric prosection for students without access to a gross anatomy laboratory.

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