Educators' Views on Dissection Alternatives During the COVID-19 Pandemic

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ABSTRACT

When the COVID-19 pandemic struck in 2020, many schools made the decision to cancel face-to-face classes and move instruction online. To better understand how the pandemic affected science educator plans to conduct classroom animal dissection exercises this spring, we conducted a nationwide survey of biology teachers (n=2,131) and asked about their experience as classes transitioned online. Our data revealed that 72% of biology educators planned on having their students participate in classroom animal dissection exercises in the spring of 2020. Of those educators, 29% shifted to the use of dissection alternatives, such as web-based programs, as a result of remote learning. Our survey investigated which dissection alternatives were most used, how teachers identified those alternatives, and whether the educators planned to use dissection alternatives again for in-person or online learning. We also examined student performance on post-lab assessments using alternatives compared to the historical performance of students who used preserved animal specimens. These survey results can help inform biology educators about available dissection alternatives that can be used both for remote learning and during in-person classes as possible replacements for dissection specimens.

INTRODUCTION

This academic year, many educators had to unexpectedly deliver course content remotely due to the coronavirus pandemic. Science educators who had planned classroom dissection exercises for their students changed their plans and either cancelled the dissection exercises or used dissection alternatives, like web-based programs, to deliver their course content remotely. While results of a previous survey administered to biology educators indicated that prior to the pandemic, 70% of educators reported using alternatives in some compacity, only about 36% of educators reported using them *in place of traditional animal dissection* and 34% of educators used alternatives *in conjunction with dissection specimens* (Osenkowski, 2015). For many biology teachers this academic year, the use of dissection alternatives was their only option.

Dissection alternatives have been widely available for many years and have become more complex with advancements in technology. A variety of interactive virtual dissection alternatives that provide students with three-dimensional views of animal organs, background information about the specimen being viewed, and anatomical comparisons of animals and humans, are readily available for free or for a nominal fee (BioLeap, 2020).

Several studies have compared the efficacy of student learning when using animal dissection or alternatives. In general, studies that examined student learning with animal dissection versus alternatives concluded that alternatives can be used to meet most learning objectives and that students using non-animal alternatives have been found to perform as well as or better than students using animal models (AnimaLearn).

However, despite dissection alternatives being widely available and effective teaching resources, a nationwide survey of biology educators that NAVS conducted in 2014 revealed that nearly 6 out of 10 teachers felt that information about dissection alternatives is not widely disseminated (NAVS, 2014).

Our study set out to acquire data about the use of animal dissection alternatives by precollege biology teachers during the COVID-19 pandemic.

METHODS

Names and email addresses for 27,224 biology teachers were obtained through the Market Data Retrieval database. Participants were asked to respond to an online survey administered through SurveyMonkey between August 3-17, 2020, with multiple choice and free response questions that addressed how the delivery of course content changed during the COVID-19 pandemic, focusing on the use of dissection alternatives.

A total of 2,131 teachers responded to the survey, representing a response rate of 7.8%. Of respondents, data from those who used dissection alternatives for remote learning. (n=438) were further analyzed.

Educators reported teaching at the 5th grade through college levels, with most, 97.7%, teaching at the high school level.

Please note that this data set is subject to nonresponse bias, in that the behavior and attitudes of participants who did not respond to the survey may be substantially different from those who did.

RESULTS

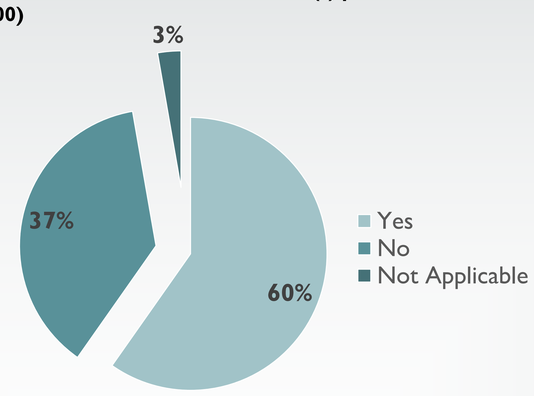
Did the pandemic and any related school closings change your plans to hold dissection exercises in class? (n=1502)

Yes, I had to cancel some, or all the dissection exercises scheduled, and I did not use dissection alternatives (for example, web-based programs) for remote learning.	67.41%
Yes, I had to cancel some or all of the dissection exercises scheduled, and I used dissection alternatives (for example, web-based programs) for remote learning.	29.16%
No, we were able to hold all the scheduled dissection exercises in class.	2.66%
Other (please specify):	0.77%
Dissections were performed during remote learning over a platform like Zoom	0.57%
N/A	0.20%

If you used dissection alternatives for remote learning, which dissection alternative(s) did you select for your students? Please provide the name of the alternative(s) that your students used (n=379).

Videos of dissection	53.56%
Various websites	30.32%
FlinnPREP	7.39%
Whitman College	5.28%
Biology Corner	4.22%
EdPuzzle	2.90%
McGraw Hill	2.11%
PBS	1.84%
Glencoe	1.84%
Emind	1.84%
Other websites	2.90%
N/A	8.44%
Worksheets (online/created)	2.64%
Paper dissection	2.64%
Other	2.40%

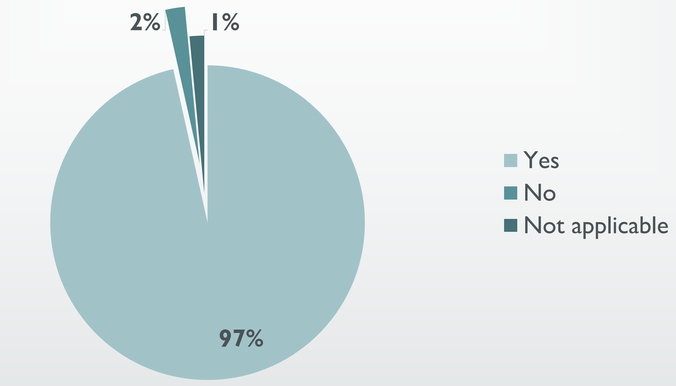
Were you familiar with the dissection alternative(s) prior to the COVID-19 pandemic? (n=400)



How did you identify which dissection alternative program(s) to use? (n=382)

Looked online for available alternatives	51.05%
Selected alternatives based on ease of use/personal preference	23.30%
Used available resources from past experiences	10.08%
N/A	6.02%
Used resources that aligned with curriculum or textbook	5.50%
A colleague helped me in my selection	4.05%

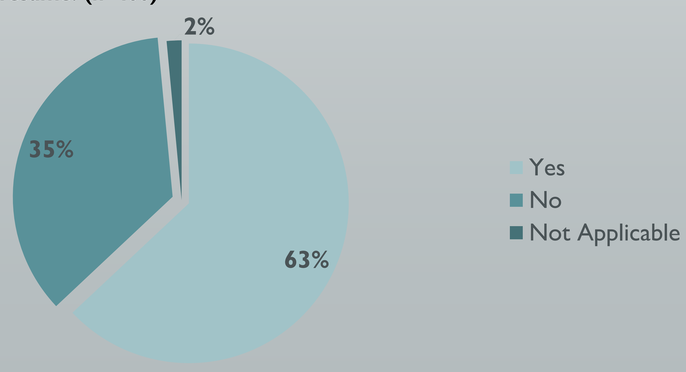
Would you consider using dissection alternatives again if learning continues remotely? (n=401)



Please elaborate on your response to the previous question (n=367).

Yes, I am open to using alternatives again if they are available, well suited, well priced, etc.	58.86%
Yes, I had a good experience with them (because of price, ease of use, students enjoyed using them, etc.)	14.17%
I have some concerns, as I prefer the use of dissection specimens	12.53%
Yes, I already use alternatives or made my own	8.17%
N/A	6.27%

Would you consider using dissection alternatives again when in-person classes resume? (n=400)



Please elaborate on your response to the previous question (n=375).

I would consider using dissection alternatives as a pre-lab, in conjunction with animal dissection specimens, or only for those who don't want to dissect	38.14%
I prefer real animal dissection specimens	32.00%
I would consider using alternatives again (they save money, save animals, I want to learn more about them, etc.)	22.13%
N/A	5.60%
Depends on the school budget or what the school says about it	2.13%

Consider the performance of students who used dissection alternatives while remote learning compared to the historical performance of students who used a preserved animal specimen. Was there a difference in student performance on the dissection-related assessment? (n=294)

Students using alternatives performed better on dissection-related assessments compared to students using preserved animal specimens	7.14%
Students using alternatives performed the same on dissection-related assessments compared to students using preserved animal specimens	25.85%
Students using alternatives performed worse on dissection-related assessments compared to students using preserved animal specimens	35.03%
I am unable to make this comparison	31.97%

If you plan to continue using dissection alternatives, how do you plan to use them? (n=386).

In conjunction with animal dissection	60.88%
In place of animal dissection	15.80%
Not applicable	15.03%
Other (please specify)	8.29%
Both in conjunction with animal dissection and in place of it	3.37%
Will use alternatives only if class continues online (not in person)	2.59%
Not sure	1.30%
Will use for make-up work for students who miss class	0.77%
Don't plan to use alternatives	0.26%

Please provide us with any other feedback on your experience or your students' experience using dissection alternatives (n=278).

N/A	26.62%
Students/Teachers prefer in-person activities	19.06%
General "positive" miscellaneous comments about the survey	12.95%
Dissection alternatives are not engaging/interactive enough	9.71%
Concerns about the quality of dissection alternatives	7.55%
Students had a positive experience with dissection alternatives	6.47%
Used in conjunction with animal dissection, for review, or for absent students	5.76%
Alternatives were challenging, confusing, or had technical issues	3.96%
Students cheated/did not participate when using alternatives	2.88%
Dissections are irreplaceable	2.52%
Did not assess students' experience with dissection alternatives	2.52%

CONCLUSIONS

During the COVID-19 pandemic, many teachers cancelled scheduled dissection exercises, while 29% turned to dissection alternatives to deliver course content during remote learning. Most instructors relied on videos of dissections or used virtual dissection resources for online learning. Sixty percent of instructors were already familiar with the dissection alternative they selected before using it this spring. Most instructors, 51%, identified alternatives by looking online, while 23% selected alternatives based on their ease of use or personal preference. The majority of instructors indicated that they would consider using dissection alternatives again if remote instruction continues or when in-person classes resume. We hope these survey findings show the breadth of dissection alternatives available and provide guidance to educators who want to replace dissection specimens in their remote and in-person science classes.

REFERENCES

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