

The Equine Anatomy Project: Program Development and Student Opinions of a Necropsy Laboratory Compared to a Necropsy DVD



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Abstract

As part of the growing equine science major at North Dakota State University, a junior-level equine anatomy and physiology course was developed in 2009. Subsequently, The Equine Anatomy Project was created to secure equine cadavers that would provide undergraduate students with the opportunity to participate in a necropsy lab. Prior to the necropsy laboratory, a detailed prosection DVD was shown to prepare students for the experience. In an effort to gauge the utility of the DVD, as well as the necropsy lab, an opinion survey was administered to the 2010 and 2011 classes. Results include responses from 39 of 48 students (81.3% response rate). Overall, 92.2% of the students strongly agreed or somewhat agreed that watching the DVD prior to the necropsy lab better prepared them for the experience, 87.2% strongly disagreed or somewhat disagreed that the DVD could replace the lab, and 89.7% strongly agreed or somewhat agreed that future classes should watch the DVD prior to the lab. From these results it was concluded that students regarded the DVD as helpful in preparing them for necropsy lab; however the majority felt the DVD could not replace the necropsy experience.

Introduction

Controversy surrounding the use of animals for dissection can be traced back as early as the 16th century (Klestinec, 2004) and the debate continues today (Balcombe, 2001; Hart et al., 2005; Moore, 2001). Evidence exists that supports (Johnson, 2002; Theoret et al., 2007; Korf et al., 2008), refutes (Balcombe, 2001; Waters et al., 2005) and finds no difference (Strauss and Kinzie, 1994) between dissection as a superior means of learning and alternative strategies (e.g. clay sculpting, interactive computer programs, DVDs, or plastinated models). This lack of congruity in the

research suggests there is still a place for dissection opportunities in higher education.

The equine science major at North Dakota State University (NDSU) was developed in 2002, with curriculum expansion in 2009 leading to the development of an undergraduate junior-level equine-specific anatomy and physiology course. Paralleling the course development process, the issue of unwanted horses in the U.S. became apparent. Unwanted horses have been defined as those horses deemed no longer useful by their current owners because they are injured, old, ill, dangerous or because they no longer offer what their owners expected (Lenz, 2008; Messer, 2004). According to a report by the U.S. Government Accountability Office (GAO, 2011), there has been an overall decline in equine welfare since 2007. This decline in equine welfare is evidenced by a growing number of horse abandonment cases, as well as increased investigations of equine abuse and neglect (GAO, 2011; Smith, 2009). In an effort to secure equine cadavers to meet the primary course goal of enhancing student understanding of internal anatomy and to provide a meaningful outlet for unwanted horses in North Dakota and Minnesota, The Equine Anatomy Project was created.

The NDSU program was modeled after The Willed Body Program at the University of Florida's (UF) College of Veterinary Medicine (Reyes-Illg, 2006). The UF program was developed to obtain ethically sourced animal cadavers and tissue (Martinsen and Jukes, 2007). 'Ethically sourced' refers to animal cadavers and tissue that have been obtained from animals who died of natural causes or were euthanized due to severe injury or terminal disease (Jukes and Chiuia, 2006). Striving to obtain ethically sourced equine cadavers, as well as protect the health and well-being of teachers

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and students, all of the following criteria must be met in order for equids to be donated to NDSU for euthanasia and subsequent use for teaching purposes:

1. Outside veterinary approval;
2. Equids must have a medically untreatable condition or be living with a condition that does not allow the owner to provide necessary care for the equid to live a comfortable life;
3. Equids may not have strangles, colic, neurologic conditions, or a condition that requires immediate euthanasia (within 24 to 48 hours);
4. Horse owners are required to sign a Donation and Euthanasia Release Form that has been reviewed and approved by the NDSU general counsel acknowledging the equid is to be euthanized for teaching purposes.

Approval from the NDSU Institutional Animal Care and Use Committee currently allows for up to 12 horses over a three year period to be donated for euthanasia and subsequent teaching use. Costs for euthanasia and carcass disposal after class labs are covered by a \$25 per student lab fee.

In an effort to measure student opinions of the utility of a prosection (i.e. a demonstration of dissection that is accompanied by narration) DVD, as well as student opinions of the necropsy lab where both prosection and dissection techniques are employed, the following objectives were developed for this project:

1. Determine if students perceived viewing an equine necropsy on a DVD would better prepare them for an actual necropsy;
2. Determine whether students felt a DVD could replace an actual necropsy.

It was hypothesized that students would perceive viewing the DVD as helpful in preparing them for the necropsy lab and that students would not feel the DVD could replace the experience of viewing an actual necropsy.

Materials and Methods

This study was deemed exempt by the NDSU Institutional Review Board (#AG11140). Undergraduate students (n = 48) enrolled in ANSC 364 Equine Anatomy and Physiology in the spring of 2010 and 2011 completed a survey to measure their opinion of the utility of a prosection DVD [produced by the Royal (Dick) School of Veterinary Studies at the University of Edinburgh, Scotland] in preparing them for the actual necropsy experience. Students needed to indicate that they both watched the prosection DVD and participated in the necropsy lab for their survey results to be included by checking the appropriate responses below:

- I DID watch the prosection DVD prior to participating in the necropsy lab.
- I DID NOT watch the prosection DVD prior to participating in the necropsy lab.
- I DID participate in the necropsy lab.
- I DID NOT participate in the necropsy lab.

Students were then asked three questions with responses on a five-point Likert scale (1 = Strongly Agree, 5 = Strongly Disagree).

1. I feel that watching the prosection DVD prior to the necropsy lab better prepared me for the necropsy lab experience.
2. I feel that watching the prosection DVD could completely replace the necropsy lab.
3. I would recommend future classes watch the prosection DVD prior to the necropsy lab.

Responses of 39 students (81.3%) who both watched the DVD and participated in the necropsy lab were included in the final data summary. Student demographic data was collected separately from course records and included major, gender, and class.

Results and Discussion

A demographic summary of all students is displayed in Table 1 (n = 48). Combined data for 2010 and 2011 showed that equine science majors comprised the majority of students, followed by Animal Science, Veterinary Technology, Microbiology, Psychology, Nursing and Non-degree. As expected for a junior-level class, upperclassmen encompassed the majority (70.8%) of students. The gender distribution of female and male students were mirrored by national statistics that reveal 92% of animal sciences students with an equine concentration are female (Food and Agricultural Education Information System, 2009).

Table 1. Demographic Summary of Students Enrolled in ANSC 364 in 2010 and 2011 (n = 48)

Demographic	Year		Total %
	2010 <i>n</i>	2011 <i>n</i>	
Major			
Equine Science	12	9	43.8
Animal Science	4	7	22.9
Veterinary Technology	5	4	18.8
Microbiology	2	1	6.25
Psychology	1	1	4.1
Non-degree	1	0	2.1
Nursing	1	0	2.1
Gender			
Female	23	22	93.8
Male	3	0	6.2
Class			
Freshman	1	0	2.1
Sophomore	9	4	27.1
Junior	5	10	31.2
Senior	11	8	39.6

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Survey results are summarized in Table 2 (n = 39). The vast majority of students strongly agreed or somewhat agreed that watching the DVD better prepared them for the necropsy lab. When asked if they felt the DVD could completely replace the lab, the majority of students strongly disagreed or somewhat disagreed the DVD could replace the necropsy lab. Finally, most students would recommend future classes view the DVD prior to the lab.

Table 2. Survey Responses of Students Enrolled in ANSC 364 in 2010 and 2011 (n = 39)

Question	Response	Year		Total %
		2010 n = 19	2011 n = 20	
1. I feel that watching the necropsy DVD prior to the necropsy lab better prepared me for the necropsy lab experience.	Strongly Agree	14	11	64.1
	Somewhat Agree	4	7	28.1
	No Opinion	0	1	2.6
	Somewhat Disagree	1	0	2.6
	Strongly Disagree	0	1	2.6
2. I feel that watching the necropsy DVD could completely replace the necropsy lab.	Strongly Agree	1	2	7.6
	Somewhat Agree	1	0	2.6
	No Opinion	0	1	2.6
	Somewhat Disagree	5	3	20.5
	Strongly Disagree	12	14	66.7
3. I would recommend future classes watch the necropsy DVD prior to the necropsy lab.	Strongly Agree	15	10	64.1
	Somewhat Agree	3	7	25.6
	No Opinion	1	2	7.7
	Somewhat Disagree	0	1	2.6
	Strongly Disagree	0	0	0

From these results it appears that students view the necropsy lab as a more useful experience than simply watching the DVD, but that the time taken to watch the DVD is worthwhile in preparing students for the lab experience. Although this survey did not measure learning, Theoret et al. (2007) reported significant improvement in exam scores of veterinary anatomy students who received prosection instruction on an actual cadaver compared to students who received prosection instruction via video. This suggests that cadaver prosections are more effective than video demonstrations. Johnson (2002) found students who performed dissection scored higher than students who were peer taught and observed dissection. Conversely, numerous studies have found either no difference (Granger and Calleson, 2007; Nnodim et al., 1996) or improved learning with alternative strategies to dissection (Hart et al., 2005; Strauss and Kinzie, 1991).

There are a number of considerations not taken into account by this survey that would considerably enhance the breadth and depth of data collected in future classes. Firstly, a measure of student learning would be helpful in determining if the resources that

go towards the necropsy lab are justified. Secondly, including demographic data on each survey would allow calculation of correlations to gender and major. Thirdly, the level of student involvement in the necropsy lab needs to be considered because it varies from simply viewing the necropsy to actively dissecting out organs and anatomical structures. Students in the equine anatomy and physiology laboratory are not required to participate in the dissection process. Those that choose to participate once the body cavity is opened are instructed on how to proceed. Finally there is the issue of students who may conscientiously object to the necropsy lab, even though the cadavers are ethically sourced. For these students, alternative resources such as plastinated specimens (Stuart and Henry, 2002), clay modeling (Oh et al., 2009), and The Glass Horse DVDs (2004 and 2007) maybe be utilized to teach anatomy.

Summary

Thus far, the NDSU Equine Anatomy Project appears to be a beneficial program for students, horse owners, and equids. At the end of each semester, students are asked to anonymously write down on index cards a high point of the class and low point of the class. These assessments consistently cite the necropsy lab as the top high point of the class. Additionally, horse owners who donate their equids to the project frequently express unsolicited feelings of comfort knowing that even after death, their horse is providing a learning experience for students (Anonymous owners, personal communication). Finally, the author believes equids who are donated to this project experience improved welfare as a result of their timely euthanasia, and that the Equine Anatomy Project provides an option for unserviceable and unwanted equids in the North Dakota/Minnesota region of the U.S. Further research into learning differences between the DVD and lab experience may aid in justifying the resources devoted to each exercise.

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