JUSTIFYING ANIMAL USE IN EDUCATION – Matt Stichter

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This paper formulates some guidelines as to when the use of animals in undergraduate education is ethically justifiable, with a special consideration of the factors relevant to those who serve on Institutional Animal Care and Use Committees (IACUC). Those who serve on an IACUC are charged with ensuring that any animal use at their institution complies with the Federal Animal Welfare Act. One of the primary duties involves reviewing protocols that propose the use of animals for research or educational purposes and assessing whether an adequate justification has been provided for the use of animals over non-animal alternatives. In addition, justifications must also be provided for the proposed species being used, the number of animals involved, and the specific procedures to be performed on the animals. Obviously there are a host of potential ethical issues to be discussed in such an endeavor, but this paper focuses on the question of whether animals should be replaced by non-animal alternatives in the context of undergraduate education. An analysis of the debate surrounding the practice of dissection – a well-known example of animal use at the undergraduate level – will help to shed light on this issue.

For the purposes of this paper, it will be assumed that animals are deserving of some minimal degree of moral consideration and concern for their welfare, in keeping with the Animal Welfare Act.[1] The initial sections of the paper explain the reasons for focusing on animal use in education, at the undergraduate level, and with regards to the question of replacing animals with non-animal alternatives. Following that is a discussion of the practice of dissection, and the arguments for and against it in education. Since part of settling that debate hinges on claims about the kind of knowledge gained from dissection and other "hands-on" kind of experiences, there is a short overview of the distinction between "knowing-how" and "knowing-that". The final section of the paper attempts to extrapolate some general guidelines from the debate over

dissection, which can be of assistance to IACUC members in deciding whether a sufficient justification has been given for animal use.

THE FOCUS ON UNDERGRADUATE EDUCATION

While any use of animals in a university setting requires some level of justification, a different standard may apply when the animals are used for educational purposes rather than for research. A distinction can be drawn between using animals for the sake of discovering new knowledge and using them for the sake of passing on existing knowledge. Furthermore, with respect to these different ends for which animals may be used, "Current public attitudes suggest that, in general, harming animals for the purpose of research that might contribute to new knowledge is considered to be more socially valuable than is the use of animals in either education or testing".[2] In this respect, justifications for the use of animals in education may be held to a higher standard than in research.

Another difference between animal use in education and research appears when you look at the vetting process for research proposals and course proposals. These days, almost any research proposal requires funding, and proposals must go through an extremely competitive process to acquire that funding. Even though the funding process does not involve an attempt to weigh the value of the lives of any animals that might be used in the proposed research, at least it does involve an assessment of the value of the new knowledge that the proposed research may generate. On the other hand, when it comes to education, no such equivalent vetting process exists. Thus, there's another reason to give educational proposals greater scrutiny with respect to whether a sufficient justification for animal use has been given.

Although the issue of animal use is applicable to education at all levels, the focus of this paper will be on undergraduate education. The use of animals in undergraduate education will likely be more controversial than in graduate education. Animal use in graduate education will usually be done to help doctors and veterinarians acquire the skills they need for their medical practice. In most undergraduate classes, the use of animals for educational purposes is merely for the transmission of existing knowledge to undergraduate majors (in fields such as biology). If students decide to pursue a career in medicine, they will obviously need to pursue graduate training. As a generalization, it will be in the graduate courses where the educational goal of acquiring professional skills may require some hands-on experience.

It should be noted that not all use of animals in education is equally controversial. It matters what kind of animal is being used, and what precisely is being done to the animal. Even if an animal rights activist believes that all animal use is ultimately wrong, presumably it is far worse to dissect an anesthetized live animal than to keep an ant farm. The focus here will be on the more controversial practices that cause an animal pain or distress, or require the animal to be killed like in dissection. Some might object that the use of an animal that has already been euthanized is less controversial, since it removes any possibility that a student would end up causing pain or distress to the animal. However, the concern for the welfare of the animal cannot be entirely dismissed even when students are not working with live animals, for "Methods of animal procurement for dissection and other consumptive uses of animals in education frequently involve pain and distress for the animals (e.g., frogs, fetal pigs, cats, dogfish sharks, bony fish, pigeons, turtles), and the majority of animals used in dissection are killed for that use".[3] Animal pain and distress cannot be morally important only after they've been procured and prepared for use in class. Thus, any educational purpose that requires

animals to be killed for their use in the class still needs to be seriously scrutinized, even if no harm could come to the animal in the classroom setting itself.

THE "R OF REPLACEMENT"

As previously mentioned, there are several potential factors to consider as to whether the use of animals can be justified. However, the primary factor is whether the educational goal could be met by the use of some non-animal alternative. If so, then there's no need to discuss further questions such as how many animals would be used, or what kind of pain or distress the animals might experience. This will be familiar to those who have served on an IACUC, since consideration of the replacement of animals with non-animal models is of paramount importance. Those on an IACUC are required to consider the "Three R's":

> In recent years, the concern within the scientific community and in the general public over the use of nonhuman animal subjects in research and education has taken focus and direction from the 1959 book, *The Principles of Humane Experimental Technique* by W. M. S. Russell and R. L. Burch, which laid out the concept of the "Three R's" for the first time, and thereby, inspired the movement for alternatives to the use of animals in biomedical research and testing. The "Three R's" are: *replacement* of conscious living animals with nonsentient animals or materials, *reduction* of the number of animals used in an experiment or procedure, and *refinement* of the techniques used in order to decrease the incidence or amount of animal pain and distress.[4]

The "R of Replacement" is obviously the first issue to consider, since reduction and refinement only matter if the decision has already been made that animals will be used. Thus, this paper focuses on whether there are good arguments to justify the use of animals over non-animal models in undergraduate education. As such, any references in the following sections of this paper to animal use being justified should be understood in the more narrow sense of being justified over using non-animal models. It does not follow that the animal use is thus justified all-

things-considered, as other considerations (such as what is being done to the animals) must still be taken into account.

THE CASE OF DISSECTION

It will be helpful to discuss this issue in the context of a particular practice that is common in undergraduate courses – dissection. The goal is ultimately to extrapolate some general considerations regarding the use of animals in education from an analysis of the debate surrounding dissection. Dissection is a useful case study, because the practice of it is controversial on a number of levels:

> Animal dissection raises many ethical and environmental concerns: the practice involves the unnecessary killing of animals; undermines conservation efforts; ignores welfare standards during animal capture, preparation, and shipping; releases formaldehyde into the environment; focuses on descriptive biology to the detriment of creative scientific thinking and research; causes some students to abandon further science education or careers; and weakens the respect for life and the humane treatment of animals.[5]

Whether the practice actually involves the "unnecessary" killing of animals, or any of the other potentially detrimental effect described above, remains an open question for the purposes of this paper. Nevertheless, the quotation above nicely illustrates how controversial the practice can be, even when there's no possibility that a student could cause harm to an animal in the process of a dissection.

All parties to this debate could in principle agree that dissection is unjustified if the killing of the animals is "unnecessary" or "needless". Of course the disagreement stems from different perspectives on whether dissection is necessary or needed to achieve some educational goal. Since dissection is still a fairly common practice, it might appear that the burden is on opponents of dissection to show that "The harm animals are caused by dissection is needless".[6]

This is the way A. David Kline frames his argument in support of carrying out dissections. What will end up being crucial in framing the issue this way is determining what counts as "needless".

Kline assumes that those opposed to dissection will argue that the harm is needless because "it provides no educational value beyond that which could be had by alternatives, viz., films, models, and simulations".[7] It should be noted right away that this objection to dissection involves a claim that is stronger than it needs to be, for one might object to dissection even if it provided some educational value. Given the initial formulation of the objection, Kline has an easy time refuting it, since all he has to show is that there is the potential for at least some minimal educational value that can be gained from dissection.

It appears highly likely that there will be some potential for dissection to add value to the educational experience, since working with alternatives involves a degree of abstraction from the actual animal. Some of the features of the animal that are lost in the abstraction "may be educationally relevant".[8] Kline has to make the moderate claim that there "may be" value, since it cannot be guaranteed that some educational value is lost each and every time a model is used in place of an animal. Though the claim is moderate, if it's true, then it is sufficient to show that the opponent of dissection is mistaken to think that dissection provides "no educational value" over alternatives. As for the truth of the claim, it is not uncommon for students to report that the hands-on experience of dissection made them understand some aspect of physiology that they hadn't understood previously.

This argument for the added value of dissection has been criticized by Steve Sapontzis. He claims that "any argument for the pedagogical necessity of doing dissections based on the

value of hands-on experience must be limited to courses whose mission is to teach people how to accomplish tasks that involve skills required for doing dissections."[9] To make his case, Sapontzis is relies on a distinction between two types of knowledge – 'knowing-how' versus 'knowing-that'. This distinction often appears in philosophical and psychological research on practical skills and expertise. It will be helpful to cover the distinction first, before discussing how Sapontzis makes use of the distinction in his argument against dissection. The reason for this is that while Sapontzis gives an accurate account of the distinction, it's less clear that he applies the distinction correctly in his objection to Kline.

KNOWING-HOW VERSUS KNOWING THAT

Hubert and Stuart Dreyfus[10] have developed an account of skill acquisition, in which the practical knowledge of an expert in a skill is a matter of knowing how to do something rather than merely knowing that a certain set of facts obtain. They cite John Dewey as having introduced the distinction between knowing-how and knowing-that as two different forms of knowledge. They quote Dewey on the distinction as follows:

> We may . . . be said to know how by means of our habits . . . We walk and read aloud, we get off and on street cars, we dress and undress, and do a thousand useful acts without thinking of them. We know something, namely, how to do them . . . [I]f we choose to call [this] knowledge . . . then other things also called knowledge, knowledge of and about things, knowledge that things are thus and so, knowledge that involves reflection and conscious appreciation, remains of a different sort[11]

Of course, knowing how to do something usually involves some knowledge of and about things. If you know *how* to drive a car, then you know *that* a car accelerates by pushing one pedal, and that it slows down by pushing the other pedal, and so on. There are numerous facts about cars and driving that you could presumably recite. However, the distinction rests on the claim that

knowing how to do something cannot be completely reduced to knowing that certain statements are true. That is, practical knowledge is not merely factual knowledge.

Take, for example, riding a bicycle. Most of us know how to ride a bicycle, but are unable to formulate any specific rules or statements about how to do so. As Dreyfus and Dreyfus point out, the difficulty of formulating simple rules for something as basic as riding a bicycle is revealed with questions like "How would you explain the difference between the feeling of falling over and the perfectly normal sense of being slightly off balance when turning? And do you really know, until it happens, just what you would do in response to a certain unbalanced feeling?"[12] In short, we rarely have answers to questions like these, yet that does not prevent us from knowing how to ride a bicycle. According to the Dreyfuses, the "fact that you can't put what you have learned into words means that know-how is not accessible to you in the form of facts and rules".[13] You can know how to do something and even achieve expertise in a skill, without that knowledge being merely a matter of knowing the facts and which rules are applicable.

In the field of medicine, Patricia Benner has successfully applied this skill model to the field of nursing.[14] Her findings support what Dreyfus and Dreyfus claim about the acquisition of practical skills, and the kind of knowledge that is characteristic of experts. Benner uses the skill model to show how achieving expertise in the field of nursing is mainly a matter of acquiring practical knowledge that can only be gained through experience. Achieving expertise in any kind of skill, be it riding a bike or playing chess, requires a lot of hands-on experience and deliberate practice. You cannot learn how to surf merely by reading a book about it. Even if

gaining factual knowledge can help you learn faster, there's no substitution in the learning process for the actual experience.

DISSECTION AND KNOWLEDGE CLAIMS

Advocates of dissection are essentially relying on this distinction, when they argue that "the use of dissection provides something of irreplaceable educational value".[15] There's something you will learn by the experience of dissecting, which you couldn't learn by any other alternative. But it's just on this very point that Sapontzis criticizes the supporters of dissection. Sapontzis's claim is that the unique knowledge gained by doing dissections just is the knowledge of *how* to dissect, rather than any kind of factual knowledge. Thus, he claims that the only kind of course that needs to involve dissections is one where the pedagogical goal is to teach the students the skill of dissecting. Since in most courses dissections are used to convey facts (knowing-that) rather than to train skills (knowing-how), Sapontzis doesn't see any reason for needing hands-on experience. As he puts it, "cutting an animal open to expose its organs is not essential to learning what those organs are, how they appear, or how they work".[16] In sum, Sapontzis's response to the argument that hands-on experience is necessary to learn or better understand certain physiological facts, is that "The flaw with such arguments is that they partake in what logicians call 'category mistakes'", since it confuses instances of practical knowledge with factual knowledge.[17]

Unfortunately for Sapontzis, it's on this last claim that he stumbles. He wants to claim that his opponents are mistaken if they think that hands-on experience will produce factual knowledge, since such experience can only produce a different category of knowledge (i.e. practical knowledge). However, advocates of dissection need not make a category mistake in

thinking that practical experience can contribute to factual knowledge. As Kline correctly points out, "it simply does not follow that the exercise of this practical knowledge can lead to the development only of further practical knowledge".[18] Although practical experience is not necessary for acquiring factual knowledge, it can still be the case that practical experience helps a student in gaining factual knowledge. There's no guarantee that students will gain any additional factual knowledge by dissection, but at least it's a possibility.

Both sides in this debate accept the claim that hands-on experience produces a kind of knowledge that can't be produced by the use of non-animal models. If the harm caused by dissection is needless only if "it provides no educational value beyond that which could be had by alternatives", then it would appear that Kline is correct in asserting that dissection is justifiable. Kline rests his case on the claim that "There are probably some courses and some instructors that realize educational benefits that could not be had without the use of real animals".[19]

The main problem, though, with Kline's approach is that opponents of dissection need not claim that it provides no educational value in order to come to the conclusion that the harm caused by dissection is needless. Kline attributes to his opponents a much stronger claim than they actually need to make, and thus Kline believes that all he has to do to refute his opponent is to provide support for the rather weak claim that there's the possibility of an educational benefit from doing dissections. What he fails to recognize is that any course could have some potential to realize some educational benefit for some student with the use of animals, because you cannot know in advance that there is no possible potential for an educational benefit of using live animals in a course. The possibility is always there. Kline has about as weak of a

standard as you could possibly have for justifying animal use in education, except that it's more accurate to say that it's no standard at all. It's not a standard, because it couldn't possibly rule out any use of animals in education.

Opponents of dissection likely have a different sense of "needless" in mind than Kline. The harm caused by dissection might still be needless, even if it does provide the possibility of some educational value, if whatever knowledge that might be gained from dissection is not necessary for the students' education. The reason for thinking that the students don't need the practical knowledge gained only through hands-on experience with animals, is that the goal of most of these undergraduate courses is to learn factual knowledge, and hands-on experience is not necessary to acquire that kind of knowledge. So Sapontzis was correct in thinking that the distinction between know-how and know-that was relevant for the dissection debate, even if he wasn't correct in some of his assertions about the implications of the distinction.

Sapontzis was also correct when he noted that Kline himself even admits that the knowledge gained through dissection isn't necessary for a sufficient education in biology:

> It was admitted that there probably is knowledge that can be gained only through dissection. But this is not to say that there is any undergraduate course or total program that requires this knowledge in order for students to be sufficiently well-educated to receive a degree in biology. A perusal of modern curricula will show that a deep understanding of the central topics can be had without dissecting animals. I have given examples where dissection adds to a student's knowledge, but they are hardly examples of knowledge that is required for one to have a rigorous biological education.[20]

In addition, if "dissection is not required for the creation of competent biologists at the undergraduate level",[21] then this is precisely what makes the harm caused to animals by dissection "needless". The opponent doesn't have to claim that there's no factual knowledge to

be gained from dissection, but just that whatever knowledge might be gained isn't necessary for an undergraduate education in biology. The use of animals for the value of hands-on experience would not be needless if the educational goal is the development of certain skills or know-how that requires practical experience to acquire, but this isn't the case in most undergraduate courses.

APPLYING THE "R OF REPLACEMENT" IN EDUCATION

If the arguments of the preceding section are correct, then most undergraduate courses will lack a sufficient justification for the use of animals for dissection, since the educational goals can be met with non-animal alternatives. What more general lessons can we take away from this debate over dissection, especially for the development of guidelines to aid groups like IACUC? Recall that the focus in this paper is on the question of whether animals should be replaced with non-animal alternatives, at least in those cases where animals would be subjected to significant pain or distress, or would have to be killed for classroom use. The preceding discussion might appear to lead to an endorsement of a general policy that no use of animals will be acceptable in such circumstances. However, that conclusion doesn't follow, as it involves an over-generalization about the educational goals pursued in undergraduate courses. There may be courses where no acceptable non-animal models exist for the goal being pursued in the class – undergraduate classes in veterinary medicine for example.

On the other hand, there are good reasons for rejecting any policy that considers all use of animals over non-animal alternatives acceptable. Since there needs to be an inquiry as to whether an educational goal could be met by using a non-animal model, it cannot be said in advance that all animal use will necessarily be acceptable. In short, neither extreme position

will be of much help as a guideline for determining acceptable animal usage. Fortunately, there are some considerations to be drawn from the discussion of dissection.

Any need for the use of animals instead of alternatives must be grounded in some kind of additional value gained by the use of animals. Call this the "adds value" standard. As noted in the debate above, it's plausible that there are times when animal use does indeed add value to the educational experience. But it was also pointed out that this "adds value" standard is by itself insufficient to justify the use of animals over alternatives. The problem with the standard is that it cannot rule out any animal use. The standard is merely: 'if there's a reasonable chance that the use of animals adds some amount of value to the learning experience of at least some of the students in the class, then the animal use is justified.' Anyone who wants to use animals in their course could claim that their use of animals meets this standard, because there's always a decent chance that some student might get something out of the experience. Notice that the standard doesn't require that the added value be tied to the actual objectives of the course. So in the end, this approach is essentially the same as an 'all use is acceptable' policy, because there doesn't seem to be any scenario where the use of animals wouldn't have at least the possibility of adding value for some student in the class.

Is there a way to amend the "adds value" standard to overcome this objection? One route would be to specify that the added value is directly tied to the objectives of the course. This certainly helps, but there are still potential pitfalls with this approach. As an example, consider a course where one of the objectives is giving students the kind of "hands-on" learning experience that comes from working directly on animals. If this is an objective of the course, then it would be necessary to use animals for the course, as there's no way to get that kind of

experience with non-animal models. It would seem that this is a good example of the added value being directly tied to the objectives of the course.

However, the problem with this approach is that it doesn't so much justify the use of animals, as merely assume the use of animals by building it into the very objectives of the course. It's essentially like saying: 'one of the goals of the course is to work directly on animals, and thus the use of animals is required to meet that goal.' Instead of justifying animal use as a necessary means to achieving some other goal, it merely makes the use of animals a goal. It's another example of a standard that fails to rule out any possible use of animals in education. Do you want to justify animal use in your course? Here's a simple method – just build animal use into the course objectives! After all, it's trivially true that you won't meet the goal of working on animals without being allowed to work on animals. But this isn't an actual justification of animal use, because it completely avoids the question of *why* it's important to use animals. The protocol merely assumes animal use, rather than justifying it. Again, it's essentially the same as the 'all use is acceptable' approach, as anyone could build this objective into their course.

If, on the other hand, the objectives of the course do not presuppose the use of animals, then the standard of "adds value" may work if the value is directly tied to the objectives of the course. This is presumably how you would support animal use in courses designed to train students in the necessary skills for veterinary medicine. To be a good vet, you need to learn certain skills, and you won't be able to fully develop those skills without some experience working on actual animals. The hands-on experience is necessary because the goal is acquiring practical knowledge, and not merely factual knowledge. In this example there's an objective (acquiring surgical skills for vet med), and the use of animals is necessary for

achieving this objective. It should be noted, however, that given a recent decrease in the use of animals in veterinary schools, it cannot be presupposed that any course in veterinary medicine will necessarily require animal use. "Several veterinary schools now teach animal surgery by using only animals that are in need of surgery. Similarly, many medical schools have eliminated their live-animal labs or have reduced the number of healthy animals they use for surgical practice".[22] If graduate schools in medicine are able to eliminate some of their animal labs, then there's yet another reason to more closely scrutinize the undergraduate courses that continue to use animal labs.

CONCLUSION

While it is desirable to produce a more extensive set of guidelines, that task is beyond the scope of this paper. In any event, no set of guidelines is likely to cover all the possible considerations as to whether the use of animals over non-animal alternatives is justified in a particular case. There will be no complete substitution for human judgment. Nevertheless, it appears that undergraduate courses that have an adequate justification for animal use involving pain, distress, or death for the animals will be exceptional rather than commonplace. Since the goal of most undergraduate courses is the transmission of existing factual knowledge, rather than the development of new knowledge or the acquisition of practical knowledge, that goal can be met with non-animal alternatives. In most cases, the use of animals in such courses will indeed be needless.

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[1] I should note that, for my purposes in this paper, I'm trying to argue using only minimal assumptions about the moral status of animals. Minimally, I'm assuming the "3 Rs" framework (i.e. reduce, replace, and refine) associated with the Animal Welfare Act. However, I do not mean to imply by this approach that animals should not be granted a higher moral status than is assumed in this paper. It is just that such issues are beyond the scope of this paper.

[2] F. Barbara Orlans, "Ethical Decision Making About Animal Experiments," *Ethics & Behavior* 7 (1997): 166.

[3] Jonathan Balcombe, "Dissection: The Scientific Case for Alternatives," *Journal of Applied Animal Welfare Science* 4 (2001): 118.
[4] Laura Jane Bishop and Anita Lonnes Nolen, "Animals in Research and Education: Ethical Issues," *Kennedy Institute of Ethics Journal* 11 (2001): 94.
[5] Bishop and Nolen, Animals in Research, p. 95.
[6] A. David Kline, "We Should Allow Dissection of Animals," *Journal of Agricultural and Environmental Ethics* 8 (1995): 193.
[7] Kline, We Should Allow Dissection, pp. 193-194.
[8] Ibid., p. 194.
[9] Steve F. Sapontzis, "We Should Not Allow Dissection of Animals," *Journal of Agricultural and Environmental Ethics* 8 (1995): 183.
[10] See Hubert Dreyfus and Stuart Dreyfus, *Mind Over Machine: The Power of Human Intuition and Expertise in the Era of the Computer* (Oxford: Basil Blackwell, 1986); Hubert Dreyfus and Stuart Dreyfus, "Towards a Phenomenology of Ethical Expertise," *Human Studies* 14 (1991).
[11] John Dewey, *Human nature and conduct: An introduction to social psychology* (London: Allen and Unwin, 1922), pp. 177-178.
[12] Dreyfus and Dreyfus, Mind Over Machine, p. 16.
[13] Ibid.
[14] Patricia Benner, *From Novice to Expert* (New Jersey: Prentice Hall Health, 2001).
[15] Kline, We Should Allow Dissection, p. 194.
[16] Sapontzis, We Should Not Allow Dissection, p. 183.
[17] Ibid.
[18] Kline, We Should Allow Dissection, p. 194.
[19] Ibid.
[20] Ibid., p.195.
[21] Ibid., p.197.
[22] Bishop and Nolen, Animals in Research, p. 95.