Dissection in Pre-college Education

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Summary

This paper discusses the educational and ethical issues surrounding dissection of non-human animals in pre-college education. It argues that this exercise has no benefits to students that could possibly be outweighed by the death of healthy animals killed for this purpose.

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The issue of dissection in pre-college schools is of great moral significance. Millions of non-human animals (animals\(^3\)) lose their lives every year to the dissection trade (3). Most of these animals appear to have been free-living (wilde) and were removed from their native habitats, killed (often with no attention to prevention or alleviation of pain), and shipped to various institutions. This has been particularly the case with amphibians and reptiles (3, 4). In some cases, the decimation of the animals was so great that it led to serious insect problems, and a ban on capture and export had to be initiated (7).

As a teacher, I am aware that there are basically two types of learning: the acquisition of conceptual knowledge or facts, and the acquisition of manual skills. At the primary and secondary school level, the former is of considerably greater importance. Furthermore, the former category lends itself particularly well to alternatives to the harming or killing of animals. Dissection at this level of school does not teach useful manual dexterity.

The often-used excuse that the 'hands-on' experience of dissection is necessary for those wanting to become biologists or medical personnel simply is untrue. It flies in the face of logic to insist that dissection, at the high school level or below in particular, is somehow preparatory for the rigors of human or veterinary medical school. As one who did not dissect in high school, and who now is a veterinarian and has spent most of his career training doctors-to-be, I can unequivocally state that the experience of dissection, or similar exercise, is totally unnecessary for the biologically minded pre-college student.

Dissection of the dead bodies of animals at the high school level or below, appears to be a 'rite of passage' rather than a well thought out and scientifically proven method of teaching. There are no data to show that this method of teaching in any way improves the student's understanding of biology. In fact, the few studies which have been done have shown no difference between students who dissected and those who did not with respect to grasping the concepts and being able to apply them (8, 10, 16).

Dissection often is defended by the statement that it fosters an understanding of *human* anatomy. Using non-human animals, however, who have an anatomy different from human beings, cannot achieve this end. Certainly, the use of human models and then application to the students themselves, where feasible, are more instructive for this. It has been shown, for example, that modeling the human body using clay resulted in a better grasp of the human body than did cat dissection for college-level students (12, 17).

There is nothing about the physical act of dissection which is of educational value. Only the
information learned is of value. Some talk about feeling the ‘texture’ of organs or seeing the ‘color’ of different tissues. This is patent nonsense, as can be appreciated if one considers for a moment about what dissection generally is in these situations: the cutting up of preserved tissues, tissues which have lost their natural color and which no longer have their normal texture.

There also is the issue of the preservatives which are used in preparing the dead animals’ bodies. Formalin, made from formaldehyde, is commonly used. This material is highly toxic and is carcinogenic (cancer producing). It is incomprehensible to subject children to this or any toxic materials for something which is not necessary. Having done research for 22 years, using many different types of tissue fixatives, I am not aware of any which are not toxic. Whereas some companies rinse the bodies and place them in a less toxic material for delivery, some formaldehyde still is there and leaks into the less toxic solutions.

There are no defensible reasons why dissection at this level of school should be continued (5, 6, 14). If the purpose of the exercise is to motivate the students to take an interest in science, there are other, far better methods. For example, there is a laboratory manual in physiology which uses the students themselves as subjects to learn basic physiology (15). There also have been developed a set of experiments in which the students learn fundamental biological principles using themselves as subjects (13). These methods can truly motivate a student, as opposed to the cutting up of largely healthy animals who were killed expressly for that purpose.

There are numerous alternatives which would give the student the foundation he or she needs to go on to other endeavors. Detailed photographs and drawings would suffice for basic information on the anatomy of various animals. There are lifelike models which could be used to enhance the lesson. The materials available are too numerous to list here.4

Dissection is being removed from curricula worldwide. Until it is completely banned, whether to dissect should be the choice of the student, with reservations as amplified later in this text. Some teachers attempt to force a student to dissect even when the student has indicated that he or she is truly opposed to this. This is counterproductive and provides for a poor educational experience (9). Students, even at the professional level, lose a degree of sensitivity for non-human life when forced to harm or kill it under these circumstances (9). We know from human studies that many people tend to obey authority figures even when being asked to do something the person finds morally objectionable (11). Students at in pre-college school are even more vulnerable (5).

Some teachers simply will downgrade the student or tell them to take other courses. This is unconscionable behavior for a teacher. The student has a right to the education and we do not have a right to impose our beliefs on them, especially when those beliefs unavoidably involve the destruction of other living beings. As teachers, we accommodate students having special needs, such as the hearing impaired. Those who object to harming or killing of animals in the name of education have special needs, too. Theirs is no less important than others’ and we should applaud them for their sensitivity and compassion.

Some argue that dissection should at least be available for those who want it, that we should not take the ‘right’ of dissection away from them. This is not compelling in the least if it involves purposeful killing. One must keep in mind that there always is a third, interested and unwilling participant in this scenario: the animal who is to have her or his life destroyed. By analogy, although it may be your right to smoke cigarettes and suffer the consequences, you have no right to do it in a manner which puts others at risk. There has to be substantial justification to take the life of an innocent animal, and this is utterly lacking in the case of pre-college dissection. Bodies of

4 You can search a database containing thousands of alternatives to various harmful or fatal uses of animals for all levels of education: http://alted.hsvma.org/ (accessed 2015-10-26). This resource is provided by the Humane Society Veterinary Medical Association.

5 Even conservative groups such as the National Association of Biology Teachers agree that ethical concerns of students need to be honored (1).
animals who have died of natural or accidental causes could be used and would be the perfect substitute when it can be shown conclusively that actual tissue is needed for a particular situation.

Whereas some may be able to provide rational reasons for using non-human animals in research to improve human health, the dissection of these animals, particularly by students at the high school or lower level, does not have the same implications. There is absolutely no justification for the wanton killing of millions of these animals every year. It is biologically, pedagogically and morally indefensible.

Finally, for those of you who are facing this issue, you may find it intimidating to ask for an alternative or refuse to participate for fear of reprisal. Take heart, however, in the fact that there is nothing your teachers can do to you that is as bad as what they expect you to do to the animals.

References:

NABT encourages teachers to be approachable and responsive to substantive student objections to dissection and to provide appropriate lessons for those students.”

Cites a figure of 5.7 million animals dissected annually in classrooms, according to the Wall Street Journal.

The snakes are captured in Manitoba. Most go to classroom dissection labs in Canada and the U.S.

“The data indicate that there is no significant difference between test scores achieved by students who dissect as compared to those who do not. Models and diagrams appear to be an adequate substitute for the dissection process. This is substantiated by equally high scores in both the control group and the experimental group. These findings suggest that educators should reassess the value of dissection as a motivational tool in their curricula. Although hands-on activities are motivational, hands on a preserved organism may not be the stimulant for most students. The work of Tamir and Sever (1980) indicated that students favor the use of living animals.”

“It has been documented (Janis and Mann 1977) that psychological distress, such as that experienced by many veterinary students in ‘animal labs’, can result in decreased observational and cognitive functions; the use of non-patient animals in veterinary education may therefore result in decreased learning... Finally, use of non-patient animals in veterinary medicine may decrease students’ abilities to be compassionate and empathic. It has been documented in a variety of situations that exposure to violence or other aversive stimuli leads to desensitization; ‘animal labs’ may desensitize students to animal suffering.”

Half of a group of 350 high school biology students were taught frog structure, function and adaptation via lecture, the other half by doing a frog dissection. Overall, students taught by lecture performed better on a post-test than did those taught by dissection.

“Two people come to a psychology laboratory to take part in a study of memory and learning. One of them is designated as a ‘teacher’ and the other a ‘learner.’ The experimenter explains that the study is concerned with the effects of punishment on learning. The learner is conducted into a room, seated in a chair, his arms strapped to prevent excessive movement, and an electrode attached to his wrist. He is told that he is to learn a list of word pairs; whenever he makes an error, he will receive electric shocks of increasing intensity. The real focus of the experiment is the teacher. After watching the learner being strapped into place, he is taken into the main experimental room and seated before an impressive shock generator. Its main feature is a horizontal line of thirty switches, ranging from 15 volts to 450 volts, in 15-volt increments. There are also verbal designations which range from SLIGHT SHOCK to DANGER - SEVERE SHOCK. The teacher is told that he is to administer the learning test to the man in the other room. When the learner responds correctly, the teacher moves on to the next item; when the other man gives an incorrect answer, the teacher is to give him an electric shock. He is to start at the lowest level (15 volts) and to increase the level each time the man makes an error...” The ‘teacher’ is not aware of the true nature of the study; the ‘learner’ is an actor. “Despite the fact that many subjects experience stress, despite the fact that many protest to the experimenter, a substantial proportion continue to the last shock on the generator” even though the person being ‘shocked’ screams as if in extreme pain.

“The clay-modeling group was significantly better at identifying human muscles on human models than the cat-dissection group, and was as good at identifying muscles on their self-made clay mannequins as the cat-dissection group was at identifying cat muscle on their specimens. This study demonstrated that clay modeling is more effective than cat dissection for learning human muscles at the community college level.”

“Results of this study suggest that the Interactive Frog Dissection can be as effective as traditional frog dissection in the high school biology laboratory in terms of learning to identify the steps of dissection and the major organs within the frog’s body cavity.”

“The results of this pilot study fit into the current body of research and support the notion that educationally effective alternatives to dissection can be developed.”

“In the control group, students performed cat dissections (emphasizing isolation and identification) of the muscular, digestive, and cardiovascular systems. In the experimental treatment group, students built clay sculptures of each human body system. Student learning was evaluated by using both low- and high-difficulty questions.... On exams after a cat dissection vs. a human-clay sculpting experience, the students in the human-clay sculpting treatment group scored significantly higher than their classmates in the cat dissection group on both the low- and high-difficulty questions.”

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