Comparative Studies of Dissection and Other Animal Uses

The Humane Society of the United States has compiled a comprehensive list of studies from a number of scientific journals comparing dissection and other animal use versus alternative methods. The studies are divided into three categories: those that demonstrate an equivalent performance on the part of students using alternative methods and traditional dissection methods; those in which students using alternative methods outperformed those performing dissections; and two studies that found students who conducted dissections performing better than students who used alternative methods.

The following studies demonstrate equal or comparable student performance between dissection and alternative methods:


_Learning outcomes were similar between two groups of fourth-year veterinary students, one who were taught surgery using a terminal and cadaver laboratory format, the other taught using survival laboratories._


_Undergraduate students who studied feral pigeons in a city park scored equally well on evaluations as did students who studied operant conditioning with rats in a traditional lab._


_Undergraduate students using computer simulations performed equally well as students using traditional approaches in physiology and pharmacology laboratories._


_Six undergraduate students working independently with a computer program gained equal knowledge, at one-fifth the cost, as did eight supervised students using freshly killed rats._


_Cumulative examination results of 308 undergraduate biology students who studied model rats were the same as those of 2,605 students who performed rat dissections._


_Use of interactive videodisc simulations yielded equivalent test performance and greater time_
efficiency in teaching cardiovascular physiology compared with instruction in a live animal laboratory.

Greenfield, C.L., A.L. Johnson, D.J. Shaeffer & L.L. Hungerford. 1995. Comparison of surgical skills of veterinary students trained using models or live animals. JAFMA 206(12): 1840–1845. Surgical skills of veterinary students were evaluated following training with dogs and cats, or soft tissue organ models; performance of each group was equivalent.


Jones, N.A., R.P. Olafson, & J. Sutin. 1978. Evaluation of a gross anatomy program without dissection. Journal of Medical Education 53: 198–205. Learning performances of freshmen medical students using films, computer-assisted instruction and prospected human cadavers were the same as those of students taught by traditional lecture and dissection.

Leathard, H.L. & D.G. Dewhurst. 1995. Comparison of the cost effectiveness of a computer-assisted learning program with a tutored demonstration to teach intestinal motility to medical students. ALT-J 3(1): 118–125. No significant difference was found in the performances of preclinical medical students who used a traditional live animal laboratory and those who used a computer simulation on intestinal motility.

Leonard, W. H. 1992. A comparison of student performance following instruction by interactive videodisc versus conventional laboratory. Journal of Research in Science Teaching, Vol. 29, No. 1, pp. 93–102. In the use of videodisc or traditional laboratories, no significant difference was found for biology undergraduate students' laboratory grades. However, the videodisc group required one-half the time.


Marszalek, C.S. & J. Lockard. 1999. Which Way to Jump: Conventional Frog Dissection, CD-Tutorial, or Microworld? Proceedings of Selected Research and Development Papers Presented at the National Convention of the Association for Educational Communications and Technology, Houston, Texas. Seventh grade students who were taught frog internal anatomy via either traditional frog dissection or CD-Tutorial had significantly higher increases in pretest versus immediate post tests scores when compared to the same scores for students using the desktop Microworld. There were no significant differences in immediate versus delayed post-test scores for three learning
methods, showing that students retain the information equally with an alternative versus traditional dissection.

Veterinary students who practiced vessel litigation and division on a hemostasis model scored as well on evaluations as students who practiced on live dogs.

No difference was found in surgical confidence or ability of veterinary graduates who had participated in an alternatives course of study versus those who had participated in a conventional course of study.

Based on physician-assistant student learning performances, the authors concluded that use of labeled sequential slides of anatomical dissections provided a viable alternative to dissection.

Two groups of high school students performed equally on a test following either animal dissection or interactive videodisc simulation.

After hesitancy in their first live tissue surgery, veterinary students from an alternative surgical laboratory program performed on par with students with a standard laboratory experience.

The following studies indicated that alternatives were more effective instructional aids than dissection:

Use of computer packages saved teaching staff time, were less expensive, were an effective and enjoyable mode of undergraduate biomedical student learning, and significantly reduced animal use.

Of fourteen learning methods for basic cardiac teaching and ECG interpretation, computer-based active learning was rated the highest in veterinary student evaluations.
Fowler, H.S. & E.J. Brosius. 1968. A research study on the values gained from dissection of
High school students who watched films of animal dissections (earthworm, crayfish, frog, perch)
demonstrated greater factual knowledge of these animals than did students who performed
dissections on them.
Veterinary students who practiced ovariohysterectomy on an inanimate canine replica scored
higher on skills tests and showed more improvement than students who practiced on cadavers.
Henman, M.C., & G.D.H. Leach. 1983. An alternative method for pharmacology laboratory class
instruction using biovideograph videotape recordings. British Journal of Pharmacology Vol. 80:
591P.
Undergraduate pharmacology students using biovideograph performed significantly better on
post-laboratory tests than those participating in the organ-based laboratories.
Biology undergraduate students using a computer-assisted interactive videodisc system which
included dissection simulations performed significantly better than students who had not used
the computer-aided instruction.
psychomotor laboratories for veterinary surgery. Journal of Veterinary Medical Education.
Inanimate models effectively taught basic psychomotor skills, and had the advantage over live
animals that they could be used repeatedly, enhancing the acquisition of motor proficiency.
the performance and achievement of high school biology students. Journal of Research in
Findings suggest that an interactive videodisc was at least as effective as actual dissection in
promoting high school student learning of frog anatomy and dissection procedures.
Medical and graduate students who used computer simulation achieved a significantly higher
grade in the cardiovascular section of the final exam than their classmates.
McCollum, T.L. 1987. The effect of animal dissections on student acquisition of knowledge of
and attitudes toward the animals dissected. Unpublished Doctoral Dissertation, University of
Cincinnati.
Approximately 175 high school biology students taught frog structure, function, and adaptation
via lecture performed better on a post-test than did approximately 175 high school biology
students taught by doing a frog dissection.

*Biology knowledge of about 92 undergraduate biology students using computer courseware increased more than did that of approximately 92 students using traditional animal-based laboratories.*


*Nursing students who studied using an interactive video program on cardiac output principles performed better on a post-test than did students taught by lecture and live animal physiology laboratory.*


*First-year undergraduate students taught rat anatomy via computer-based instruction scored higher on average than students taught using conventional dissection, regardless of how much time each student spent on the class.*


*Medical students used both computer demonstrations and animal (dog) demonstrations, and rated the former higher for learning cardiovascular physiology.*


*Undergraduate students who learned human anatomy by building clay sculptures of each human body system scored significantly higher on both low- and high-difficulty questions than their classmates who performed cat dissections.*

**Two studies have shown dissection to be a more effective instructional aid than alternative methods:**


*High school biology students taught earthworm and frog dissection via traditional dissection scored significantly better on a post-test than high school biology students taught using a CD-ROM. When the scores to the post-tests were separated and compared independently among males and females, the students performed equally.*

Eight biology undergraduate students who dissected fetal pigs scored significantly higher on an oral test with prosected fetal pigs than did twelve students who studied on a computerized pig (MacPig).