

Slide References: <http://ramsites.net/~kungae>

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**The Case for Educational Software in the Life Sciences
(or)
There's More Than One Way to Skin a Cat**

The world we live in today is drastically different from the world of just two decades ago. Technology is reshaping virtually every facet of our existence, from how we communicate and do business, to how we bank, shop, entertain and yes, even educate ourselves.

The same technologies are also reshaping the way that science itself is done, from how we diagnose and treat illness, to how we investigate the bio-mechanisms of disease, to mapping the human genome. Doctors make diagnoses based on images produced by CAT scans and MRIs. A new field called Telemedicine has made it possible for doctors to diagnose patients via high-resolution digital pictures transmitted over the Internet, and for surgeons to learn innovative surgical techniques by observing live satellite broadcasts of operations taking place on the other side of the world.

So, why can't an undergraduate biology student learn the internal structures and functions of animal anatomy without cutting open live or once living animals? The good news is: They can, and they are.

Many other schools, from the secondary level all the way up through medical school, are adopting alternatives like the ones I'm going to tell you about today. Studies have shown that students using these technologies learn as well or better than students performing lab exercises on animals. These alternatives are highly cost effective, and some of them are even free. There is an incredible variety of alternatives available that can answer any academic objective in the life sciences. And lastly, in light of all this, using these technologies instead of animals is simply the right thing to do.

Answering the growing trend of students objecting to animal dissection for religious or ethical reasons, schools and states across the country are adopting student choice policies, and some schools are doing away with animal labs altogether.

At the secondary school level, student choice laws now exist in California, Florida, Illinois, New York, Pennsylvania and Rhode Island. States with informal policies include Louisiana, Minnesota and Maryland. Legislation is pending in Delaware, Massachusetts, New Jersey and Vermont. And a student choice bill has just passed both the House and Senate right here in Virginia and now only requires Governor Warner's signature to make it law. Countries such as Argentina, Norway, Switzerland and Britain have banned dissection altogether for secondary students.

Today 125 out of 126 medical schools have done away completely with dog labs, something they once claimed they couldn't teach medicine without. Two-thirds of all

U.S. medical schools, including Harvard, Stanford and Yale, have eliminated animal laboratories used for teaching in favor of modern, cost-effective and humane alternatives. Last year, the University of Illinois joined several other undergraduate programs in the country, including UC-Berkeley, Cornell, and Virginia Tech, by officially granting undergraduate students the right to use alternatives instead of animals in the classroom.

Since VCU is now developing a science teacher preparation program, it would be also make sense for VCU to begin actively introducing its future science teachers to the technologies that are going to be used more and more prevalently at all levels of life science education.

There are many studies that demonstrate that students using alternatives learn as well or better than those who performed lab exercises on animals. I've posted a reference list on my website for anyone interested in reviewing the studies, as well as a few excerpts from those studies.

Implementing these technologies is easier and less expensive than most would expect. There are numerous programs that will lend these tools to universities for no charge other than a refundable deposit and the cost of return shipment. I have borrowed four applications from Animalearn that are appropriate for lower level undergraduate biology majors. These are on exhibit now in the Commons.

The four US based Lending Programs are:

1. Animalearn:
2. ESEC
3. HSUS
4. NAVS

Borrowing through these programs is not only a pain-free way of sampling many of the different technologies, it is also an ideal way RIGHT NOW to offer students with moral or religious objections to dissection suitable alternatives that will not only enhance their learning but can also save teachers the time and headaches of having to scramble together alternative exercises of their own. These programs can be uploaded to the computers that exist in every bio lab classroom, and each computer can accommodate up to two students at a time.

Further into the future, it is my hope that VCU will begin investing in these technologies to enhance the learning of all life science students. Choosing this avenue is also more cost effective than purchasing cadavers. A detailed cost comparison slide is posted at the website address referenced at the beginning of this paper.

The programs available for purchase include those that can be borrowed, but also encompass a much larger universe of exciting educational tools. The book [From Guinea Pig to Computer Mouse](#), contains a comprehensive listing of current applications and other tools available including videos and free online resources that cover everything from anaesthesia, anatomy, biochemistry, cell biology, surgery, embryology, histology, pathology, physiology, psychology and pharmacology. I have three copies that I would be happy to lend out. This book can also be obtained from Animalearn.

Now to my last point: A basic ethical principle asserts that if we have a choice between two effective ways of achieving something – one that causes pain and suffering – and the other that does not – then ethical conduct dictates using the latter method. Dissection and alternatives present just such a choice.

There exist in the world today both medical doctors and veterinarians who have never harmed an animal in the pursuit of their medical careers. Dr. Andrew Knight, veterinarian and director of education at Animalearn, says: “The need for using animals in education is clearly strongest in veterinary school, and the fact that I and other veterinarians have been able to graduate without harming any animals proves that current methods are unnecessary at all levels of education.”

It is true that, at one time, dissection was our only option for teaching the life sciences. But please consider that dissection dates from the educational reforms instituted by Charles Darwin’s contemporary, Thomas Huxley, during the time before we used electricity to light our homes. There is a better way now.

Educational software and other modern tools for the Life Sciences, like all other technologies, are a product of the natural progression of the human species, and what I’ve introduced to you today is but a glimpse of a growing and undeniable trend in this field.

In summary, educational software applications are being adopted as alternatives to animal labs at all levels of education all over the world. As this trend continues, more students will be asking for these alternatives. Studies have shown that students using these technologies learn as well as better than students using animals. These technologies are more cost effective, many of them are even free. And applications are available for any discipline in the life sciences.

It is my hope that VCU will choose to grab this digital calf by the horns and actively position itself on the cutting-edge (no pun intended) of life science education.

Other pages of interest:

<http://ramsites.net/~kungae/quotes.html> (quotes from doctors asserting dissection is unnecessary)

<http://ramsites.net/~kungae/carolina.html> (list of violations found at Carolina Biological Supply during and undercover investigation)

<http://ramsites.net/~kungae/experiment.html> (list of quotes from scientists and doctors against vivisection)

<http://ramsites.net/~kungae/greatminds.html> (list of relevant quotes from some of the greatest minds of humanity)

<http://ramsites.net/~kungae/link.html> (information on the links between animal abuse and human violence)