

Movement to Curtail Animal Dissections in Zoology Curriculum: Review of the Indian Experience

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Summary

Animal dissections have been dropped from the curriculum in several developed countries, and virtual laboratories are taking their place, or at least the concept of the “three R’s” is becoming accepted. Yet, the scenario in the developing countries in this regard has been dismal. However, recently, a movement has started in India in this area, thanks to the aggressive approach of PfA, I-CARE and InterNICHE, supported by a few zoology educators and policy makers, who joined this movement as freelancers. The aggressive campaigners against animal dissections put up convincing arguments to the orthodox zoology educators and higher education planners with such veracity that the arguments cannot be ignored. The arguments, to be presented in detail at the conference, and the campaign have been rewarded with success such that a few universities and autonomous colleges have revamped their zoology curricula so as to dispense with or reduce animal dissections. The Bharathidasan University, Tiruchirappalli, Tamil Nadu, India, has been the trendsetter, evolving what is known as the “Bharathidasan University Model”. A memorandum from I-CARE and PfA to the University Grants Commission, Government of India, New Delhi, was sent out by the UGC to the universities with a request to consider the points positively. However, there is still a need to bring about an attitudinal change in the zoology educators and higher education planners such that they participate willingly in this endeavour. The role-players at all levels are identified and approached with a language that is understandable to each and are adequately supported by hands-on training in the alternative methods. Ultimately, the responsibility in this regard lies with the educators themselves, since they are the ones who, working in the academic committees that design the curricula, can cut down on the requirement for dissections.

*Zusammenfassung: Bestrebungen zur Abschaffung der Sektionsübungen im Zoologiestudium: ein Erfahrungsbericht aus Indien
Präparierübungen an Tieren wurden aus den Lehrplänen vieler fortschrittlicher Länder zugunsten virtueller Laboratorien gestrichen, zumindest das Konzept der „3R“ wird mehr und mehr anerkannt. In Entwicklungsländern jedoch ist das Szenario in dieser Hinsicht bedrückend. Immerhin ist in jüngster Zeit in Indien einiges in Bewegung geraten, dank dem kompromisslosen Vorgehen von PfA, I-CARE und InterNICHE, und unterstützt durch einige Zoologie-Professoren und Politiker, die sich freiwillig dieser Bewegung angeschlossen haben. Die rigorosen Verfechter einer sektionsfreien Ausbildung hielten den orthodoxen Zoologie-Professoren und universitären Studienplanern derart überzeugende Argumente entgegen, dass diese nicht mehr ignoriert werden können. Diese Argumente, die während der Tagung in Chennai im einzelnen vorgestellt wurden, haben einige Universitäten und unabhängige Kollegen dazu bewegt, ihre Lehrpläne dergestalt umzugestalten, dass auf Sektionen ganz oder überwiegend verzichtet werden kann. Die Bharathidasan Universität in Tiruchirappalli, Tamil Nadu, Indien, ist ein solcher Trendsetter, sie hat das sogenannte „Modell der Bharathidasan Universität“ entwickelt. Ein Memorandum von I-Care und PfA zu Händen der universitären Förderkommission (UCG) der indischen Regierung in Neu Delhi wurde von der UGC an alle Universitäten verschickt mit der Aufforderung, diese Punkte positiv in ihre Überlegungen einzubeziehen. Trotzdem bedarf es noch grosser Überzeugungskraft, um eine Verhaltensänderung der Zoologie-Professoren und universitären Lehrplanbeauftragten herbeizuführen und sie zur freiwilligen Mitarbeit auf diesem Gebiet zu bewegen. Die Akteure auf allen Ebenen sind mit verständlichen Argumenten und praktischen Übungen in Alternativmethoden ausgerüstet. Letztlich liegt nun die Verantwortung bei den Professoren selbst, sie sind es, die in den akademischen Gremien die Lehrpläne entwerfen und damit auch die Pflicht zu Präparierübungen beenden können.*

Keywords: animal dissections, zoology, higher education, alternative methods

1 Introduction

For several years now there has been a worldwide debate, particularly in higher education circles, with conservationists and animal welfare activists, about the

logic, rationale and utility of animal dissection in the life science curriculum. The dimension the debate has reached so far is indeed heartening. In several developed countries animal dissections have been dropped from the curriculum and the vir-

tual laboratory concept or project approach has been introduced, or at least the “three R” concept has been put into practice. This was made possible by the strenuous lobby and effort of conservationists and animal welfare activists working in groups, small or big, at the international level, operating through local



chapters. The respective scenario in the developing countries has been dismal. The Indian people are traditionally conservative and, therefore, the efforts fell on deaf ears for several years. However, thanks to the aggressive approach of PFA, I'CARE and InterNICHE, supported by a few zoology educators and policy makers, who joined this movement as freelancers, progress towards change has begun in India. The aggressive campaigners against animal dissections put up convincing arguments to the orthodox zoology educators and higher education planners with such veracity that they cannot be ignored. This article tells of this experience.

2 Why reduce, dispense with or use alternatives to animal dissections?

2.1 Animal dissection is a step backwards in learning in the life sciences

Each subject of knowledge has its own development and history. From an incipient stage at the time of genesis, the subject makes small to big progress, in which process newer branches are born and the older ones loose emphasis. This is also the case with life sciences. The undergraduate programme in the sixties consisted of a course on invertebrates, one on chordates and two courses on general principles, covering cell biology, genetics, embryology, physiology, ecology and evolution. The laboratory courses consisted of one on the invertebrates and another on the chordates. The knowledge pertaining to these subjects that was available then placed a lot of emphasis on anatomy, systematics and evolution. Naturally, the laboratory courses covered learning about the animals from these perspectives. In the course of time there has been a gradual change in the subject content of zoology. The ecological approach to life sciences with Odum's School of Ecological Energetics emerged. Scientists shifted to this trend, but did little to re-orient the curriculum, particularly the lab course, on this approach. We continued with animal dissection. Soon, with the advent of biochemistry and the popularity gained by this subject, and new subjects like cell biology and genetics, there was shift in emphasis

to biochemical, cell biological and genetic approaches. There should have been a similar shift in the laboratory course to these areas. But this did not happen. We taught the theory of these subjects but did little to change the laboratory course. We continued with a major emphasis on animal dissections in the lab course.

Subsequently, even biochemistry had to take the back seat in view of the rapid developments in molecular biology and its offshoot, biotechnology. With this should have come a shift in emphasis from anatomical, cell biological, genetic and biochemical approaches in the laboratory to a molecular approach. Today the most popular anatomy journals approach anatomy from a molecular perspective. There is Molecular Cell Biology, Molecular Embryology, Molecular Genetics, Molecular Systematics, Molecular Evolution and so on. Not only did we fail to realize this trend, but we continued to emphasize the anatomical approach, particularly in the laboratory course. Not only did the old teachers become obsolete but they continued to produce teachers who can look at the laboratory course only from an anatomical perspective. Thus, this continuation of the anatomical approach to zoology means that the knowledge gain of the students is curtailed and that innocent animals are killed in thousands for dissections. This is not an attempt to shun learning of anatomy. But, anatomy should have only the share due to it, a share which has shrunk in light of the inclusion of the more modern subjects into the curriculum. For this small share we currently still sacrifice too large a number of animals, and this despite the fact that we have newer methodologies to teach animal anatomy, viz. computer-aided learning and virtual laboratories. Who is responsible for this? We, the teachers, higher education planners and administrators.

2.2 Animal dissection: learning process or skill development?

Notwithstanding the above argument, assuming that there is a need to do animal dissection as an aspect of life science/zoology learning, one must ask whether animal dissection is a learning process at all? Our experience is that the students do dissection for the sake of it

and to score high marks. The students do not intend to learn anatomy or appreciate animal organization by performing dissections. If it happens at all, it happens in a few exceptional cases. There is reason to believe that an average student who has astute skills in dissection scores far higher marks than a bright student poor in dissection skills. In fact, dissection as a laboratory exercise has a negative impact on a bright student who lacks dissection skills. And what about the topics in anatomy for which no provision for dissections have been made in the laboratory exercises? Are not students learning the structure of the cell, intracellular organelles and the structure of the gene without dissecting a cell or a gene? The methodology adopted to teach the students the anatomy of a cell or gene could just as well be adopted to teach them the anatomy of animals. Thus, dissection is more a skill development than a learning process. Skill development for what? At what cost? At the cost of innocent animals?

2.3 Skill development for surgery?

Historically, the zoology curriculum was designed to qualify candidates for admission to professional courses such as medicine and veterinary science. It was believed that animal dissection provided opportunity for students intending to take these courses to gain on-hand experience and develop first surgical skills. This was true. But, then, in the recent past, the situation changed. In most of the universities and institutes, graduates in life sciences are no longer considered for admission to these professional courses. A pass in the 12th standard or a pre-degree is the prescribed qualification. The selection criteria are such that graduates can no longer be candidates. Thus, animal dissection in the life science/zoology curriculum does not serve this purpose anymore. Also, according to Jerry Vlasak, board-certified trauma surgeon at a level II trauma centre in California and a fellow of the American College of Surgeons, "the best way to learn about human anatomy and about saving human lives is by studying humans, not animals. Imagine your surgeon saying, with scalpel in hand, 'Don't worry, I've done this procedure on a goat'."

2.4 Qualitative versus quantitative education

In post-independence India there were only few colleges and universities and study was quality-oriented. Fewer students studied life sciences/zoology. Therefore, fewer animals were killed for dissection. Then the scenario changed and there was a vast and rapid expansion of higher education offers – quantitative education. The doors of higher education were thrown open for all and sundry – a welcome development indeed from the national perspective of “education for all” and human resource development. With this, the number of students taking life science/zoology education rose from a few thousand to several thousand. This required a respective increase in the number of animals killed for dissection. The pre-degree system enrolled several times the number of students who would later actually go into zoology for their undergraduate studies, and much fewer students got the opportunity to enter post-graduation in zoology. Thus, to produce a few graduates and much fewer post-graduates in zoology, millions of animals are killed. Should this be continued?

In Tamil Nadu nearly 400,000 students are enrolled in the pre-degree programme and at least about 250,000 choose to learn biology/zoology and botany. They dissect animals. Assuming that each student dissected 5 frogs, 1,250,000 are killed each year in Tamil Nadu alone. How many if all the states in India are considered? Is nature an inexhaustible source of frogs? It cannot be and it is not so. The animal collector does not bother about the reproductive status of the frog. The students like to have large-sized animals for dissection and these are usually the breeders. Removing the breeders results in fewer offspring. This, in combination with the pollution of water bodies by human activity, further hampers the survival of the frogs. What is the outcome? The green frog has now become a rare commodity. Depletion of an animal species from its natural environment alters the niche position, causing a dramatic change in ecology. For example, the depletion of the green frog population in Southern India resulted in an increase in the population of tiger frogs. This has resulted in an increase in the insect species that are the staple diet of the green frog.

2.5 Do all students like animal dissections?

“I began the dissection but found it difficult. I had to get the instructor to break his jaw and tie him down to my dissection tray, because I could not stand breaking his little bones. I slowly completed the dissection while wrestling with my conscience.” – This is the agony expressed by a school student. Many bright students do not take up zoology simply because they cannot bear the horrible sight of dissecting an animal, anaesthetized or dead. Should such bright students be deprived of learning zoology just because they are humane? “Today, I still cannot understand what the purpose of dissection is. I know first hand that high school students do not take it seriously enough for it to be considered educational. The only thing students learn is that it is acceptable to kill and abuse animals. It also encourages the pointless abuse of animals. For example, a boy who took the biology class with me went home after the pig dissection and caught and dissected a live frog. Moral standards are often compromised and lowered because of the practice of dissection. Dissection is simply a course on how to be cruel to animals. This is one lesson that kids can live without.” This is the impression of the student quoted above.

2.6. How many graduates in zoology take on zoology-oriented professions?

This is another major question. Few, rather very few, graduates in zoology take on zoology-oriented professions. How many zoology-oriented jobs are available in the country? The largest number is in teaching. The others are negligible. Graduate teachers, post-graduate teachers, college teachers, university teachers, and scientists, in a rather crippled pyramidal pattern. These teachers have been trained in animal dissection as a laboratory exercise. We kill animals for dissection to produce teachers. To produce these few teachers, and much fewer scientists in zoology, millions of animals are sacrificed.

2.7 Inadequacy of teachers?

The teachers do not want to change. Rather, they do not want to change to the modern branches of science, because they are only trained in and capable of doing

the outmoded subjects and exercises. They lack confidence in the modern sciences. Thus, the inadequacies of the teachers become the handicap of the students. There is a strong need for the teachers to attend rigorous workshops on techniques and skills in the new and emerging areas of the respective subjects. This will do a lot of good for higher education and, in the present context, motivate updating exercises in these subjects and, thus, get out of the dogma of animal dissection.

3 The issues summed up

Thus, animal dissections and killing animals for this purpose raises serious issues from ethical, social, pedagogical and environmental perspectives. From the academic perspective there is little need and scope for dissections in the contemporary scenario. Instead, there is a strong need for biodiversity conservation, ecosystem balance and love of animals. In the end, a human is a biological species like all animals. Therefore, as much as man has a right to live on this planet, so do the animals. Let us not harm the animals just for unnecessary laboratory exercises.

4 The effort and outcome as of now

The Committee for Purpose of Control and Supervision of Experimental Animals (CPCSEA), Government of India, InterNiche, an UK-based voluntary organization, People *for* Animals (PfA), a voluntary organization at the national level, and International Center for Alternatives in Research and Education (I²CARE), another voluntary organization based at Chennai, individually as well as collectively, took up this issue and made a serious effort to canvas for dispensing with, or at least reducing, animal killing for dissections. One of their major strategies was to rope in the support of a few enlightened zoology educators in this movement. The author of this article and M.C. Sathyanarayana, from A.V.C. College, Mayiladuthurai, Tamil Nadu, supported by these organizations, targeted the zoology teachers to motivate them in this regard. Initially, the goal was mainly to bring



about a paradigm shift in the pedagogy of giving the students hands-on experience in learning about animal anatomy in the laboratory. Alternatives to animal dissection was the principal theme. This was approached from two perspectives. First, workshops were conducted in different parts of the country, especially in Tamil Nadu. College teachers of zoology were enrolled as participants and told convincingly to switch to alternatives to teach animal anatomy. A CD-ROM based approach and relevant websites were brought to their attention. Going a step further, after the demonstration they were given free access to the facilities. To begin with, it was tough going indeed. Orthodoxy and conservatism held the teachers back. Persistent motivation started yielding fruits. Slowly, a change in attitude was achieved and many started appreciating the effort.

Once there was a positive change in the teachers, the focus was turned towards bringing about changes to the curriculum, such that there is no need for animal dissection, to the greatest extent possible. Taking advantage of their nomination to the boards of studies of various universities and autonomous colleges in Tamil Nadu, the spear-headers of this movement argued in favour of dropping dissections and introducing computer-aided learning in their place. The first great success was made at Bharathidasan University, Tiruchirappalli, where this was achieved. Enthused by the success, the operation was continued and most of the universities in Tamil Nadu have dropped a major part of the dissections from the zoology curriculum. A tentative estimate will put the number of animals saved thus at about 30,000 per annum.

5 Ministry of Education and University Grants Commission approached

Having done well in Tamil Nadu, the next attempt was to spread the message to the rest of the country. Considering the vastness of the country and the innumerable educational institutions, the modality adopted in Tamil Nadu is not feasible for practice. Therefore, supported by the spearheading teachers, I'CARE drafted a lengthy memorandum that was submitted

to the H'ble Minister for Human Resource Development of Government of India by H'ble Mrs. Maneka Gandhi of PfA. The minister understood the gravity of the situation and referred the memorandum to the University Grants Commission (UGC), Government of India, the apex body deciding the destiny of higher education in India, with instruction to do what was necessary. The Secretary of UGC, in his letter dated October 31, 2006, addressed to all universities in India, referred to said memorandum and sought to incorporate the suggestions. The feedback from the universities is encouraging and the picture looks rosy indeed.

6 What could be the approach to animal biology lab?

These are the days of biodiversity. Each country is proud of its diversity of fauna and flora. Much emphasis is put on biodiversity and its conservation, particularly in the context of the indiscriminate pollution of the environment. Several species have vanished and several others are on the verge of vanishing. If we are to conserve the treasure of biodiversity, not only the students must be educated in this, but they must also be told to be humane in their approach towards animals. If we kill animals in front of them or for them and make them dissect them, how can we expect them to be conscious of biodiversity? Thus, the approach to studying the animals should be with the holistic perspective of seeing them alive and in their natural environment. This will inculcate in the minds of students an inquisitiveness to wonder at the exquisite variety in them and their roles in the environment. This will also kindle interest to understand their systematics. Animals that cannot be watched in the immediate vicinity may be shown to them by visits to museums.

7 What about studying animal anatomy in the lab?

It should have its share, but only its due share. And that can be done using models and charts. Do the students not understand the anatomy of mitochondria, Golgi appa-

ratus and the gene when this is explained using diagrams, models and charts? We live in the era of information technology which encompasses educational technology. There are innumerable free and commercial websites and CD-ROMs that teach animal anatomy and also animal dissection. These alternatives, in addition to letting students learn anatomy without causing pain to animals, make this endeavour thrilling, less expensive, and provide a compelling reason to turn to operating a computer and visit websites. One major hesitation among the teachers in this regard is that this approach does not provide scope for examination. In fact this approach also provides adequately for examining the students.

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