

Impact of E-Resources and Softwares on Biodiversity Conservation and Zoology Teaching

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Abstract:

E-resources and software programme are very much helpful for biodiversity conservation and also serve as effective teaching tools. The arrival of E-journals reduced the use of papers for which many trees are being sacrificed for making paper. With advancement of the technology and the development of computer-based simulations have convinced the science learning. Software programs such as V-FrogTM, which is a virtual reality-based frog dissection program that can be effectively used instead of real frogs and eMind invertebrate for virtual dissection of invertebrates. A virtual software application allows users to work with a virtual specimen like that of real one that can be cut and explored in variety ways for each individual user. This will help to reduce killing of frogs which are doing effective role as a biological control agents by consuming mosquitoes and other insect pests. Similar online programme will be helpful as effective teaching tools as well as helpful for the conservation of the live animals for dissection.

Keywords: Biodiversity Conservation, Dissection, computer simulations, zoology, education

I. INTRODUCTION

In the present day E-journals come to the prominence with the advent of the Internet. Research scholars can browse their related field of publication within minutes in libraries with this facility. Presently E-journals are available in all the Indian Universities with the facility launched by UGC- Infonet since 2003. The advent of the E-journals creates new era in the publication which greatly reduced the use of papers in which most of the conventional printed journals depend on (Khan 2012). This will reduce the cutting of trees for making paper and help the conservation of forest trees.

History of dissections are believed to be in such a way that animals were easily available in plenty for very less number of students, but the present scenario has forced dissection to be an outdated teaching and learning method as the situation has reversed conversely (Akbarsha 2007). With the advent of modern technology educators framed curricula capable of exposing students to the acquisition of knowledge through observation rather than through the primitive method of dissecting animals (Sathyanarayana, 2009). University Grants Commission request for discontinuation of dissection in Zoology discipline realizing the fact that most of the animals are caught from the wild, and their indiscriminate removal from the natural habitats disrupts the biodiversity and ecological balance. Hence, learning the anatomy and physiology of animals through virtual softwares instead of killing them.

The practice of animal dissection in laboratories dates back to the late 1800s. The two aspects of animal killing in science education include dissection and vivisection, for which approximately 170 species of animals are used. Dissection is the exploration of dead animals to study their anatomy and physiology, whereas vivisection is animal experimentation, involving cutting, burning, shocking, drugging, starving, irradiating, blinding, or killing of animals (Sathyanarayana, 2009). In this context, the effectiveness of alternatives through models and smart e-learning applications seems to be quite convincing as the objective of conservation of animals seems to be promising. Here we present the scope of biodiversity conservation and also the effective alternatives available so as to cope up with the century-year-old educational system in India.

Electronic resources have a huge impact on the dissection-based learning in the zoology discipline. The use of computer simulation tasks enhances the learning in the science classroom with the focus of most recent research studies (Akpan 2001). These computer-based simulations can effectively be a useful tool in helping students to understand and experience practical applications of scientific thinking (Akpan and Andre 2000; Coleman 1998). Moreover, the technology creates powerful possibilities for the representation and manipulation of relational model systems (Akpan and Andre 2000; McKinney 1997).

II. NEED FOR ALTERNATIVES

The prevalence of cruelty-free science classes and use of alternatives is trending, as most of the people has learnt the fact that the use of animals in science education is no longer a necessity. This perhaps avoids the harmful usage of animals in education in the areas of science. In fact this is possible only through the advent of modern non-animal models and methods for training to get expertise effectively (Marszalek and Lockard 1999).

Animal models with smart e-applications are widely available. They are cost-effective and are capable of providing compatible learning experiences. These alternatives save animal lives and triggers biodiversity conservation greatly. Advantages of alternatives have a far smaller environmental impact than does the harvesting of frogs, use of toxic preserving chemicals and after-class disposal of body parts. In addition to frogs, other commonly dissected species include rats, pigeons, turtles, snakes, salamanders, earthworms and roundworms.

III. VIRTUAL SOFTWARES FOR DISSECTION

One example of a popular, interactive computer software program is V-Frog™, a virtual reality-based frog dissection program. V-Frog™ is one of the latest alternatives to use in place of real frogs and is available to borrow for free through our ESEC Loan Library program. Designed for high school to graduate level biology courses, a PC mouse allows students to pick up a scalpel, cut open skin, explore internal organs, watch a beating heart, observe digestion, conduct an endoscopy, look at underlying muscles, bones, and organs, and observe nerve and muscle response, as well as other capabilities not possible with a physical specimen. V-Frog offers real-time interaction, unlimited manipulation, and 3-D navigation, making every dissection reflect a student's individual work. The award-winning Digital Frog 2, an interactive CD-ROM, allows students to perform an in-depth "dissection" of a computer-generated frog with a digital scalpel. The program also includes animations, quizzes, videos and information about frog behavior, ecology and environmental issues. Similarly eMind invertebrates software is helpful for the variety of invertebrates virtually.

The models are used to study the anatomy and to learn animal handling without causing stress to animals. These models are of three-dimensional plastinated in nature. A manikin is an anatomical model. For example, a manikin of a full-size animal can be designed for cardiopulmonary resuscitation training. This alternative tool is helpful in teaching laboratory exercises in pharmacy and medicine. Manikins have been employed in veterinary education as well. Models of anatomic parts, whole-body manikins, and various computer-based learning programs have provided educators with training tools for students aiming to become professional veterinarians.

The development of e-learning technology, a computer-based technology, has contributed significantly to our knowledge of effective understanding in the Zoology discipline. Students can be trained in animal anatomy using computers, and virtual reality technologies are revolutionizing the educational system. The time has come to change the laboratory curriculum and put the available digitalized CD ROM, other animal alternatives, and web resources to good use. Teachers often cite the cost of alternatives resources and computers as a reason for not implementing them, but the alternatives provide great advantages.

Following are the major advantages of computer simulations:

1. Experiments can be repeated at any time and almost anywhere.
2. Experimental methods are cost-effective and affordable when compared to the cost of animals.
3. Could avoid the killing of animals for dissection purposes.
4. Facilitates conservation of animals and balanced ecosystems.

IV. CONCLUSION

In response to growing criticism of depletion of forests and biodiversity the e-learning sources like e-journals and materials are great alternatives, Similarly for the dissection of real animals the computer models are great alternative. According to Schrock (1990) no computer model is complete enough and no computer simulations can replicate actual organs and is failure in providing the complete sensory experience such as sound, smell, taste and touch. On contrary, according to Duncan (2008) virtual dissection may provide learning opportunities to students who would not engage in, and learn from, physical dissection for either moral or ethical concerns and health concerns related to chemicals and hazardous laboratory instruments. However, whatever lacking in the computer aided models we speculate that smart e-learning is practically convincing to understand the biology and physiology as prior importance must be conservation oriented. In fact, active learning through computer simulations and e-resources are effective alternatives to the hands-on experience with live animals in conservation point of view.

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