

Experimental Teaching and Interactive Computer Assisted Learning : The Student's Viewpoint

B. Medhi, M. Sukhija, S. Upadhyay*, A. Bhatia**, K. Anuradha

Abstract

A student view point regarding utility and present role of experimental teaching and interactive computer assisted learning was cited from three Medical Colleges of North India using a set of questionnaires. The majority of the student cited that animal experiments are important part of medical curriculum. However, computer assisted learning techniques will be useful aid in future but currently cannot replace animal experiments as the tool of choice for medical education and research.

Key Words

Experimental CAL, Teaching

Introduction

Whenever the issue of animal experiments in research and teaching arises, medical schools put forward the plea that animal experiments are an essential part of teaching curriculum and where possible, their use is assisted by other learning techniques like models, charts, videofilms, etc. Institutions where animals are used for experiment and research have formed committees to ensure that use of animals for any purpose is adequately justified and that such work is done as humanely as possible. This is exemplified by the federal Animal Welfare Act in America under which all institutions using animals are required to have a committee for animals that reviews any procedure pertaining to animal use. Due approval by such a committee is to be obtained before initiating the use of animals for any purpose (1). In addition, a novel concept of learning by computer simulation has emerged as a futuristic trend with potential global impact. The present study was conducted in three medical colleges of North India to assess the student opinions of the present role of experimental teaching and interactive computer assisted learning (CAL).

Materials and Methods

A student opinion inventory was prepared consisting of a set of twenty seven statements. The content of these statements ranged from issues on role of practical work in biomedical research and learning; the possible reactions towards dissections and whether they are beneficial to the medical student; how such work on animals will benefit them; the moral justification behind animals for laboratory use; the attitude towards alternative teaching tools like models, preserved specimens, documentary films used in the medical institutions and the students' attitude towards these modes of learning; the role of computer graphics and simulation in the present day teaching and how it compares with manual dissection work. The students' perspective was also assessed for the current scenario that given the option, should dissections be banned or made compulsory. An open comment was invited over the usefulness of computer technology/simulation in performing long distance surgeries.

The inventories were distributed to 150 undergraduate of fourth and final year MBBS students in three medical colleges and institutions of North India. The students were

From The Department of Pharmacology, PGIMER, Chandigarh, *Cardiorespiratory Physiology, Vallabhai Patel Chest Institute, New Delhi and **Pharmacology, Maulana Azad Medical College, New Delhi (India).

Correspondence to: Dr. Bikash Medhi, Assistant Professor, Department of Pharmacology, PGIMER, Chandigarh-160 012 (India).

instructed to give independent opinions on the statements. Each statement had three options: agree, disagree or can't say. The students were required to tick against any one option for each statement. Confidentiality of information submitted was ensured.

Results were analyzed by calculating the percentage of students expressing a particular opinion.

Results

A total of 150 student opinion inventories were distributed. 130 students submitted the filled up inventories. Analysis showed that the majority i.e. 63% of students agreed that in vitro and in vivo experiments in animals are essential for better understanding and learning of the biological process. 23% of students expressed opinion against use of experimental animals and also raised the issue of ethical conduct in such work. A minority of 12.7% were undecided on this view.

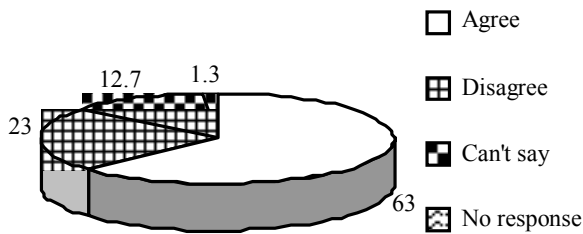


Fig. 1 Student's opinion poll for use of animals and its ethical justification (percentage response)

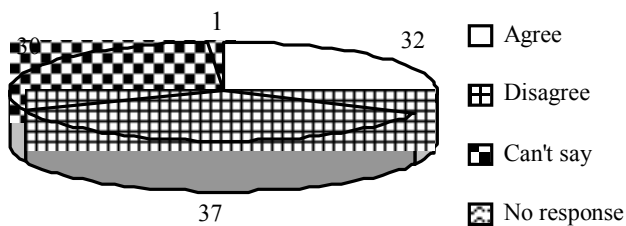


Fig. 2 Student's opinion poll for computer assisted learning(%)

Table 1. Response assessment to questionnaire

Objective assessed	Agree (% response)	Disagree (% response)	Can't Say (% response)	No Response (%)
Animals should be used in experimental research and teaching and their use is ethically justified for the purpose	63	23	12.7	1.3
Computer assisted learning is beneficial for experimental teaching	32	37	30	1

The statement pertaining to computer assisted learning evoked a mixed response. While 32% of students agreed that it will be beneficial for future experimental teaching, a slightly higher percentage of 37% students disagreed to this and 30% were not aware of computer assisted learning.

Discussion

The results of this study convey the readiness of most medical students to use animals for learning and research. But in a significant percentage, the attitude towards animal experiments was to the contrary i.e. almost one-third of medical students were neutral or opposed to vivisection as a teaching tool. These findings are match with a similar study done in a medical school of Israel where 59% of students expressed a positive attitude, 13.5% were neutral and 27.5% saw the laboratory use of animals negatively (2). Our study, however, did not pose real life situation to the students but put questions that simply tested their outlook to the different modes of learning to which they were routinely exposed, whether they expected to benefit or not from these methods currently used and what was their instinctive reaction about the much hyped issue of dissection of animals. The fact that a significant number of students did not favor animal use raises concern regarding the receptivity of such a portion of student to the knowledge imported via dissection work with consequent decrease efficacy of such a teaching aid. When the question of efficacy arises in such a situation, the grounds for mortality of animal use become debatable. In an attempt to put an end to the confusion of medical students and workers, the Council of Scientific Affairs recommends a set of guidelines on the use of animals in medical research and training. These mandate the adequate justification of animal use, appropriate approval of any procedure on animals, however, minor it may be, by an Institutional Animal Care and Use Committee, minimum pain to animals, use of non-animal models where possible and prior dissemination of information to students regarding their participation in such work (3).

Inspite of new policies for use of animals in medical education, considerable dissatisfaction over this issue remains. Despite this, use of animals for experiment and research has become associated with various medical specialties like physiology, surgery, pharmacology, advanced

life support, ophthalmology, pediatrics and a number of others follows in this list notwithstanding alternatives available teaching aids like videotapes, models etc (4).

An emerging trend as an alternative to animal experiments is use of computer simulations to duplicate live dissections. These have the advantage of lesser involvement of time and labor, repeatability, ease of dissemination of information even over global distances and most important, computer assisted learning does not speak arguments over ethics. Moreover, the computer savvy generation of students takes easily to this method of learning. But amazingly, in our survey, such a possibility found favor with only about a third of the participants while majority took the idea negatively or were unaware of computer simulated learning. The reasons for such results need a more detailed evaluation. To the contrary, encouraging results were obtained in an Australian study of computer simulated pharmacology experiments for undergraduate pharmacy students (5). Does this point to a radical difference of attitude over distances or is it a nuance of a difference in exposure to modern day technology? Neither reason seems plausible enough. Whatever the causality for such conflicting results, computerized teaching has penetrated the medical education system and in due course of time will probably carve a niche for itself in medical research and learning.

Multimedia computer based training (CBT) programs have marked their entry into the field of surgery also where they have proved to enhance standard instructional media through a combination of graphic, video and audio formats while offering the potential for unlimited interactivity. CBT may in fact provide a cost effective alternative to traditional means of basic knot-tying and suturing instruction. Further, this will lead to improved interaction between the student and the clinician, who

can then direct efforts towards technical details and more complicated skills instead of the basics (6).

The 'virtual reality' created by computer based learning has immense potential not only in terms of flexibility and convenience, but also in its unique presentational benefits and provision of personalized learning to the increasing number of medical students. Hence, an initial investment of fund is likely to pay off in the long run. However, without adequate planning and training of staff, the consequences may prove to be disastrous (7).

In summary, in this study, majority of students cited that animal experiments are an important part of the medical curriculum. Dissections impart considerable manual skill and knowledge albeit the ethical issue involved. Computer assisted learning techniques will be a useful aid but currently cannot totally replace animal experiments as the tool of choice for medical education and research.

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