Original Research Paper

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CAN SIMULATED MODELS TAKE OVER HANDS-ON DISSECTIONS? - A SURVEY ON STUDENT PERSPECTIVE

Priya Goel* Assistant Professor, Department of Zoology, Deen Dayal Upadhyaya College (University of Delhi). *Corresponding Author

Sudhir Verma Assistant Professor, Department of Zoology, Deen Dayal Upadhyaya College (University of Delhi).

ABSTRACT A survey was conducted to assess the undergraduate biology student's perspective on hands-on dissections versus simulated dissection models. A questionnaire consisting of relevant questions plus their general opinion toward use of animals in classroom dissections and ban on animal dissections was circulated among college students and the results analyzed. More students find hands-on dissections better than virtual ones, though they felt at undergraduate level, the ban on hands-on dissections is justifiable.

KEYWORDS : dissections, virtual, hands-on, animal, simulated models

Introduction:
Widespread controversy over Animal Dissection to teach Biology has led the way to Virtual Computer-Based Dissection Programs[1]. The latter serve as an interactive, problem-based alternative to hands-on dissections, though they come with their own limitations[2]. So in the present study, a survey was conducted with an aim to investigate the opinion/perception of biology students on computer-simulated dissections.

Methodology: A cross-sectional study was conducted. A questionnaire consisted of 13 questions (both objective and short descriptive type) was circulated among the undergraduate students of Delhi University colleges and to the alumni pursuing higher studies in other colleges and universities of India. Students were selected randomly and they were informed about the purpose of the study. An The data was collected from the questionnaire and analyzed using Microsoft Excel.

Results: A total of 136 responses were obtained. 89.8% of the respondents were well versed with computer applications. The rate of dependence on online sources among the 137 respondents showed a bell curve, the mean being 7.23. The most common sources for online study included Search engines including YouTube (55%), Open education portals including video lectures (25.5%), online publications including e-Books (18.2%). Most of the respondents (92%) have used online tools for computer-based dissections like Frogut, Digital Frog 2.5 though others did not remember any specific name at the time of survey. About 1/4th (26.3%) of the respondents felt simulated models help in recognition of real magnitude/ position of organs and tissues, though 13.9% felt otherwise, 27% said at times and 32.8% had no say on this. 36.5% were of the opinion that virtual animal dissections/ surgeries/ biological studies are not as explanatory as manual ones, only 1/5th (19%) agreed to it, 44.5% are of the opinion that both have equal importance. Half of the respondents (50.4%) felt that stimulated models can help in acquisition of core knowledge about inner anatomy of specimens. There was almost a tie between those that believe (38%) simulated models give a feeling of the physical properties and strength of connections between various organs and tissues and those who did not believe in this (35%). More than half of the respondents felt that the ban on dissections was correct as dissections disturb ecological balance and also dehumanize and desensitize students to the social value of animals; though 40% felt that the ban reduces the practical skills of the students plus dissections can be done at postgraduation level only when the students have actually taken up Biology as mainstream subject. The respondents were checked for the advantages and limitations of computer-based simulations with respect to time and space, ethics, ecological constraints and understanding of the complexity against hands-on dissections. Earlier studies have also confirmed students' inclination toward hands-on dissections[3,4,5]

Conclusion: The analysis of the questionnaire showed that it is not possible to analyze unequivocally which dissection variation is justified for teaching Biology. Though the students understand the limitations of computer-simulated dissections, still they believed the ban on hands-on dissections is correct at undergraduate level.

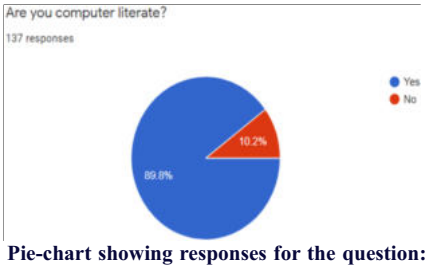

Figure 1. Pie-chart showing responses for the question: Are you computer literate?

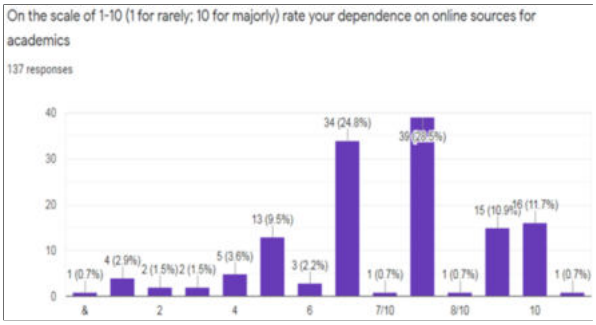

Figure 2. Pie-chart showing responses for the question: On a scale of 1-10 (1 for rarely; 10 for majorly) rate your dependence on online sources for academics.

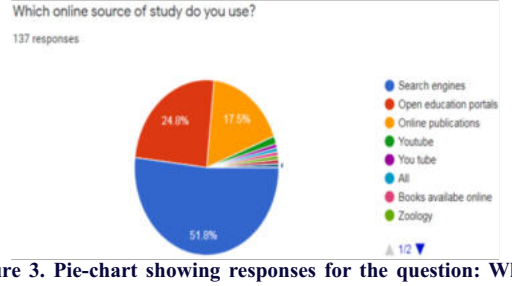

Figure 3. Pie-chart showing responses for the question: Which online sources of study do you use?

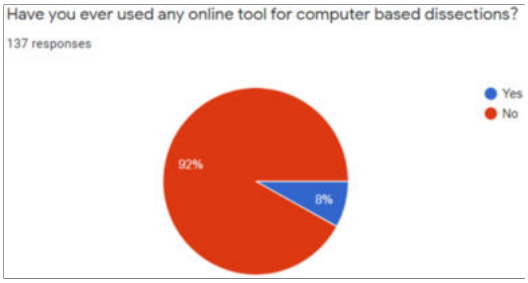

Figure 4. Pie-chart showing responses for the question: Have you ever used any online tool for computer based dissections?

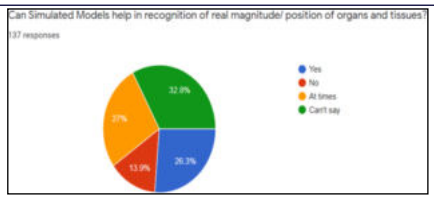

Figure 5. Pie-chart showing responses for the question: Can simulated models help in recognition of real magnitude/ position of organs and tissues?

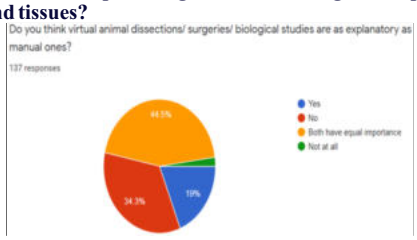

Figure 6. Pie-chart showing responses for the question: Do you think virtual animal dissections/ surgeries/ biological studies are as explanatory as manual ones?

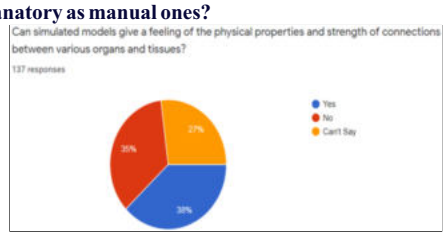

Figure 7. Pie-chart showing responses for the question: Can simulated models give a feeling of the physical properties and strength of connections between various organs & tissues?

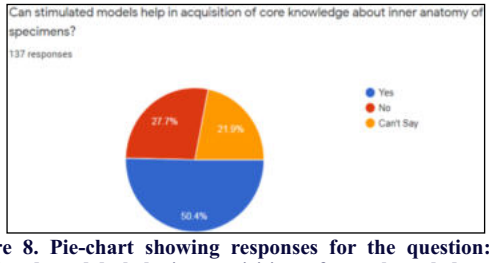

Figure 8. Pie-chart showing responses for the question: Can simulated models help in acquisition of core knowledge about inner anatomy of specimens?

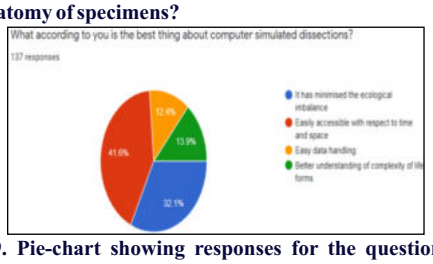

Figure 9. Pie-chart showing responses for the question: What according to you is the best thing about computer simulated dissections?

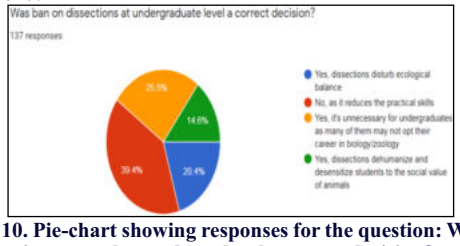

Figure 10. Pie-chart showing responses for the question: Was ban on dissections at undergraduate level a correct decision?

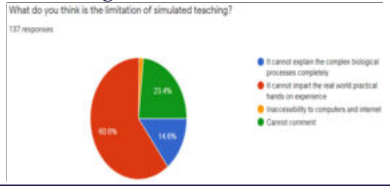

Figure 11. Pie-chart showing responses for the question: What do you think is the limitation of simulated teaching?

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