

ABSTRACT

USE OF MULTIMEDIA TECHNOLOGY TO PROVIDE SOLUTIONS TO EXISTING CURRICULUM

PROBLEMS: VIRTUAL FROG DISSECTION

Christine Youngblut, Ph.D

George Mason University, 2001

Dissertation Director: Dr. Edgar H. Sibley

The objective of this research was to determine whether currently available multimedia technology can resolve existing problems in the K-12 science curriculum. There are several practical and ethical problems relating to the classroom use of animal dissection and this led to the selection of hands-on frog dissection as the curriculum activity where the use of multimedia was investigated.

The major finding was that multimedia-based virtual dissection was more effective than hands-on dissection in helping students learn about frog anatomy. Moreover, this result was achieved when the time available for the virtual dissection was approximately 44% less than that available for hands-on dissection. Examination of possible relationships between student characteristics and achievement revealed that students' attitudes to educational uses of animal dissection and their computer experience were positively correlated with their achievement scores. No relationships were found between either student gender or dissection experience and achievement test outcomes. Students rated virtual dissection as the easier of the two types of

dissection, though they gave equivalent ratings for their enjoyment of virtual and hands-on dissection. Despite favorable feedback on the virtual dissection, a significant majority of students stated that they felt they would be "missing out" on a valuable experience if they were not given the opportunity to perform a hands-on frog dissection.

Comparing how students spent their time during each type of dissection showed that students spent a significantly larger proportion of time On-Task when using the multimedia-based virtual dissection. In particular, the average increase in the proportion of time spent on activities directly related to the subject matter was over 36%. Time spent On-Task had a significantly positive relationship with achievement for hands-on dissection. It may play a similar role for achievement with virtual dissection, but the small deviation in time On-Task data for virtual dissection prevented confirming this intuition.

The teacher who participated in the research found that the use of a multimedia, inquiry-based computer application did limit his insight into students' classroom progress. However, he did not feel this to be a problem, nor did it in any way reduce his control over class activities.