Students Using Visual Thinking to Learn Science

in a Web-based Environment

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Abstract

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United States students’ science test scores are low, especially in problem solving, and traditional science instruction could be improved. Consequently, visual thinking, constructing science structures, and problem solving in a web-based environment may be valuable strategies for improving science learning. This ethnographic study examined the science learning of fifteen fourth grade students in an after school computer club involving diverse students at an inner city school. The investigation was done from the perspective of the students, and it described the processes of visual thinking, web page construction, and problem solving in a web-based environment.

The study utilized informal group interviews, field notes, Visual Learning Logs, and student web pages, and incorporated a Standards-Based Rubric which evaluated students’ performance on eight science and technology standards. The Visual Learning Logs were drawings done on the computer to represent science concepts related to the Food Chain. Students used the internet to search for information on a plant or animal of their choice. Next, students used this internet information, with the information from their Visual Learning Logs, to make web pages on their plant or animal. Later, students linked their web pages to form Science Structures. Finally, students linked their Science Structures with the structures of
other students, and used these linked structures as models for solving problems. 
Further, during informal group interviews, students answered questions about visual thinking, problem solving, and science concepts.

The results of this study showed clearly that 1) making visual representations helped students understand science knowledge, 2) making links between web pages helped students construct Science Knowledge Structures, and 3) students themselves said that visual thinking helped them learn science. In addition, this study found that when using Visual Learning Logs, the main overall ideas of the science concepts were usually represented accurately. Further, looking for information on the internet may cause new problems in learning. Likewise, being absent, starting late, and/or dropping out all may negatively influence students’ proficiency on the standards. Finally, the way Science Structures are constructed and linked may provide insights into the way individual students think and process information.