

Using Menus as a Differentiation Technique in Small Multi-Level Life Science and Physical Science Classrooms

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Background

I teach all of the 5th-12th grade science classes at a small rural school. There is a wide range of interest and ability levels in my students. Many of the classes also include students from two or more grade levels. The class sizes are small (between 2 and 15 students) and differentiation of instruction is both challenging and essential.



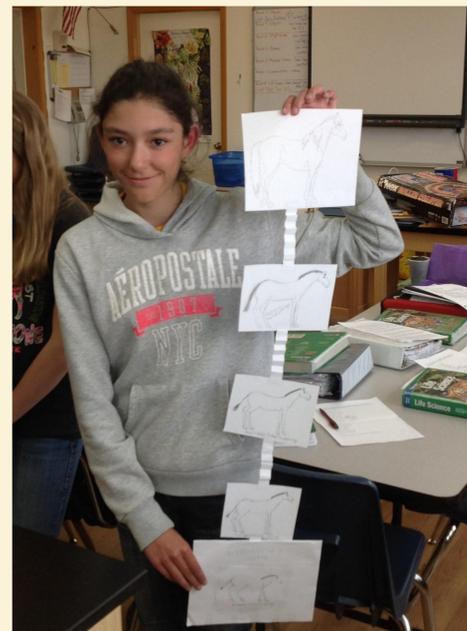
Research Questions

This research project was designed to address the following questions:

- How effective is a menu-driven learning method as measured by students' mastery of unit standards?
- What are the effects of a menu-driven learning method on student attitudes towards their science class and science in general?
- How does a menu-driven learning method impact the classroom teacher?

Methodology

Two classes (one junior high life science class and one high school freshman-level physical science class) were taught using a traditional lab-activity-minilecture format for two units. At the beginning of two additional units, they were given a menu of activity options from which to choose. During the treatment units, individual students selected their own lab activities and other assignments from the menu in such a way that they earned an appropriate number of points and they addressed each of the unit learning objectives. Data was collected to monitor changes in student content mastery, student attitudes towards science, and the effects on the classroom teacher.



Data Collection and Analysis

Several different data collection instruments were used to address the research questions, including a teacher log, pre- and post-unit written assessments, student attitude surveys, student interviews, classroom observations and student projects. The data from these instruments was examined using only basic statistical methods due to the small sample sizes of the classes involved to find both class-wide trends and the impact of the treatment on individual students.



Results

- This study did not show any large positive or negative impact of the treatment on either student attitudes or student concept mastery overall.
- For some individual students, there was an increase in concept mastery using the menu-based system.
- For other individual students, there was a decrease in concept mastery using the menu-based system.
- The majority of students in both classes were enthusiastic about using the menus.
- The main negative effect of the treatment on the classroom teacher was the occasional challenge of adequately addressing individual students' needs in a timely manner when each student was working on a different project.