

Use of Computer-Based and Inquiry-Based Learning Activities to Differentiate Instruction for High School Chemistry

Background

I conducted this capstone project with my 11th and 12th grade chemistry students. The school offers only one chemistry course resulting in a wide range of students' abilities within a classroom. The advanced and struggling students are often underserved. To differentiate instruction, I provided self-paced learning activities so advanced students could learn additional, challenging topics and struggling students could receive remedial instruction. These learning activities were video lessons and guided inquiries that integrated immediate feedback. Students were able to revisit the material and retake the formative assessments.

Primary Question

1. Can computer-based and inquiry-based learning activities that integrate instantaneous formative assessment feedback be used to maximize the learning of advanced, proficient and struggling science students within the same chemistry classroom?

Sub-Questions

2. Does the use of computer-based and inquiry-based learning activities that integrate instantaneous formative assessment feedback increase student learning of advanced chemistry topics?

3. Does the use of computer-based learning activities that integrate instantaneous formative assessment feedback for remediation increase learning for struggling students?

4. How do students believe computer-based and inquiry-based learning activities that integrate instantaneous formative assessment feedback impact their education?

Data Collection and Analysis

Question	Data Source	Data Source	Data Source
1	Pre- and Post-Test, Lesson Quizzes, and Formative Assessments	Pre-, Mid-, and Post-Unit Student Surveys	Mid- and Post-Unit Student Interviews
2	Formative Assessments	Lesson Quizzes	Mid- and Post-Unit Student Surveys and Interviews
3	Formative Assessments	Lesson Quizzes	Mid- and Post-Unit Student Surveys and Interviews
4	Pre-Unit Student Surveys and Interviews	Mid-Unit Student Surveys and Interviews	Post-Unit Student Surveys and Interviews

Treatment

Two of my four sections served as the treatment group and the other two sections served as the comparison group. Advanced students in the treatment group learned three additional topics. Students in this group who struggled with a topic completed the remediation activities. Proficient students in the treatment group and all students in the comparison group received the core curriculum as it had been taught the previous year.

Results

