Analogies as a Means of Instruction and Assessment in High School Chemistry

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Background & Demographics

The goal was to determine if using analogies in the chemistry classroom impacted student learning of the periodic trends. This action research project was used in three general chemistry classes at the high school level (N=68) at Montoursville Area High School.

Research Questions

1. What are student perceptions on analogies as a means of instruction?
2. Do students prefer using analogies as a means of demonstrating their learning?
3. Does the use of analogies in instruction and assessment generate increased learning gains in science?

Treatment Part 1: Instruction

3 lessons in periodic law unit.
Analogy used to introduce each lesson.
Examples:
-The formation of ions is like a dog-walking service
-Electrons are money & halogens are bank robbers

Treatment Part 2: Scaffolded In-Class Assessments

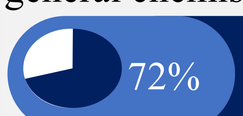
3 analogy-based assignments used after lesson with support & interviews for student success.

Treatment Part 3: Feedback & Reflection

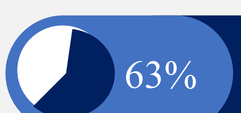
Students participated in questionnaires, Likert scale surveys, and interviews to provide feedback and self-reflect

Results: Student Perceptions & Normalized Gains

Students were asked to reflect on their overall satisfaction with analogies used in instruction and assessment. The in-class analogy assignments were assessed for normalized gains across the three general chemistry classes (N=68)



72% Percentage of students that reported an increase in *self confidence* on the Likert scale survey after completing the analogy assignments



63% Percentage of students that reported the analogy assignments to be *engaging and attention grabbing* on a Likert scale survey

27% The *average normalized gains* of the sample size between the first and final analogy assignment treatment.

Conclusions & Future Considerations

On average, student scores increased by 27% from the first to the final analogy assignment. Interviews and feedback revealed lower frustration levels, deeper responses, and reduced reliance on scaffolding. Students noted that analogies provided a foundational understanding, leading to enjoyment of the instructional method and boosted confidence and comprehension. They expressed a desire for more assignment variety beyond reading. In future projects, I would diversify the analogy assignments to accommodate various learning styles, including audio versions for auditory learners and hands-on experiences for kinesthetic learners, alongside traditional reading materials.