A Study of Problem-Based and Discussion Prompts in Knowledge Retention

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Purpose

• The purpose of this study is to determine if there is a difference in the effectiveness of discussion based prompts versus problem solving based prompts in students' understanding of a concept (in organic chemistry) as shown by correctly answering quiz problems.
• If a particular type of prompt promotes better student comprehension, then workshop questions should utilize the more efficient prompt style.

Methods

• Prompts on the mechanism of ozonolysis were distributed and completed during Organic Chemistry Workshop. Students were allocated 10 - 15 minutes to complete prompt activity.
• 10 Students completed problem based prompts, and 4 students completed discussion styled prompts.
• After the completion of the prompt, students completed a quiz on the mechanism of ozonolysis. Fourteen students were quizzed.
• At the end of the workshop, students completed a survey designed to measure student preferences for study methods that favored discussion or problem solving. Thirteen students filled out the survey.
• Scratched notes on Prompts were analyzed for demonstration of successful student acquisition of material.
• Subsequent quizzes were analyzed for number of correct answers in respect to electron pushing, proposed intermediate, and proposed product to demonstrate successful student retention of material.

Results

• The Students who answered the problem-based prompt showed a higher proficiency in understanding the mechanism of ozonolysis, showing correct arrow pushing diagrams and correct intermediates.
• Students who answered discussion styled prompts showed a higher proficiency in obtaining the correct product of the reaction, but did not show the correct mechanism or intermediate steps.
• Students who completed the survey showed a greater preference for studying for test with practice problems as opposed to discussion with peers.

Conclusion

• The results showed that the problem-based prompt led to a better understanding of the details of a reaction (mechanism, intermediates), but did not lead to the students finding the correct outcome of the reaction.
• The discussion styled prompt showed that students gained a better understanding of the outcome of the reaction, but they did not help the students understand the mechanism of the reaction.