



Misconception Probes in Human Anatomy and Physiology

Scott Quinton

Cardston High School, Cardston, Alberta, Canada



Master of Science in
Science Education

Introduction & Background

My research was conducted in a class of senior level biology students at Cardston High School in Cardston, Alberta, Canada. The class was made up of 16 students, 5 male, and 11 female. Four students are identified as First Nations.

Students bring their previous knowledge and understanding with them when they come to class. One of the roles of a teacher is to try to build upon that knowledge. But what if the students previous understanding is flawed? For example students may think that all acids are able to eat through a table or container leaving only a steaming, glowing, green puddle behind based on what they may have seen on television. This misconception may make it more difficult for students to come to a correct understanding of acids and their properties unless the misconception can be corrected as part of the educational process.

Misconception probes are a method of identifying what misconceptions students have so that instruction can be tailored to address them.

Research Questions

Primary Question:

1. What affect do misconception probes have on learning and achievement?

Secondary Question:

2. What affect do misconception probes have on student confidence?

Methodology

Three misconception probes were given as formative assessments during the treatment unit. Remedial instruction was given the next day based on the results to address the misconceptions.

Learning and achievement was assessed through two summative exams. The previous years class was used as a comparison group, as well as the exam scores from the previous unit where no treatment was given. This allowed both internal, and external comparison.

Student confidence was assessed by administering a pre-test Likert survey. Teacher observations, open-ended survey question, and interviews with students, were also used to support these findings.

The benefits of the probes in general and of the individual probes was assessed through a Likert survey. Students were also asked to provide their opinions on the advantages and disadvantages of the probes.

Finally a randomly selected group of students from the treatment group were invited to participate in a post-test interview. Questions on the survey further addressed student achievement and student confidence.

Data & Analysis

- Overall exam performance was not significantly affected but did show a negative effect on mean and quartile scores compared to previous units, and previous classes.
- Students felt that the misconception probes had a positive effect on overall understanding (Figure 1).
- The more difficult probes were viewed as more helpful to students.
- The misconception probes showed evidence of greater metacognition and self awareness on the part of students.

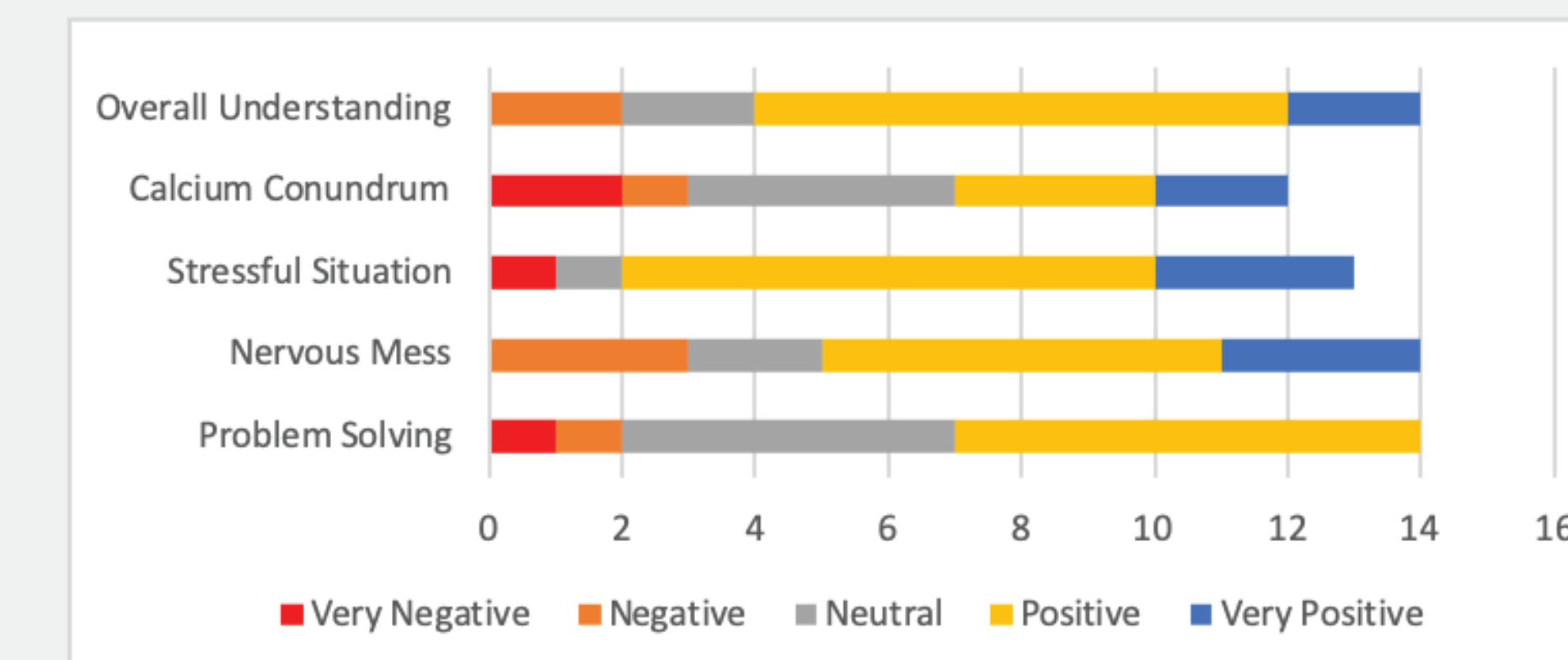


Figure 1. Student responses to the misconception probe survey (N=14) .

Conclusions & Value

The misconception probes increased student metacognitive awareness and confidence, but may have negatively affected exam performance for some students.

Misconception probes need to be a part of a large well developed strategy for educating students about misconceptions to be most beneficial.

