

# AN ANALYSIS OF HANDS ON MEDICAL EXPERIENCE AND STUDENT ENGAGEMENT IN THE SCIENCE CLASSROOM

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## Introduction

My goal for this action research project was to integrate more hands-on, career related experiences for students in order to increase the engagement of students in science. In addition to my normal classroom materials (notes, laboratory work, and other classroom based projects), I integrated job shadowing, guest speakers in various medical fields, and emergency medical technician (EMT) skill training.

## Research Question

My study was focused on answering the following question:  
•How do hands-on medical experience and work-based learning impact student engagement in the science classroom?

Sub-questions:  
•To what extent might hands-on medical experience affect students' confidence and feelings of preparedness in science?  
•Does job shadowing in the medical field increase student interest in those careers?

## Treatment

The class chosen for this study was the anatomy and physiology class at Chinook High School (CHS), a public 7-12 school in Chinook, Montana. Over the course of six months, 16 anatomy and physiology (A&P) students shadowed medical professionals two times and learned EMT training skills while also participating in standard classroom-based A&P instruction.

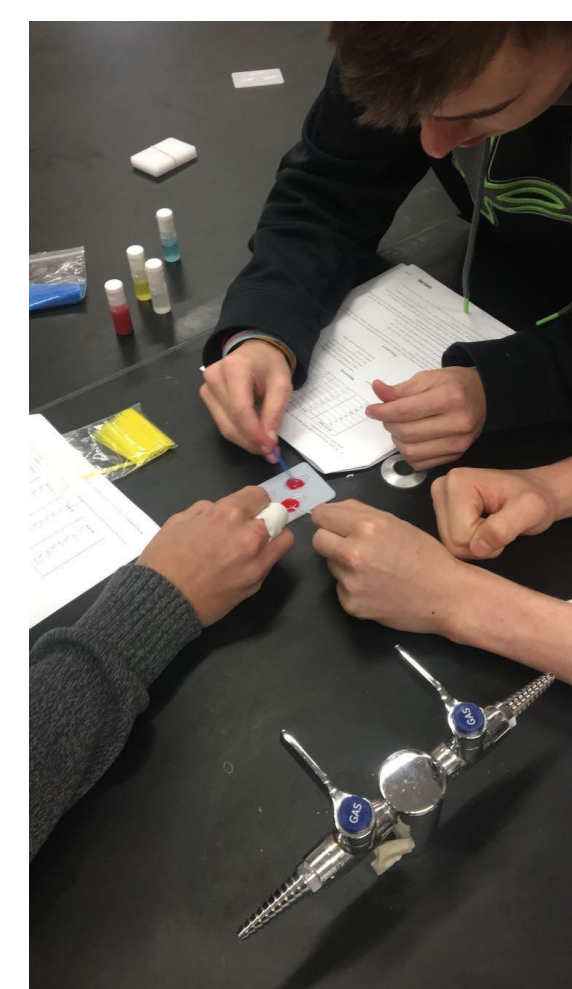


Figure 1. Students completing a blood typing lab.

I am interested in a career in the medical field.

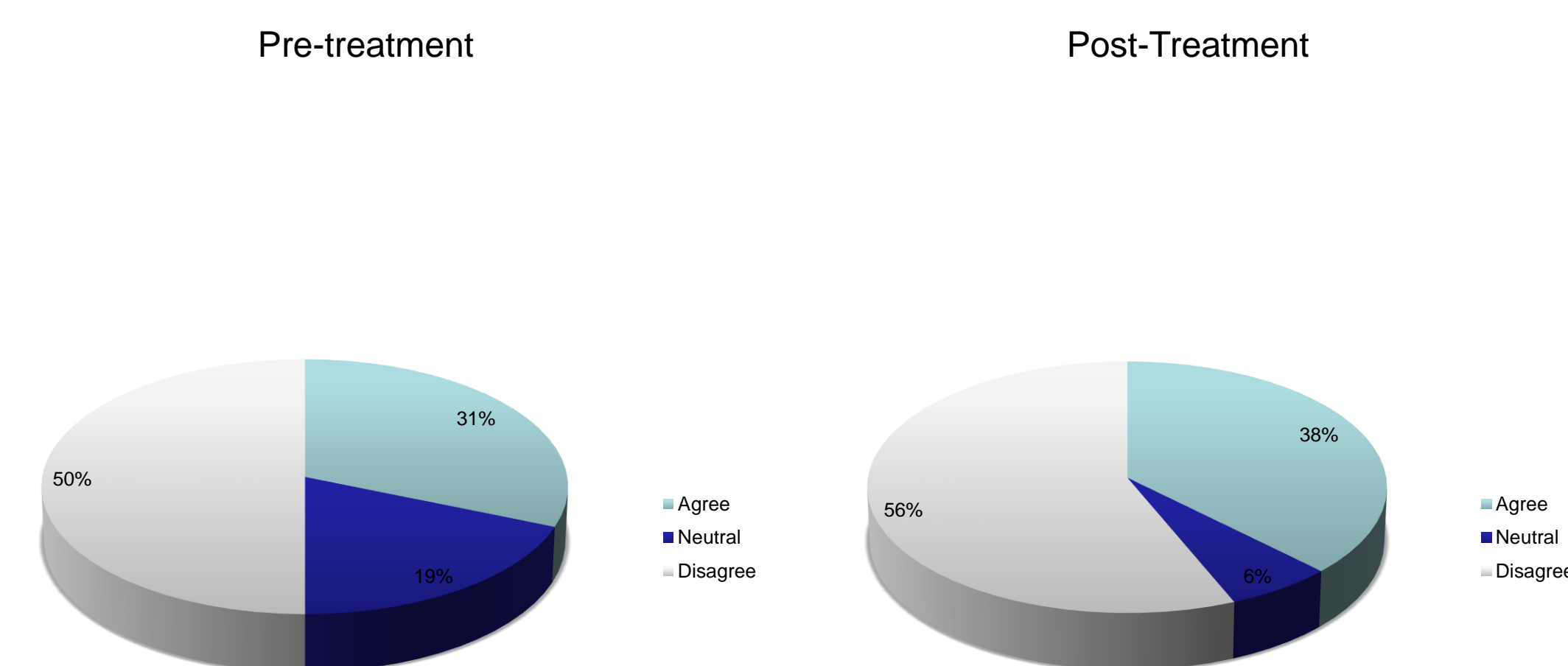


Figure 2. Student response to statement: I am interested in a career in the medical field.

## Data Collection

Research Questions	Data Source 1	Data Source 2	Data Source 3
<b>Primary Question:</b> How do hands-on medical experience and work-based learning impact student engagement in the science classroom?	Pre- and Post-treatment Likert Surveys	Post-treatment interviews	Educator Reflections
<b>Sub-question 1:</b> To what extent might hands-on medical experience affect students' confidence and feelings of preparedness in science?	Pre- and Post-treatment Likert Surveys	Post-WBL experience reflection	Post-treatment interviews
<b>Sub-question 2:</b> Does job shadowing in the medical field increase student interest in those careers?	Post-WBL experience reflection	Post-WBL experience interviews	Pre- and Post-treatment Likert Surveys

## Results

According to the Post-Treatment Engagement Interview Questions, 94% of students reported that they felt their engagement in Anatomy and Physiology (A&P) had increased during the treatment period (N=16).

The information from the pre- and post-treatment Student Engagement surveys was then compared using a Wilcoxon's signed rank test and Fisher's test in order to examine the impact of the treatment.

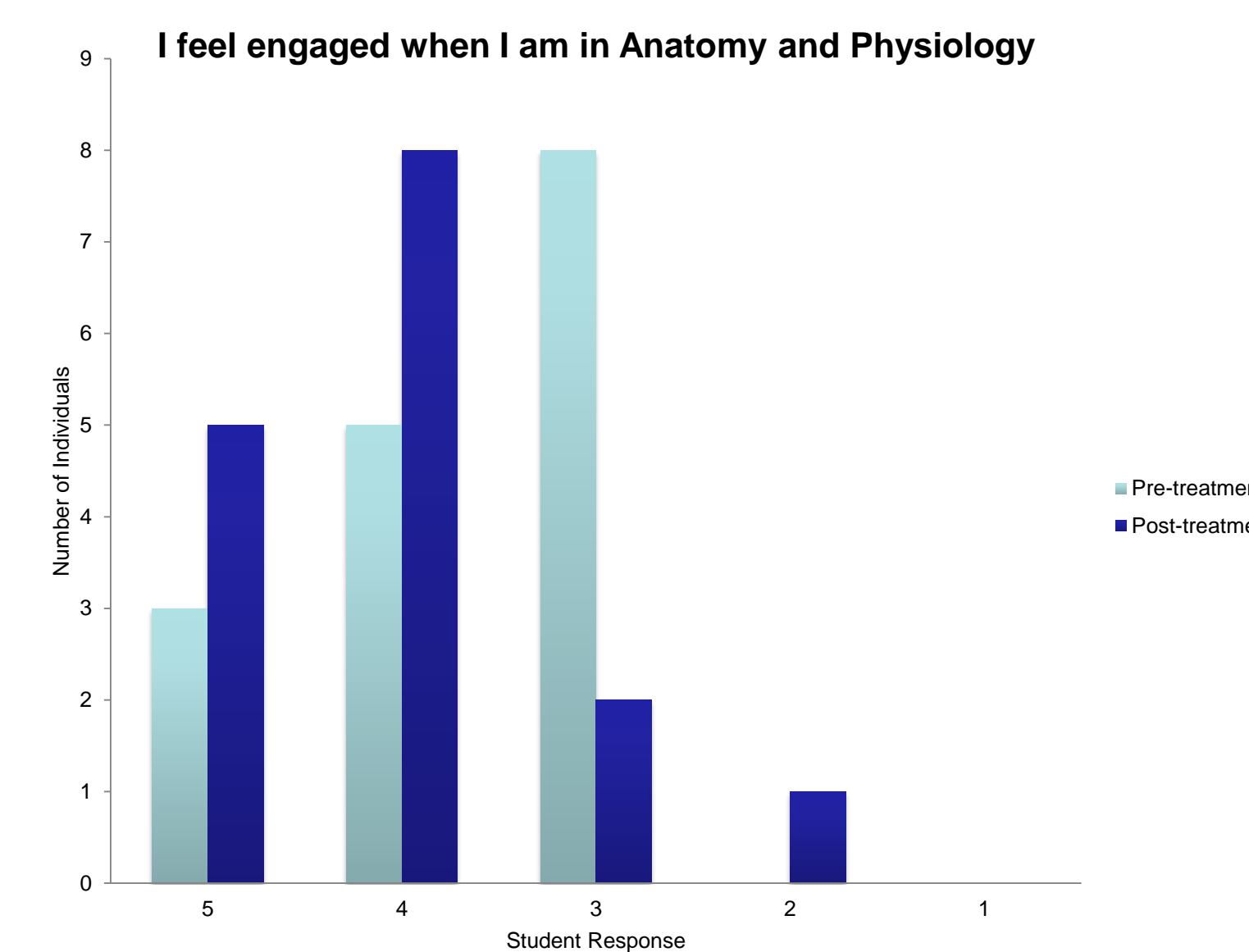


Figure 3. Student response to statement: I feel engaged when I am in anatomy and physiology. 5 = Strongly Agree, 4 = Agree, 3 = Neutral, 2 = Disagree, and 1 = Strongly Disagree.

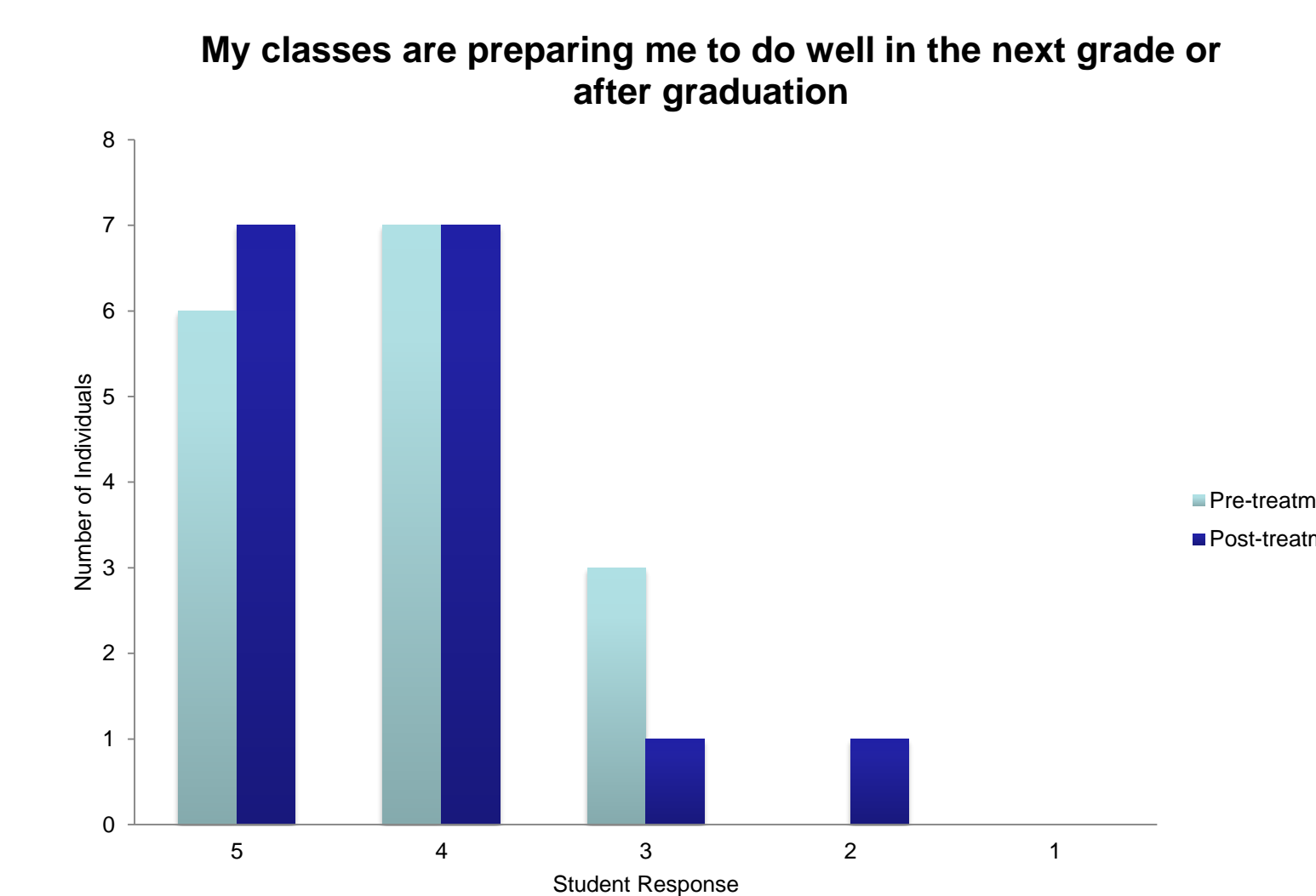


Figure 4. Student response to statement: My classes are preparing me to do well in the next grade or after graduation. 5 = Strongly Agree, 4 = Agree, 3 = Neutral, 2 = Disagree, and 1 = Strongly Disagree.



Figure 5. Student response to statement: My classes are teaching me skills that I need to be successful in life outside of school. 5 = Strongly Agree, 4 = Agree, 3 = Neutral, 2 = Disagree, and 1 = Strongly Disagree.

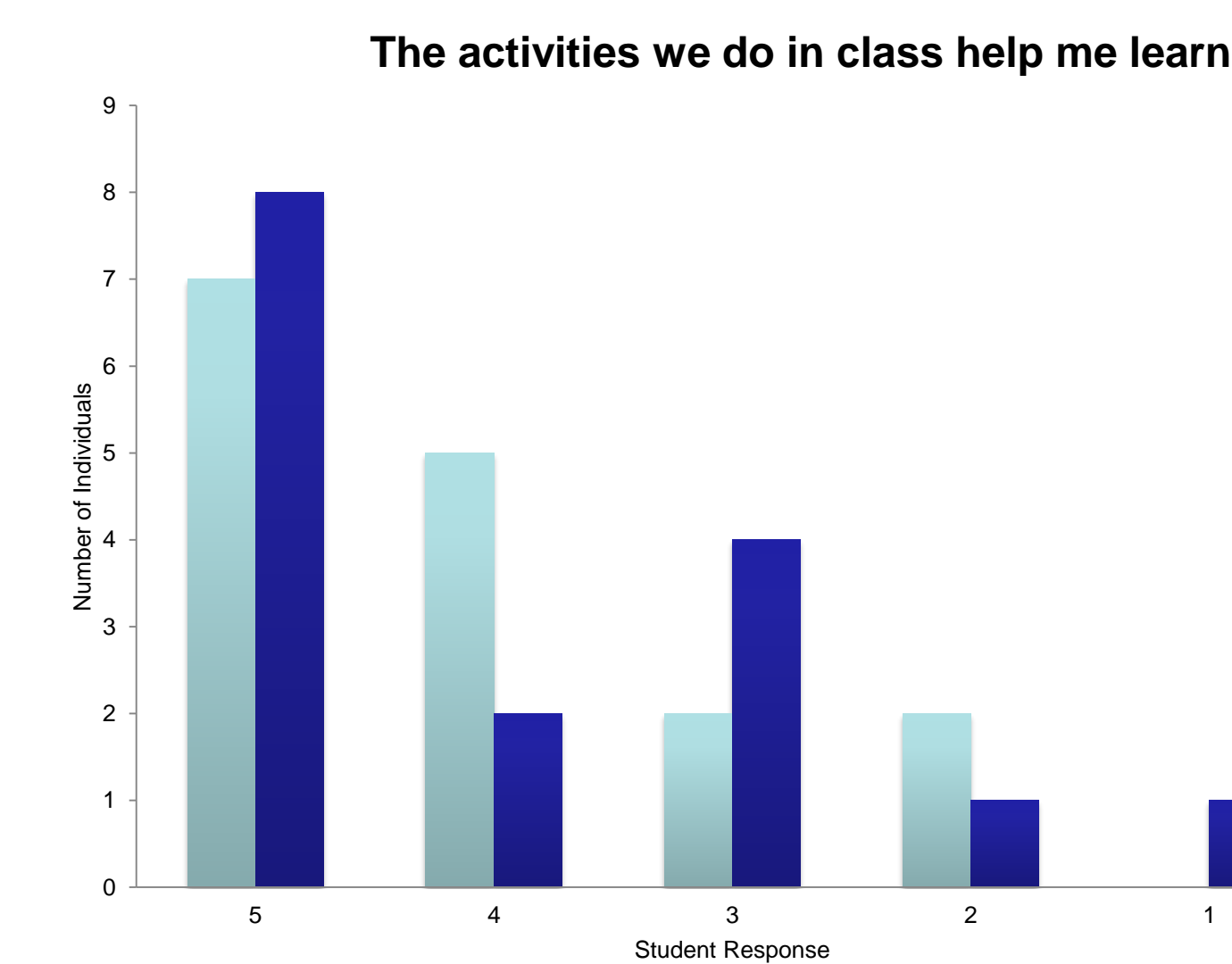


Figure 6. Student response to statement: The activities we do in class help me learn. 5 = Strongly Agree, 4 = Agree, 3 = Neutral, 2 = Disagree, and 1 = Strongly Disagree.

## Student Responses

"Having to take charge of my labs, notes, presentations, and other homework without set dates has definitely increased my responsibility and engagement."

"I feel my time management has improved."

"I really liked doing the EMT skills and my shadowing experience was really good and it was cool to see everything in action."

"I am a very visual learner so the EMT training, though rough at times, did help me understand better."

"This shadow helped me prepare for educational planning in the future, but instead of being a county nurse, I have a different area of nursing that I would want to go into."

"After finding a routine, it was better to have a self-paced class because I was able to organize assignments in a way that was best for me whereas in the beginning of the year, we could have lots of homework one day and not much on another."

"The self-paced class and online notes (worked well) so you could do school if you are going to be gone or work on the weekends."

## Discussion

Though the results of data analysis of the quantitative data seemed in contrast to the qualitative data, the treatment did seem to have an impact on students. The engagement of students as reported by the SES, indicated no statistical difference post-treatment compared to pre-treatment. Student interviews indicated that a majority of the class, 94%, felt as though they were more engaged post-treatment than in the pre-treatment period.

The self-paced style of class seemed to reduce the stress levels of students who were gone often for sports and other activities, as they knew all the assignments before their absence.

I have wanted to flip my classroom for a while, and this project gave me the push to do that. I look forward to continuing with this classroom structure and experience, not only with A&P but by integrating it into other classes that I teach as well. Throughout the treatment period, students seemed more engaged and collaborative with their fellow students.



Figure 7. Students perform fetal pig autopsies.



Figure 8. As part of a skill lab, students auscultate each other's breathing and heartbeat.

