

Using STEAM to Make Models For Anatomy and Physiology Classrooms

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Background

Anatomy is a historically difficult discipline due to the mental load of information. The purpose of this study is to help find a better way for students to visualize complex anatomical structures using models. Students will create a model by using the principles of STEAM (Science, Technology, Engineering, Art, and Math). A mixed methods approach will be used to collect data for this project.

Research Questions

Focus question: Does STEAM learning by modeling increase the understanding of the human body?

Sub questions:

- Does STEAM learning increase the understanding of the human anatomy among different groups of students (i.e., males, females, 504 Plans, English Language Learners (ELL))?
- Do students enjoy STEAM learning and projects?

Methodology

Pre-Treatment

- Didactic Teaching Methods
- Pretest

Treatment

- Students Build Model
- Student Journal
- Student Interview Part 1

Post-Treatment

- Student Posttest
- Student Survey
- Student Interview Part 2

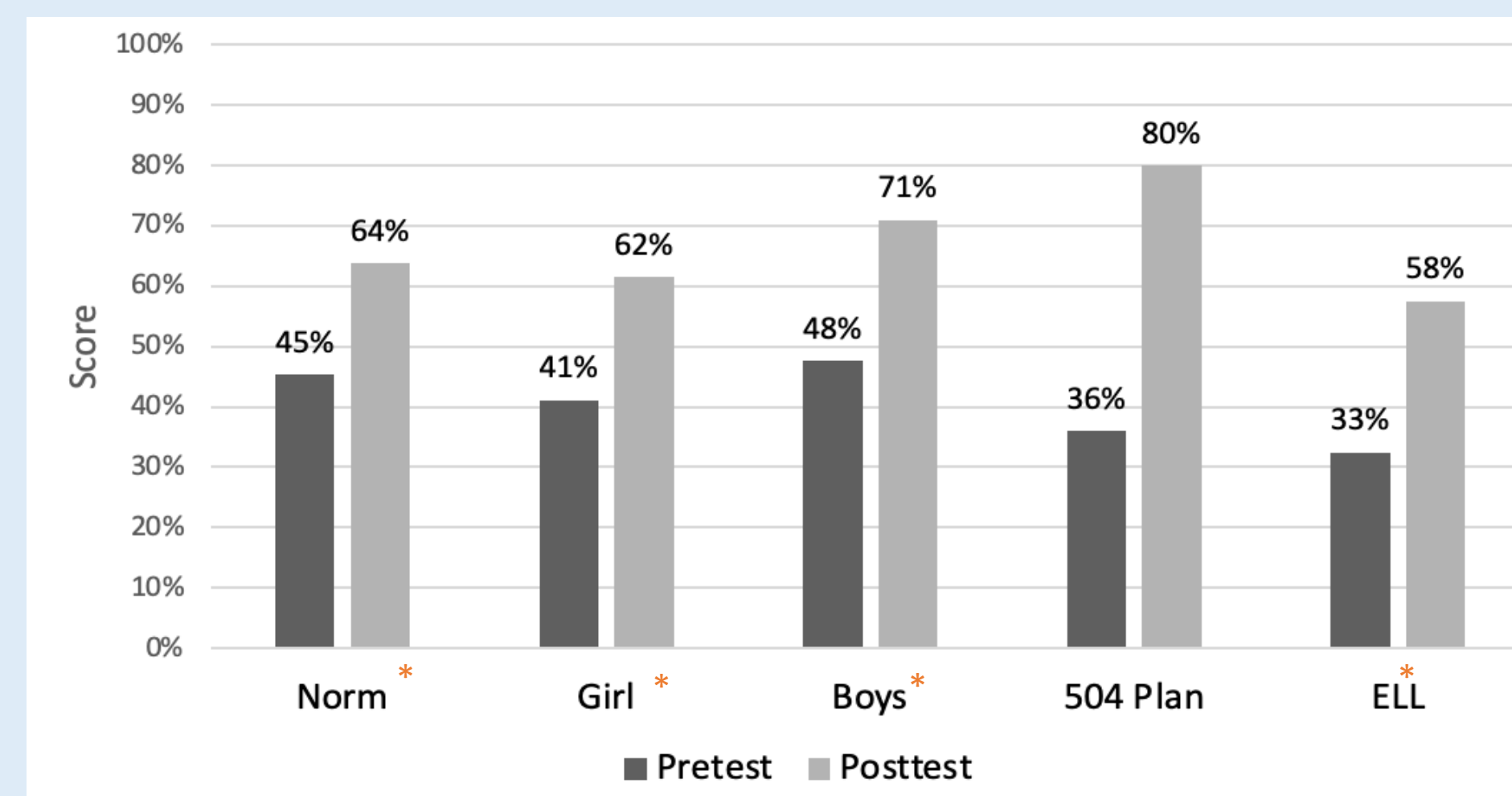


Figure 1. Average scores of the pretest (N=49) and posttest (N=43) of different groups of students, * indicates significant data (p-value <0.05).

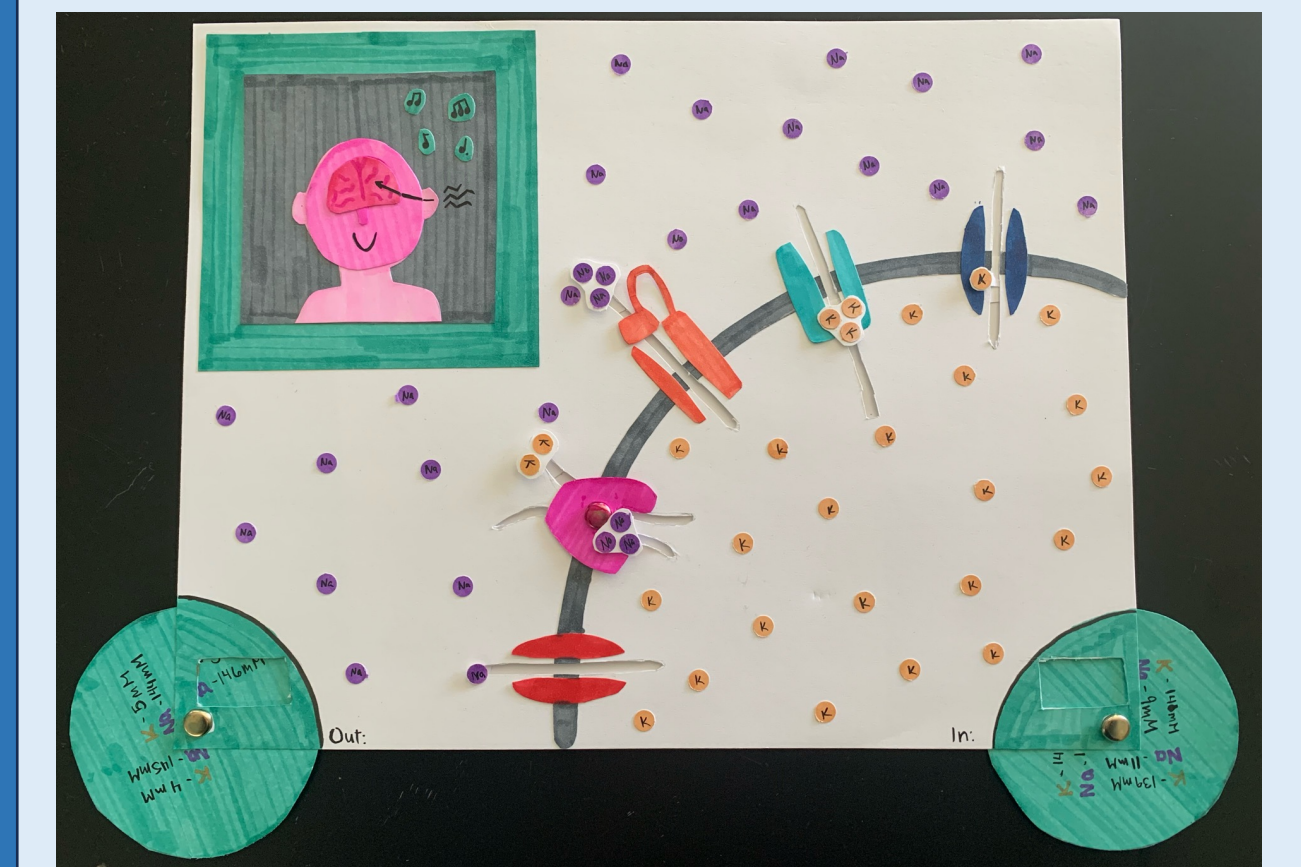


Figure 2. Example of student project that made a paper model with moveable parts to represent the nervous system.

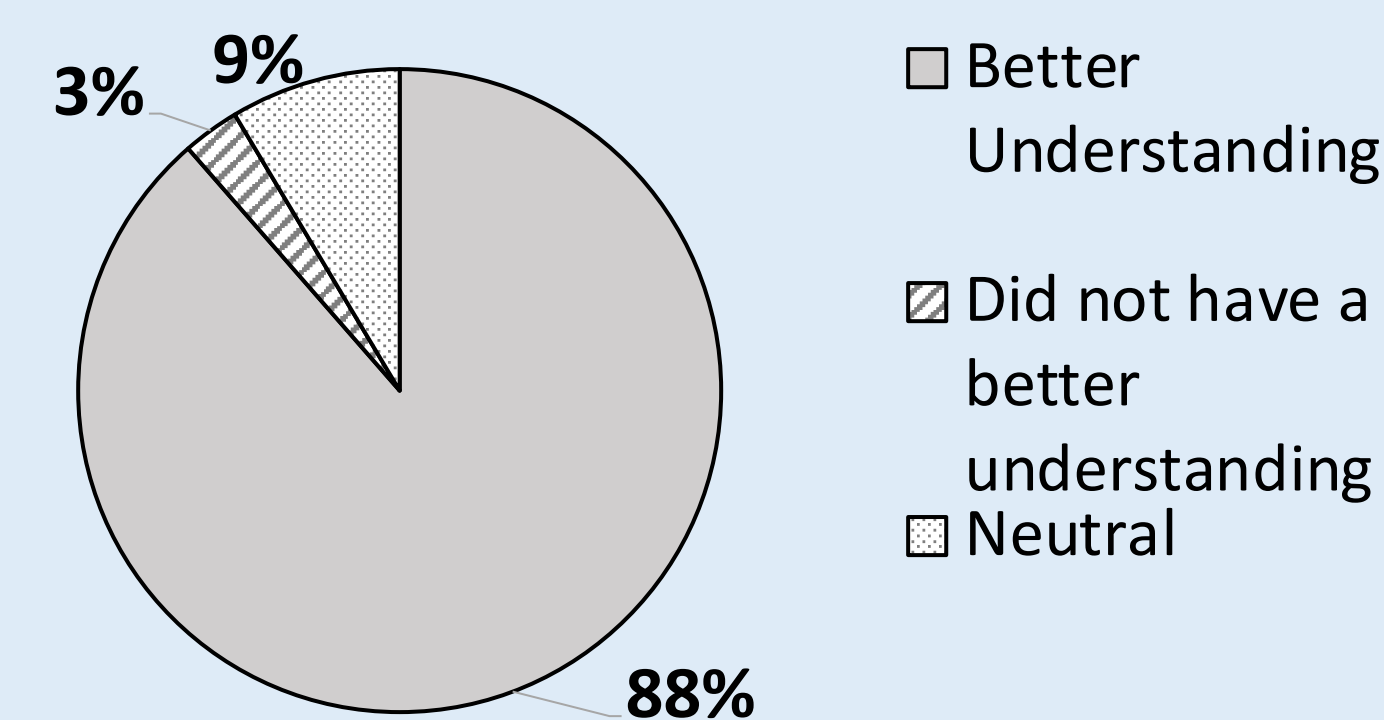


Figure 3. Percentage of students who better understand the nervous system after modeling (N=35).

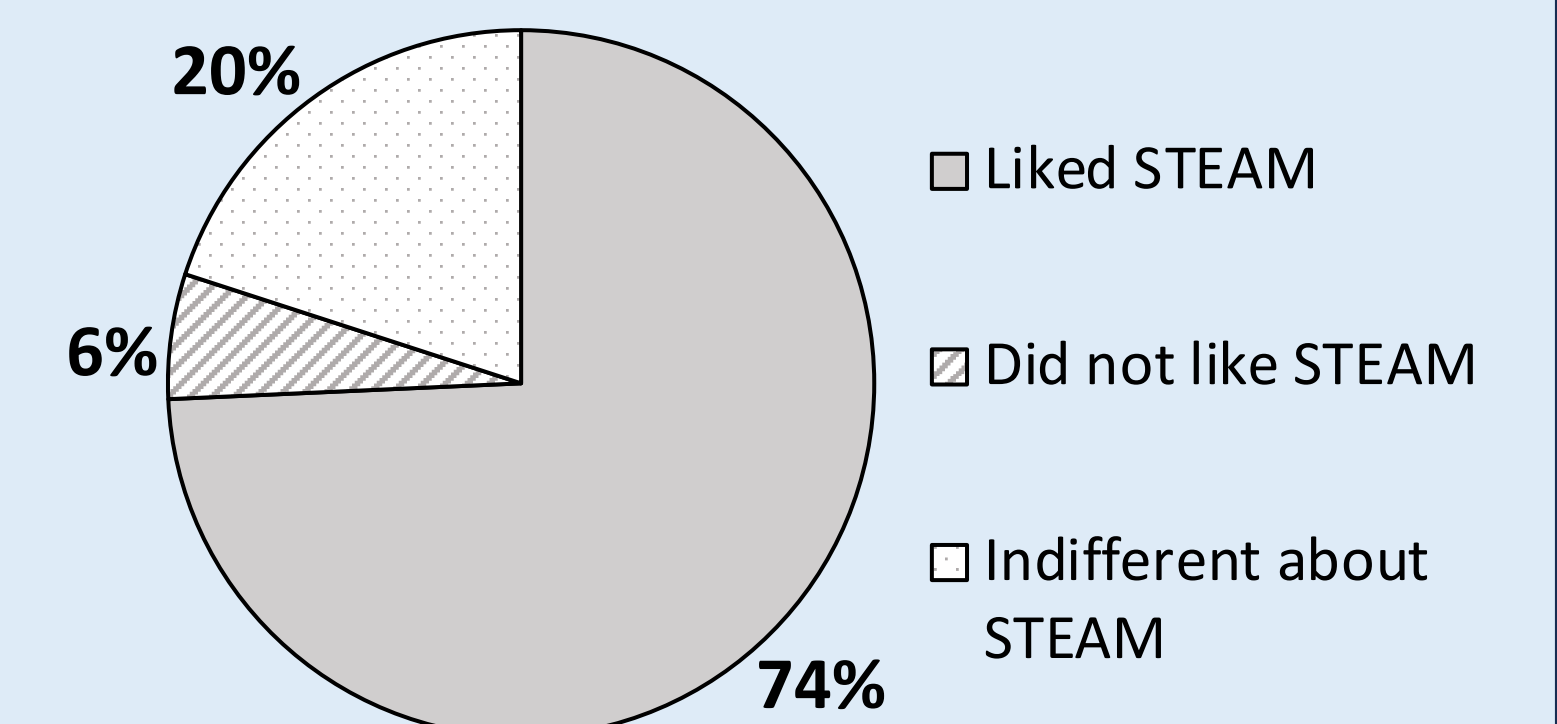


Figure 4. Percentage of students who enjoyed STEAM from the Student Journals post treatment (N=35).

Student Thoughts: "I did enjoy this kind of project. I feel that it allowed us to use lots of our strengths. It also pushed us to use things out of our comfort zone."

Conclusion

After creating a model, students demonstrated an enhanced understanding of the connections within the human body, as evidenced by the pretest and posttest scores, with the majority of groups showing significant gains (Figure 1). Furthermore, a majority of students indicated that modeling provided them with a deeper understanding of the nervous system compared to traditional learning methods (Figure 3). Students also enjoyed the process of making a model by using STEAM because it encouraged creativity (Figure 4). Overall students benefited from modeling with STEAM and increased their understanding of the human body.