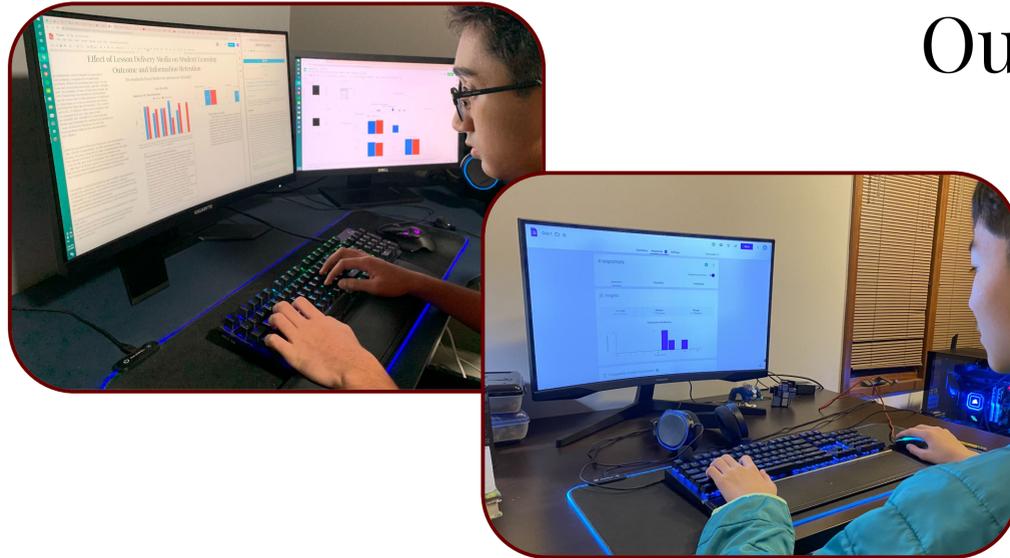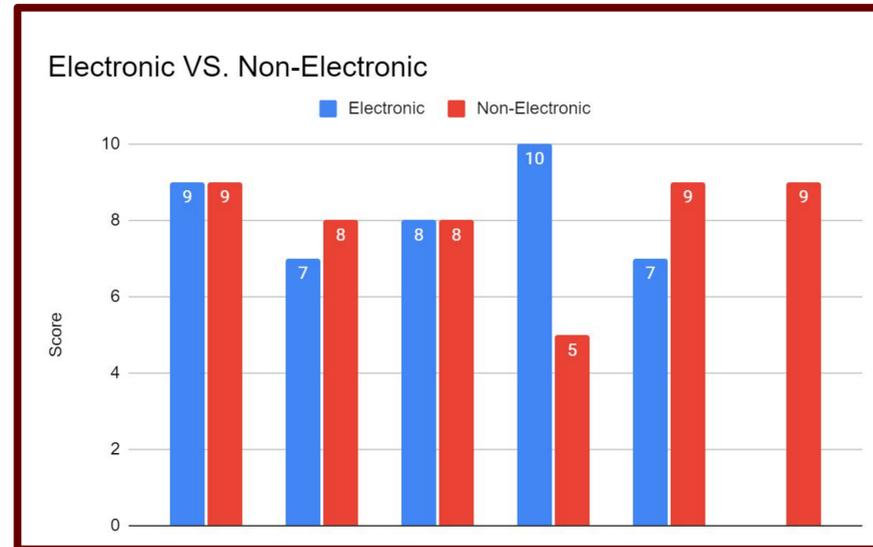# Effect of Lesson Delivery Media on Student Learning Outcome and Information Retention
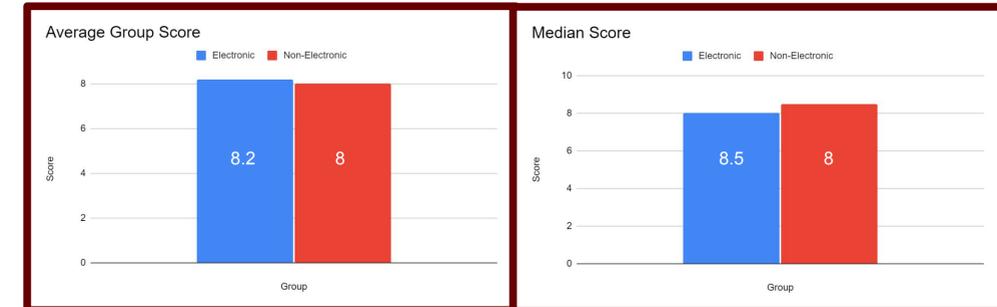
Do students learn better in-person or virtually?

Our Results:

These are the test scores of the individuals who participated in the experiment, in no particular order *(Note: the bars are automatically grouped in pairs, the pairs have no correlation)

Background:

The COVID-19 pandemic caused people to experience electronic teaching methods, compared to traditional non-electronic methods. When researching this topic, it was found this topic was not researched in depth, and few reliable sources were found. An example of one of the ones found, an article from the APA (American Psychological Association) showed an increase in scores due to the presence of optional electronics in the classroom as well as a decrease in scores due to the off-task behavior that the electronics. The scores overall were found to be 2% higher when an electronics ban was in place when compared to not. The aim of this experiment was to simplify the variables by removing the choice of the students and defining the method of teaching, as well as eliminate non-productive behavior to test the effectiveness of each method without the uncontrolled variable of students' choice.

Inspirations:

We were inspired to research this topic from our own experiences with learning in the COVID-19 pandemic. For the most part of the 2020-2021 school year, we were expected to take in information through an electronic device across a screen. We felt that our grades were affected in some way by the new way of learning, but could not connect anything specific, like how or by how much. So we set out to do this experiment to find out for ourselves how much online learning generally impacted students compared to traditional learning in a classroom.

Procedures:

Our plan was to gather a high school group and a middle school group to take a lesson presented by ourselves. This way, the findings could be generalized, since students of all ages were affected in the real world by new learning media. Originally, it was attempted to recruit 20 participants in each age group, but ended up having 11 participants total.
- The group was split in half and assigned a teacher and method of learning
- Each group received a lesson on the Harmonica, with standardized lesson material
- The electronic group used a Pear Deck (slide presentation) and a Kahoot (online learning game)
- The non-electronic group used the blackboard and paper handouts
- The electronic group then took a 12 question quiz on google forms
- The non-electronic group took an identical quiz on paper
- This data was then collected

What Was Found:

The difference in the median and difference in average was 0.5 (4.1%) and 0.2 (1.7%) points, respectively. After considering students' day to day performance differences as well as the sample size of the experiment, it was found to be reasonable to conclude that the difference was small enough to consider both mediums equal. The non-electronic group's median was greater by 0.5 points, and the electronic group's average was greater by 0.2 points. Due to the nature of these results, it was concluded that the scores were similar enough to deem electronic teaching methods and non electronic teaching methods equal in effectiveness of educating students.

Discussion and Applications:

If we ever get back to experimenting on this topic again, we plan to run the experiment with more people. Observing changes in official students' standardized testing scores after the pandemic will be interesting - how much did the pandemic really affect learners? Even without a major change of events, virtualization is slowly being more incorporated into regular classroom learning. We plan to follow up on other studies published until there is a clear observation and explanation that one type of learning is more beneficial than the other or they are equal, or if it is decided virtualization is not the right place to draw the line. Research into our topic in general has been very relevant lately. Current and future studies can help take virtualization to its full potential to be more effective and fit more snugly to each student's personal needs, making it a better method of teaching.