The Efficacy of Digital Science Notebooks on Student Learning and Student Self-Expression in a 5th Grade Science Classroom

Jamie MacDonald

MONTANA STATE UNIVERSITY MSSE

Background

The 2020-2021 school year has seen more challenges as many schools, including mine, navigate a remote learning environment. Science notebooks continue to be a successful learning tool in the science classroom, however because of the remote nature of learning, students have had to switch to using digital notebooks. It is important to look at the efficacy of using digital science notebooks vs. physical science notebooks to see if students are using their notebooks to organize their work, express their learning through a UDL approach, and show mastery of the content standard through their notebooks.

Research Questions

What is the impact of digital science notebooks on student learning?

- What is the effect on student attitudes towards learning science?
- What is the effect on student attitudes towards online learning?
- What is the effect on teacher attitude towards providing feedback and grading?
- To what degree are students taking responsibility for their learning? Can they express themselves and their learning virtually?

Treatment and Research Design

Treatment of this study began December 17th, 2020 and was completed on April 4th, 2021. Students completed an attitude survey that was administered at the beginning, middle, and end of treatment. Students also took a pre- and post-assessment for two of their science units. One unit was completed without the use of digital science notebooks and one unit was completed with the use of digital science notebooks. The teacher completed a survey and journal each week during treatment.

Data Collection and Analysis

Student Attitude Survey

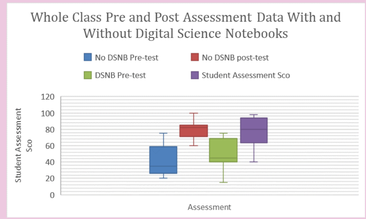
- What is the impact on student attitudes towards learning science?
- What is the impact on student attitudes towards online learning?

Pre- and Post-Assessment Data

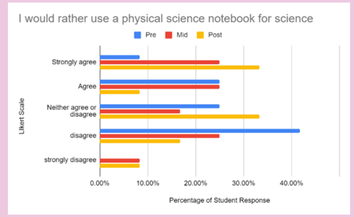
- What is the impact of digital science notebooks on student learning?

Teacher Survey and Journal

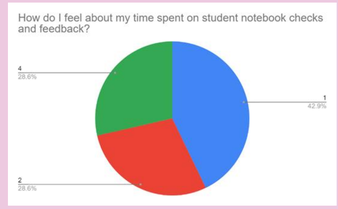
- What is impact on teacher attitude towards providing feedback and grading?
- Are students taking responsibility for their learning? Are students expressing their learning through their notebook?



Data Collected from Pre- and Post-Assessment scores.



Example of data from Student attitude survey question.



Example of data from Teacher Attitude Survey question

Conclusion

This study did not show significant efficacy with the use of digital science notebooks in the science classroom. Students were unable to show self-expression through their digital science notebooks based on the format of their notebooks. The format of a digital science notebook will be considered for future studies, as the need for an interactive digital science notebook is necessary in today's digital world.

Implications to Teaching

Due to the Covid-19 Pandemic, the sample size of this study was much smaller than anticipated. This is mostly due to students transferring in and out of remote learning. Teachers were also encouraged to use curriculum materials, and little opportunity was available for students to use the digital notebooks to their potential. Going forward, this study could be duplicated with a control group using physical science notebooks, while another group uses digital science notebooks. Until this research is complete, physical science notebooks will continue to be used in the in-person classroom for the upcoming school year. If students are still remote, a new format for digital science notebooks would be considered.