The Effects of Digital Games on Engagement and Behavior

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The Effects Of Digital Review Games On Student Engagement & Behavior

The purpose of this study is to determine the effects of digital review games on student engagement and behavior. The setting of my study is in the 6th grade technology classroom of Tea Area Middle School in Tea, South Dakota. I will study my 6th grade students. I have six sections of technology class, each section has approximately 25 students, and a total of 152 students. The setting and participant sample are relevant because it helps me have a better understanding of how I will conduct my action research plan. Knowing that I have 25 students per section will allow me to better conduct my research and lead me to data analysis on digital review games in the classroom. Students will be given weekly reviews on the content covered that week. I will alternate between traditional study guide type reviews and digital review games provided from Digital games in academic libraries: A review of games and suggested best practices. Snyder Broussard, M. (2012). Both qualitative and quantitative data will be collected by using a traditional student questionnaire, a teacher journal, a behavior observation tally sheet that I will create and, and a final student questionnaire.

In technology class, the concepts I really want to apply are critical thinking, chunking problems into smaller portions, and problem solving skills. All three of these are skills students will absolutely need outside of the classroom. If students don't feel engaged in my classroom, these concepts might not be reached in the magnitude they are intended. I can speak from personal experience, if I wasn't engaged in the classroom, this would typically lead to negative behaviors and ultimately hinder my performance in the classroom. I personally believe that online review games can improve student engagement. Video Games are useful instruments for learning specific strategies and for acquiring knowledge; they also develop the learning that is characteristic of the culture of the information society. Gros, B. (2007)

Although, there may be some deficiencies in the evidence I uncover. Just because a student is engaged, doesn't mean that this will diminish their behavior problems. Likewise, just because a student is well behaved, doesn't mean they will in turn be engaged. Also, even if a student is engaged and well behaved, doesn't mean they will see profound success in the class.

By implementing this study, I will hopefully be able to produce data on which type of review is more effective for students engagement and behavior. This study should be beneficial for other teachers and even administration by providing evidence to which type of review is more influential to help meet the students needs.

Keywords: Digital Review Games, Student Engagement, Student Behavior, Traditional Review Games

Review Of Literature

It is hard to deny that video games have firmly established itself as a mainstay in today's culture. Angry Birds, a single casual game for mobile phones, alone earns two million dollars per

month (Slutsky, 2011). Video games have had a profound effect on those who have played them. But, can the use of digital games used in a classroom setting really enhance student behavior and engagement of middle school students? Like books and movies, digital games can be used in many ways. Digital games are user-centred; they can promote challenges, cooperation, engagement, and the development of problem-solving strategies. (Gros, B. 2007)

Middle School can be a difficult time for many students. There are several changes that take place in middle school. Students are beginning to decide what their interests are, they begin to make new friends, classes become more difficult, students have more responsibilities, and are expected to adapt to changing classrooms/schedules. All of these changes, can lead to engagement and behavior problems inside the classroom (Onetti et al. (2019).

During this period, it is also common for students to experience an increase in anxiety and/or depression that manifests into school behaviors that include poor attendance, lower grades, and behavioral problems. (Onetti, W. et al 2019) Additionally, students with lower academic ability, lower self-esteem and who are unprepared for middle school appear to be particularly vulnerable to poorer school and peer transitions, which have been associated with depression symptoms (Onetti, W. et al 2019). These students who do not adjust to the new challenges of middle school risk becoming unmotivated and possibly disengaged from school all together. All of which, make the transition to middle school a difficult one.

Digital games have become a part of young people's lives, and children are being exposed to games at younger and younger ages (Common Sense Media, 2013). Smith and Throne (2009) stated that, "Educators can boost students' enthusiasm and active participation in mathematics through competition." Students are generally excited to play games in mathematics, especially when there is competition involved. Games like Kahoot! and Quizizz are ideal

platforms for helping students competitively review for assessments (Robinson, 2017). It's nice for both students and educators because students can see instant feedback on questions they got either right or wrong. Students don't have to wait days to see feedback like with pencil and paper assessments. Another positive from using digital review games is that they can be easily personalized to fit accommodations in the classroom. Since Vygotsky's groundbreaking work on Zones of Proximal Development in the 1920s, we've come to learn that differentiation of content is a necessity for learning. Take a digital review game like Nearpod, this tool can allow students to go through self- paced lessons which allow students to learn at their own pace but can still provide that instant feedback. Students in today's world, frequently play digital games on their electronic devices with the goal of achieving higher scores. Educators too, can incorporate digital games into their instruction to address students' desires for competition, at the same time covering their standards.

Student engagement is an important precursor for learning. Engagement has been shown to be related to better achievement at school, while disengagement has been shown to be related to school dropout (Van Uden, J., Ritzen, H., & Pieters, J. 2014). Within the classroom, a positive relationship with the teacher contributes to student engagement, as do structure and clear teacher expectations. Student engagement is fostered in learning environments in which student autonomy is supported and where there is no punishment (Van Uden. et al 2014). The journal stated that there are three types of engagement: behavioral, emotional, and cognitive.

Students are behaviorally engaged when they participate in the lessons, are on time, concentrate on the assignments given, and put effort into those assignments. Students are emotionally engaged when they are enthusiastic about a class, are interested in going to the class, and demonstrate a positive learning attitude. Students are cognitively engaged when they

understand the importance of their education and the specific subjects and assignments, are able to formulate their own learning goals, make use of their self-regulating capabilities, and want to achieve academically. (Picka, K. 2017)

The use of technology by adolescents has greatly increased since 2001. According to (Shin et al. 2012) , about 66% of children aged 8 to 18 have a cell phone, and 76% have an iPod (or similar) device. Results from the two studies in this journal revealed that using a technology-based game in the classroom was beneficial to students of all ability levels in learning arithmetic skills. Technology and games have yielded consistently positive results with regard to motivation, persistence, curiosity, attention and attitude toward learning. The accessibility and flexibility of handheld devices can provide students with more integral and spontaneous opportunities to fully take advantage of "off-moment behavior" from classroom activities to support learning. (Shin, N et al. 2012)

A majority of the themes from all the literature I have reviewed have stated that digital review games in the classroom can be largely positive. There are still deficiencies that will need to be discussed in this action research plan. Not everything about digital review games can be positive. I can vouch that plenty of things can go wrong when using technology in the classroom, much more than with traditional pencil and paper reviews. It's also widely noted that digital games need to be done in moderation. Kids today get enough screen time as it is, if we push it to much at school, we might run the risk of doing more damage than good.

Writing An Action Research Plan To Guide The Research

This study was designed as an action research project to get a better understanding with the effect of digital games on student behavior and engagement. Digital review games and paper-and pencil reviews were alternated from week to week for the six weeks of the study, with a total

of three digital review games and three paper and pencil reviews (Table 1). The digital review games were created by me and administered through the websites Kahoot & Quizizz. Students used Chromebooks and are given a login link and code to play the games. The paper and pencil reviews were very similar style questions the students would see in the Kahoot & Quizizz games, but they were presented by printing off a Google Forms assessment. Students were given a copy of the worksheet and began to answer the questions to the best of their ability. After everyone completed the worksheets, I went through the correct answers having students fix errors along the way. Both styles of review had 10-20 questions.

TABLE 1 - COMPUTER SCIENCE ROTATION

	Review Type	Content
WEEK 1	Pencil & Paper	For Loops
WEEK 2	Digital Game (Quizizz)	DoWhile Loops, Until Loops
WEEK 3	Pencil & Paper	If Then Statements
WEEK 4	Digital Game (Quizizz)	Procedures
WEEK 5	Pencil & Paper	Static Lists
WEEK 6	Digital Game (Kahoot)	Dynamic Lists

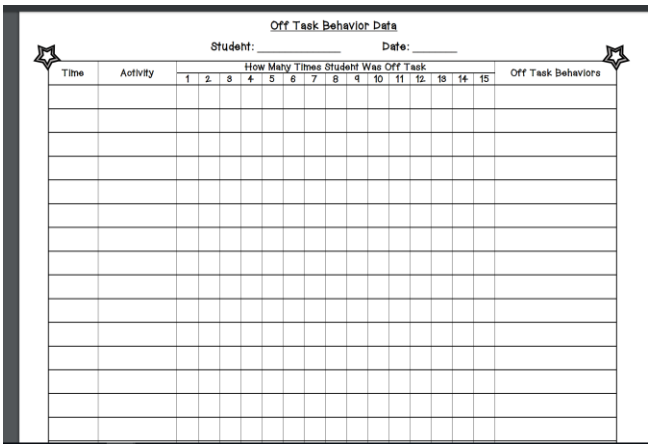
Each weekly forty-three minute review period started with explaining what type of material would be reviewed and how the material would be presented to them before going through the review activity and ended with students filling out their Likert scale questionnaire. When it was a digital review week, I would project the link and the code on the board and the

students would log into the digital review game. When it was a pencil and paper review week, I would ask a volunteer to pass out the packets of worksheets.

Collecting Data

Multiple data sources, both qualitative and quantitative, were used to determine if digital review games had an impact on student engagement and motivation. Observations of students' on- and off-task behavior were collected during each review. During both style of reviews, I would use the chart below to record students that were off-task as well as the behaviors the student was displaying (Figure 1). At the 5 minute, 15 minute, and 25 minute mark, I would record what appeared to be the number of on task students and off task students. If a student appeared to be off task, I would write what the off task behavior was. I then figured the percentage of on task students vs. the percentage of off task students. (Figure 5)

Figure 1 --->


Off Task Behavior Data

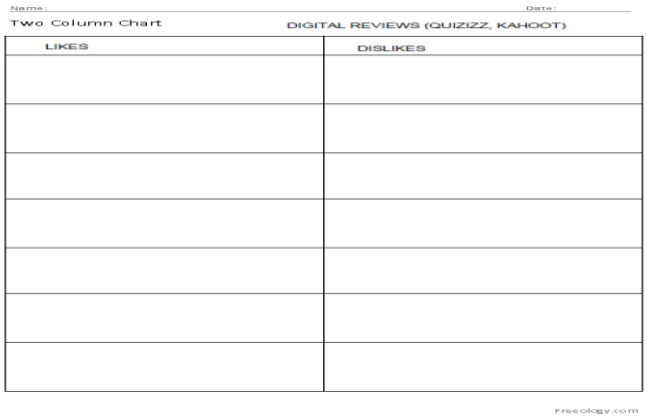
Student: _____ Date: _____

Time	Activity	How Many Times Student Was Off Task														Off Task Behaviors
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	

After six weeks of participating in both digital reviews and paper and pencil reviews, students completed a questionnaire answering what they liked and did not like about each style of review (Figure 2). Together, these data sources were the main source to determine if digital

review games affected the students' engagement and behavior.

Figure 2 --->



Name: Date:

Two Column Chart DIGITAL REVIEWS (QUIZIZZ, KAHOOT)

LIKES	DISLIKES

Freeology.com

Analysis Of The Data

Both qualitative and quantitative data were collected using student Likert scale questionnaires, on- and off-task behavior tally, and a final student questionnaire. The quantitative data I used from the on- and off-task behavior sheet was placed into a Google Spreadsheet and the Likert scale questionnaire I made into a Google Form and placed it into the students Google Classroom to be answered. Percentages for the total students on and off-tasks were calculated at the five-, fifteen-, and twenty-five minute marks for both digital games and paper and pencil reviews. The questions utilized for the Likert scale questionnaires were tallied based on how many students answered each question with strongly agree, agree, neither, disagree, or strongly disagree.

The qualitative data (on- and off-task behavior sheet & the final student questionnaire) was placed into categories. The on- and off-task behaviors were split into two categories: on-task behaviors and off-task behaviors. The student questionnaire data was divided into likes of paper and pencil reviews, dislikes of paper and pencil reviews, likes of digital games, and dislikes of digital review games.

The first part of this study addressed how engaged students were during the two different

styles of reviews. All of the data collected provided evidence relating to how students are engaged behaviorally and emotional in the lessons. The first two questions focused on behavioral engagement and how the students rated themselves on the effort they put into their work and if the extended throughout the entire class period (Figure 3 & 4) . Overall, very few students disagreed to working hard or the entire class period.

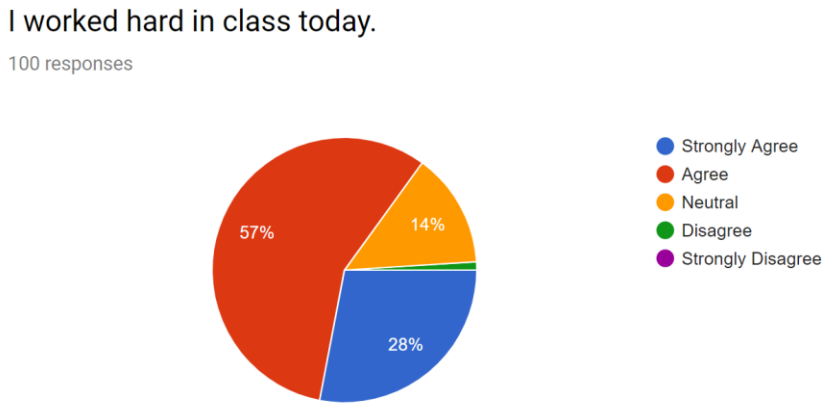
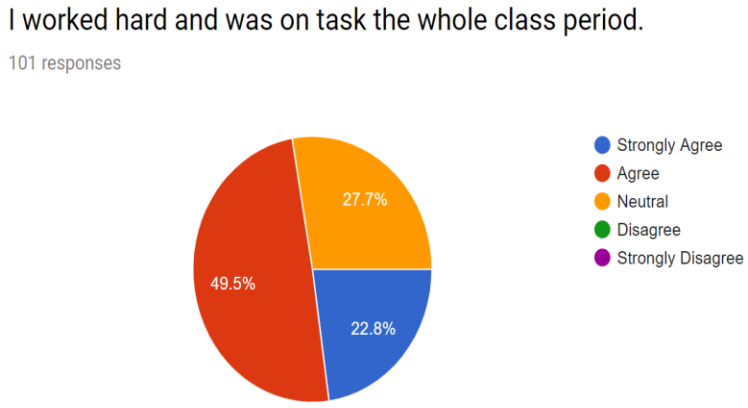


Figure 3



<- Figure 4

During the reviews, I kept a record of how many students demonstrated on- and off-task behaviors at 5 minutes, 15 minutes, and 25 minutes into the review activity. The on- and off-task behaviors for both paper and pencil and digital games included many of the same behaviors.

Common behaviors from both included: talking to other students, staring around the room, surfing the web after they complete the review, and laying their head down on the desk.

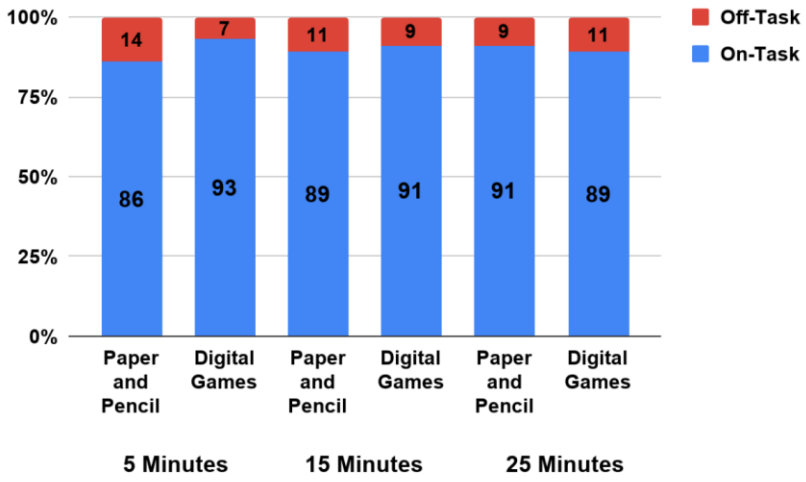


Figure 5. Percentage of students on-and off-task at time intervals of 5 minutes, 15 minutes, and 25 minutes.

At the end of the study, students took a questionnaire about what type of review they enjoyed more (Figure 6). Then, students answered what they liked and did not like about each style of review. Common likes for Digital Reviews are listed below in Figure 7. There were only a few that enjoyed pencil and paper reviews more and the most common reasons were that: “You don't feel as rushed” , “It's not so competitive," “You can skip through questions more easily” , and “I don't feel as rushed”.

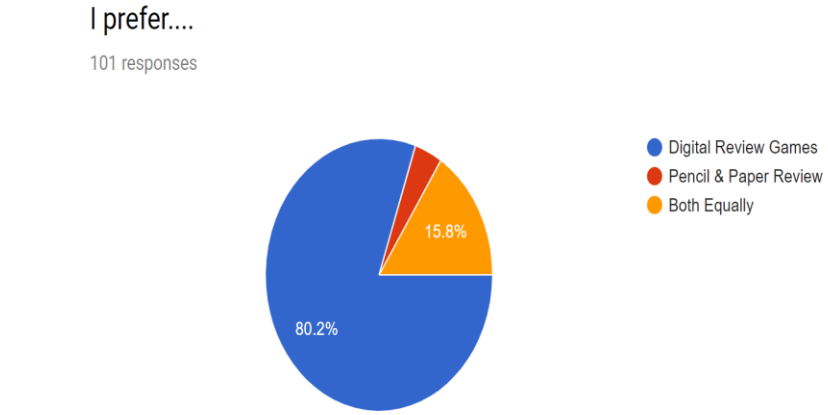


Figure 6

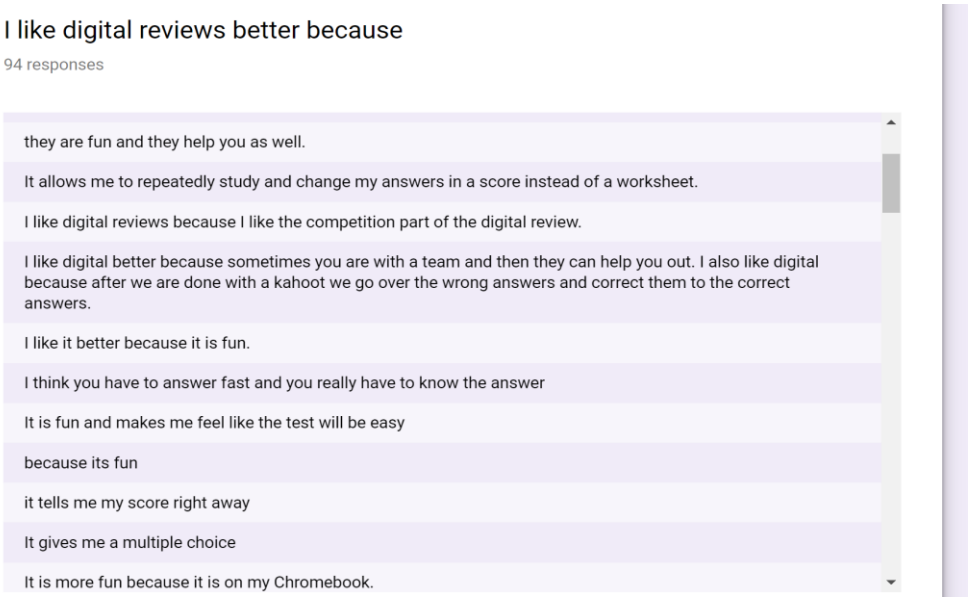


Figure 7

Action Plan To Improve Practice & Reporting Results

The goal of this action research study was to determine the effect of digital games on students' engagement and behavior in my 6th grade technology classroom. After analyzing the data that I collected, several conclusions about the effects of digital games on student engagement and behavior arose. One conclusion is that behavioral engagement decreases the longer students participate in digital games. There were some students that would finish the Kahoot game early and would travel to websites they shouldn't be on or would bother other students.

Despite this decrease in behavioral engagement, there was an increase in engagement when using digital games. Students seem internally motivated to repeat a review just to increase their overall score. Students also indicated a bigger preference for digital games over paper and pencil reviews. Overall, this action research study was moderately inconclusive on whether digital games had a more significant impact on both student engagement and behavior. Specific parts of engagement were positively impacted by digital review games while behavioral engagement was negatively impacted.

Knowing one style of review does not increase both student engagement and motivation; a blended practice of both styles is needed. When teachers incorporate both styles into their reviews, you will be better suited to meet the needs of all of your learners. The advantage of using a programs like Quizizz and Kahoot is that many reviews have already been created. Teachers can use these quizzes or take questions from a variety of premade quizzes.

After concluding this study, it became evident that further research would be needed to determine which style of review would increase student engagement and behavior the most. It became evident that it was difficult to gauge behavior while teaching. Like my professor stated, "Often if a student is quiet, it is easy to miss off-task behavior or it is easy to be biased and look at the students we expect to be off-task more often." The study indicated that neither style of review impacted both student engagement and motivation. Instead, a balanced approach using both styles of review is most beneficial for students.

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