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Gamification of the Classroom: Seeking to Improve Student Learning and Engagement

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Gamification of the Classroom: Seeking to Improve Student Learning and Engagement

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An Action Research Project Presented
in Partial Fulfillment of the Requirements
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Abstract

The purpose of this study was to find how gamification of the classroom would affect middle school students in a northern suburban school district in Minnesota. This work was designed to find if student proficiency would increase because of gamification and if students would become engaged with the classroom material due to its implementation. Using three classes taught in this new setting and two classes taught in the standard of past years, test scores were measured and studied to find significant changes along with a survey to the gamified classes about their experience regarding engagement. The study found that there was no major distinction between the classes regarding student proficiency using test scores as data, but the student surveys suggested that student engagement was increased because of the rollout of gamification in the classroom. Gamification may not have a positive or negative impact on student proficiency but does show that it can increase student engagement of the classroom material.

Gamification of the Classroom: Seeking to Improve Student Learning and Engagement

Technology is a pivotal piece to everyday society in the United States and will only continue to grow in the future (Ruggiero & Mong, 2015). The availability to create, design, build, and innovate with technology has never been so widely available (Montrieux, 2015). The education system is no different and the upcoming generation will be the first fully immersed in technology within the classroom (2015). Reaction from educators towards this student group is going to be a major challenge and strategies should be attempted now in order to be best prepared for the future culture shift (Ruggiero & Mong, 2015). The focus for this upcoming generation needs to be a delicate blend of technology and student collaboration (Oliveira & Cruz, 2018). Since technology can often impede the social capacity of students, there needs to be emphasis on applications that can help harness teamwork and engagement with the classroom material (Bickle & Rucker, 2018). Examining these applications and deciding which are effective for student proficiency and engagement can be a focal point for education in the decades to follow.

It seems most often that students struggle with motivation and engagement when it comes to attending school and paying attention in class. Looking at what they do instead with their free time is important because it must be comprised of captive strategies to attain student focus for such long periods of time (McCreery, Krach, & Nolen, 2014). Since students need to implement learning strategies in order to understand game mechanics, there needs to be common ground for educators to use for curriculum stimulation as well (Gee, 2005). This common ground area is where the idea of gamification originated for classroom use.

Gamification is a strategy that brings game-based mechanics and thinking to normally non-game contexts (Kapp, 2012; Sanchez, 2017). Classrooms do not necessarily change in the

realm of the lessons, but the feel of the class is more of a game. Instead of lessons, there are quests and instead of test there is a boss battle. Rather than there being a teacher, there is a gamemaster and the students create their own avatars online that they can send on adventures throughout school year (Sanchez, Young, & Jouneau-sion, 2017). Those same avatars can then join a party and the students are now collaborating with class material in a way that increases engagement.

The research for gamification so far has been positive when it comes to engagement and motivation. Studies show that when game mechanics are applied to a classroom setting, they can positively impact students (Alsawaier, 2018). This is due to the unique strategies video games have developed throughout the years to attain playership (Gee, 2005). Ideas such as experience points, leveling up, badges, achievements, and avatars can all play a role in encouraging students to perform well in class and motivate them to complete assignments as well as behave in class (Bruder, 2015; Byl, 2013; Goehle, 2013).

The pressing issue of gamification lies within the concept of extrinsic and intrinsic motivation. The studies have found that if gamification is not implemented correctly, there could be a negative long-term outcome through lack of intrinsic motivation (Gerber, 2017; Hitchens & Tulloch, 2018; Kim, 2015). If gamified classrooms constantly reward tangible things to the students, the students will only want the reward and not focus on their class material. Providing a balance of rewards and learning is critical to a successful gamified classroom, and ironically, this also goes for good video games as well (Gee, 2005).

Due to these findings and the literature that has been researched for the topic, this study seeks to find if gamification will help the classroom improve its overall academic proficiency and if gamification of the classroom can help increase student engagement of the curriculum

material. If adding a layer of game to a class motivates students and gets them engaged in the material, it would be wise to attempt this in order to potentially benefit student learning.

Literature Review

Gamification History and Examples

Over the last decade, as smartphones and laptops have become more affordable, there has also been a revolution in the ‘gamification’ of work and consumption (Byl, 2013). This word began appearing around 2008 with a few different definitions, but eventually began to be known as the idea where a teacher or creator brings game-based mechanics and thinking to normally non-game contexts (Kapp, 2012; Sanchez, 2017). Research suggests that this would increase engagement with a certain activity because the act of learning or completing that certain activity becomes more like a game instead of the arduous or innocuous task it once was (Goehle, 2013).

Although the actual term, “Gamification” was coined in the later 2000s, the idea itself is relatively old (Morford, Witts, Killingsworth, and Aavosius, 2014). Related to the term could be usages such as serious, persuasive, and alternate reality games, but now recently, gamification is beginning to take on its own meaning (Morford et al., 2014). It has been utilized in strategies to increase engagement in topics individuals may find difficult to perform, but essential for life.

Fitocracy for example is a gamified program online that assists people with getting healthy and working out (Goehle, 2013). If someone struggles to find motivation to get in shape, they can instead make it feel like a game by winning awards, challenging others, and communicating with similar minded individuals. Suddenly working out which at first seemed like a challenging task that people often put off doing turns into a fun activity because of gamification (2013).

Another example would be Chore Wars, which takes performing the tasks of housework and turns it into a role-playing game with rewards so those that are performing the tasks see it as more enjoyable (Goehle, 2013; Kim, 2015). Since the child is more focused on the game-side of the activity versus the actual chore itself, there is suddenly more motivation to complete the task.

Another interesting development is that the adult asking is no longer the authority figure to say no to, but instead the power is deflected to a game and avatar which the child feels obligated to assist (Alsawaier, 2018).

Gamification can also take on a role that companies use to motivate customers to use their services. Earning points when spending money and unlocking achievements with things such as credit cards and frequent shopper programs also fits under the gamified umbrella (Byl, 2013). Since the video game industry is growing even faster than the music and movie industry, it would make sense to see companies using game elements within their profit strategies (Morford, Witts, Killingsworth, & Alavosius, 2014). This of course raises then some concerns of gamification. Some are concerned that people will become so engaged with earning points that they may become irresponsible with their finances (Gerber, 2017). This need of acquisition is something companies will be researching more in the future as consumers build brand loyalty and perks for leveling up in certain club rewards systems that feature gamification strategies (Byl, 2013).

As this strategy became more relevant, especially with greater access to technology, it was only a matter of time before there was implementation in the classroom (Bruder, 2015). If gamification can increase engagement for tasks such as working out, doing chores, and consuming products, then the research began to suggest that it could also engage learners to perform well in classes (Alsawaier, 2018; Haris & Sugito, 2015; Papadakis & Kalogiannakis, 2018). The literature thus far presents several examples of programing that is specifically tuned to gamify work that was once seen as monotonous. When educators can create an environment where students solve problems and use information in an authentic way, gamification can increase retention and enthusiasm (Alsawaier, 2018).

One example of what gamification can look like in the classroom is with a website called Class Dojo, where students are motivated through badges and rewards for behaving and being attentive in class (Gerber, 2017). Instead of power struggles or having students' questions why they need to act a certain way, the power is instead directed to a game-based platform which they understand. Not performing the correct tasks has external effects on progressing in the game, and that motivates students to instead be more attentive and manage their behavior better (Gerber, 2017). The program also has ways a teacher can group students faster and manage the classroom in such a way that it does not look like a spreadsheet, but rather a user interface that students can engage with. Giving students the ability to oversee their own learning gives them a higher chance of becoming engaged in not just the game, but the class material as well (Kapp, 2012).

Another example of gamification in the classroom is a program called Classcraft, which will be reviewed in greater detail later, but in its essence is a classroom management system where students create an avatar that is teamed up with other classmates to conquer the class material (Haris & Sugito, 2015; Papadakis & Kalogiannakis, 2018; Sanchez, Young, Jouneau-Sion, 2017). This program utilizes the common pillars of gamification which includes achievements, experience gaining, in-game currency and other rewards that allows students to feel motivated to gain in addition to the learning mastery of the actual class. Providing this layer to students above the class gives them a different mindset when they are engaging in the curriculum (Kim, 2015). Instead of a test, students try to beat a boss and instead of an assignment, they are going on a quest. Words which often have negative connotations with boredom or difficulty are given different language so that students perceive these struggles differently (Sanchez et al, 2017). With these ideas in mind, Classcraft still puts the class material first and is not an actual game. Teachers need to put their coursework within the game in order

for it to work, so gamifying the classroom does not mean students are playing games every day, they are instead creating a different world for the material so that it becomes more approachable for students (2016).

Gamification versus Gaming

The literature makes several notes of differentiation between what gamification is and how it differs from educational games (Alsawaier, 2018; Byl, 2013). Educational games have been around for centuries and just recently with the access to technology in schools, computers and mobile devices have given these games a larger platform to operate. There are games for keyboarding, math, and vocab that allow users to interact with material to study (Gee, 2005). Even games such as Oregon Trail assisted students in finding out more about westward expansion, but that is not gamification (Goehle, 2013).

Gamification is putting a layer over something that is not usually regarded as a game and placing game elements on top of it in order to stimulate engagement (Byl, 2013; Kapp, 2012). The important difference is that students are not constantly playing games along with getting rewarded in class and gamification does not dramatically change the curriculum standards (Kim, 2015). All the material that needs to be taught by the educator is still presented and lessons like worksheets, lectures, and group work are all still the composition of the class. Gamification comes into play to engage students in tasks that may have otherwise been neglected or ignored (Alsawaier, 2018).

The reason why this distinction is important is because in game-based learning, the student's engagement lasts as long as the game's length and is only directed towards a specific topic. Once the game is complete however, the engagement is lost and the student feels that their mastery is complete, and closure has taken place (Alsawaier, 2018). Gamification is different in

that it reflects the class itself, not a certain lesson within it. The educators need something that engages students in their classwork and carries on past certain assignments. These tasks are like quests and can carry on throughout the year if the teacher chooses (2018). Being able to connect units together like this allows for the game strategies to continue and the educator can tailor their lessons anyway they would like instead of being bound to a computer.

Gamification Components

The literature on gamification makes important notes on what a classroom implementing this looks like and they take many of the strategies from video game research (Gee, 2005). Those that have studied what makes games so engaging to adults and kids along with what keeps people playing (Gerber, 2017; Morford, Witts, Killingsworth, & Alavosius, 2014). Being able to mimic those concepts into a classroom could prove positive for students to become engaged in classroom material.

The first of these components is the use of experience or (XP). Students can complete tasks, achieve high scores, and practice good behavior to level up in class (Bruder, 2015; Byl, 2013; Goehle, 2013; Sanchez et al., 2017). The reason why this component is so essential to gamification is because it is the feeling of progression that increases engagement. The visual appeal of advancement engages students and challenges them to notice that they are excelling in the class material. This can be a motivator to even the most unmotivated student; especially if they enjoy video games as a hobby (Alsawaier, 2018). As the school year continues, leveling up with experience points continue to get more difficult to attain and the bonuses or perks they gather are more lucrative. These perks could be anything the educator would like to motivate students. In some cases, it's different clothing for an avatar, in other cases it could be listening to music while working on an assignment (Sanchez et al., 2017). Regardless of the bonuses, seeing

a score or level attributed towards advancement is a reoccurring theme in many video games now, and students see these as a reflection of progress (Goehle, 2013).

Another component commonly found in a gamification classroom are avatars, which are electronic characters made by the students that are part of the virtual experience (Sanchez et al., 2017). Games utilize avatars because they give students a way to express themselves in both the real world and in the virtual world where problems can be projected onto a different thing they can control (Alsawaier, 2018). This customization of their learning allows for the student to feel like it's their own. It might be one thing to change the clothing on an avatar to make it look unique compared to someone else's, but it can give the student a virtual expression of themselves (Byl, 2013; Gee, 2005). It also allows the student avatars to join up and become a party against the class material; which provides an additional support to collaboration (Alsawaier, 2018). Perhaps students struggle with one-on-one interactions socially. They could still help teammates by interacting with the avatars (Sanchez et al., 2017). All students in the class are granted the ability to have a projective identity with avatars, and therefore they can make their own unique persona that they can increase in power (Sanchez et al., 2017).

Other than gaining experience or raising the power of an avatar, completing quests, earning badges and achievements are all possible outcomes that students can seek in a gamified classroom (Bruder, 2015; Gerber, 2017; Morford et al., 2014; Oliveira & Cruz, 2018). Quests are the classwork involved in the class. This could be a math assignment, a written paper, or even an online activity, but the unique caveat is that it always goes back to progression (Goehle, 2013). Ensuring an educator ties the class materials back to the game elements is critical so the students understand they are attaining power or experience through performing the quests and the quests are directly related to the learning targets of the class. Gamification is not the lesson; it is more

of a layer that is placed on the classroom material to make it more appealing to students (Alsawaier, 2018).

Badges and achievements are the reflection for putting in the work and can be displayed usually in some way on an avatar or given to the student (Goehle, 2013; Morford et al., 2014). The difference between these and completing quests are that these are for above and beyond work that is not normally asked of the student but is available to attain (2013). This is can provide a unique edge to gamification because it incorporates those students who want to push beyond what is asked. Normally, someone would think that these are given to the students who excel the most, but there is a stipulation that should be addressed if there is a desire to use these effectively. Utilizing badges and achievements the most is when they are given for effort, not for high grades (Alsawaier, 2018). Gamification's effectiveness comes from rewarding failure because it should be the process that is praised and not the success (Gerber, 2017).

Gamification Issues: Extrinsic vs. Intrinsic Motivation

Much of the literature for this topic regards it in a positive light and something that should gain more notoriety as the world becomes more virtual and technologically advanced (Bruder, 2015). However, as more studies are completed and more research is performed, there is a worry in the community regarding correct implementation. One discussion is regarding how gamification provides copious amounts of extrinsic motivation but seems to lack in intrinsically motivating student to do well in their studies. (Alsawaier, 2018; Byl, 2013; Gerber, 2017; Kim, 2015).

Extrinsic motivation is essentially when someone is doing a certain act because they would like a reward for that act (Kim, 2015). In a simplified version of gamification, that is what it may look like from the outside (Gerber, 2017). An educator is giving a student a reward for

completing a task. They do the task not because they want to learn, but because they want the prize for finishing (Gerber, 2017). This is an area of concern where students seem to not prefer the game elements but would rather want real, tangible prizes (Kim, 2015). Studies show that extrinsic motivation can affect the ability of students to acquire intrinsic motivation (Alsawaier, 2018; Byl, 2013; Gerber, 2017). Kim writes that tangible rewards were detrimental in the long run for younger students and impacted their motivation to complete tasks intrinsically (Kim, 2015).

Gamification works well in its simplest form for programs like Chore Wars and workout applications because the most difficult thing about these skills is the completion of them (Kim, 2015). A child is not learning how to clean a dish or vacuum the floor, but instead the parent is just trying to get the child to perform a task they already know. In school however, educators are trying to get student to learn new material for the first time. Since gamification has extrinsic motivation involved within its strategies, it also needs to draw the desire of intrinsic motivation as well to be most effective (Kim, 2015).

The research suggests that it is possible for gamification to be both intrinsically and extrinsically motivating, but the educators considering this classroom need to be careful in the delivery to the students. Avoiding physical rewards for accomplishing quests or tasks first off is one of the biggest prevention tactics (Kim, 2015). There is not a need for candy or physical rewards in a system when there are already rewards in-game for accomplishing tasks. Also, it is not necessarily a bad thing to have reward systems, but over-rewarding students can be detrimental because it does place more emphasis on the treat and not the learning (Gerber, 2017).

Another intrinsic motivator is the badge and achievement system if the teacher rewards effort and not grades. Students should be expected to work for these kinds of tasks and should

even fail several times before achieving them (Gerber, 2017). Failure is a huge piece of the gamification process that is often overlooked but provides an authentic piece that engages students (Gerber, 2017). The power in a game that is unlike school is that failure is often a step towards the goal as opposed to a roadblock preventing further learning (Byl, 2013). Just as an example, people do not think about why they still enjoy a video game as they are continuing to fail while progressing. In fact, it is the games that a player seems to fail the most in that gamers want to continue playing because they have not yet achieved mastery (Gee, 2005). If that is the case, then successful implementation of gamification in the classroom needs to take the strategy of failure to heart and if an educator can tie badges and achievements to the accomplishment, it would encourage students to seek them (Sanchez et al., 2017).

Researchers have also suggested that the use of collaboration amongst the students in attempt to protect and help their avatars is another way to assist in the intrinsic motivations within student learning (Alsawaier, 2018; Hitchens & Tulloch, 2018; Kim, 2015). The students are not helping, protecting, or saving their party's avatars because they are getting rewarded for it, they are doing it because they enjoy the journey (Sanchez et al., 2017). This is where gamification can shine because the educator is allowing the students to all become teammates trying to get through a simulated world along with the class. Collaboration is at the heart of gamification and student success is reliant on the idea that they are working together to achieve positive results (Alsawaier, 2018).

Gamification as Action Research

Studies have been completed on this classroom strategy after implementation and the results vary depending on how it was completed and what age the students were (Beemer et al., 2019; Hitchens & Tulloch, 2018; Sanchez et al., 2017). Overall, there is positive feedback in the realm of engagement as most students find gamified classrooms to be more motivating and enjoyable compared to traditional styles without (Hitchens & Tulloch, 2018; Sanchez, et al., 2017). Student proficiency of the class standards however had mixed results and there was no clear indication that gamification assisted in lifting test scores compared to non-gamified classes (Hitchens & Tulloch, 2018; Sanchez et al., 2017).

Hitchens and Tulloch performed a study on gamification but made sure to point out it was only about motivation and engagement; not about raising proficiency scores (2018). They wanted to see if students had favorable views of a classroom that engaged in gamification. The students were in college and taking video game studies courses at the time and it utilized in game currency along with experience. Hitchens and Tolloch (2018) concluded that students had a highly positive view of the experience and kept them motivated to do actively participate in class. The drawback they noticed was that a small minority of students did have negative views of the experience and that may have negatively impacted their learning throughout the course. Hitchens and Tulloch's (2018) study shows that gamification can motivate students and engage them in the material, but as mentioned the test scores were not calculated.

Another study completed by Beemer et al., had 300 low income family elementary school students within a 20-week intervention program to increase moderate-to-vigorous physical activity (MVPA) (2019). They used gamification techniques to try and increase participation for

the students and the results were promising. There was an increase in MVPA participation from the students and an increase in enjoyment (Beemer et al., 2019). Having an increase in engagement like the elementary school student had in this study is what gamification seems to accomplish most. This study is reflective of the workout apps that utilize gamification to increase motivation for participants to complete tasks in order to improve their health (Morford, Witts, Killingsworth, & Alavosius, 2014). When the students do not feel like they are being told to do the work because they need to and instead are given access to gamified strategies, it makes it feel like play much more than a task (Sanchez et al., 2017).

There were two additional studies that helped motivate this study in that they both attempt the program, "Classcraft." Sanchez, Young, and Jouneau-sion explain that one study comes from France and the other from Canada (2017). They are both similar sized schools and similar socioeconomic backgrounds. The study found that in both cases there was an increase in student motivation and engagement with the gamified classroom. They also reported that there was an increase in student collaboration due to the party system in the game (Sanchez et al., 2017). Both teachers were satisfied with what it did to the motivation of student learning, but there was absence of if the student did better in exams thanks to the gamified learning.

Along with the student study, Sanchez et al., also surveyed teachers that used the program (2017). The findings showed that those that responded back usually did so favorably of the program and explained with many of their responses that it engages their student more than it would have if there was not gamification (2017). Regarding student proficiency in the class standards however was unchanged, and there was no clear indicator to show that the student performed better on assessments because of gamification (2017).

Conclusion

Regarding the research behind gamification, there is still much that needs to be done when thinking about its effectiveness and its long-term effects (Kim, 2015). There are many positives that gamifying a class can bring, especially to student engagement and motivation of completing tasks (Alsawaier, 2018; Hitchens & Tulloch, 2018). Even behavior problems significantly decrease if a proper setting of gamification has been established in the classroom (Sanchez, et al., 2017). When students buy-in to the game, they act as if it is any other game; they play on their off-time because it uses the same strategies to entice (Alsawaier, 2018). Teachers become gamemasters and tests become bosses; the class suddenly seems much more attainable and the goals becomes highly sought after to gain that extra experience (Sanchez et al., 2017; Hitchens & Tulloch, 2018).

Downfalls of gamification are apparent under a couple of circumstances which include the divide between intrinsic and extrinsic motivation along with the inconclusive data regarding student proficiency (Alsawaier, 2018; Byl, 2013; Gerber, 2017; Kim, 2015). It is widely known that there is a concern with too much extrinsic motivation and how it effects young learners (Kim, 2015). Getting treats or rewards for tasks that students should just normally want to complete can have negative long-term effects (Gerber, 2017).

Gamification has various extrinsic motivators within its framework, so being careful implementing the rewards is important to keep the integrity of the class and the proper motivation of the students (Gerber, 2017). Many of the researchers conclude with that concept. While they agree that gamification is a useful tool and can greatly impact student engagement, it can also pull students away from the class material and only towards the extrinsic prizes (Alsawaier, 2018; Byl, 2013; Gerber, 2017; Kim, 2015).

Methods

Participants

As table 1 describes, participants in this study involved 141 students of a northern suburban school of Minneapolis, Minnesota. They were in 7th grade, which is usually between the age of 12 and 13 years old and were taking a class called U.S. Studies. Sixty-two of the students were male and 79 were female. Amongst the five classes that were studied, 13 students were receiving ELL services and 15 were receiving special education services with class sizes averaging 28 students each. From these five classes, two were considered the controls in the study and did not have the additional programming of the gamification tool called, “Classcraft.” The other three classes were gamified using Classcraft while undergoing the same curriculum.

Table 1

Student Data and Demographics from the Study

Class Breakdown by Group	Group 1 (Non-Game)	Group 2 (Non-Game)	Group 3 (Game)	Group 4 (Game)	Group 5 (Game)
Male	9	12	12	14	15
Female	15	16	18	17	13
ELL	3	1	3	3	3
Special Education Services	5	2	2	5	1
Class Size	24	28	30	31	28

From the two that were controls, the first class contains 24 students (9 male and 15 female), three ELL students and five that are served with special education considerations. This class is also taught in a different room than the other social studies classes due to classroom constraints of the building. They also have a different class setting with tables as opposed to desks due to it being a science room for the rest of the day. All other educational pieces are

consistent with the other classes studied including Chromebook access, class materials, and assessments.

The second control class contains 28 students (12 male and 16 female), one ELL student and two that are served with special education considerations. This class is taught in the same classroom as the gamified classes and has access to the same technologies as all the other classes. The only variable that is different from the teaching perspective is the lack of gamification of the curriculum.

Gamified classes are sized at 30 (12 male and 18 female), 31 (14 male and 17 female) and 28 (15 male and 13 female). There are three ELL students in each of the classes and two special education students in the first, five in the second, and one in the last respectively. These three classes are taught in the same room with the same services, class materials, and assessments along with the same gamified strategies of the study. Although Classcraft has an app for phones, the study does not include outside of school data to ensure those that do not have the access are negatively impacted. The strategies used in the study are contained in the classroom with the option to delve further outside of school if desired.

The school these students are from serves over 1200 students grades 6-8 and has a free/reduced lunch ratio of 53 percent. Racial diversity of the school is 59 percent white, 18 percent African American, 9 percent Hispanic/Latino, and 7 percent Asian. The school has recently undergone a large population increase over the last year of over 400 students due to boundary changes which is worthy of note to understand differing conditions the students are going through other than just the educational aspect. This includes the educators as well in the building as they have had to transfer to the school from others around the district. This transition

may impact the culture of the building as it creates its own unique identity to serve the new student population.

The student population in the building has access to internet and technology is available enough to have access when wanted in the classroom. There are 12 classroom computer carts, 3 computer labs, and all English teachers have their own cart in their rooms. Students at this school, because of this ease of access, are technologically literate and the expectation is they can access material on their own if needed. The gamified classes depend on technological literacy for there to be any signs of success.

Measures

Quantitative data was compiled for this study in order to answer the two research questions. The need for both scoring data and student surveys were vital to understanding these questions. The first research question was if gamification of the classroom improves student academic achievement. This can be discovered best through analysis of student scoring data on assessments based on curriculum throughout the study. There were five different instances in which an assessment was used to discover student performance on four specific educational standards.

The first four assessments were formatives on the material for the first unit of the class which pertained to the U.S. Constitution. The assessments were given in all the classes the same way and on the same days. Formatives, which in the gradebook do not count against the student actual grade, are still inputted into the grading program so the students still see their score. All four of the assessments were multiple choice and were under ten questions. To ensure student learning is focused onto the Minnesota State Standards, these questions pertained directly to learning targets of the unit and had purpose behind each one. The curriculum team and I

developed these tests to be given to the students and the scores were computed using google forms which were then transferred to our online gradebook called, Synergy.

The fifth assessment was a unit 1 common summative assessment in which student grades were impacted for the first time of the year. All formative assessments before this test were meant to prepare for this test which is also multiple choice. The unit 1 assessment is worth 30 points and contains all learning targets from the U.S. Constitution unit which includes information on the preamble, the three branches of government, and the rights and responsibilities of American citizens. The test was created by the curriculum team I am a part of, and we align the questions to district standards in order to prepare the students for a trimester final.

Each class took the test on the chromebooks in class and had as much time as they needed to complete the assessment. The program used to create and deliver the test was called, Mastery Manager and this program allows students to flag and eliminate choices they believe are incorrect. The program also allows the student to see their score at the end of the exam. These scores were entered into a gradebook program called, Synergy as a reflection of their unit 1 learning. They were allowed to retake portions of the exam to recover credit.

As the test scoring data was being collected, there was survey data also being compiled within the gamified classrooms. A google survey survey was given on google forms to research the second research question which pertained to if the gamified classroom would increase student engagement with the class material. The questions had both multiple choice and written response areas for students to write about their experience. This was completed after the first couple of weeks and then another time at the end of the study to see the progression.

Procedures

The study was conducted with five classes in the middle school setting at the same school during the 2019-2020 school year. Two of the classes were taught in setting where gamification was not present and three of the classes were taught in this kind of setting. Google Classroom was used for both of the studies and chromebooks were also used frequently for online assignments that pertained to the learning standards. The only piece that the two classes did not have was the gamified experience the other three classes had.

The three gamified classrooms used a program called, "Classcraft" which is strategy that layers a game over the content of the class. The students choose an avatar which goes on an adventure with them as they progress through their assignments in the classroom. That character gains gold and experience based on success of the assignments, their scores on tests, and behavior in the classroom. The educator is the one that reports the experience and gold for anything they feel shows progress or a good attitude. The educator can also take life away from the avatars based on class behavior if it is warranted.

On a typical day with the program, the class would start out with a daily event, which is something random their characters go through. After that they are presented with the agenda for the day on the board, they would log into Classcraft and Google Classroom to check what their tasks are for the day. If there was an online activity for them to complete, they would look at their quest tab in Classcraft and complete the tasks, similar to what a game looks like except the material is pertinent to the class. They would also access Google Classroom material when the user interface told them to go there instead. Students would complete these tasks and then after they were allowed to check their character to give it new clothes, tools, pets, and whatever else they would like based on the experience gains and gold accumulation of the tasks they

completed. The formative assessments were also completed by asking students to compete them through the gamified programming.

The process mentioned is performed at least three days a week when the assignments call for online access and if chromebook carts are available at the school. If there is not computer access for the day, the educator can still access their characters and utilize classroom management tools for that lesson by projecting the material to the board. This was used whenever there were times in which the assignment did not call for chromebooks in order for students to still feel the classroom has been gamified.

In addition to the quests and the classroom management areas of the game, team collaboration was also a consideration on a daily basis. The students were placed into teams so they could assist each other when the need occurred. Student can help each other based on their class trait and role. The students were given time with this feature to build efficacy and team collaboration with class material. This can include a formative assessment which is considered a “Boss Battle” in the game were students can talk to each other before they answer the question in front of the class.

Results

Test Score Data Analysis

The first research question of this study was regarding student academic achievement in a gamified classroom and whether it would increase mastery or not. Upon initial analysis of the data, it appears that there is not a significant change in student proficiency in the gamified classrooms versus the non-gamified. The non-gamified rooms show slightly higher scoring data, but all classes are above mastery and meet the learning targets for each assessment. Since there are no dramatic shifts either way in the data, the study shows that gamification of the classroom does not increase student academic achievement, but it also does not decrease learning proficiency either. The findings are inconclusive and further study would need to take place in order to understand if there is a change in learning mastery because of gamification.

Although the non-gamified scores are slightly higher than the gamified, in most cases it is not a dramatic increase in proficiency and all classes are proficient in their scoring of the assessments. The median scores for all classes were within a couple points of one another and no class had severe a difference in their scoring. Adaption of the new material may have had an impact on the gamified classes as they proceeded to learn both classroom material and the user interface of the program called, “Classcraft.”

Table 2

Percent and Median Scores of Unit 1: Learning Target #4 Formative Assessment

Variable	Group 1 (Non-Game)	Group 2 (Non-Game)	Group 3 (Game)	Group 4 (Game)	Group 5 (Game)
% Class Average	70.2	82.9	74.4	74.1	74.1
Median Score out of 15	12	14	12	11	11

Table 2 indicates the first assessment given to the students for the study and it pertained to the 13 newly formed states of the US. The students took this formative on Google Forms and the findings are consistent. Groups 3, 4, and 5 which are the gamified groups all nearly scored the same and were proficient with their understanding of the learning target (a learning target in this district is essentially a Minnesota curriculum standard). Group 2 was noticeably higher in their success and some students in group 1 really struggled with the material, but the median of the class was still a 12 out of 15. This assessment overall shows that there is no real distinction between the two ways of teaching and further study needed to be completed. For table 2, there was not a significant difference in the scores for non-gamified ($M = 11.51$, $SD = 3.57$) and gamified ($M = 11.30$, $SD = 3.39$) conditions; $t(115) = 0.31$, $p = 0.76$ with $d = 0.06$.

Table 3

Percent and Median Scores of Unit 1: Learning Target #1 Formative Assessment

Variable	Group 1 (Non-Game)	Group 2 (Non-Game)	Group 3 (Game)	Group 4 (Game)	Group 5 (Game)
% Class Average	67.7	79.1	63.1	78.6	71.5
Median Score out of 10	7	8	6	8	8

Table 3 shows more diversity in the scoring among all the groups. One group from both the gamified and the non-gamified classes scored low while the others remained proficient with the learning target. Cumulatively, the two groups are comparable again with no clear consensus on if gamified learning increases learner achievement. For table 3, there was not a significant difference in the scores for non-gamified ($M = 7.32$, $SD = 2.39$) and gamified ($M = 7.13$, $SD = 2.48$) conditions; $t(122) = 0.54$, $p = 0.59$ with $d = 0.08$.

Table 4

Percent and Median Scores of Unit 1: Learning Target #2 Formative Assessment

Variable	Group 1 (Non-Game)	Group 2 (Non-Game)	Group 3 (Game)	Group 4 (Game)	Group 5 (Game)
% Class Average	75.9	82.4	70.7	83.7	80.4
Median Score out of 10	7.5	9	7	10	9

Table 5

Percent and Median Scores of Unit 1: Learning Target #3 Formative Assessment

Variable	Group 1 (Non-Game)	Group 2 (Non-Game)	Group 3 (Game)	Group 4 (Game)	Group 5 (Game)
% Class Average	86.2	96	79.4	90.9	82.1
Median Score out of 10	8	9	7.5	9	8

Table 4 and 5 present group 4 and group 2 both showing high mastery level although they are from non-gamified and gamified classrooms. All classes in these two assessments were proficient and there was a good showing of mastery from both sides. Since these assessments are being given roughly one week apart from one another, it is interesting to see there being a slight uptick in all the classes with the material in general. The concepts are different and may have different rigors of understanding, but now that they have gotten used to their respective routines, they are both performing at desired levels. Although the gamified classrooms are not necessarily breaking away from the non-gamified classes towards greater mastery, they are certainly not regressing. This is an important point because of Figure 1 presenting the idea that students find a gamified classroom enjoyable. For table 4, there was not a significant difference in the scores for non-gamified ($M = 7.87$, $SD = 2.24$) and gamified ($M = 7.84$, $SD = 2.25$) conditions;

$t(124) = -0.06, p = 0.96$ with $d = 0.01$. For table 5, there was a difference in the scores for non-gamified ($M = 8.15, SD = 1.30$) and gamified ($M = 7.55, SD = 2.13$) conditions; $t(120) = 2.08, p = 0.01$ with $d = 0.45$.

Table 6

Percent and Median Scores of Unit 1: Government Summative Assessment

Variable	Group 1 (Non-Game)	Group 2 (Non-Game)	Group 3 (Game)	Group 4 (Game)	Group 5 (Game)
% Class Average	89	90	81	85	78
Median Score out of 30	27	27	24	25	24

Table 6 is the unit assessment for the students and the first true grade in their gradebook. Since all the previous assessments were formative, this is the one that will show on their progress reports. What is shown in the table is that the non-gamified classrooms performed considerably higher in relation to the gamified classes. The median score for both being 27 out of 30 is a high mark for this assessment and is two to three points higher than the gamified groups. This shows that gamified classrooms have not been increasing student achievement compared to the non-gamified rooms. Their scores however are not low in comparison with proficiency of the standards in unit 1. Being in the seventy-percentile range is considered proficient, and all the classes are scoring well above that threshold. Although the non-gamified class is scoring higher, they are all still performing at high levels.

Classcraft Survey Data Analysis

The second research question of this study is regarding student engagement with the material. Gamification of the classroom has greatly enhanced engagement with the material and

the overall enjoyment of the class has gone up for the students participating in the gamified environment. This is displayed through a google form survey which asked students a series of questions regarding their experience with, “Classcraft” the gamification program that was used for the study. The data compiled shows that the students enjoyed the experience overall and felt that the program was helping learning become fun and more engaging.

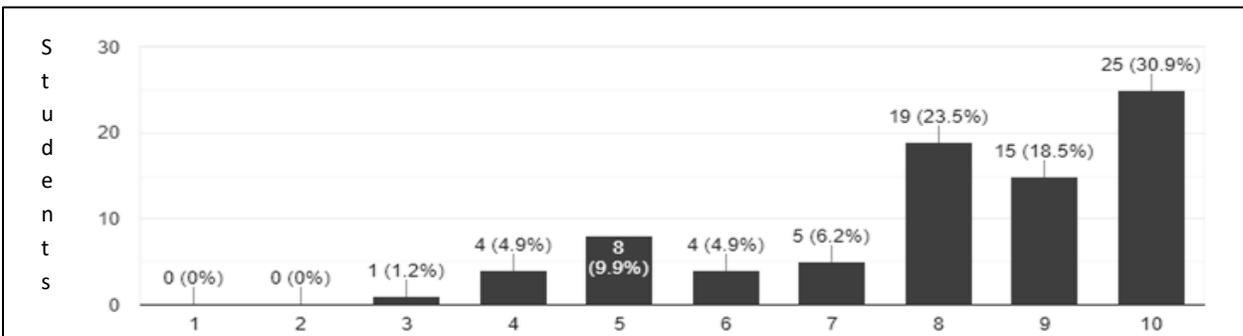


Figure 1. Classcraft Overall Enjoyment Level.

As shown in Figure 1, the students surveyed enjoyed the experience and were dedicated to their characters in the online gamified classroom. The question that was asked initially was, “What is your reaction so far to Classcraft for this class?” Out of 84 responses, no students picked the lowest two options and only one chose a, “3.” One could add up all the sub-eight responses and still not get to how many students chose 10 out of 10. Overall, this shows that the student in all three of the groups highly enjoyed the experience of having gamification in the classroom.

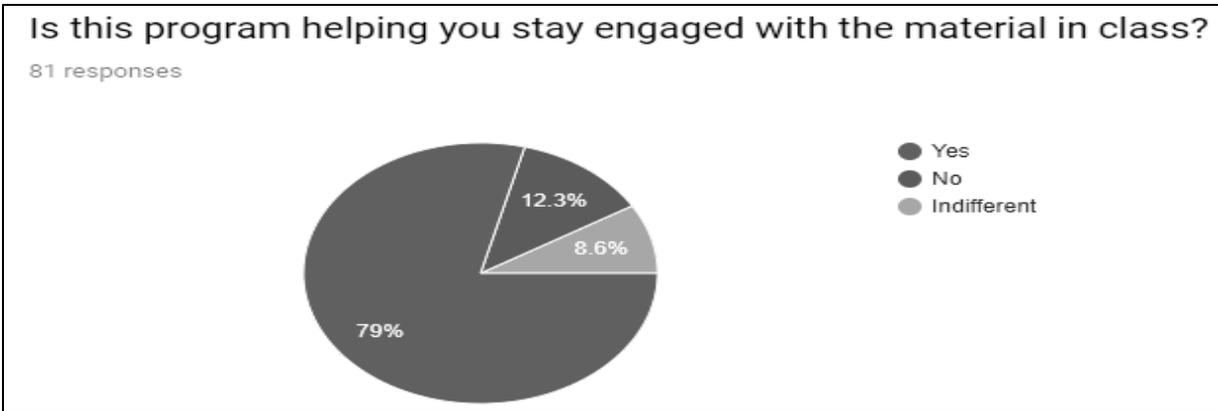


Figure 2. The Class Engagement Question.

The second research question for this study is regarding student engagement, so the second question in the survey given to students asks them if they feel engaged with the material in class. The answer shows that 79% of respondents think that this strategy is giving them a better chance at being engaged with the material of the class while 12.3% do not think it is helping them stay motivated with the material. Having a 12-13-year-old grouping of middle school student provide an almost 80% approval rating on anything pertaining to class is a relatively high number and gives prudence to the idea that gamification provides students an extra sense of engagement with class material.

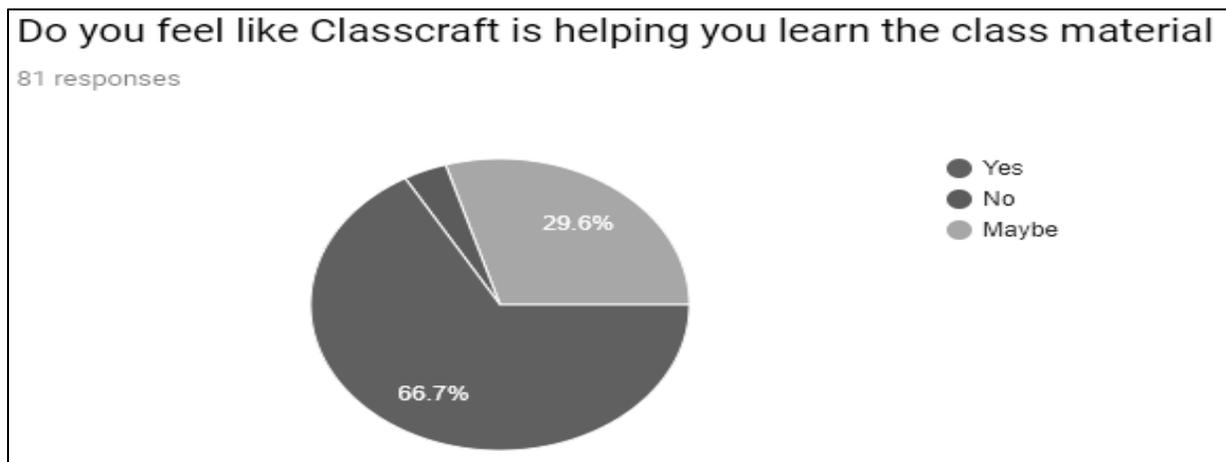


Figure 3. Deciphering Between Playing and Learning.

Figure 3's question pertains to the idea that gamification may just have the engagement within the game itself and not the class material. Being able to imbed both the gamification elements and have class material presented is essential to ensuring the students are getting the information they require for mastery. It is interesting to notice the shift downward from "Yes" in Figure 3 compared to Figure 2 and the rise in "Maybe." There is a notable decrease that needs to be addressed because it seems that students are not as sure if the material is being learned or not although 67% of students still believe that they are being helped by this strategy. There is one additional observation regarding how many students picked, "No" for this question. It is less than 4% of the respondents that believe it is not helping, which coincides with Figure 1's data that students prefer to want to keep gamification around regardless of if it is helping or not.

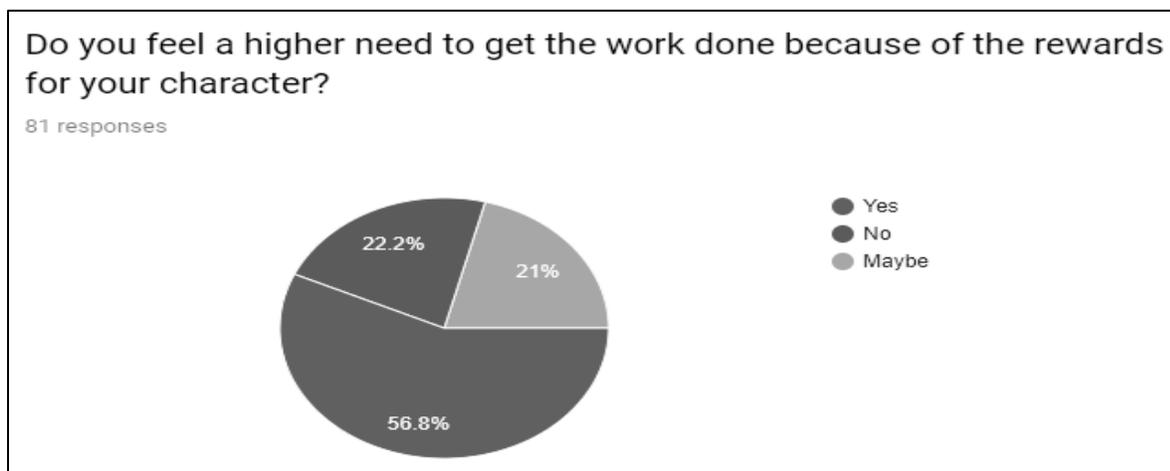


Figure 4. Extrinsic versus Intrinsic Motivation.

This question presented to the students was because of what was uncovered within the review of the literacy regarding this topic. Studies have shown that students become too extrinsically motivated from gamification because what they do in class is not for their own personal knowledge, but rather a reward for their virtual character (Alsawaier, 2018; Byl, 2013; Gerber, 2017; Kim, 2015). The findings show that over half of the students in the gamified classroom feel a greater desire to do work because they want their character to be successful with

22% indicating it does not make a difference and 21% unsure if it's a reason. The importance of this evidence is that although students seem to want to work on the material for their character, they are still in turn working on the assignments that will help them with the class learning targets. This motivation is found in most students in the gamified classrooms, so the class culture is defined by a mutual understanding of care to one another's game avatars.

Discussion

Summary of Major Findings

The data recorded in this study finds that there are no significant changes to student proficiency when they are placed within a gamified environment compared to a classroom where the same information is being presented in a non-gamified setting. This was concluded through formative and summative assessments created by my curriculum team that was given to all students in the same way. Looking at the data for each test, there are fluctuations of the test scores, and some classes have consistently higher scores, but they are spread out amongst the classes in such a way that shows it is not because of gamification that this is the case.

The data that was recorded regarding classroom engagement and the effects of gamification does show promise according to survey data that was given to the students participating. I created a google form survey that was voluntarily taken by the student participating and it found that students enjoyed the new learning strategy. Each question received high marks in engagement level, enjoyment, and classwork understanding. Having 7th grade students amassing to nearly 80% positivity (Figure 2) shows that they did like the strategy for class, and it helped them stay engaged with the material.

Overall, although the strategy did not show high marks in the most critical piece of schooling with student proficiency, it is a promising note to see that student enjoy this style of learning and there are positives that go along with it that the non-gamified classes did not get to partake in. The student collaboration part that gamified classrooms bring and the comradery toward the material assisted in that engagement piece to the curriculum and students react positively each time they enter the classroom when they log in to their computers to check out their avatars. They like the class much more just because they find value in the new strategy.

Limitations of the Study

There are limitations to the study that may have an impact on the scores and if corrected could assist on student proficiency. This study was done at the beginning of the school year and the scoring was completed when students were still getting acquainted with one another. This may have had an impact on the grades since it took more class time to allow the students to know their teams better and the user interface of the game Classcraft. Since students not only needed to understand the basic functions of the class like google classroom and their Chromebooks, but also Classcraft, this may have formed a learning curve that would take time for the students to master including their required classroom material.

Also, the inability to acquire Chromebooks everyday inhibits the full capabilities of the gamified experience. Students that do not have technology at home are also impacted because they do not get to access as much as those that do with the availability of the program anywhere. If a school was a 1:1 with students and technology, and students were able to access information equally, the studies findings may have changed.

Further Study

This study should be elongated to the entire school year to establish the full feel of the program. An educator also needs to consider how long it will take them to learn the program as well and over time develop lessons and improve their pitch to the students. Perhaps the student proficiency graph bends upwards over time as the students become better acquainted with the programming and the technology over time. It would also be beneficial to see where gamification goes in the upcoming years when technology becomes more widely available to all students in families. Future studies should experience a gamified classroom with their students because there is much opportunity for growth in this field based on the data gathered.

Conclusion

Technology has been rapidly increasing over the last decade and it has found its way into school faster than ever (Montrieux, et al., 2015). Students are changing along with this increase and have been becoming much more accustomed to living with technology and understanding its functions; in many cases even faster than the teachers (Ruggiero & Mong, 2015). As educators of the next generation of technology-based students, there needs to be a shift from the brick and mortar classroom setting or students will just become disengaged and unwilling to learn because it is just something that they do not believe they will ever need in their tech-driven lives (Montrieux, et al., 2015). Educators need to find ways to incorporate their standards in new learning models that involve technology before these ways become outdated and student engagement is lost (Seglem & Bonner, 2016).

There are strategies and avenues that have been attempted and are becoming more mainstream by the day, one of them being the concept of gamifying the classroom to assist students in making learning something they find more engaging. Being able to change a class in such a way that it feels more like a game could transform the educational landscape and allow students who normally would not enjoy school to find renewed passion with the walls. The more students get used to gamified systems in their schools, there is a chance that student proficiency could then increase from the new strategies as well. Gamified interfaces such as Classcraft are the forefront to a new concept that makes school relatable and fun for students. If a student is engaged in class, there is a much higher chance that student will become more proficient in what is being taught.

The future for gamification is shown through the advancement of technology and there should be ongoing research within this area of education as new access becomes available for

future students. Researchers should study the effects of gamification on schools with 1:1 ratio of technology per student as there may be a difference compared to schools that do not have the resources yet. When a student has equal access to technology compared to their classmates, it could impact their drives in a gamified setting. In addition, researchers should also be seeking new, innovative ways to apply gamification to students in order to find the strategies that increase student achievement. Since it has been shown that gamification can be used to increase engagement in the classroom, there also needs to be a pull towards trying to increase proficiency. This could be possible when technology access allows it, but it needs to be studied in order to develop consensus that gamification is a viable strategy in the classroom.

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