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## Gamification, Game-Based Learning, and Student Engagement in Education

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Gamification, Game-Based Learning, and Student Engagement in Education

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## Abstract

Over the past few years the application of educational technology in the classroom setting has been increasingly popular. Educators at all levels, primary, secondary, and post-secondary have been exploring best practices in the use of educational technology and the impact that educational technology has on student learning. Many educators have explored the idea of gamification and game-based learning in their classrooms to improve student learning and student engagement. Using technology to create a gamified or game-based learning shows positive results and has fostered an environment that encourages students to collaborate with their peers, engage with content material, and stay motivated to learn. The use of leaderboards and badges along with other game elements contributes to an enjoyable learning environment for students. Gamification and game-based learning increased students' engagement, self-efficacy, and enjoyment of learning.

*Keywords:* gamification, game-based learning, student engagement

## **Chapter One: Introduction**

In recent years there has been eagerness in the education world around gamification and game-based learning (Buckley & Doyle, 2016). Roy and Zaman (2018) summarize gamification in education as the use of different game components to increase student engagement. Game-based learning is a form of learning that includes different learning activities and motivational elements. Educators have been looking for ways to combine best educational practices with components of these games to help increase student engagement in the classroom. “The problem of education is that we must convert student extrinsic motivation into intrinsic in order to increase student self-efficacy to explore, participate and to reach true knowledge gain and nurture new innovative thought” (Bandura, Freeman, & Lightsey, 1999, p. 292). Intrinsic motivation is the feeling of engagement when an activity is performed. Extrinsic motivation is the feeling that originated outside of the activity (Roy & Zaman, 2018). Educators have experimented and explored gamification and game-based learning in their classrooms to help students convert extrinsic motivation into intrinsic motivation to increase student engagement.

### **Problem Statement**

The implementation of gamification and game-based learning may pique interests of students, but are the strategies effective in engaging and motivating their learning? Gamification is not for entertainment purposes but rather for the experience to improve the learner’s retention.

The eight elements of gamification used in learning are rules, goals, outcome, feedback and rewards, problem solving, story, player(s), safe environment, sense of mastery (Faiella & Ricciardi, 2015). Game-based learning has been referred to as the borrowing of a game’s principles and applying them to real world situations to engage the user. This learning was not

created as games just for students to play, but rather the design of learning activities that introduced concepts and guided students to a learning objective (Pho & Dinscore, 2015).

Gamification and game-based learning has incorporated an important aspect of game mechanics. Game mechanics are the tools that spark a meaningful learning experience when used correctly. Designing games requires creators to keep in mind the user engagement, motivation and achievement. Different approaches will change based on the educational setting and learning targets. Game-based learning implemented the foundational way games have been played throughout history such as experience, game mechanics, structures and strategies (Plass et al., 2015).

The purpose of the study is to understand the concepts of gamification and game-based learning and how the best practices relate to engagement and challenges in students learning. Educators benefit from understanding the elements that exist in gamification and game-based learning.

### **Importance of the Study**

Technology has played an important role in the education system and has shifted the ways educators provided content and the way students learn. Information has been made readily available to students by a simple Google search. As a result, educators have been able to alter their teaching by focusing on soft skills to allow students to become lifelong learners. If gamification and game-based learning enhance students' engagement, they should be used in the classroom.

### **Background of the Problem**

The use of technology plays an important role in implementing and creating game-based learning and gamification units in the classroom. Technology is a valuable tool to create a

platform for the teachers to use, as well as allow them to provide assessment and feedback in a timely manner (Zainuddin et al., 2020). It can also help students organize information and allow teachers to set up and keep track of gamification and game-based learning elements such as leader boards, badges, experience points, guilds, onboarding, achievements, power or level ups, quests, items, skills, currency, punishments, trades and special challenges (Matera, 2017).

Technology is an essential tool in gamification and game-based learning.

Gamification and game-based learning must be about the process of learning. Students must be engaged and motivated to solve problems. In education, motivation is considered a key determinant of learning. It is used to explain the attention and effort students dedicate to particular learning activities (Brophy, 2013). For this reason, part of the role of the teacher is managing learner motivation. In most circumstances, the objective is to increase motivation levels with a view to engendering positive outcomes, such as increased effort, persistence and enhanced performance (Buckley & Doyle, 2014). If gamification and game-based learning provide positive results in student engagement and are effective in student learning, students should gain knowledge on the content that is being taught.

### **Research Question**

In what is known about how children learn, how shall educators' best teach to utilize and implement technology to enhance student engagement? Gamification and game-based learning may be the answer. This leads to the research questions:

RQ1: What are the best practices of gamification and game-based learning in K-12 education to engage students?

RQ2: What are the challenges when implementing gamification and game-based learning?

## **Limitations**

A limitation for the researcher is the number of participants that will be able to be interviewed. COVID-19 has caused teachers to teach in-person and virtually. Teachers are not given a lot of prep time due to COVID-19 restrictions. They do not have the time to participate in a research study, and the lack of in person teaching due to COVID-19 is a limitation.

## **Definition of Terms**

**Gamification** is the process of adding games or game like elements to something (such as a task) so as to encourage participation (Merriam-Webster, 2021).

**Game-Based Learning** is learning that is facilitated by the use of a game (Whitton, 2012).

## **Summary**

As education has shifted towards developing lifelong learners, the process of learning has changed. Educators have begun to create new opportunities for students to learn new skills with their peers. Gamification and game-based learning has game elements and components involved that have allowed development of skills necessary to become a twenty-first century learner. Through such opportunities, students have been motivated to take leadership in their own learning. If gamification and game-based learning has a positive relationship on student engagement then educators should use these teaching methods and strategies in their classroom.

This paper has five chapters. Chapter one introduced gamification and game-based learning. Chapter two discusses the literature review of gamification and game-based learning on student engagement and challenges in an educational setting. Chapter three discusses the research methodology, while chapter four provides the results from the interviews. Lastly,

chapter five provides the conclusion and implications of the research findings on educational practices.

## **Chapter Two: Review of the Literature**

The thought of gamification and game-based learning puts a smile on people's faces and having a good time in people's minds (Yildirim, 2017). When research was collected on the effect of gamification and game-based learning on student engagement in education, primary variables examined included students from differed from age levels and grades. The purpose of this study is to understand the concepts of gamification and game-based learning and how the best practices relate to engagement and challenges in students' learning. The literature reviewed examined how game-based learning, gamification, engagement, enjoyment, collaboration, and use of leader boards and badges have an influence on student engagement in K-12 education.

### **Historical Overview of the Problem**

The basic concept of gamification is not new, but the word itself is a 21st-century addition to the English language (Wright, 2010). The word refers to the incorporation of game elements, like point and reward systems, to tasks as incentives for people to participate. Gamification is about making something potentially tedious into a game (Merriam-Webster, 2021). Gamification is effective because it taps into people's natural desires for competition and achievement.

Many schools districts technology is advancing and they are starting to transition to digital curriculum. Game-based learning is suited to take advantage of a digital curriculum. Game-based learning is an environment where game content and game play enhance knowledge and skills acquisition, and where game activities involve problem solving spaces and challenges that provide players/learners with a sense of achievement (Nadolny et al., 2020).

The skills used in game-based learning and gamification are like those in skills that students need to help them be successful. The four skills are communication, critical thinking,

collaboration and creativity (Magilvy, 2011). Educators have targeted these skills for years and matched them with learning objectives to create meaningful learning experiences for their students.

With technology playing an important part of education, it has changed the way teachers provide lessons, content, and curriculum (Whitton, 2012). Educators have had to alter their teaching to allow students to become lifelong learners. Students exposed to gamification and game-based learning had significantly better academic achievement and attitudes towards learning than students who used traditional methods. Properly designed educational games were beneficial to students' engagement, concentration and aspects of trial and error (Partovi & Razavi, 2019). Gamification improved the creativity and classroom management of elementary students. Students had a positive learning experience, enhanced class participation and challenged students to think about the unknown (Chen et al., 2020).

If gamification and game-based learning increase students' engagement, they should be used in the class. Nevertheless, if there is not a great connection found between gamification and game-based learning with student engagement educators are not validated in using these practices in their classrooms.

### **Theoretical Framework**

Theory is used in qualitative research to provide an overarching lens for the researcher to view behaviors and attitudes of groups of people. A theoretical perspective shapes the questions that are asked in research and impacts how data is collected (Agee, 2009). In qualitative research, the use of a theoretical lens also guides the researcher to determine which issues are important to explore.

The theoretical framework for this research study is the connectivism learning theory. The learning theory claims individual's knowledge is distributed and resides not only in the brain, but also in connections with electronic and human components which the learner has developed in the course of his learning. Connectivism is a meaningful learning process that requires a network environment that is open to interactions at varying levels of intensity (Siemens, 2005).

Connectivism is characterized as the enhancement of how a student learns with the knowledge and perception gained through the addition of a personal network (Siemens, 2004). It is only through these personal networks that the learner can acquire the viewpoint and diversity of opinion to learn to make critical decisions. Since it is impossible to experience everything, the learner can share and learn through collaboration. Explaining learning by means of traditional learning theories is severely limited by the rapid change brought about by technology. Connectivism is defined as actionable knowledge, where an understanding of where to find knowledge may be more important than answering how or what that knowledge encompasses (Duke, 2013).

### **Best Practices with Gamification and Game-Based Learning**

Lack of engagement has been found to be a widespread problem for students in schools (Sanchez, 2019). Traditional strategies have been ineffective in mitigating this issue and have failed to bring about student engagement in learning (Seixas, 2019). Gamification has become a growing trend in education as a novel approach to student learning. When implemented properly, it has been found to increase student engagement. Gamification has enhanced teaching methods by facilitating learning, improving participation and expanding knowledge (Zainuddin et al., 2020). The review of the literature examined how gamification and game-based learning have

influenced student engagement with the best practices of leaderboards, collaboration, and enjoyment. Along with challenges of gamification and game-based learning.

### ***Leaderboards***

Leaderboards and badges have been an effective way to implement gamified tasks. While they are not the only tools in gamification, the competitive nature of these elements is particularly engaging. The achievability of badges and spots on the leaderboards provided motivation for even low performance task problems (Landers et al., 2014). Leaderboards and badges directly changed the gameplay and students' perception that they were performing better in game. As a result, students' effort levels increased both in game and in education (Park et al., 2019).

Research and numerous successful implementations have demonstrated several advantages of leaderboards with gamification and game-based learning. Leaderboards are frequently used to engage the user and subsequently increase time-on-task (Landers, 2015). Leaderboards provide entertainment, a sense of accomplishment and memories which link play events to specific rewards (Wang, 2011). Leaderboards can serve as a motivator as learners see that their work is recognized and increase overall participation (Scales et al., 2016). Leaderboards provide specific goals for the player to reach and they help increase performance over time (Mekler et al., 2013). This can be further amplified as leaderboards influence the perception of progress within educational videogames by mapping progress and inciting actions (Fels, 2013). Thus, leaderboards do not only provide motivational goals which might help to complete learning tasks, but also motivate the player to take actions within early stages of the process if the performance is not perceived as sufficient (Domínguez et al., 2013). Players who are not able to master the game can try to increase their personal best in order to maintain

motivation to work with the educational material. Finally, it is suspected that leaderboards affect motivation, post-test performance and behaviors through the process of competition (Simões et al., 2013). This might further increase interest, enjoyment, excitement and involvement (Clarebout, 2013).

### ***Enjoyment***

The research showed that gamification had a positive impact on students' attitudes towards lessons and engagement but the effects were limited due to the short-term nature of gamification studies (Yildirim, 2017). Students had a common positive perception of the gamification procedure and the elements promoted positive emotions towards the game mechanics (Yildirim, 2017). Students showed positive attitudes towards gamification strategies and wanted more lessons to be taught in this way. Students enjoyed using a gamification learning strategy and it increased student engagement, cognitive loads and achievement levels (Turan et al., 2016). Implementing game-based learning provided students with engaging learning experiences in an interactive manner. Game-based learning allowed students to have freedom on tasks, increasing student interest and engagement and avoiding negative emotional experiences (Taub et al., 2019).

### ***Collaboration***

Gamification as a twenty-first century instructional skill proved to be an influential tool that has allowed students the opportunity to collaborate. It has increased student engagement and provided fun classroom activities that kept students engaged and motivated to work together to learn (Zainuddin et al., 2019). There were four main reasons found for why teachers have incorporated gamification into their teaching. The first reason was that it inspired students to learn together. The second reason was that it created interactive lessons in which students were

encouraged to fully understand the material within their group. The third reason was that gamification facilitated student learning. Finally, it captured students' attention (Mena & Perreno, 2017). Gamification encouraged students to collaborate more than students who did not have the opportunity to use gamification strategies (Chen et al., 2019).

### *Challenges*

Once games are fully integrated into the system, the difficult part is to achieve a balance between normal assignments, in-class instructions, and games. The new trend of interactive educational games is to integrate learning and fun, this method could possibly lead to over-reliance. Once students do not have the privilege of using games to learn, they could potentially experience a loss of focus (Faiella & Ricciardi, 2015). Games are still in its early stages of development, therefore as much as the benefits are apparent, it is difficult to predict the long-term learning outcomes due to the lack of empirical data to back and support game-based learning (Landers et al., 2014). The efforts that parents, teachers and educators still put in may not be worth it (Livingstone, 2011). Competition may just act oppositely to what is originally expected because students may lose motivation to actually learn the material when they are so focused on winning (Yildirim, 2017). Losing in a game can perhaps not trigger motivation to learn and repeat the levels and only serve to lower self-esteem.

Another challenge of game-based learning is implementing various technological tools into the classrooms. Teachers feel inadequately prepared for the task and thus avoid using any tools, relying instead of the traditional approach. One of the more well-known problems that teachers often face is the lack of computers at school or at home and a lack of sufficient access to other types of technology (Smerdon et al., 2000). Although this problem can be averted by supplying teachers with the necessary technology, certain types of technology will still remain

unavailable to them due to higher costs or the difficulty in keeping up to date with the advancements in technology. Another more common problem is the lack of time to plan classes using these new technological tools or to explore new tools in your own free time in order to understand their functionality (Wood et al., 2005). Although time management is always an issue when it comes to planning or learning new things, understanding these technological tools and most importantly being able to use them may help the teachers facilitate their own classroom management and class preparation later on. In other words, the initial time investment required to become sufficient at using new technological tools will pay dividends in time and will potentially save a lot more time in the future. For the most part, teachers should already be aware that the best way to learn is by doing and that practice makes perfect. Furthermore, Ertmer (1999) discovered that certain teachers are innately resistant to change and are passive toward various technological changes that are constantly happening around them. Although stubbornness to change is difficult to overcome, it is school's responsibility to ensure that all of the teachers get adequate training in using all the necessary tools and that the teachers are at least willing to try a new approach. On the other hand, schools may become complacent in using a traditional teaching style or may contain several teaching styles, not supporting any one of them specifically (Yildirim, 2017). With the amount of various technological tools available today, it is quite likely that a brief search on the Internet will uncover at least one way of adapting gamification and game-based learning for any sort of a classroom.

### **Summary**

Throughout chapter two game-based learning and gamification were studied to determine the best practices on student engagement. Chapter three discusses the research methodology.

Chapter four provides the results from the interviews. Lastly, chapter five provides the conclusion and implications of the research findings on educational practices.

### **Chapter Three: Research Methodology**

The purpose of this study is to understand the concepts of gamification and game-based learning and how the best practices relate to engagement and challenges in students learning. The following sections describe the research design, setting, data collection and data analysis.

#### **Research Design**

A qualitative research approach was used in this study to gain a better understanding of best practices and challenges of gamification and game-based learning when implemented in K-12 education. Qualitative research aims to understand the meaning and experience of human lives and social worlds (Fossey, 2002). Past experiences and feelings are brought into the qualitative research setting (Thomas, 2011). Qualitative research is centered on the how and why of a particular issue, process, situation, subculture, scene or set of social interactions (Dworkin, 2012). Interviews with teachers were used to answer the research questions. De Fina (2011) discusses that the reputation of interviewing as a method of data collection is a recognized fact.

#### **Sample and Setting**

While the target population for this research study was educators, the sample for this study was comprised of seven teachers in K-12 who have used gamification and game-based learning. Participants teach at elementary, middle school, and high school grade levels, and had at least five years of experience of educating using gamification and game-based learning.

The researcher selected participants by purposeful sampling. The sample size used in qualitative research methods is often smaller than that used in quantitative research methods (Fossey, 2002). Qualitative research methods are often concerned with collecting an in-depth understanding.

The researcher recruited participants at the school district he is employed at. The school district is located in the Midwest. It has five schools and 2,108 students in grades K-12 with a student-teacher ratio of 16 to 1. The interviews were done through face-to-face and Zoom depending on what COVID-19 protocols were in place during the time of the interviews.

### **Instruments**

The instrument used in this qualitative research will be interviews. The interviews with seven teachers will be used to answer the research questions to find out the best practices of gamification and game-based learning in K-12 education to engage students and challenges when implementing gamification and game-based learning. Participants in the interviews will be given the informed consent information and will be asked a series of open-ended questions (see Appendix A). The interview questions were derived by the best practices from the literature review.

### **Data Collection**

Interviewing is one of the most common methods for collecting data in qualitative research. Interviews allow participants to provide substantial, contextual experiences of events (Bryne, 2001). Each interview lasted between fifteen minutes and twenty-five minutes. The recorded and transcribed narrative does not include any identifying information. The participant's identity was kept anonymous by using a coding system. The first participant was coded as participant 1, and the pattern followed throughout the remaining interviews. Open-ended interview questions were used to give participants an opportunity to explain experiences and challenges of gamification and game-based learning. Data gathered will be stored on a password protected computer with access by only the principal investigator.

Because the research process for this study involved collecting information from teachers, the principal researcher sought approval from the International Review Board (IRB) before the data collection process began. The study was approved by the IRB and given an “Exempt” status.

### **Data Analysis**

The process of data analysis in qualitative research seeks to combine all data collected and identify coherent themes or patterns that address the area of inquiry. After all data was collected for this study, data analysis was completed by the researcher. The process included transcribing interviews, coding the interview data, organizing data into categories, and identifying common themes and patterns.

Thematic Analysis is an accessible, flexible, and increasingly popular method of qualitative data analysis. Learning to do it provides the qualitative researcher with a foundation in the basic skills needed to engage with other approaches to qualitative data analysis (Braun & Clark, 2012). Thematic analysis is a method to figure out themes from transcribed interviews.

In the data analysis process, it is the researcher’s responsibility to ensure that all data are disclosed truthfully, even data that may be opposite to the researcher’s beliefs or dispositions. The researcher analyzed all data equally so that the results accurately represent the experiences of participants that have used gamification and game-based learning.

### **Summary**

A qualitative research approach was used in this study to explore and develop an understanding of best practices and challenges of gamification and game-based learning when implemented in K-12 education. Interviews were conducted with seven participants who use

gamification and game-based. Data collected through interviews will remain confidential.

Chapter four will summarize the interview results.

## **Chapter Four: Results**

The purpose of the study is to understand the concepts of gamification and game-based learning and how the strategies relate to engagement and challenges in students' learning. Data analysis included transcribing all interviews, reviewing the interview transcripts for themes, coding the data, and writing up the results. To identify emergent themes that represent findings, the researcher coded all data. The process used by the researcher to code the data included reading each transcript thoroughly, returning to transcripts to identify main themes in each, and subsequently grouping the identified themes to create overarching rich themes. Each interview transcript is stored in an individual file on a password-protected computer.

### **Demographics**

Seven educators participated in this research study. Five of the participants were male and two of them were female. All participants were located in a rural Midwest school district. Of the seven participants there were five elementary, one middle school, and one high school teachers. Experience ranged from two to six years using gamification and game-based learning. The technology platforms that were used were Kahoot, Google Slides, Quizizz, and Blooket.

### **Data Analysis**

Interview questions 1, 2, 3, 4 and 5 were synthesized to answer the first research question, -

“What are the best practices of gamification and game-based learning in K-12 education to engage students?” Below is the results by each interview question.

***Interview Question 1: Please tell me a little bit about your experience in gamification and game-based learning?***

In response to IQ1, six of the seven (86%) teachers suggested that students like to compete against classmates. Subject 4 was excited when he stated:

I liked using gamification in my classroom because students would typically be more engaged than traditional learning. It also can act as a motivator because student like to compete against one another or challenge themselves to get through the game.

Twenty-nine percent of the respondents indicated that students progressed at their own pace.

***Interview Question 2: How are the students more engaged in gamification and game-based learning vs traditional practices?***

In response to IQ2, four of the seven (57%) participants reported that gamification and game-based learning brings out teamwork. Subject 1 provided this point of view:

In my experience the best part of gamification is the teamwork between students. It eliminates behavior problems and keeps kids on task. It also increases student achievement and student engagement. I believe gamification gives kids the incentive to participate in something they may not otherwise want to participate in.

Twenty-nine percent of the participants stated that game factor keeps students more engaged in game-based learning.

***Interview Question 3: What have you used for leaderboards for gamification and game-based learning?***

In response to IQ3, five of the seven (71%) educators have used individual leaderboards to track progress. Subject 4 expressed:

When doing gamification I have reward students for their individual progress, but also have given rewards for leaders of the entire classroom. Not all learners are the same ability so I try to make each student be as successful as they can by giving them different ways to earn rewards.

Twenty-nine percent of the subjects stated that they use candy prizes for rewards when students complete certain steps.

***Interview Question 4: What are some ways you have made gamification and game-based learning more enjoyable for students?***

In response to IQ4, four of the seven (57%) participants used current trends to make gamification and game-based learning more enjoyable. Subject 3 stated:

I have found that the most enjoyable gamification units for kids are the ones that have current trends tied in. This could be things like Fortnite, Among Us, football, and so on.

Twenty-nine percent of the participants said they make game-based learning more enjoyable by using it for review.

***Interview Question 5: How do the students collaborate in gamification and game-based learning?***

In response to IQ5, six of the seven (86%) teachers suggested that having students work in partners or groups help the students learn from each other and share ideas. Subject 2 provided this view:

I have students work in groups for the review games. They work with each other. One student might record answers, one might consult notes. They all have different jobs.

Twenty-nine percent of the subjects expressed that students collaborate by developing a plan when using game-based learning.

Table 1 summarizes the best practices for gamification and game-based learning.

**Table 1: Best Practices of gamification and game-based learning**

Themes	Percentages
Competition	86%
Partners	86%
Individual leader boards to track progress	71%
Current trends	57%
Teamwork	57%

Interview questions 6 and 7 were synthesized to answer the second research question,

“What are the challenges when implementing gamification and game-based learning?”

***Interview Question 6: What challenges have you faced when implementing gamification and game-based learning?***

In response to IQ6, four of the seven (57%) teachers stated that students get too competitive.

Subject 1 was frustrated when she claimed:

The biggest issue that I have run into are kids not wanting to accept that they have lost, especially our special needs kids. However, this is another great learning lesson in resilience.

Three (43%) participants said that time management is difficult for some students. Subject 3 stated:

The biggest challenge with gamification is the initial setup. It can take a long time to find and adapt to resources. I am not really a techy person so I find that it takes me longer to do the setup. Also, kids that have time management difficulties can be hard to juggle.

***Interview Question 7: How have you overcome these challenges?***

In response to IQ7, five of the seven (71%) educators have used coping skills to overcome students who are too competitive. Subject 2 pointed out that:

I continually remind that it's a learning opportunity more than just a game. The kids need to internalize that or it becomes a waste of time. I also have pretty firm rules and engagement expectations that help things go smoothly.

Twenty-nine percent of the participants set rules and guidelines to overcome the challenges of game-base learning.

Based on the results, the challenges of gamification and game-based learning are students getting too competitive and students who struggle with time management.

### **Summary**

In conclusion, the gamification and game-based learning approach in the classroom has increased students' engagement. These approaches have heightened students' ability to stay engaged with their learning and collaborate with their peers with the use of leaderboards and badges. Some challenges are students getting to competitive or struggling with time management. The final chapter examined how the research completed should impact instructional practices and how gamification and game-based learning are applied in the classroom.

## **Chapter Five: Discussion and Conclusion**

The purpose of this study is to understand the concepts of gamification and game-based learning and how the best practices relate to engagement and challenges in student's learning. Gamification and game-based learning approach in the classroom has increased students' engagement. These approaches have heightened students' ability to stay engaged with their learning and collaborate with their peers with the use of leaderboards and badges. While additional research still has to be done, there were positive impacts of gamification and game-based learning in the classroom. The final chapter will present the theoretical connection and conclusions of this study, discuss implications in leadership, and provide recommendations for future research.

A qualitative research approach was used in this study to gain a better understanding of best practices and challenges of gamification and game-based learning when implemented in K-12 education. Previous chapters discussed background information on game-based learning, the research questions and methodology, and the findings of the study. Chapter five will present the theoretical connection and conclusions of this study, discuss implications in leadership, and provide recommendations for future research.

Interviews with teachers were used to answer the research questions, which provided the best practices of gamification and game-based learning relating to engagement and challenges in student's learning. The research questions guiding this study were the following:

RQ1. What are the best practices of gamification and game-based learning in K-12 education to engage students?

RQ2. What are the challenges when implementing gamification and game-based learning?

Data collection was performed through face-to-face interaction and Zoom depending on what COVID-19 protocols were in place during the time of the interviews, and the researcher used thematic coding to analyze the data. Four themes emerged for RQ1 (1) competition against classmates, (2) individual leaderboards help to track progress, (3) current trends, and (4) students working with partners or groups. Two themes emerged for RQ2: (1) students get too competitive and (2) time management is difficult.

### **Theoretical Connection**

Connectivism Learning Theory served as the theoretical framework for this qualitative study. The theory claims individual's knowledge is distributed and resides not only in the brain, but also in connections with electronic and human components which the learner has developed in the course of his learning. Connectivism is a meaningful learning process that requires a network environment that is open to interactions at varying levels of intensity (Siemens, 2005).

Various participants identified that gamification and game-based learning helps students learn the same concepts as a traditional lesson, but adds a fun factor. In line with the beliefs of Connectivism, student learns with the knowledge and perception gained through the addition of a personal network understanding (Siemens, 2004). It is only through these personal networks that the learner can acquire the viewpoint and diversity of opinion to learn to make critical decisions. Gamification has enhanced teaching methods by facilitating learning, improving participation and expanding knowledge (Zainuddin et al., 2020). For example, Subject 5 discussed how students love having the freedom to experience learning on their own terms. Kids enjoy learning on their devices and if one uses the current trends it enhances the students' knowledge. Subject 3 stated how students make great growth because the game factor is so engaging that they are much more invested.

Several participants also identified that networking with other students improves learning and engagement, due to the fact students can share ideas and learn from each other.

Connectivism is a networked group effort where learning is a process of connecting people and information. While Duke (2013) found that it is impossible to experience everything, the learner can share and learn through collaboration. Subject 6 discussed how the students are in groups and help each other. When the students finish the unit, they get to be leaders, helpers, and coaches. This drives the students to help each other out and learn different things. Subject 1 discussed how teamwork in game-based learning gives the kids an incentive to participate in something that they might not want to participate in. Even though it is a team effort, it also tests individual knowledge and gives the power to the students to learn new concepts. Both Subjects 1 and 6 expressed that students are more willing to work together and help each other complete tasks in game-based-learning. Most students can relate to some type of game or interest, which makes the kids more engaged.

### **Research Question 1 Discussion:**

Based on similar responses and meaning from the participants, themes were identified and grouped together for each of the two research questions. Four themes emerged for RQ1, “What are the best practices of gamification and game-based learning in K-12 education to engage students?”: competition against classmates, individual leaderboards help to track progress, current trends, and students working with partners or groups.

#### ***Theme 1: Competition against classmates***

The competition of game-based learning affects motivation, post-test performance and behaviors (Simões et al., 2013). This increases interest, enjoyment, excitement and engagement. In addition, using gamification and game-based learning in the classroom can create a

competitive atmosphere for students to intrinsically motivate themselves in their learning.

Competition can be positive when it comes to student engagement (Yildirim, 2017). Students want to play and learn with friends. Students are engaged and want to beat classmates in game-based learning. Six participants in this study identified that competition with classmates' helps students go above and beyond. Interview questions associated with the emergent theme were the following:

Select discussion relevant to this question include:

Participant 1: It is common practice in elementary music to teach the kids through movement and music. Because folk music was created to pass the time in families, most songs create a partner or full group game. It is also common when learning the 4<sup>th</sup> grade curriculum to use karate belts. With this system in place it provides a competitive edge for those wanting to go above and beyond, but it also lets the lower end of students to progress at their own pace. I use gamification to experience new concepts and review old concepts. It gives me a great perspective on who is still learning the curriculum and who understands it.

### ***Theme 2: Individual Leaderboards Help To Track Progress***

For gamification and game-based learning to be effective, teachers must use different game elements that encourage engagement, enjoyment, and student collaboration. Such game elements could include leaderboards and badges. Leaderboards provide specific goals for the player to reach, and they help increase performance over time (Mekler et al., 2013). This can be further amplified as leaderboards influence the perception of progress within educational games by mapping progress and inciting actions (Fels, 2013). Leaderboards provide motivational goals which might help to complete learning tasks, and motivate the player to take actions within early stages of the process if the performance is not perceived as sufficient (Domínguez et al., 2013). Teachers can use leaderboards to see which students are successful and which students need additional help. The teacher can work individually with the struggling students or have the students who are successful work with the kids that need help. Five participants in this study

identified that individual leaderboards tracks students' progress. The findings of this study in gamification and game-based learning align with the research completed in other sectors.

Select discussion relevant to this question include:

Participant 1: I have used gamification in the form of leaderboards when we are prepping for a concert. Each grade level and class earns a certain number of points by following specific criteria. The class with the most points then wins a class party. I have also used charts to have the students track individual progress and create learning goals. I have also used rewards in the form of colors for students to level up to the next level where they can work at their own pace.

### ***Theme 3: Current Trends***

Gamification has a positive impact on students' enjoyment towards lessons and engagement (Yildirim, 2017). Students show positive attitudes towards gamification strategies and want more lessons to be taught in this way. Gamification is a learning strategy and has increased student engagement, cognitive loads and achievement levels (Turan et al., 2016). Game-based learning engages students' interests, gives freedom on tasks, and avoids negative emotional experiences (Taub et al., 2019). Teachers need to adapt to what the kids know and like. Using current trends enhance the classroom environment. A welcoming classroom makes learning enjoyable. Students are more engaged when they are learning about topics they enjoy. This emergent theme was identified by four teachers in this study during the interviews.

Discussion relevant to this question include:

Participant 4: First, I try not to overuse gamification so it is something they look forward too. Second, I try to use different platforms and tie it to different subjects. I feel it is also important to make the challenges different. I have also given students choice and gear it to their interests.

### ***Theme 4: Students Working With Partners or Groups***

Gamification and game-based learning increased student engagement and provided fun classroom activities that kept students engaged and motivated to work together to learn (Zainuddin et al., 2019). Teachers have incorporated gamification into their teaching to inspire

students to learn together, create interactive lessons in which students are encouraged to fully understand the material within their group, and capture students' attention (Mena & Perreno, 2017). Students enjoy being with friends at school. Kids can help their partners learn and are comfortable asking for help. Teachers can put students in groups based on learning ability. This enhances student learning and engagement when kids are in groups. This emergent theme was identified six educators in this study during the interviews.

Discussion relevant to this question include:

Participant 1: In my experience the best part of gamification is the teamwork between students. It eliminates behavior problems and keeps kids on task. It also increases student achievement and student engagement. I believe gamification gives kids the incentive to participate in something they may not otherwise want to participate in. It also provides me with an easy way to test student progress and see which concepts we need to repeat. Not only do we learn games to study different concepts but we also use them for review. One of the games we use for review and music vocabulary is sink or swim. There are two teams that answer questions against each other. Even though it is a team effort to win, it also tests individual knowledge and gives the power to students to sink the kid that knows the most just to win the game for everyone.

## **Research Question 2 Discussion**

Based on similarity of responses and participants' meaning, themes were identified and grouped together for the second research questions. Two themes emerged for RQ2, "What are the challenges when implementing gamification and game-based learning": students get too competitive and time management is difficult.

### ***Theme 1: Students Get Too Competitive***

The consequences of competition may act opposite to what is originally expected because students may lose motivation to actually learn the material when they are so focused on winning (Yildirim, 2017). Losing in a game can decrease motivation to learn by making it difficult for students to repeat the levels. In turn, this may contribute to lower self-esteem. Students do not like to lose to classmates when they play games. When students lose, they sometimes get angry

and not want to play anymore. This behavior will decrease student engagement. In addition, kids work fast through the material to try to win instead of taking the time to learn. Four participants in this study identified that students can get too competitive during game-based learning.

Interview questions associated with the emergent theme were the following:

Select discussions relevant to this question include:

Participant 6: Honestly, just sometimes kids get too competitive. There is one kid in my class that does not handle losing well at all and will freak out. A majority of the kids enjoy it and have fun though. When students get a bad attitude because of the competition I sometimes threaten them by going back to pencil and paper, this usually helps.

### ***Theme 2: Time Management is Difficult***

The new trend of interactive educational games is to integrate learning and fun. This could possibly lead to over-reliance and students being off-task. Once students do not have the privilege of using games to learn, they could potentially experience a loss of focus (Faiella & Ricciardi, 2015). Games are still in its early stages of development, therefore as much as the benefits are apparent, it is difficult to predict the long-term learning outcomes due to the lack of empirical data to back and support game-based learning (Landers et al., 2014). The efforts that parents, teachers and educators still put in may not be worth it (Livingstone, 2011). Game-based learning gives the students freedom to work at their own pace. Some students need structure and guidelines to complete tasks on time. Technology devices gives students the ability to get off task. Students could be accessing different games when they are supposed to be on the educational game. Three participants in this study identified that time spent on task can be a challenge. The findings of this study in game-based learning align with the research completed in other sectors.

Select discussion relevant to this question include:

Participant 3: The biggest challenge with gamification is the initial setup. It can take a long time to find and adapt resources. I'm not really a techy person so I find that it takes me longer to do the set-up. Also, kids that have time management difficulties can be hard to juggle.

## **Conclusions**

Best practices of gamification and game-based learning in K-12 education to engage students are incorporating current trends, competition, and collaboration with the inclusion of leaderboards. Challenges teachers struggle with are excessive competition and difficulty with time management. After conducting individual interviews with seven participants, reviewing the literature, and synthesizing the findings in chapter four, the researcher draws the following conclusions from the study:

1. Game-based teamwork between students appears to increase student learning and engagement.
2. Leaderboards is a best practice that contributes to competition and student engagement.
3. Excessive competition and time management become challenges when implementing game-based learning in the classroom.

The results of this study are important because it suggests the best practices of game-based learning. This study identified the best practices being leaderboards, enjoyment, and collaboration. The study generated several leadership implications for practice.

## **Implications for Leadership Practice**

**Conclusion 1:** Game-based teamwork between students appears to increase student learning and engagement

**Implication:** Educators that are looking for a new way to motivate and engage students in their own classroom should consider incorporating gamification and game-based learning into their teaching. Collaboration is a key practice in game-based learning and allows for the experience of

being important to others. It also enables learners to master challenges they otherwise might not be able to overcome on their own, which can result in feelings of accomplishment. To effectively implement such strategies, educators must first look at the state standards or curriculum they are required to teach for their grade level. Teachers should start focusing on how they will implement their game-based learning into their classroom. Students will have more enjoyment and increased engagement when they complete lessons with a friend.

**Conclusion 2:** Leaderboards is a best practice that contributes to competition and student engagement.

**Implication:** For gamification and game-based learning to be effective, teachers must use different game elements that encourage engagement, enjoyment, and student collaboration. Such game elements could include themes, leaderboards, and badges. These game elements will increase competition and student engagement in the classroom. Some web based platforms such as Kahoot, Quizizz, Blooklet, and Google apps can be used to support these game elements. Leaderboards help teachers track student's individual progress. Using gamification and game-based learning in the classroom can create a competitive atmosphere for students to intrinsically motivate themselves in their learning. However, competition can be both positive and negative when it comes to student engagement.

**Conclusion 3:** Excessive competition and time management become challenges when implementing game-based learning in the classroom.

**Implication:** In order for gamification to effectively be implemented, educators need guidance on how to balance academic rigor with gamified elements, so that the students are still learning content that needs to be taught. They need to learn about different strategies, game elements, and platforms that can be used to implement gamification and game-based learning. After learning

about these pieces of gamification, teachers can begin to apply them to their own teaching in order to create more meaningful lessons. The professional development also needs to expose and teach educators about the tools that can be used to help gamify their classroom. In addition to professional development, educators need time to plan and prepare how they are going to implement their gamification and game-based learning in their classroom. They need to take time to manipulate and play with their gamified lessons or units to make sure that it will make sense to their own students. This time enables them to figure out the storyline for the theme of the game, the goal, such as the standard that is being met through this gamified lesson, as well as identifying places where students might struggle while playing. In addition, educators need time to create reflection and follow up discussion questions that will help them better understand student learning and their understanding of the standards or topics that are being covered. This time is also crucial for educators to be able to create activities on different platforms that can be incorporated in their gamified lesson, as well as become familiar with how each platform works

### **Recommendations for Future Research**

While the research shows that there has been many benefits to using gamification and game-based learning in the classroom to enhance student engagement, there still needs to be additional research done on the topic. Future research may include: (1) What is the long term learning impact on students in high school when gamification and game-based learning is a learning strategy?, (2) What are the solutions to prevent excessive competition?, and (3) What are solutions to improve time management?

### **Summary**

Using technology to create a gamified or game-based learning shows positive results and has fostered an environment that encourages students to collaborate with their peers, engage with

content material, and stay motivated to learn. Research has shown the use of leaderboards and badges along with other game elements contributes to an enjoyable learning environment for students. Gamification and game-based learning increased students' engagement, self-efficacy, and enjoyment of learning.

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### **Appendix A: Interview Questions**

1. Please tell me a little bit about your experience in gamification and game-based learning?
2. How are the students more engaged in gamification and game-based learning vs traditional practices? Please provide a few examples.
3. What have you used for leaderboards for gamification and game-based learning?
4. What are some ways you have made gamification and game-based learning more enjoyable for students?
5. How do the students collaborate in gamification and game-based learning?
6. What challenges have you faced when implementing gamification and game-based learning?
7. How have you overcome these challenges?

## Appendix B: Interview Transcripts

### Participant 1

Interviewer: How long have you been using gamification and game-based learning?

Participant 1: I have been using gamification my entire career, so six years. There is not a concept I teach that does not have a game and activity attached to it.

Interviewer: What technology platforms have you used for gamification and game-based learning?

Participant 1: I have used google slides, kahoot, chrome music and staff wards. However, I like my games to be a bit less tech savvy since they get that so much in the classroom.

Interviewer: Please tell me a little bit about your experience with gamification and game-based learning?

Participant 1: It is common practice in elementary music to teach the kids through movement and music. Because folk music was created to pass the time in families, most songs create a partner or full group game. It is also common when learning the 4<sup>th</sup> grade curriculum to use karate belts. With this system in place it provides a competitive edge for those wanting to go above and beyond, but it also lets the lower end of students to progress at their own pace. I use gamification to experience new concepts and review old concepts. It gives me a great perspective on who is still learning the curriculum and who understands it.

Interviewer: How are students more engaged in gamification and game-based learning vs traditional practices?

Participant 1: In my experience the best part of gamification is the teamwork between students. It eliminates behavior problems and keeps kids on task. It also increases student achievement and student engagement. I believe gamification gives kids the incentive to participate in something they may not otherwise want to participate in. It also provides me with an easy way to test student progress and see which concepts we need to repeat. Not only do we learn games to study different concepts but we also use them for review. One of the games we use for review and music vocabulary is sink or swim. There are two teams that answer questions against each other. Even though it is a team effort to win, it also tests individual knowledge and gives the power to students to sink the kid that knows the most just to win the game for everyone.

Interviewer: What have you used leaderboards/badges/rewards for gamification and game-based learning?

Participant 1: I have used gamification in the form of leaderboards when we are prepping for a concert. Each grade level and class earns a certain number of points by following specific criteria. The class with the most points then wins a class party. I have also used charts to have the students track individual progress and create learning goals. I have also used rewards in the form of colors for students to level up to the next level where they can work at their own pace.

Interviewer: What are some ways you have made gamification and game-based learning more enjoyable for students?

Participant 1: I usually play boys vs girls. Then for the entire week we add up the points that the girls have achieved and the points that the boys have achieved. When competition is involved, this often keeps the boys especially engaged and trying their best. My games are usually, but not always, competitive in nature. This way kids stay engaged. I also usually include movement with everything that we do.

Interviewer: How do the students collaborate in gamification and game-based learning?

Participant 1: Often times the games are a team effort or a partner effort. So, they often reach the desired answer in groups going against each other. Also, there is not always one answer to the games that we may play, so it's fun to see the kids creatively collaborating.

Interviewer: What challenges have you faced when implementing gamification and game-based learning?

Participant 1: The biggest issue that I have run into are kids not wanting to accept that they have lost, especially our special needs kids. However, this is another great learning lesson in resilience.

Interviewer: How did you overcome these challenges?

Participant 1: To overcome this reaction I often move into the next activity quite quickly. Otherwise, if it is a big issue, it gives me a chance to talk to that kid one on one. It is also an expectation that we talk about at the beginning and middle of the year – how we handle “Winning” and “Losing”.

## Participant 2

Interviewer: How long have you been using gamification and game-based learning?

Participant 2: I've used forms of gamification in my classroom for 6 years. It isn't a major part of what we do, but it is a tool I use.

Interviewer: What technology platforms have you used for gamification and game-based learning?

Participant 2: Kahoot, Google Slides, Jeopardy Templates

Interviewer: Please tell me a little bit about your experience with gamification and game-based learning?

Participant 2: I'll often use gamification as review. It's hardly ever the vehicle by which I teach, but is often the vehicle by which we review once students have a fairly firm grasp on a concept. The kids enjoy it. I've found it works better as a review because they get so caught up in the game and all that comes with it that they don't learn as well, but they can recall and compete.

Interviewer: How are students more engaged in gamification and game-based learning vs traditional practices?

Participant 2: I find that the students who are most engaged in gamification are the ones who are generally engaged anyways. Some students who are more "sporty" enjoy when we play games that involve shooting baskets.

Interviewer: What have you used leaderboards/badges/rewards for gamification and game-based learning?

Participant 2: Sometimes I use candy as a prize for the winners. It's a good way to teach that not everyone wins, and that's okay.

Interviewer: What are some ways you have made gamification and game based learning more enjoyable for students?

Participant 2: Gamification in and of itself is enjoyable. I have pretty firm ground rules that allow students to enjoy the game while still learning and reviewing. I also try to use things that the students, like tik tok dances, video games, or phrases that are "in".

Interviewer: How do the students collaborate in gamification and game-based learning?

Participant 2: I have students work in groups for the review games. They work with each other. One student might record answers, one might consult notes. They all have different jobs.

Interviewer: What challenges have you faced when implementing gamification and game-based learning?

Participant 2: Time spent "on task" goes down sometimes due to the competitive nature of the games. With Kahoot, students don't think before they answer because it's partly based on time.

Interviewer: How did you overcome these challenges?

Participant 2: I continually remind that it's a learning opportunity more than just a game. The kids need to internalize that or it becomes a waste of time. I also have pretty firm rules and engagement expectations that help things go smoothly.

### Participant 3

Interviewer: How long have you been using gamification and game-based learning?

Participant 3: I began using Gamification last school year. I fully implemented it into math but no other subject area. This year, with the uncertainty of our learning model, our team chose to all implement the curriculum, making it challenging to incorporate it. I have still been able to do this for a few units of math along with a few units of science.

Interviewer: What technology platforms have you used for gamification and game-based learning?

Participant 3: The main platform that I use for gamification is google slides. Along with google slides, I use Kahoot, Quizizz, Nearpod, Quizlet, and IXL as tools for skill practice.

Interviewer: Please tell me a little bit about your experience with gamification and game-based learning?

Participant 3: Gamification takes a lot of work on the front end. From my experience, it's nearly impossible to prep from the ground up only using contract time and it can become overwhelming. On the other hand, it allows for immense individual and small group time in the classroom.

Interviewer: How are students more engaged in gamification and game-based learning vs traditional practices?

Participant 3: Students must be intrinsically motivated in order to have this work successfully. Students that have a difficult time setting their own pace will need more guidance and structure. Some students that you wouldn't expect, will make great growth because the game factor is so engaging that they are much more invested. It is incredible to see the growth that some students will make with this. Last year, a student that scored on-target or average for all standardized tests was now scoring at the top of my class. She was engaged and motivated to tackle her work each day. She finished her work so quickly that I then supplemented with higher level work.

Interviewer: What have you used leaderboards/badges/rewards for gamification and game-based learning?

Participant 3: I haven't used a leaderboard because I find them hard to keep up with. I have done small rewards after kids complete certain steps and then finished with an activity day after the unit test.

Interviewer: What are some ways you have made gamification and game based learning more enjoyable for students?

Participant 3: I have found that the most enjoyable gamification units for kids are the ones that have current trends tied in. This could be things like Fortnite, Among Us, football, and so on.

Interviewer: How do the students collaborate in gamification and game-based learning?

Participant 3: To be honest, I haven't had a lot of collaboration within it. I have had kids work in teams to help complete certain steps or the reviews together. It is something I would like to incorporate more moving forward.

Interviewer: What challenges have you faced when implementing gamification and game-based learning?

Participant 3: The biggest challenge with gamification is the initial setup. It can take a long time to find and adapt resources. I'm not really a techy person so I find that it takes me longer to do the set-up. Also, kids that have time management difficulties can be hard to juggle.

Interviewer: How did you overcome these challenges?

Participant 3: Setting more guidelines and due dates for those kids helps.

Interviewer: Is there anything else you want to add?

Participant 3: I absolutely love gamification! I would be doing it more this year but I think we were all so unsure of how this year looks that it seemed intimidating to tackle. Also, being a new mom, I am still finding a balance between work and home. I'm doing my best not to let work come home with me anymore. Working with teammates also makes a big difference. Having multiple people to work with and bounce ideas off of helps lighten the work load.

#### **Participant 4**

Interviewer: How long have you been using gamification and game-based learning?

Participant 4: I have used types of gamification for the last 2-3 years.

Interviewer: What technology platforms (Kahoot, Google slides, etc...) have you used for gamification and game-based learning?

Participant 4: I have used jeopardy-labs.com, Kahoot, Google Slides, Quizizz, Khan Academy, Raz Kids, and Happy Numbers

Interviewer: Please tell me a little bit about your experience with gamification and game-based learning?

Participant 4: I liked using gamification in my classroom because students would typically be more engaged than traditional learning. It also can act as a motivator because student like to compete against one another or challenge themselves to get through the game.

Interviewer: How are students more engaged in gamification and game-based learning vs traditional practices?

Participant 4: Typically students are more engaged not only because it is something different, but it keeps them coming back for more. During gamification you may learn the same concepts as a traditional lesson, but adds a fun factor to it. Most students can relate to some type of game.

Interviewer: What have you used leaderboards/badges/rewards for gamification and game-based learning?

Participant 4: I have mostly used leaderboards and rewards. When doing gamification I have reward students for their individual progress, but also have given rewards for leaders of the entire classroom. Not all learners are the same ability so I try to make each student be as successful as they can by giving them different ways to earn rewards.

Interviewer: What are some ways you have made gamification and game-based learning more enjoyable for students?

Participant 4: First, I try not to overuse gamification so it is something they look forward too. Second, I try to use different platforms and tie it to different subjects. I feel it is also important to make the challenges different. I have also given students choice and gear it to their interests.

Interviewer: How do the students collaborate in gamification and game-based learning?

Participant 4: Depending on what type of activity we are doing, their communication comes in a variety of forms. Sometimes they collaborate before the task to make a plan. Other times they might use Google chat to problem solve. I like it when students work in partners or groups so they can share ideas and learn from each other. They sometimes do them individually as well.

Interviewer: What challenges have you faced when implementing gamification and game-based learning?

Participant 4: The two biggest challenges I have encountered are basic technological issues with student devices and time. Some students just take a lot longer than others to through the

tasks. The other challenge I have encountered is making it grade level appropriate so it is not too hard, but in the end it should be challenging.

Interviewer: How did you overcome these challenges?

Participant 4: Since I am somewhat new to gamification and only use it occasionally, I use a lot of trial and error. I am still making adjustments on the fly.

## Participant 5

Interviewer: How long have you been using gamification and game-based learning?

Participant 5: 5-6 years as frequently as possible in our fifth grade neighborhood. I use any game I can find to support math, reading, science, and social.

Interviewer: What technology platforms have you used for gamification and game-based learning?

Participant 5: Kahoot, Google Slides, Any Hyperdocs, Blooket, Prodigy, EM Games, Brainpop has games that go along with their movies.

Interviewer: Please tell me a little bit about your experience with gamification and game-based learning?

Participant 5: I don't have a full-fledged unit on game-based learning that I use, but I try to sprinkle in game-based learning as often as possible. Kids love to learn on the device and through games. Anything they can do that is head-to-head with their classmates helps as well, which is why Prodigy is one of our most popular games in class.

Interviewer: How are students more engaged in gamification and game-based learning vs traditional practices?

Participant 5: Students are excited to play against one another and build up their characters like more power, better outfits, and what not. The best part about a game is that students can typically just play and ignore having to read the rules or follow some directions. They just love to go and have a little freedom to experience everything on their own terms.

Interviewer: What have you used leaderboards/badges/rewards for gamification and game-based learning?

Participant 5: We started using Blooket, which is like Kahoot, but can totally mess with the kids who are used to winning all of the time. We love to display these leaderboards because kids who don't normally win have a shot of winning. They can steal or exchange gold after answering a question correctly. This has really leveled the playing field and frustrates those few kids who are used to dominating every game. We use leaderboards occasionally in quizzizz or kahoot too. We have also created a good behavior chart in our class with Crewmates from the game Among Us. Kids are secretly drawn daily and need to be on their best behavior throughout the day in order to not get caught being the Imposter. Once students have earned enough positive days, the class reward becomes something they voted on--"Co-Teacher and Participant 5 need to say yes day." With some set guidelines of course.

Interviewer: What are some ways you have made gamification and game-based learning more enjoyable for students?

Participant 5: Go with what is current and they enjoy when you can. Try using it to prop up your curriculum. For example, teach the kids something first, make them use it traditionally, then say we are going to have some fun if you can handle it gamified, and things work really well because students know the other way of learning is not as much fun.

Interviewer: How do the students collaborate in gamification and game-based learning?

Participant 5: In some games they work together, like on a game board on google slides. Interactions are usually side-by-side interactions, but are not limited to that way. Students have the capability to play against one-another from anywhere, not just a school, but when they do it in school they like to play near one another so they can talk. With Covid, they've needed to spread out a bit, but that doesn't stop most kids from trying to group together in order to play a friend.

Interviewer: What challenges have you faced when implementing gamification and game-based learning?

Participant 5: Teachers have to give up some control. Easy for students to fake doing things or make it look like they are gaming, but really they are wasting time. Teaching digital citizenship to 10-12 year olds. There's always the kid in each class who likes to sign in with funny and inappropriate names. Kids in games are not always rule followers, they like to be trailblazers and figure it out as they go. Rules don't always work the best.

Interviewer: How did you overcome these challenges?

Participant 5: I make kids learn the skill before they play games to support their learning. If they can't handle games appropriately they go back to paper and pencil. That has helped cut down on a lot of problems, but new problems are always popping up.

## Participant 6

Interviewer: How long have you been using gamification and game-based learning?

Participant 6: I have been using gamification and game-based learning for 2 years now.

Interviewer: What technology platforms have you used for gamification and game-based learning?

Participant 6: Technology Platforms I use for gamification and game-based learning are Google Slides, Kahoot, Quizizz, Blookit, Schoology, Seesaw, Google Forms

Interviewer: Please tell me a little bit about your experience with gamification and game-based learning?

Participant 6: I started using gamification last year. I started with math. I make different themed units for math. Example: College football, Mario, Mini Golf, Are You Smarter Than Your Teacher. I use game elements like leaderboards, badges, challenges, quests, and competitions.

Interviewer: How are students more engaged in gamification and game-based learning vs traditional practices?

Participant 6: I would say that the students are more engaged during the gamification units. Kids are completing extra work to earn better scores. They really like the competition between students. When doing team leaderboards they are more willing to work together and help each other.

Interviewer: What have you used leaderboards/badges/rewards for gamification and game-based learning?

Participant 6: For Mario, I used coins for ways for students to track different activities, for football I use stickers to put on different helmets, and for golf I use leaderboards on number of strokes

Interviewer: What are some ways you have made gamification and game-based learning more enjoyable for students?

Participant 6: Creating friendly competition amongst students. It makes the students self-driven. It allows them to learn different things!

Interviewer: How do the students collaborate in gamification and game-based learning?

Participant 6: In each unit they usually are in groups. They get to help each other. When students are finished with their work they get to be leaders. Example: Coaches, or super mario helpers. This drives the students to help each other out.

Interviewer: What challenges have you faced when implementing gamification and game-based learning?

Participant 6: Honestly, just sometimes kids get too competitive. There is one kid in my class that does not handle losing well at all and will freak out. A majority of the kids enjoy it and have fun though. When students get a bad attitude because of the competition I sometimes threaten them by going back to pencil and paper, this usually helps.

Interviewer: How did you overcome these challenges?

Participant 6: I have to teach the students coping skills. This is actually a good thing because it is a life skill.

## Participant 7

Interviewer: How long have you been using gamification and game-based learning?

Participant 7: 6 Years

Interviewer: What technology platforms have you used for gamification and game-based learning?

Participant 7: Google Docs and Slides.

Interviewer: Please tell me a little bit about your experience with gamification and game-based learning?

Participant 7: Gamification gives students extra motivation to compete or do extra vs the opposite. Many students will achieve at a higher level when competition is on the line. I have used gamification in things as simple as having leaderboards for a warmup activity for the day such as how many pogo jumps can you do in a minute to how many jump ropes can you do in a minute to keeping track of class vs class activities and having a leaderboard for how many times class can get through an obstacle course.

Interviewer: How are students more engaged in gamification and game-based learning vs traditional practices?

Participant 7: I did an outdoor unit at my previous school and one of the activities was sledding and I counted how many times the average student went up and down the hill during Fitness activity time in 27 minutes and each student averaged 3 times. I then set up a target that students needed to slide through for it to count for a point for their team and kept track of each classes total score for what we called Olympic Bobsledding. Students increased their average to around 6 trips down the hill and we had all classes get from 120-180 students total through the cones.

Interviewer: What have you used leaderboards/badges/rewards for gamification and game-based learning?

Participant 7: I have used leaderboards and rewards but the biggest reward for most is winning and being competitive as that is what they enjoy and when it is internal vs external it will help set them up for long term success.

Interviewer: What are some ways you have made gamification and game-based learning more enjoyable for students?

Participant 7: By giving a set number to hit vs only the top few kids has made more students work towards it making a leaderboard. Making leaderboards open for more students vs just 1-2 has helped because the highest flyers still want to have the top score, but it helps some students in the middle to push higher for themselves.

Interviewer: How do the students collaborate in gamification and game-based learning?

Participant 7: During the Olympic Bobsledding Unit students collaborated to come up with the best way to get a high score. Some students helped carry others sleds, some students offered to do extra slides down the hill, if others were tired. Ultimate teamwork

Interviewer: What challenges have you faced when implementing gamification and game-based learning?

Participant 7: Although the overwhelming majority of students are competitive some are not. So Figuring out ways to motivate all students and not just high flyers or competitive athletes.

Interviewer: How did you overcome these challenges?

Participant 7: Instead of only putting a top 3 leaderboard up or top ten leaderboard, choosing a number and putting everyone's name up on the leaderboard that makes that mark for example. I have found that high flyers want to have the highest score and other student push to get to that number.