The Use of Gamification in the Classroom

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BETHEL UNIVERSITY

THE USE OF GAMIFICATION IN THE CLASSROOM

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APPROVED

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Abstract

The research presented in this paper is an overview of the use of gamification in education. The study explores the questions: Why is gamification a tool used in the classroom? How is gamification being implemented? What are the potential problems and limits to gamification? The research suggests that using gamification in a classroom increases students’ motivation, positive feelings toward the class, and completion of learning tasks. This is due to the fact that elements used in a gamified classroom tap into students’ need to feel a sense of autonomy, competency, and relatedness. Gamification can also help teachers gain more timely feedback in order to improve their instruction. Since gamification is a relatively new concept in the area of education, more research and implementation are needed especially in secondary education and heterogeneous classrooms.
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CHAPTER I: INTRODUCTION

One of the main goals for an educator is for students to attain the learning goals and objectives in their course. In order for students to accomplish this goal, educators must provide learning tasks designed and chosen specifically for students to acquire the skills and knowledge needed. While students progress toward the learning goal, educators should assess the level of proficiency students are demonstrating by evaluating the progress and competency shown in the learning tasks. Then they can give useful feedback to students in order for them to correct misunderstanding in the learning or fill gaps in skills and knowledge that may be lacking.

Ideally, this is the basic function of a learning environment. But, how can educators provide and assess learning tasks if students are unmotivated to do them? Motivating students to engage in their learning tasks is vital in order for learning to happen. One tool gaining in popularity to help motivate students is a relatively new concept called gamification.

The term “gamification” is most often defined in education as “the use of game elements in a non-game context” (Deterding et al., 2011). Gamification is not simply playing games in a classroom setting, but using game theory and good game design elements to help shape the coursework of a class (Chapman & Rich, 2018). By incorporating successful gaming principles into a course, the intent is for students to feel more motivated, have more choice, support, and be empowered in their education. This should lead to students being more engaged with learning tasks, and therefore have more success obtaining their learning goals. Additionally, students who are more motivated are able to have a greater sense of accomplishment and overall enjoyment in their learning.

The terms “game theory” and “good game design” are used to explain the principles and elements game developers use to create and understand what makes a highly engaging game.
While there are many principles and elements in game theory that are recognized as good game design, there are some principles and elements that translate to an educational system more effectively than others. Gaming principles are overarching essential ideas that can apply to many specific game elements used in a game, or gamified course, while a game element is a specific tool in keeping with gaming principles. Deterding (2013), in his research and study of gamification in education, laid out some core gaming principles that apply to a games course. First, variety and choice given to players are principles that are important for players to feel a sense of autonomy. A second principle is that well structured games also should have clear and well defined rules and goals. Good games also allow for players to grow incrementally in their skills at a rate that is not too easy which could lead to boredom, nor too difficult which could lead to frustration and quitting. Gamification draws on these same gaming principles to ensure that students are highly engaged, motivated, growing in skills, and supported throughout their learning.

These principles are present in most specific elements of a gamified course. Gamified elements are numerous and have been used to varying degrees of success in a course. The research presented here will explore challenges, quests, avatars, pseudonyms, scaffolding, badges, leaderboards, experience points, feedback, constructive competition, and cooperative learning. While some of these elements are seldom used in a gamified course, there are some elements that are used in most courses. Barta, Gama, Jorge, and Gonzales (2017) states that a typical gamified course would include these common elements: experience points and levels, challenges or quests, badges or collectible artifacts, and leaderboards. These elements are used more frequently because they have shown a greater impact on motivation for students.
To help explain why using gamification works to motivate students to engage in desired behaviors, many researchers draw on the theory introduced by Ryan and Deci in the 1980s, called the self-determination theory. This has had further research and improvement and was reintroduced in 2001 by Ryan and Deci. This theory states that there are three needs that affect a person’s motivation. These needs are autonomy, competence, and relatedness. Autonomy refers to a person’s own sense of self, choice, and worth. Giving students choice, personal feedback, and recognition helps to fulfill students’ need for autonomy. The second need is competence, which refers to the need to feel confident and effective. A student’s ability to see their progress toward mastery and having choice in how they show their learning can fulfill this need. Finally, relatedness is about the need for social connection and having their value recognized by others. Collaboration, team competitions, and group connection activities can lead to students feeling secure in their learning community and valued by others. This theory also recognizes that there are intrinsic and extrinsic motivation factors that go into an individual’s overall engagement and productivity. Intrinsic motivation refers to the internal factors like pleasure and personal interest that help to engage people. While extrinsic motivation is about the external rewards and punishments, like grades, that motivate. According to Ryan and Deci (2001), those that are intrinsically motivated have higher levels of engagement and overall performance. Educators and researchers in studying the effects of gamification and how it is best implemented, study good game design and also tie these principles to the theories and principles of motivation.

**Rationale**

The Pew Research Center (2018) conducted a study on game usage in teens ages 13-19 and found that around 97% of boys and 83% of girls play video games, with an average time of around 13 hours of play a week (Anderson & Jiang, 2018). Many teens can easily spend hours
playing a game, but can’t seem to find the time to complete learning tasks. It is difficult for students to improve and grow in their learning and skills if they are unmotivated to actually do the work necessary for growth. Using gamification as a tool to motivate, taps into the needs of students in order for them to have the desire to engage in tasks. Additionally, gamification elements fit nicely with best practices in education, like differentiation and backward design.

The goal of this research is to have a better understanding of why gamification is a useful tool, how to best implement elements of gamification, and what elements should be used for best results. Additionally, using the research on gamification the author will apply this knowledge to a seventh grade geography course at Edgewood Middle School, in Mounds View, Minnesota. The goal in implementing gamified elements is to increase students’ engagement, motivation, and positive feelings toward the course, which should lead to students having more success in attaining the courses learning goals.

Application

The application of this thesis will involve four main steps. The first is to clearly define the learning goal and the form of measurements students will complete in order to assess their mastery of the learning goal. Learning tasks that align well with the learning goals will be considered and created. The second step is to choose what gamified elements will be incorporated into the course. These will be chosen based on several determining factors such as information from previous years on areas students tended to struggle with, technology resources, alignment with district, school, and classroom goals, and keeping in mind the three needs from the self-determination theory (Deci & Ryan, 2001). The third step will involve the actual implementation of the gamified elements and figuring out the logistics of how best to include them into the curriculum. Finally, the author will assess the effectiveness of the implementation.
and adjust elements based on students’ attaining the learning goal, completion of tasks, and student surveys.

**Definition of Terms**

Since some of the terms used in this study are relatively new, a common definition is needed. Gamification is “the use of game design elements in a non-game context” (Deterding, 2011 p 9). The term gameful design is also used as an alternative to gamification. “Gamified learning” is using gamification in the context of learning. “Self-Determination Theory” is the theory of motivation (Ryan & Deci, 2001) used to help explain why elements of a gamification course are successful in motivating students because of the needs of autonomy, competence, and relatedness are met (Sailer & Homner, 2019). “Game Based Learning” is game play in a classroom that is aligned with specific learning goals.

**Guiding Questions**

Chapter II of this study will focus on answering three guiding questions around gamification. The first is: What is the compelling “why” gamification should be used in the classroom? Gamification is not a set curriculum, but a tool with many components of use. This section will look at the factors of why gamification is a potential tool to help motivate and engage students in their learning tasks.

The second guiding question in Chapter II is: How is gamification implemented? Using research and studies done by educators, this section will delve into specific elements of gamification and how they were used in a course. It will also discuss to what extent the research found these elements impactful in the students’ motivation and feelings toward the course. Additionally, this section will explore to what extent the studies were able to find the correlation between a gamified course and improved achievement in the learning goals.

The final question in Chapter II will answer: What are the potential problems and limits to a gamified course? This section will explain some of the negative results studies found in
implementing game design elements to a course. It will also explore alternatives to avoid some of the potential problems.
CHAPTER II: LITERATURE REVIEW

Literature research for this thesis was done primarily through searches of ERIC, EBSCOhost, Educational Journals, EBSCOhost, and Academic Search Complete from 2000 to 2020. Additional online searches to locate specific articles often cited in the literature found were also used. Articles were eliminated that were not peer reviewed or had a strong focus on education application. The key words used in these searches were “gamification,” “gamified,” “self-determination theory,” and “game-based learning.” Chapter II of this thesis is organized into the following three sections: The Compelling ‘Why’ of Gamification; How Gamification is Implemented; and The Potential Limitations and Problems of Gamification.

The Compelling ‘Why’ of Gamification

Gamification is a tool incorporated into a classroom primarily to help motivate students to complete learning tasks, but it can have additional positive effects. This section of Chapter II will present research on the effectiveness of gamification on student motivation. First, the research will present how game elements in a course can fulfill the motivation needs of students as described in the self-determination theory. Second, since incorporating gamification into a classroom often means more choice, autonomy, and relatedness it will also look at the heterogenous appeal toward gamification. Finally, in creating and implementing a gamified course this study will also present that research has shown gamification can have positive effects for teachers in designing, implementing, and adjusting instruction.

Self-determination Theory and Gamification

Research has shown that incorporating gamified elements into a course helps fulfill the three aspects of needs described in the self-determination theory as well as intrinsically motivate students to engage more in the learning process. In a study done by Gomez-Carrasco,
Monteagudo-Fernandez, Moreno-Vera, and Sainze-Gomez (2019), the researchers discovered that their use of gamified elements did indeed improve the motivation of the learners receiving the gamified course significantly compared with students who did not participate in the gamified course. The study was conducted with 210 participants in a university course for primary educators. The participants were placed randomly into four classroom groups that all engaged in a gamified course that involved elements of choice, experience points, rewards, and challenges. These elements were chosen to help fulfill the self-determination theory needs of autonomy, competency, and relatedness. By using choice in the course, Gomez-Carrasco et al. (2019) were fulfilling the students' need to feel autonomy. Experience points and rewards helped to fulfill a student's need to feel competent. Challenges and awards that compared their results with others helped students to fulfill their need for relatedness. Students throughout the course filled out questionnaires using a Likert scale that helped assess motivation, enjoyment, and competency. According to posttest data as well as an end of course survey, students had a high overall opinion of the course. Also, the evidence showed higher intrinsic motivation and extrinsic motivation for students that participate in the gamified course. In fact, the data analysis of the end of course survey showed that students gave a higher overall score to the intrinsic motivation factors, such as the desire to learn, as opposed to the extrinsic motivation factors (Gomez-Carrasco et al., 2019). The study concluded the implementation of the gamified elements had a significant and positive effect on the cognitive, motivational, and behavioral learning outcomes.

In a gamified study done by Khan, Ahmad, and Malik (2017), the researchers incorporated gamified elements like a progress tracking system, experience points, feedback, optional challenges, goals, and visuals to help motivate their students to engage with the learning. The researchers carefully chose these elements in part to fulfill the three needs of
autonomy, competency, and relatedness. The study involved 72 eighth grade middle school students in a science course. Forty-one were randomly placed in a control group receiving traditional instruction and 31 were placed in an experimental group of students receiving the gamified course. The study used both quantitative and qualitative data to help determine the effectiveness of gamification on motivation and cognitive growth. Students were given pre and posttests on three different units of study. Teachers throughout the course filled out five-point Likert scale surveys observing students body language and engagement. Focus groups asking questions around motivation, enjoyment, and feeling of competency before, during, and after the course were also done. Comparing pre and posttest data, Khan et al. (2019) found a significant difference in growth between the experimental and control group, the experimental group scoring an average 1.77 point difference higher than the control group. In analyzing the qualitative data, teacher surveys showed higher scores in the experimental group in motivation and positive body language throughout the course. The information gathered from focus group questions revealed overall, students in the gamified course had a more positive experience of the course and felt more motivated to complete work. In turn, these students participated more in the learning activities, which resulted in these students showing a better understanding of complex concepts.

Gamification and Heterogenous Appeal

Another compelling reason to implement gamified elements in a classroom is the heterogenous appeal. Although the majority of studies presented in this research involve college courses, there are studies that have incorporated gamification into classrooms of more heterogeneous students, meaning groups of students of a wider variety of strengths, needs, and interests. One study done by Malinverni et al. (2016) looked at the use of games and a gamified
classroom for children with autism spectrum disorder. The study was done over four sessions, involving 10 students with autism spectrum disorder. The course first laid out specific behavior goals for students to achieve, mainly stronger connections with family and classmates. A game was then designed to help students reach these goals while also using character, story, choice, fantasy and rewards as motivational tools. Before and after the games sessions observations were done by teachers and parents and surveys asking questions surrounding the behavior goals were completed by students and families. The data not only showed that students found the game fun, motivating, and engaging, but students were able to achieve the behavior targets like initiating connections and conversation. Parents also reported an increase of engagement and conversation in the homes during the sessions. The research done by Malinverni et al. (2016) helped to show that students with higher needs also benefit from gamified courses.

Other researchers studied the differing effects of gamification on males and females. In the study by Khan et al. (2017), the research showed that overall, females were more engaged with the gamified course than males. But, the qualitative data revealed a higher level of enjoyment by both boys and girls engaged in the gamified course than the boys and girls in the traditional course.

Bovermann and Bastiaens (2020) explained that gamification in education focuses on learners’ motivation, learning, and engagement. They wanted to see if gamification appealed to all users or just specific types of students. Bovermann and Bastiaens (2020) researched five different user types: socializer, free spirit, achiever, philanthropist, and player. They then focused on how these user types related to different gaming elements in a gamified course. Eighty-six students participated in a questionnaire following the completion of the course for quantitative analysis. The questionnaire first asked questions to determine what type of game user students
were, which was based on a classification system of game players by Bartle in 1996. Then, students were asked additional questions using a four-point Likert scale to collect data on students' feelings toward the specific elements and tasks of the course the students participated in. Quests, badges, rewards, leaderboards, teams, and choices were some of the main gamified elements students participated in and then answered questions about. The study concluded that the learners reported a wide range of preferences and interests in the gamified elements and tasks. Overall, all students reported a higher sense of achievement, pleasure in the course, and motivation than previous, more traditional courses. Therefore, the authors concluded that a gamified course should utilize several elements in order to address different likes, interests, and personalities. Bovermann and Bastiaen (2020) also concluded that although the group that participated in the study was a heterogeneous group, gamification elements focusing on choice and variety helped meet the needs of the diverse group of learners in their course achieve the learning goals. Essentially, gamification tends to incorporate differentiation because of the choices it offers students in engaging learning tasks and choices in demonstrating their proficiency with the learning goals.

**Teacher Feedback**

Yet another compelling reason to incorporate gamified elements into a classroom is the amount of valuable feedback teachers receive in regards to their students' learning. Chia Yuan Hung’s (2018) found that an arguably more useful purpose for gamifying a classroom beyond motivation is the careful design itself. The study focused on his difficult graduate level philosophy course that involved arduous readings, academic writings, and complex and controversial topics. With learning targets established, Chia Yuan Hung carefully went about designing the course by incorporating clearer goals that were incremental, choice in assignments,
ability for students to resubmit work. He then researched gamified elements and chose progress bars, points, badges, and paths. The gamified course had seven participating students. Chia Yuan Hung acknowledged that the effects of this gamified course could not be measured satisfactorily because of the many variables that could affect students' responses to the course and the small number of participants, but he found in the process of gamifying his class it improved his instruction. Chia Yuan Hang (2018) argued that when educators gamify a class, the values, intentions, and biases of the designer become more transparent. Educators must determine what actions get rewarded or penalized, how the gamified system is presented, and how users are expected to interact. This can be helpful feedback to not only the students but also the educator. They are able to evaluate their course and better clarify goals and explain and demonstrate how to achieve these goals to their students. In the design thinking process of gamification an educator is finding ways of addressing problems, discovering unclear goals and expectations in the learning process of their classroom, and changing these existing situations into clearer, more precise and attainable goals for learning. Additionally, in a gamified classroom teachers can expect more pieces of feedback from student engagement and therefore can adjust their instruction based on what they are learning from the students and their attainment of the learning goals.

**How is Gamification Implemented**

By studying good game design and game theory, researchers have identified several key elements of games that have players enjoying the game, feel motivated to keep playing, and find solutions to problems. Öztürk and Korkmaz (2019), in their study of gamified courses, listed key elements of good games to include: enjoyability, clear rules and goals, motivating, interactive and facilitate active participation, growth in challenge levels, immediate feedback and results,
opportunities to win, competition, struggle, failure, problems to be solved, interaction between players, and story and experience. Using these major elements, the authors conducted a study in a social studies course involving 60 students, 31 of which were in a control group and 29 in an experimental group that incorporated gamification. Students in both groups were given pre and posttests and also surveys involving questions about attitudes of learning and motivation. Surveys and posttests showed students in the experimental group scored higher average growth between the pre and post tests and surveys in areas of motivation, love for social studies, cooperative learning, and growth in learning. The authors concluded that using these key elements of gamification would benefit the emotional, social, and cognitive needs of students in social studies courses.

In a study done by Cheong, Filippou, and Cheong (2014), the researchers first laid out the proper implementation of incorporating key game elements into their course. First, educators need to understand their students, or “players.” In other words, what are the skills, interests, and strengths the students are bringing to the course? Second, what are the learning goals of the course, and what should students do to gain the learning objectives? Finally, what appropriate game elements should be incorporated to motivate the players to act, thereby attaining the learning goals? Gamified elements in a course often include things like experience points, leaderboards and progress bars, challenges, badges or awards, choice, feedback, and social interaction. Fifty-one students participated in their gamified course. When the course concluded, students participated in a survey that gauged their feelings toward the course in comparison to their previous course experience. The researchers found that for the majority of the 51 students who participated in their gamified course, the highest favorable gamified elements were social interaction, engagement, feedback, and increased level of difficulty in the learning. They also
found that around 90% of students surveyed had positive expectations of a gamified course. The question every educator should be asking is why any educator should consider implementing these game elements into the classroom, beyond just student enjoyment or positive expectation.

Self Determination Theory Guides the Basis of How

Since gamification is primarily a tool educators use to motivate students to engage in the learning activities in order for them to reach their learning goals, educators must carefully decide what elements to use and how to use them. Specific elements to implement are in part to fulfill the three aspects of self-determination theory by Deci and Ryan (2001). The first aspect, autonomy, is fulfilled by tools such as challenges and quests, and avatars and pseudonyms. The second aspect, competence or mastery, is fulfilled by tools such as scaffolding, challenge and gain, badges, leaderboards, and experience points, and feedback. The third aspect, relatedness, is fulfilled by gamification elements like leaderboards, feedback, and constructive competition. This section takes a closer look at how these gamified elements are used in the classroom and to what extent researchers have found them useful.

Autonomy

Autonomy refers to the feeling of being in control of actions and thoughts. Deci and Ryan (2001) argue that when a person has a sense of autonomy, their intrinsic motivation increases because of a natural drive or enjoyment in doing the task at hand.

Challenges and quests. Challenges are optional activities students can engage in to enhance their learning experience. Quests can be the same as challenges, but often gamified classroom quests involve different stages and choices students can make along the way. Challenges and quests are often part of good game design because they give the player a sense of autonomy by giving choices in game play. The same can be true in a classroom. A study done
by Dominguez et al. (2013) incorporated nine quests with 36 challenge activities students could choose from. Upon completing these tasks, students would receive virtual trophies to help them keep track of their progress and gain a sense of accomplishment. The study involved first, second, and third year university students in six different majors. This study had a control group of 73 students who did not have challenges and quests, and an experimental group of 123 students who did. Both groups were required to complete a minimum number of tasks, but given the choice of doing more tasks. The experimental group’s tasks were similar to the control group, but were couched in terms of challenge and quest. Additionally, upon completing a challenge or quest students received a virtual trophy to fulfill a sense of completion and achievement. The study analyzed data throughout the three-year course including overall test scores and the number of tasks completed. The study found that the experimental group had higher scores for task completion than the control group. The conclusion made by the researchers was that the incorporation of challenges, quests, and trophies motivated students to complete more learning tasks.

Chia Yuan Hung (2018) found that incorporating quests with choices in his course led to better participation and engagement with learning activities. He also added an additional component of students being able to start and abandon a quest. Students still received benefits in terms of points and badges for starting and completing parts of a quest. This gave students the motivation to try an activity and permission to stop if they were not motivated to continue it, or if they discovered the activity was not as beneficial for their learning. Chia Yuan Hung found that the variety of purposeful activities in the quests to help students achieve their learning goals gave the students an opportunity to make choices based on their learning style and preferred way of learning. This helped fulfill a student’s need to feel autonomy and feel in control of the choices
they can make in their learning. One conclusion of his study was that students chose to participate more in learning tasks like forums, sharing ideas, asking questions, and defining concepts than in previous years of his teaching the course.

**Avatars and pseudonyms.** The use of avatars and pseudonyms is another device by game designers in order to engage a player's imagination and sense of autonomy. Tan Yuen Ling (2018) decided to incorporate gamified elements including avatars into her university course on film studies. Twenty-two students completed Likert scale surveys and a 22-item questionnaire during and after the course to gauge the level of interest/enjoyment, competency, and choice. She then compared these results with 254 other university students’ surveys that were not in a gamified course. In each category the mean score of the surveys from the gamified course was higher. Tan Yuen Ling (2018) found when players are able to use their imagination and play in a game they are more apt to try, and more motivated to start over if they fail. This is especially true if they are represented by a character, often digitized in gamification as an avatar, or a pseudonym. An example of using an avatar or pseudonym is replacing their name on a leaderboard with whatever avatar or pseudonym they desire. If these are anonymous it frees students from feeling ashamed or discouraged if they are at the bottom of the leaderboard, but still gives students a sense of accomplishment or may motivate them to action if they are able to relate their progress in comparison to the rest of the class. Students also know that their teacher is aware of their progress which can give the students a sense of recognition and accomplishment.

**Competence/Mastery**

Competence, which is also called mastery, is another aspect of self-determination theory. This aspect refers to a person’s sense of effectiveness and confidence with the task or situation at hand (Deci & Ryan, 2001). When a student feels competent, this increases their feeling that their
behavior is self-directed, which can lead to more persistence and drive when working on a task. This aspect can be fulfilled by giving useful feedback or giving the student a chance to show their mastery over a task in a meaningful way. Gamified elements that attempt to fulfill this need for competence include scaffolding, challenge, and gain; badges, leaderboards, and experience points; and personalized, specific, and timely feedback.

Scaffolding, challenge, and gain. Barata, Gama, Jorge, and Goncalves (2017) included increasing challenges and difficulty in activities that were slightly ahead of their students’ skills in an effort to increase students’ mastery of the learning targets and sense of competency. This study was done over a three-year period; in the first year 35 students participated, in the second year 52 students, and in the third year there were 54 students. By incorporating scaffolding elements, students were able to see the growth and mastery of the learning goals. The first year of the study included challenges that increased in difficulty and skill for students. It also included experience points that students gained for completing tasks throughout the course. Research has shown that if students are presented with too easy of a task that they are able to master quickly or in one try, students are not as motivated to continue to the next level. However, if students can feel challenged and can see their progress and growth in the task at hand, they feel a sense of accomplishment and are more likely to start the next task. In addition to this helping to motivate the student to continue with their learning tasks, this study also found that students were better able to gain the knowledge they needed to attain the learning goal because of the incremental growth in skill and knowledge through the carefully planned learning tasks. This study also incorporated leaderboards and badges that helped students keep track of their progress, and compare their progress with other students. In the subsequent years, there were additions to the course to help motivate students and give more choice. For example, in the second year a
learning tree was added which gave the students several paths of learning they could choose from when they were completing learning tasks. In the third year Barata et al. (2017) concerned with the quality of work by students incorporated awards focusing on quality rather than quantity of learning tasks. This study also shows the importance of continuing to analyze data throughout a course and changing elements of a course to better address the needs of students.

Badges, leaderboards, experience points. Another gamified element that leads to a sense of competence and mastery is the addition of badges, leaderboards, and experience points into a course. Badges can be a tangible or virtual award given to students for completing a task or accomplishing a certain level of quality or score in a task. Studies in gamification and behavior have found that badges help place the performance expectations higher, instill goals that increases the user’s self-efficacy, and give the user more satisfaction for completing tasks. In a study done by van Roy, Deterding, and Zaman (2019), they researched the use of personal badges and how they helped motivate students in the classroom. They also compared the use of badges in education with the use of badges in games, specifically in the very popular game Pokémon Go. The study involved 81 student participants in an online course where they could gain personal badges in their learning tasks. Students had the option of attempting badges or foregoing badges altogether. During the course, students were asked to write about their experience in regard to earning badges. The researchers found that awarding personal badges help motivate students to work harder because of students' satisfaction in gaining a badge. Badges not only give students a sense of competence and mastery, they also could fulfill the need to relate their achievements with others if students are able to compare their badges to what others have accomplished.
However, if students are limited in being able to compare information and interaction with others, the motivational appeal of badges is lessened. Still, some participants reported personal badges made them feel accomplished even if they were unable to compare their badges with others. Badges can functionally serve as feedback, encouragement, and goal setting devices. In this study, badges were given to students for starting, continuing, and completing a task. Out of 81 students that participated, 40 mentioned this feedback on their progress toward completion as important feedback in what they had accomplished. There were also 88 mentions by students in surveys that said they found that badges helped them to plan future goals in learning. It also gave them satisfaction for starting activities and choosing to end activities before completion if they discovered they wanted to pursue a different learning experience. Badges also allowed students to see the progress of their learning and growth. Thirty-two students mentioned this awareness of the milestones of learning helped them to grow in their feelings of competence and mastery. The study concluded that badges need to be used as an intentional function in a gamified course and badges provide a useful tool for students to feel competent in the learning.

Another tool to give students feedback used in many gamified courses is experience points and personalized feedback. Welbers, Konijn, Burgers, and de Vaate (2018) incorporated experience points and badges into their study of a gamified course using an app. There was a total of 101 students in a university course that voluntarily participated by using this app over the course of three weeks. Out of the 101 students that participated, 37 received tailored feedback that included their name, while 33 received generic feedback, and 31 received no feedback. Additionally, experience points were earned by all students when they accomplished a learning task. Learning tasks were specifically chosen in an effort for students to ultimately accomplish
the course’s learning goals. Badges were then awarded once a certain amount of experience points were achieved. This study concluded that the use of these elements gave students overall a feeling of competence in progressing toward their learning goal by showing them consistent, up-to-date knowledge of their progress. The study also found that if the feedback was tailored and personalized, this showed greater results in the increase of the desired behavior in students. Welbers et al. (2018) found the simple act of using the student’s name in feedback, like attaching it to the badges, experience points, and additional specific feedback from the instructor, led to increased participation and effort by students. Additionally, they found that negative feedback, which was defined as pointing out specific problems and areas that needed improvement, was more effective if the problem could be immediately remedied. Giving tailored, personal negative feedback helped students to target specifically what areas in their learning or skills needed more attention and work. However, positive feedback, which was defined as the areas of strength and improvement that a student had shown, was more effective when the ability to fix problems was delayed. The study concluded that feedback, which can come in the form of experience points and badges, should be timely, personalized, tailored, and specific to the task at hand. The incorporation of these elements helps students to feel a growing sense of competence, which gives them the motivation to continue with their learning.

Relatedness

Relatedness is the aspect in the self-determination theory that speaks to the need of people to feel connected and valued by others. When a student feels a part of a safe community and feels seen for their value, this need for relatedness can be met (Ryan & Deci, 2001). Gamification tools that help fulfill the need for relatedness are leaderboards, feedback, constructive competition, and cooperative learning.
Leaderboards. In many gamified courses, students are able to compare their progress with others in the course. Often this is done with leaderboards, which can show the students experience points earned, badges, or the quests or challenges completed. Educators have to be careful with this because of potential privacy violations and potential feelings of incompetence, but if the leaderboard is showing elements in a course that are based on students’ choice and completion of tasks, not on their actual grade or mastery of the material, this can be a useful motivational tool. The research done by Bovermann and Bastiaens (2020) found that using leaderboards which showed the students’ experience points and badges were effective in motivating most students to engage in more learning tasks throughout the course. For the students in the top half of the course this acknowledgment of their accomplishments was a positive motivator that gave them a sense of worth in the classroom and competency. It also made them aware of their progress in relation to their classmates.

Feedback. As stated earlier, feedback can fulfill the need for a sense of competence or mastery. Feedback in a gamified course can be the gaining of experience points and badges, but it also can be specific information from the instructor on a student’s work and progress. When personalized and timely, feedback can give students feel seen and recognized for their work which leads to the fulfillment of relatedness. Constant feedback that is timely is used often in a gamified course because of the nature of students seeing their progress in real time. This can be accomplished by game results students participate in and completion of challenges, quests, and other learning tasks (Sailer & Homner, 2019).

Constructive competition. Constructive competition is defined by Rigby and Ryan (2011) as good-natured competition that encourages cooperation and mutual support. Constructive competition is aimed at improving everyone’s skill instead of defeating someone.
This can help students to feel supported, relevant, and successful in their learning. Sailer and Homer (2019) discovered the use of collaboration and constructive competition showed the most promising results for behavioral learning outcomes. One way of incorporating constructive competition in a gamified course is by having challenges or competitions between teams where students have to work together in order to accomplish their goals. By participating in team challenges and competitions, students reported feeling motivated to participate because they felt a part of the team, and found the learning more engaging and fun.

Cooperative learning. In the study designed by Öztürk and Korkmaz (2019), middle schoolers in the gamified experimental group participated in team games. The team games required students to work together in order to achieve a specific goal which was tied to a learning objective. Öztürk and Korkmaz (2019) found by analyzing surveys done before and after, there were more positive feelings toward cooperative learning in the experimental group at the end of the course than in the control group. The researchers concluded that having students working toward a common goal together helped students to feel more a part of the class and a valued member of the group, thereby fulfilling the students’ need for relatedness.

Potential Limitation and Problems

In much of the research done on gamification, it has shown to be a useful tool in motivating students to engage in learning tasks. There is also research to show it can increase the number of students who reach the learning goals of a course. However, in several studies, researchers have found limitations and problems in some of the ways gamified elements have been applied to courses. Some of the limitations and problems found in studies were that students did not achieve the courses learning objectives, motivation waned, there were frustration and problems due to the lack of tools, technology, and skills, social interaction was more limited, and
the lack of research in gamification makes it difficult for educators to successfully apply gamified elements to the course.

Learning Goals Not Met. Studies such as the one conducted by Khan et al. (2017) found that although students in the gamified course reported feeling more engaged and motivated to complete learning tasks, the overall growth comparing the pre and posttest scores in attaining the learning goals were similar between the control and experimental group. Potential reasons why students were not attaining their learning goals were that the learning tasks students completed were not aligned well with the learning goals, the course elements focused on quantity over quality, and the game elements such as story felt disconnected and superfluous to the learning.

Lindberg, Laine, and Haaranen (2019) looked at the implementation of 29 gamified systems in K-12 computer programming courses in seven different countries, including the United States. A variety of gamified elements and games were employed in courses like action, simulation, role play, increasing difficulty, creativity, and choice. Analyzing national curriculum standards against the games and elements used, they found that some implementation of these elements did not address the actual learning goals of the course. Their research did find that overall, educators reported an increase in student motivation and participation, but the attainment of learning objectives did not necessarily follow. Lindberg et al. (2019) concluded that gamification and games still need to be analyzed for their effectiveness in students attaining their learning goals.

Barata, Gama, Jorge, and Goncalves (2017) found in the first year of their study that some students were very motivated to complete challenges and tasks in order to gain experience points and badges, but this often meant they were trying to complete tasks as fast as they could. They realized that students were being rewarded for the quantity of their work and not the
quality, which meant for some, they were not reaching the learning goals. Since this study lasted for three years, Barata et al. (2017) were able to adjust the gamified elements they were using. In years two and three of the study, the course included a stronger focus on completing tasks that required a level of quality to be accepted.

Additionally, Tan Yuen Ling (2018) found that although incorporating story and fantasy into a course can be motivating and draw students' interest into the tasks. However, these elements can feel disconnected from the actual learning. This can lead to students feeling confused about what the actual learning task is, and for some students in the study, the storied elements were demotivating because it took time away from the actual learning tasks and felt disconnected to the learning.

Motivation wanes. Gamification is primarily a tool to motivate students to engage in learning. However, some studies found that after the initial introduction to gamified elements, some students quickly became disengaged. Game theory contends that much of the enjoyment and engagement of games revolve around curiosity stoked by novelty and competence. When playing games again, players often lack the same sense of challenge and motivation because they do not have the same feeling of growth in their competence or novelty. Gundry and Deterding (2019) in their review of over 60 studies found that the same results can happen in a gamified course as well. Gundry and Deterding (2019) reviewed several studies that stated that once the novelty of a competition or game element wore off, it was quite likely students were not as motivated to participate in activities. Therefore, adding more complexity and novelty may be needed for engagement and motivation. This, of course, requires deliberate planning and design, which takes time from the instructor.
Another possible reason for students to lose motivation to engage in learning tasks is the unintended negative consequences of leaderboards. Studies done by Dominguez et al. (2013) and Barata et al. (2017) both found that students at the bottom of the leaderboard felt discouraged and lost motivation to the point of not completing or even starting learning tasks. In the study done by Barata et al. (2017) they decided to try and combat these feelings of discouragement and disengagement by adding more choice for learning tasks, which for some students resulted in reengagement.

Lack of technology and skills. Many gamified courses require hardware and software to engage in the challenges, quests, and learning tasks. These can include online games and having online tasks that require specific apps and course platforms. In some courses, it was discovered that issues like slow internet connections, apps or platforms not accessible for all students because of hardware or software needs, or students not trained in using these apps and platforms led to students feeling discouraged and unmotivated to continue with the course work (Buhariar & Leo, 2018; Gomez et al., 2019; Tan Yuen Ling, 2018; Welbers et al., 2019).

Limited social interaction. Several studies also found that in some gamified courses students felt they lacked social interaction and collaboration with their fellow classmates and the instructor. Gamified courses rely heavily on personal achievement and gaining experience points and badges by completing individual tasks. Sometimes gamified courses do not incorporate much, if any, tasks that require collaboration and connection with fellow students. If feedback was mostly based on online game scores, or other quick, impersonal methods, students also felt a disconnect between themselves and their instructor (Cheong et al., 2014; Tan Yuen Ling, 2018). In one study several students reported a lack of teacher guidance in their gamified course which led to feelings of frustration and disinterest (Khan et al., 2017). Since relatedness is one of the
three needs of motivation in the self-determination theory, this feeling of disconnect could result in students lacking motivation and enjoyment in the course.

Lack of research. Gamification applied to education is a relatively new concept. Most studies done between 2011-2015 focused on what gamification is and why it may be helpful to implement elements of gamification into a classroom. Since 2016, the studies and research done in this field have been more focused on how gamification is implemented. Additionally, there has been an increase in studies focusing on more diverse groups of students and a wider age group, like those with special needs and in middle school and high school (Nacke & Deterding, 2017). However, it is important to note that even though research is growing, it still is a relatively new concept and many studies done before 2016 were testing new tools, concepts, and ideas making it difficult for them to test exact correlations of the elements used to the impact it had overall with students’ learning. Tan Yuen Ling (2018) found that the concept of gamification was overall an effective motivational tool, but more research is needed to solidify a stronger connection between the gamified elements used in a course and the attainment of learning goals. Sailer and Homner (2019) further found that gamification research is relatively new and the number of actual primary studies is small. Therefore, significant data on the motivational and especially cognitive effects of the use of gamification in a classroom is extremely limited. They believe that more research will need to be done to understand what the impact of precise gamified mechanisms has on motivation and cognitive growth.
CHAPTER III: APPLICATION

Introduction

This chapter lays out the development and implementation of gamified elements in a seventh grade geography classroom in the Mounds View, Minnesota district. The chapter focuses on how the author created a gamified course based on the research of this study. It will show why the author chose to implement gamified elements, how backward design was used to establish what activities would be used based on the learning goals of the course, what gamified elements were chosen, how these elements were then implemented, and what adjustments in the gamified elements were made after assessing the learning outcomes. The author had 10 sections of 10-15 students. Sections were diverse and included students with learning disabilities, English language learners, males and females, and various strengths and interests. Students had class two days a week, with one of the days being an online lesson.

Process for Gamified Curriculum: Establishing the Compelling Why

While researching gamification, the author found that most studies concluded that overall gamification led to an increase in completing learning tasks because of an increase in motivation (Bovermann & Bastiaens, 2020; Chia Yuan Hung, 2018; Gomez-Carrasco et al., 2019; Khan et al., 2017). Additionally, recent research on gamification has helped to establish that incorporating gamified elements into a course has heterogeneous appeal, including students with special needs, different strengths and personalities, and males and females (Bovermann & Bastiaens, 2020; Khan et al., 2017; Malinverni et al., 2016). Gamified elements also lead to more constant and immediate feedback for both teacher and student. This feedback can help teachers further plan and adjust their instruction to help students attain their learning goals (Chia Yuan Hung, 2018). It can also help students to feel motivated to continue with learning tasks,
understand where their learning is at and what growth needs to happen (Bovermann & Bastien, 2020; Sailer & Homer, 2019; Welbers et al., 2019). The evidence supporting the use of incorporating gamified elements into the classroom led the author to incorporate some gamified elements into a seventh grade world geography course (see Appendix A).

Backward Design

Cheong et al. (2014) and Chia Yuan Hung (2018) both stated that when incorporating gamified elements to a course, using backward design was important in order to focus the tasks to the ultimate learning objectives. Backwards design is a more effective way to plan curriculum because it has proven effective in producing more long-term learning and desired results (McTighe, 2005). Keeping this in mind, when redesigning the first unit of geography, the author first considered the Minnesota Department of Education standards specifically focusing on the benchmark 8.3.1.1.2 where students should be able to “Create and use various kinds of maps, including overlaying thematic maps, of places in the world; incorporate the “TODALSS” map basics, as well as points, lines and colored areas to display spatial information (Minnesota Department of Education, Social Studies Standards, 2011 p. 85).” Then, addressed what summative assessments would be used to gauge student attainment of this learning goal. After that, it was decided what formative assessments and activities would need to be done in order for students to progress to their learning goals. Challenges that enhanced the learning objectives were then created to add to the activities and assessments.
Choosing Gamified Elements

When deciding what gamified elements to incorporate into the course, several factors were evaluated based on the research from this study. First, considering previous years assessments, the author reviewed data to establish what skills and knowledge students would most likely struggle with (Cheong et al., 2014; Chia Yuan Hung, 2018). Second, based on the criticisms of Welbers et al. (2019) the author considered and evaluated the technology resources and skills students had available and what resources and skills they potentially lacked. Third, the author evaluated which elements of a gamified course best aligned with the district, school, and instructor’s goals for learning and overall student well-being and growth. For example, student connectedness is a district, building, and classroom goal. Keeping this goal in mind, constructive competitions were incorporated into the course to help foster belonging, relatedness, and challenge (Rigby & Ryan, 2011; Sailer & Homner, 2019). Fourth, the author further selected gamified elements the research was finding most successful and eliminated elements that had shown potential issues and problems. Finally, the author further narrowed the selection elements in gamification by those that showed the most promise in addressing the three needs of the self-determination theory of autonomy, competency, and relatedness (Ryan & Deci, 2001). Keeping these factors in mind, elements chosen to be implemented in the course were choice, badges, team leaderboards, team competitions, pseudonyms, challenges, and individual leaderboards (See Appendices A, B, C, D, E, F, G, H, I, J).

Implementation

Giving students choice in what learning tasks they engage in and how they show their learning is an important element in a gamified course (Bovermann & Bastiaens, 2020; Chia Yuan Hung, 2018; Dominguez et al., 2013; Öztürk & Korkmaz, 2019; Tan Yuen Ling, 2018).
The author incorporated several choices for students to show their learning in both summative and formative assessments (See Appendix A, B and C). Not only does this address the self-determination theory’s need for autonomy, it also fulfills the important educational framework of differentiation. Differentiation involves responding to a student’s needs, strengths, and interests and responding to these by providing them with assessments that give them ways to utilize their strengths, interests, and skills (Bovermann & Bastiaens, 2020; Chia Yuan Hung, 2018; Dominguez et al., 2013; Öztürk & Korkmaz, 2019; Tan Yuen Ling, 2018).

Challenges were also included (See Appendix D). For most assignments, students could complete an additional challenge which awarded them points for their team, or “house.” Challenges help to fulfill the need for students to feel like they have autonomy and choice in the learning, and also serves as a way to increase learning and engagement (Barata et al., 2017; Chia Yuan Hung, 2018; Dominguez, et al., 2013; Öztürk & Korkmaz, 2019). For students who grasp the material quickly, this also serves to further supplement their learning and potentially draws on their interests and strengths. It also helps further motivate students by continuing to give them new challenges which helps prevent motivation waning due to boredom (Gundry & Deterding, 2019).

Aligning tasks to the learning goals helps to ensure the learning goals are actually met (Khan et al., 2017; Lindberg et al., 2019). An important learning goal in the geography course is spatial learning of places around the world. Keeping this goal in mind and also the technology resources available to students (Buharia & Leo, 2018; Welbers et al., 2018), mapping games with challenges and leaderboards were also put into the course (See Appendix E and F). Using a mapping game site, students could choose to compete in the game of their choice in order to try and get the best score in the class. Students were also given the choice to start and abandon a
game giving them a sense of autonomy (Chia Yuan Hung, 2018). This gaming competition helped students attain their learning goals by building scaffolding into the game. Students often start on easier games then progress to more difficult ones. The difficult games often require many turns to master, which research would suggest is motivating because of the sense of reward when improvement is shown (Dominguez et al., 2013; Gomez-Carrasco, et al. 2019). It also helps motivate students by fulfilling their need for autonomy, in giving them a choice whether or not they compete and recognition for their individual efforts, as well as their need for competence and relatedness because students are given instant feedback on their accomplishments and recognition by the instructor and fellow students because of the leaderboard (Barata et al., 2017; van Roy et al., 2019).

Badges were also incorporated to help motivate students (See Appendix G). Some studies showed that in the gamification of a course, the quantity of tasks done went up, while the quality went down (Barata et al., 2018; Tan Yuen Ling, 2018). To attempt to address this potential problem, badges were awarded to work that showed the highest quality on specific assessments that required more time and effort. This work was judged blindly by another teacher to try and legitimize the judging. Implementing badges in this way the instructor hoped to motivate students to show quality work and also give students who received a badge a sense of competency and recognition, thereby helping to feel more motivated to continue in learning tasks (van Roy et al., 2019; Welbers et al., 2018).

One major element implemented into this course was a team, or “house” competition (See Appendix H, I, and J). Each in-class group of students were called a “house.” The term “house” was chosen to capitalize on many students’ love for the Harry Potter book series. The ten houses got to choose a name, their house colors, and design their logo. Houses were awarded
points by individual students completing challenges, gaining badges, and team competitions. Students were shown the house leaderboard at each in-class session, but were only shown the top 5 leaders to try and minimize discouragement for the houses at the bottom of the leaderboard. At the end of the unit, the winning house got to claim the “Geography House Cup” (See Appendix G and H) as well as receive free time and candy. In the research found in chapter II, a problem found in some gamified classes was the lack of social interaction and teacher recognition (Tan Yuen Ling, 2018; Cheong, et al. 2014). Also, on individual leaderboards when some students were shown at the bottom, they felt discouraged and often disengaged (Domingue, et al. 2013). However, other researchers discovered that by incorporating more cooperative challenges and competitions, students often had more enjoyment, fulfillment, motivation, and collective learning (Öztürk & Korkmaz 2019). By incorporating house challenges, where students had to collectively as a team accomplish a goal, the author hoped to capitalize on these potential positive outcomes. Additionally, having more collaboration and connectedness among students is a district, school, and class goal because of the positive impact it is shown to have on students' mental health and intellectual growth.

Assessing and Adjusting

After completing unit one in the geography course, the author assessed students’ attainment of the learning goals, engagement in learning tasks, achievement, and enjoyment. The summative assessment showed positive overall results with over 95% of students showing mastery (a score of 80% or higher) on their assessment. The assessment itself had several choices of how students were able to show their learning (See Appendix C), some of which before this year could not have been carried out because of large class sizes. Since classes are at a maximum of 15, students could choose to verbally respond to questions one-on-one with the
teacher. For many students with reading and writing difficulty, and for English language learners, this proved to be a favorable choice in showing their learning. Additionally, 8% more students were able to show mastery on the mapping part of the test. The author believes this is in part due to the mapping game site and competition students engaged in.

An area of concern is the engagement of students outside of class. Typically, students have two online lessons a week. Some at home lessons have only about 50% of students actually completing them. While many of the higher achieving students are not only completing the work, but also choosing to complete additional optional challenges, others are not finishing their work, or often not even starting it. Students not engaged in the work have given the following excuses: I forgot; I didn’t understand it; I didn’t know I was supposed to do it; I was busy; I was out of town. Reexamining gamified elements, the author decided to incorporate two additions based on research into the course to try and motivate students to complete work at home. First, incorporating individual leaderboards like the studies done by Bovermann and Bastiaens (2020), van Roy et al. (2019) and Rigby and Ryan (2011). These leaderboards will show the points students earn by completing the challenges, earning badges, and participating in competitions. Second, giving additional points to houses that have a certain percentage of the at home work finished on time. Classes with over 50% of students completing the assignment will all get 1 point, 75% of students 3 points, and if all students turn in the assignment they all get 5 points. This would also be shown in class weekly which would give feedback to students to let them know what should have been done. However, the bottom five teams would not be shown on the list because some research has suggested that this can lead to frustration and giving up on learning tasks (Barata et al., 2013; Dominguez et al., 2013).
In future years, elements of this gamified course will need further adjustment. In part because class sizes will more than double, so some choices that are on assessments will need to change. The house competition also will need to be revamped because of class size. Since students will not have days of online school, elements to address current issues and problems that are the result of online school may not need to be a part of the course or should be adjusted to address whatever new problems and concerns arise.
CHAPTER IV: DISCUSSION AND CONCLUSION

Summary of Literature

Gamification is defined as “the use of game elements in a non-game context” (Deterding et al. 2011). While game-based learning is about incorporating games into the classroom, gamification uses game theory and good game design elements to help shape the coursework of a class (Chapman & Rich, 2018). Why gamification is used in the classroom is often for motivational purposes. Using the self-determination theory by Ryan and Deci (2001), researchers have found gamified elements help fulfill the three aspects of autonomy, competency, and relatedness. Most researchers have found that students in gamified courses complete more learning tasks and have a higher level of enjoyment and positivity of the course (Deterding et al., 2011; Gomez-Carrasco et al., 2019; Khan et al., 2017). Recent research over the past five years have studied the heterogeneous appeal and success of gamification in courses for students with varied abilities, such as a course for students with autism spectrum disorder (Malinverni et al., 2016), and varied personalities and strengths (Bovermann & Bastiaens, 2020). Additionally, gamification has also been shown to help educators to give and receive feedback more frequently, effectively, and timely (Chia Yuan Hung, 2018; Sailer & Homner, 2019; Welbers et al., 2018). Gamification also lends itself to incorporating scaffolding, challenge and gain in achievable, incremental ways that help students feel motivated to complete learning tasks and ultimately to attain their learning goals (Barata et al. 2017; Chia Yuan Hung, 2018; Dominguez et al., 2013).

How gamification is implemented in the classroom is extremely varied. Elements in gamification such as choice, challenges and quests, avatars and pseudonyms, scaffolding, experience points, badges, feedback, leaderboards, cooperative learning, and constructive
competition should be carefully implemented to help motivate students and ultimately to achieve the learning and classroom goals. Using backward design helps to ensure the learning outcomes are first established so that learning tasks are created and implemented to help students achieve the learning outcomes (Cheong et al., 2014; Oztürk & Korkmaz, 2019). Elements can be chosen that fit the self-determination theory and the three needs of autonomy, competency/mastery, and relatedness (Ryan & Deci, 2001). Incorporating gamified elements like challenges, quests, avatars, and pseudonyms help fulfill a student’s need for autonomy (Chia Yuan Hung, 2018; Dominguez et al., 2013; Tan Yuen Ling, 2018). Scaffolding challenges, badges, leaderboards, experience points, and feedback are elements of a gamified course that help fulfill a student’s need for competency and mastery (Barata et al., 2017; van Roy et al., 2019; Welbers et al., 2018). The third need, relatedness, can be filled by incorporating gamified elements like leaderboards, constructive competitions, cooperative learning, and personalized feedback (Bovermann & Bastiaens, 2020; Oztürk & Korkmaz, 2019; Rigby & Ryan, 2011; Sailer & Homner, 2019). Additionally, educators should evaluate their classroom resources, time, and the skills, needs, preferences, and strengths of their students (Sailer & Homner, 2019).

Knowing some of the potential limitations and hazards of gamified elements can also help educators choose and implement elements of gamification in their classroom to the greatest benefit. Some studies found the gamified courses versus the traditional course did not result in a higher level of achievement. This was especially true if the learning tasks were not aligned with the learning goals, or if students were rushing through tasks to achieve the reward (Barata et al., 2017; Khan et al., 2017; Lindberg et al., 2019; Tan Yuen Ling, 2018). Incorporating backward design helps to eliminate this potential limitation as well as awarding badges for quality work over quantity. Another potential limitation to gamification is students’ motivation wanes.
Gamification relies in part on novelty and fun to motivate. If the same tasks are done, students can feel bored with the repetition (Gundry & Deterding, 2019). Leaderboards can also cause students to feel discouraged and lose motivation if they are always seen at the bottom of the leaderboard (Barata et al., 2017; Dominguez et al., 2013). Adding new elements and including avatars and pseudonyms to leaderboards can increase motivation when it starts to wane. Students lacking resources and knowledge on how to use the resources can also be a limitation in a gamified course leading to frustration and sometimes quitting (Buharia & Leo, 2018; Gomez et al., 2019; Tan Yuen Ling, 2018; Welbers et al., 2019). Educators should evaluate the resources and the abilities of their students when considering what gamified elements and tasks they incorporate into their course. Some studies have shown that a gamified course can lead to students feeling isolated and unconnected to fellow students and their teacher. Especially if the gamified elements are all accomplishments individuals can earn and achieve. By incorporating group competitions, quests, and celebrations, educators can foster an even more collaborative and connected environment in their classroom (Cheong et al., 2014; Khan et al., 2017; Tan Yuen Ling, 2018). Finally, gamification is a relatively new concept in education and as such has a limited amount of research, especially in primary and secondary school settings. Since 2016, there has been more research done in heterogeneous classrooms, but it is still limited. Additionally, researches have stated there needs to be additional research and data to more precisely correlate specific gamified elements with learning successes (Nacke & Deterding, 2017; Sailer & Homner, 2019; Tan Yuen Ling, 2018).

**Professional Application**

Finding ways to motivate students to complete learning tasks is a challenge for every educator. Students who are intrinsically and extrinsic motivated to complete learning tasks often
show a greater level of achievement in attaining learning goals. Additionally, students who are motivated often report having more positive feelings toward the subject matter and course overall which has a positive impact on their social and emotional well-being. Gamification has shown to be a great tool for students to help motivate them, feel more connected, positive, and receive helpful, relevant feedback. Educators also benefit from a gamified classroom. It helps educators receive useful feedback to address students’ needs in attaining learning targets. Also, it helps them to design their course with even more deliberate intent since incorporating gamified elements takes time, evaluation, and analysis.

Educators should evaluate their resources, student needs, and learning targets when designing a gamified course. Since more and more classrooms have access to online learning, it is easier to incorporate online activities and games that can quickly give feedback to students, increase the difficulty of tasks, give rewards, badges, and have competitions. However, there are many tasks and competitions that do not have to have a digital component. Classroom competitions, in-person games, and choices in assessments are also a part of a gamified course and can lead to better motivation and positive feelings in students. Acknowledgement of achievement and celebration by badges, trophies, and awards can also be implemented in any classroom and can make students feel more competent, acknowledged, and connected. Many educators at the elementary school levels spend more time acknowledging achievements and celebrating them, but as much of the research in this study has shown, even college students or graduate students are motivated by awards, badges, and trophies (Deterding et al. 2013).

Incorporating gamified elements into a course can seem daunting and be time consuming for educators. However, educators should remember that gamification is not a replacement for their curriculum and instruction, but a tool in assisting them to help motivate students to better
grasp the instruction and learning. With that in mind, educators can start small and implement elements one at a time. Educators can then take the time to analyze what is and is not working in the implementation and adjust the elements to better fit their curriculum and students’ needs (Barata et al., 2017).

**Limitations of the Research**

The purpose of this study was to assess the effectiveness of gamification in the classroom and explore how it is best implemented. The terms game-based learning and gamification are current and new terms used in education, often interchangeably. Even in the literature from the early 2000s, some articles used the terms interchangeably. The author decided to focus on gamification instead of game-based learning, so eliminated research that used the term gamification, but the research was more focused on game-based learning.

The author is using this research in their middle school geography course. Originally, the author tried to find research on gamification just in the secondary level. However, it became apparent that since this is a relatively new concept in education the research expanded to research done at the post-secondary level as well.

**Implications for Future Research**

Before 2016 research surrounding gamification was almost all surrounding post-secondary courses. This meant there were not many studies done in K-12 settings, and studies did not show the effectiveness of gamification for more heterogeneous groups of students, like those with special needs. Since 2016 however there has been research conducted to include a wider variety of students ages, backgrounds, and needs (Nacke & Deterding, 2017). Still, with only a few years of study, there is much research to be done surrounding gamification and secondary education. In particular, elements of gamification that are most successful in
heterogeneous groups of students. Also, studies surrounding effective implementation and design in the middle school level is limited, especially in courses involving the humanities.

**Conclusion**

Although gamification is a relatively new concept in education and requires more research, it has shown in significant studies to motivate, engage, and ultimately help students attain their learning goals. By addressing the needs set forth in self-determination theory, using gamified elements can fulfill a student’s need to feel autonomy, competency, and relatedness. Educators have to be purposeful in designing their course to make sure the activities and tasks students are engaging in move them toward the learning goals of the course. By incorporating elements like choice, challenges and quests, avatars and pseudonyms, scaffolding, experience points, badges, feedback, leaderboards, cooperative learning, and constructive competition, educators can motivate students to engage more in learning tasks and have more enjoyment in the course content. Educators also have to consider what research has shown to be hindrances in motivation, like a lack of novelty, choice, collaboration, technology and skill issues, and feelings of incompetence. They also must be aware of the potential issue of students showing more quantity of tasks completed, and a lack of quality. Finally, they need to keep their unique group of students in mind. Finding activities that are challenging, yet attainable for their learners, and activities that students can complete based on their skills and technology is important to ensure students are able to fully participate in a gamified course.
References


doi:10.24039/olj.v22i2.1167


## APPENDIX A

### Unit 1 Outline

This unit outline includes the learning objective, activities, challenges, assessments, and slides.

<table>
<thead>
<tr>
<th>Unit objective: Students will be able to…</th>
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| 8.3.1.1.2 “Create and use various kinds of maps, including overlaying thematic maps, of places in the world; incorporate the “TODALSS”

<table>
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<th>Week 1:</th>
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<tbody>
<tr>
<td>1.1 Places in the world (google maps challenge) Activity</td>
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<tr>
<td>Geography introduction slides - introduction to geography, house competition, house points</td>
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<th>Week 2:</th>
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<tr>
<td>2.1 TODALSS Activity</td>
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<tr>
<td>2.2 Globe basics Activity</td>
</tr>
<tr>
<td>2.1 TODALSS and Globebasics slides</td>
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<td>3.1 Creating a map - formative assessment</td>
</tr>
<tr>
<td>3.2 Reading a map - activity</td>
</tr>
<tr>
<td>3.1 Creating and reading a map slides</td>
</tr>
</tbody>
</table>

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<th>Week 4:</th>
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<tr>
<td>4.1 Reading a map and globe basics, Unit 1 Assessment</td>
</tr>
<tr>
<td>4.2 Creating a map with TODALSS - Unit 1 Assessment</td>
</tr>
<tr>
<td>4. Unit 1 Assessment slides</td>
</tr>
</tbody>
</table>
APPENDIX B

**Summative Assessment on TODALSS**

Students created a map of their choice, incorporating accurate TODALSS. This assessment gave students choice on what they created and how they created the map.

<table>
<thead>
<tr>
<th>Directions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1.</strong> You will create a map of a real or fictional place. Your map must include all TODALSS, 4 symbols in the legend, and 10 total features on the map. Features can be cities, roads, mountains, rivers, restaurants, places to go, etc.. Your map can represent a large area, like an entire country, or a small area like your bedroom.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Choices for creating your map:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>3</strong> The map can be:</td>
</tr>
<tr>
<td>- A real place like your bedroom, Disney World, Minnesota, Tokyo, France.</td>
</tr>
<tr>
<td>- A fictional place like the land of a favorite book, an amusement/water park you create, an island you own.</td>
</tr>
<tr>
<td>- You can include the features you want. Examples: A map of favorite restaurants, a map of ten places from the book <em>The Hobbit</em>.</td>
</tr>
</tbody>
</table>

You can create your map:

- On paper using markers, colored pencils, pens, etc.
- Digitally
- 3D- you can make a place out of legos or play doh, still include TODALSS!
### APPENDIX C

#### Part of Unit 1 Summative Assessment - Mapping Basics

This assessment includes three choices for students to show their learning.

<table>
<thead>
<tr>
<th>X here your choice</th>
<th><strong>Continents:</strong> Choose one of the options below on how you want to show that you know!</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Game! Play Seterra Continents game in classroom and show Mrs. Mulberry your score. Score__________</td>
</tr>
<tr>
<td>2</td>
<td>Say it! I will point to a continent and you will say the name of to me.</td>
</tr>
<tr>
<td>3</td>
<td>Write it! What continent is number…</td>
</tr>
<tr>
<td></td>
<td>1.</td>
</tr>
<tr>
<td></td>
<td>2.</td>
</tr>
<tr>
<td></td>
<td>3.</td>
</tr>
<tr>
<td></td>
<td>4.</td>
</tr>
<tr>
<td></td>
<td>5.</td>
</tr>
<tr>
<td></td>
<td>6.</td>
</tr>
<tr>
<td></td>
<td>7.</td>
</tr>
</tbody>
</table>
### Challenge!!
This is optional, but will earn you 10 house points!

**Answer the following:**

1. Why did you create the map you made?
2. What are your 2 favorite features you included and why?
3. What additional features would you put in your map?

### Additional Points!

Your map can win a badge by being:
- creative
- artistic
- most features
- interesting
- accurate
APPENDIX E

Mapping game with score

Students could enhance their geography knowledge and receive house points by completing a game. They also could receive additional points and badges if they received the best score. Seterra mapping games was the site used.
APPENDIX F

**Individual Leaderboard, Mapping Competition**

Students could compete in a mapping game competition. Students who scored a higher percentage could put their name on the leaderboard. Once the leaderboard was at 100% accuracy, students had to beat the time. This leaderboard was displayed in the classroom.

<table>
<thead>
<tr>
<th>Name</th>
<th>Percentage</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sam</td>
<td>153%</td>
<td>2:57</td>
</tr>
<tr>
<td>Ben</td>
<td>100%</td>
<td>1:47</td>
</tr>
<tr>
<td>Anna</td>
<td>100%</td>
<td>1:31</td>
</tr>
</tbody>
</table>
APPENDIX G

Badges Awarded

Students received badges for demonstrating high quality on their assessment. Badges were awarded based on creativity, artistry, and accuracy. The maps were judged by another teacher to help ensure fairness.
APPENDIX H

House Cup- Unit 1 winners “The Marauders”

House teams won the cup by individual and team points. Individuals could win points by completing challenges, earning badges, and competing in mapping competitions. House teams could win points by winning group competitions and having the high percentage of assignments turned in.
APPENDIX I

**Geography House Team Competition Board**

Points earned by students completing challenges, winning competitions, and earning badges were compiled on a spreadsheet, then divided by the number of students in each house to give an average number of points scored on a team.

<table>
<thead>
<tr>
<th>Team</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Leprechauns</td>
<td>34.4</td>
</tr>
<tr>
<td>Deep Fried Frogs</td>
<td>33.3</td>
</tr>
<tr>
<td>The Government</td>
<td>29.8</td>
</tr>
<tr>
<td>Black Mamba</td>
<td>27.8</td>
</tr>
<tr>
<td>The Marauders</td>
<td>27.2</td>
</tr>
<tr>
<td>Glizzy</td>
<td>21.8</td>
</tr>
<tr>
<td>Little Big People</td>
<td>18.6</td>
</tr>
<tr>
<td>Puppy Peoplez</td>
<td>17.0</td>
</tr>
<tr>
<td>Kool- Aid Men</td>
<td>16.0</td>
</tr>
</tbody>
</table>
APPENDIX J

Geography Individual Competition Board

Individual points were earned by completing challenges, winning competitions, and earning badges.

<table>
<thead>
<tr>
<th>Team Name:</th>
<th>Ethan A.</th>
<th>Sarah G</th>
<th>Noah J.</th>
<th>Ina M.</th>
<th>Maria M.</th>
<th>Johnathan P.</th>
<th>Noah P.</th>
<th>Rylan R.</th>
<th>Bella R.</th>
<th>Annika R.</th>
<th>Keoni S.</th>
<th>Tiffany T.</th>
<th>Titus U.</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Mauraders</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>10</td>
<td>0</td>
<td>0</td>
<td>10</td>
<td>0</td>
<td>10</td>
<td>0</td>
<td>10</td>
<td>0</td>
</tr>
</tbody>
</table>