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Junior High Teachers' Perception on Consistent Implementing Technology-Based Gamification

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This is to certify that the doctoral study by

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has been found to be complete and satisfactory in all respects,
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Walden University
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Abstract

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MSc, Simon Fraser University, 2012

BSc, Shahid Bahonar University, 1993

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Abstract

The problem investigated was many junior high teachers do not consistently implement technology-based gamification (TBG) within class activities despite evidence showing it as a useful learning tool for student engagement. This study aimed to explore why junior high teachers do not consistently implement TBG and identify the barriers and potential solutions from teachers' perspectives. A modified technology acceptance model and diffusion of innovation theory were combined with cultural and local aspects to generate a comprehensive gamification acceptance model. A basic qualitative approach was suitable for the study. The research questions sought junior high teachers' perceptions about consistently implementing TBG, the obstacles, and the potential solutions. Seventeen teachers of four neighboring schools in western Canada formed the purposive sample for semistructured personal interviews. The method of data analysis was interpretive thematic coding. Study outcomes supported TBG's usefulness as a learning object and an engagement tool that offers students' sense of community. The data aiding TBG's ease of use indicated that teachers' experience, required preparation time, and technical support altered the TBG adoption rate. Also, internal and student-related pressures for teachers defined perceived social pressures and altered the TBG adoption rate. Teachers identified insufficient training as the main barrier and suggested that TBG standardization is the leading solution to inconsistent implementation of TBG. Principals may use the outcomes to remove the barriers for teachers. Districts directors can standardize TBG and measure teachers' practice with TBG. Such data may positively impact social change by supporting teachers to make informed decisions about removing barriers and improving the TBG adoption rate.

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Dedication

I dedicate my dissertation to my family and many friends. Special gratitude to my wife, Laya, my son, Ario, and my daughter, Auva, for being there for me throughout the doctorate program.

I also dedicate this dissertation to my colleagues at Farhangian Educators Association (FEA) for being patient with my pace of meeting my responsibilities at FEA during my doctorate studies.

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Chapter 1: Introduction to the Study

Previous studies have revealed that teachers can effectively use gamification to solve learners' lack of engagement within class activities (Dichev & Dicheva, 2017; Sanchez-Martin et al., 2017). High school teachers are often encouraged and engaged in training for applications of technology-based gamification (Computer Using Educators of British Columbia, 2020). According to a technology support teacher-librarian at the study site, the technology and support to gamification are available for high school teachers. However, junior high teachers do not consistently implement technology-based gamification (TBG). This investigation was necessary to discover why junior high teachers from British Columbia (BC), Canada, do not consistently implement TBG in their classes. This study also addressed the obstacles in using TBG and the solutions to the problems from junior high teachers' point of view.

Teachers who gamify their classes often deliver their lessons better by inviting students to be observant immediately (Sobocinski, 2017). These teachers can positively influence their students' psychological and behavioral outcomes (Fadhli et al., 2020). They can contribute to their students' education by driving them into productive doubt, eagerness, and excitement to gain knowledge while achieving tasks (Sobocinski, 2017). Therefore, they can positively change the social life of their students and make them self-directing citizens. I contributed to a literature gap in this research by finding why junior high teachers may not consistently implement TBG. Future research can benefit from this study's findings that identified obstacles to using TBG and possibly encourage teachers to apply TBG.

This chapter provides a background about the previous studies on gamification and briefly shares the problem statement and purpose of the study. Then I offer the research questions (RQ), conceptual framework, nature of the study, and the definition of the critical terms. Before the summary of this chapter, the chapter addresses assumptions, scope and delimitations, limitations, and significance of the study.

Background

Gamification of courses can facilitate experiential learning environments to increase student engagement and motivation (Sanchez-Martin et al., 2017). Previous research has revealed that game-playing can improve the classroom atmosphere (Huizenga et al., 2017). Gamification can also be helpful to overcome students' emotional rejection of challenging topics (Sanchez-Martin et al., 2017). Furthermore, many teachers have come to openly acknowledge gamification's positive effects on students' peer interactions (de Lope et al., 2017). Nevertheless, teachers have also reported that applying TBG is challenging (Sanchez-Mena & Marti-Parreno, 2017; Sobocinski, 2017). Many high school teachers view themselves unprepared for integrating TBG into their lessons (Sanchez-Mena & Marti-Parreno, 2017; Sobocinski, 2017). High school teachers have also reported a lack of time (Sobocinski, 2017), resources and training, and self-efficacy in using technology as barriers to preparing and using productive TBG (Sanchez-Mena & Marti-Parreno, 2017). As a result, the TBG adoption rate among junior high teachers is below expectations (Cheok & Wong, 2015), although TBG tools are available.

Previous researchers have attempted to find why different teachers feel hesitant about integrating TBG (Adukaite et al., 2017; Asiri, 2019; Dele-Ajayi et al., 2017). They

have found that factors such as curriculum fit (Dele-Ajayi et al., 2017), relative advantage (F. Huang et al., 2019), and enabling environment (Adukaite et al., 2017) influence teachers' decisions in accepting and adopting TBG. Researchers have also addressed questions such as what the obstacles for teachers in using gamification are (Bourgonjon et al., 2013), how challenging it is to identify good games (Araujo & Carvalho, 2017), and how attitudes of school principals affect teachers' intentions in implementing gamification (Machado & Chung, 2015). Researchers have also examined how insufficient the system's support is for teachers in implementing TBG (Araujo & Carvalho, 2017; Hill & Valdez-Garcia, 2020; Sobocinski, 2017) and why teachers need to improve their skills by professional development programs before they can effectively gamify their lessons (Bourgonjon et al., 2013; Hill & Valdez-Garcia, 2020).

The research around gamification was still limited before this study (see Fadhli et al., 2020). Questions such as why many junior high teachers do not implement TBG within class activities (Sobocinski, 2017), what are the specific obstacles for junior high teachers in implementing TBG into their class activities (Hill & Valdez-Garcia, 2020), and what are teachers' perceptions of potential solutions to overcoming these obstacles (Sobocinski, 2017) have remained either unanswered or only partially answered.

BC teachers need to transform the education system at the local level to better engage students in their learning (British Columbia Ministry of Education, 2020). Schools and districts have supported teachers' professional development and training for integrating technology, including TBG (Computer Using Educators of BC, 2020). High school administrators have also stated their expectations for teachers to implement TBG.

However, according to the school principal and the technology support teacher at the research site, teachers' perceptions of what challenges them with their inconsistent implementation of TBG were unknown for the local school administrators and technology departments. Therefore, discussing why teachers do not consistently implement TBG into their class activities addressed a gap in the literature and a significant local problem.

Problem Statement

The research and meaningful local problem in the Mountain Lake (a pseudonym) school district, according to the school principal and technology-support librarian teacher and addressed in this study was that many junior high teachers do not consistently implement TBG within class activities despite evidence showing it as a useful learning tool (see Khan et al., 2017; Stieler-Hunt & Jones, 2017).

Students of all levels generally have a positive perception of the use of gamification (Buckley & Doyle, 2016). Still, only 11% of higher education instructors have gamified their classes, and 38% have never used gamification (Marti-Parreno et al., 2016). High school teachers have also testified that they are reluctant to take risks with classroom management of junior high students and that preparing TBG was not justified when they work alone preparing TBG (Sobocinski, 2017).

Lack of supporting literature was the first limitation around teachers' perceptions of TBG (Alabbasi, 2018). Marti-Parreno et al. (2016) stated that the research, to some extent, has not discussed or identified teachers' opinions as to the change agent in school toward TBG, and most are focused on the students' behavioral intentions in using TBG.

Studies about the factors influencing teachers' decisions in using TBG from the teachers' perspective are also limited (Fadhli et al., 2020; Marti-Parreno et al., 2016), and previous studies have not systematically approached the problems with using TBG. There should be factors affecting teachers' perceptions.

Researchers should employ as many potential influencing factors as possible to discuss and address teachers' acceptance and adoption of TBG. Some researchers have examined playfulness of gamification, curriculum fit of the games, learning opportunities offered to the class when using gamification, challenges brought to the students, teacher's self-efficacy, and teacher's computer anxiety as the predictors of teachers' decisions about using gamification (Adukaite et al., 2017). Others have used factors such as subjective norm and social pressure teachers experience for using gamification, syllabus connectedness of the existing TBG, engagement and learning opportunities offered to the classes, teacher's experience with technology, and enabling environment of the schools (Dele-Ajayi et al., 2017).

Recent studies have added factors related to specific cultural and regional indicators of nationality, gender, and age (Asiri, 2019; F. Huang et al., 2019). F. Huang et al. (2019) adapted behavioral intentions (BI) from Davis's (1989) work, subject norms from Fishbein and Ajzen (1975), individualism-collectivism index, power distance index, uncertainty avoidance index, compatibility, and complexity from Rogers (2003), and an indulgence-constraint index from Hofstede (2011) when they studied the factors influencing the use of gamification by teachers. However, there was no study with inclusive types of factors.

The existing studies have not closed the gap in the knowledge of teachers' main drivers and barriers to using gamification in their courses (Fadhli et al., 2020; Ozcinar et al., 2019). The drivers and obstacles for implementing TBG for practicing junior high school teachers were unknown, and few studies targeting junior-high level courses were conducted, only inviting pre-service teachers. Teachers' voices about the potential solutions to the problems mentioned above have not been systematically heard. The school principal and the technology-support teacher-librarian at the study site shared that the drivers and barriers for junior high teachers of BC in consistently implementing TBG are unknown. This gap defined the study's purpose.

Purpose of the Study

The purpose of this study was to investigate the reasons many junior high teachers at Mountain Lake school district do not consistently implement TBG within class activities despite evidence showing it as a useful learning tool. The study's focus was to identify the obstacles to consistently implementing TBG for the teacher-participants of this study. The study was also designed to explore the solutions to those barriers from the participants' perspectives.

This study's research paradigm was a basic qualitative study that provided an opportunity to conduct an empirical collection of data by exploring the opinions of junior high teachers at Mountain Lake school district in BC. According to the technology-support teacher-librarian at the study site, junior high teachers of Mountain Lake do not consistently implement TBG, and I identified a corresponding gap in the literature. I

employed an inductive methodological process to formulate the reasons behind inconsistent TBG implementation.

Kahlke (2014) stated that the RQs of some studies do not fit neatly within a single established methodology, such as grounded theory or ethnography, and researchers employ to use a basic approach. I noticed the same quality with the RQs of this study and employed a basic approach. A phenomenological investigation seemed close to this paradigm, but it was not entirely suitable. The difference between phenomenology and basic is similar to the difference between "experiencing" and "experienced." A phenomenology investigates lived experience and addresses an ongoing inward act to connect to phenomena and how participants are experiencing the phenomena.

Meanwhile, a basic investigation focuses outwardly on what has been experienced, what has happened, and participants' beliefs about what they have experienced (Percy et al., 2015). It does not have to be ongoing. The latter was more suitable for this study as I collected data from teachers' experience with applying TBG.

It was helpful and productive to know whether, for example, internal indicators such as teacher's self-efficacy or external indicators such as lack of information technology support were barriers. These findings provided information to educational leaders at both school and district levels to develop proper solutions. I wanted to identify a collection of barriers to target in future professional development. A purposeful RQ was required to determine that collection.

Research Questions

The following research questions guided this study:

RQ1: What are junior high teachers' perceptions about consistently implementing TBG within class activities?

RQ1a: What are junior high teachers' perceptions of the obstacles for teachers in consistently implementing TBG within class activities?

RQ1b: What are junior high teachers' perceptions of potential solutions to overcoming these obstacles in consistently implementing TBG within class activities?

Conceptual Framework

Teachers' BI is a phenomenon discussed in this study. Accepting or not accepting a technology, TBG in this study is a teacher behavior. Because the technology acceptance model (TAM) discusses users' behavior, it was an appropriate model for this study, and it has been used in several similar studies. If teachers believe in the benefit of a TBG, they are more likely to implement it. Nevertheless, there are two arguments, subsets of BI, to ensure a consistent TBG implementation: teachers’ acceptance of TBG and teachers’ feeling comfortable adopting TBG (F. Huang et al., 2019).

Davis offered TAM in 1989 to explore factors affecting technology acceptance. I used TAM to investigate factors affecting teachers' decisions to accept a TBG. Researchers have identified that factors suggested by TAM are not inclusive, and there are other factors affecting technology acceptance (Asiri, 2019; Dele-Ajayi et al., 2017; F. Huang et al., 2019). Thus, they had added a few more influencing factors to TAM to generate an extended TAM. A few researchers, such as Asiri (2019), have combined the

extended TAM with cultural and regional factors. The compilation of the factors influencing teachers' decisions to accept technology is further addressed in Chapter 2. I also added some local-based influencing factors addressing potential issues in the district where the research occurred.

Acceptance of TBG does not guarantee its adoption. Therefore, for the second argument, Rogers's (2003) diffusion of innovation (DOI) theory was a suitable model for addressing the TBG adoption rate by teachers. If the time required to prepare TBG or its complexity is high and does not justify using TBG, even though teachers accept TBG as a valuable tool for student engagement, they avoid implementing it. Therefore, in this study, I explored factors influencing the rate of adoption of TBG. Combining both arguments, I studied teachers' perceptions of TBG from two lenses of TAM and DOI to address junior high teachers' BI of accepting and adopting TBG. In western Canada, 8th to 12th-grade students are called high schoolers, while 8th to 10th-grade students are junior high.

I combined the factors identified in the work of Davis (1989), Adukaite et al. (2017), Dele-Ajayi et al. (2017), F. Huang et al. (2019), and Asiri (2019). I also added a few local-related indicators to generate a comprehensive gamification acceptance model (CGAM) with 23 factors. These factors helped prepare interview questions, collect and categorize responses, analyze and interpret outcomes, and make conclusions. The details of influencing factors are part of Chapter 2. The framework explained above is related to the study approach and key RQs.

Seeking teachers' perceptions of TBG fitted qualitative methods with open-ended questions in interviews. Pektas and Kepceoglu (2019), Ozcinar et al. (2019), Alabbasi (2018), Huizenga et al. (2017), Yong et al. (2016), Stieler-Hunt and Jones (2017), and Sanchez-Mena and Marti-Parreno (2017) benefited from qualitative studies in which they asked "what" questions exploring teachers' opinions about TBG. They were comfortable collecting data and indicated that their approach was suitable for offering conclusions. I also sought teachers' perceptions; therefore, a qualitative approach was ideal for teachers to share their opinions in open-ended interviews.

The RQs of this study was "what" questions, similar to the studies mentioned above. In addition, I noticed similarities between the research elements and terms of this study and the studies mentioned above. For example, the participants' characteristics, nature of institutes, and study interests were similar to those of this study. Therefore, I considered these similarities and conducted qualitative research combining a TAM-based with a DOI approach. This combination defined the nature of this research.

Nature of the Study

I primarily felt responsible for supporting junior high teachers' virtue and functionality by developing a deeper understanding of the problem. This responsibility defined this study’s design point of view (see Hood, 2016). As an educator, I know teachers would like to explain their feelings, and many hesitate to answer predesigned questions such as questionnaires. Therefore, the decision to approach this study with a qualitative method seemed adequate. In addition, it helped me better understand teachers'

underlying drivers and barriers inconsistently applying TBG (see Huizenga et al., 2017; Putz et al., 2020).

I conducted this study using qualitative research methods and interviewed junior high teachers to determine their TBG perspectives. According to Matua and Van Der Wal (2015), personal interviews provide the opportunity to engage interviewees and the interviewer in meaningful discussions and interactions. Open-ended questions engaged the interviewees in communication and helped me explore the phenomenon with limited existing knowledge in the growing technological education industry (see Fadhli et al., 2020; Suh et al., 2018; Zainuddin et al., 2020). Nevertheless, the nonprobability sampling technique for 17 teacher participants made a suitable qualitative study for this research, as 68% of qualitative studies have used between five to 25 participants (see Yong et al., 2016).

From a list of all junior high teachers willing to participate from four neighboring schools of Mountain Lake district in BC, I chose 17 best fits for personal online interviews. I recorded the sessions for a better chance to engage in open-ended discussions. The talks were semistructured with an interview protocol; however, the interviews went on when teacher-participants preferred to explain their feelings and experience applying TBG. I ensured guiding the discussions to identify the obstacles to consistently implementing TBG and the participants' potential solutions. The CGAM's 23 defined factors were a vital instrument helping with the interview protocol questions, organizing data, and interpreting data. To better understand the range of CGAM factors, I define the terms in the following section.

Definitions

The definition of some of the CGAM's factors influencing teachers' decisions in consistently implementing TBG are as follows:

Challenge-level appropriateness: The level of the challenge TBG offers to any specific class and grade (Adukaite et al., 2017).

Curriculum fit: The extent that TBG can be used to support a subject's traditional classroom curriculum. It also explains the ways and the capacity that TBG can meet the curriculum (Dele-Ajayi et al., 2017).

Enabling environment: The degree that the infrastructure (power, internet, devices) supports the use of TBG (Dele-Ajayi et al., 2017).

Parents' perceptions: The parents' awareness and belief about TBG; the extent to which parents' gender, age, and characteristics affect their assumption on TBG's usefulness (Eutsler et al., 2018).

Playfulness: The level that TBG is attractive and generates a desire for students to participate. It is the extent that TBG reduces self-consciousness and keeps learners surprised and entertained (Pavlidis & Markantonatou, 2018).

Relative advantage: A product's degree of superiority or attractiveness to customers over existing products. It refers to how TBG is perceived as better than the idea it supersedes (Rogers, 2003).

Students' acceptance: The degree to which the performance expectancy, effort expectancy, social influence, facilitating conditions, the voluntariness of use, and

students' age, gender, and experience may affect how students accept participating in TBG-based activities (Yalcin & Kutlu, 2019).

Subject area appropriateness: Discusses whether TBG meets the core curriculum and detailed educational purposes of a subject (Adukaite et al., 2017).

Subject norm: The degree to which the stakeholders believe TBG is beneficial and should be used at schools (Dele-Ajayi et al., 2017).

Teacher's computer anxiety: The extent of teachers' negative experiences, if they felt fear or apprehension working with computers, affecting their decision to accept and adopt TBG (Adukaite et al., 2017).

Assumptions

The scope of the study, in particular the number of interviews, the variety of subject areas designed to be covered, and pandemic conditions, demanded some assumption. This study's assumptions, which affected the study's pathway, are discussed in this section.

Interviewing 17 junior high teachers out of 70 of them in the four schools from the Mountain Lake district was adequate to discover why junior high teachers do not consistently implement TBG. Seventeen participants were more than the number of participants that most qualitative researchers have interviewed for TBG-related studies (see Dele-Ajayi et al., 2017; Sanchez-Mena & Marti-Parreno, 2017; Yapici & Karakoyun, 2017; Yong et al., 2016). Teacher-participants' answers to the interview questions informed the study effectively because I chose participants from a sample of practicing teachers who had experienced preparing and using TBG at least once. The

participants voluntarily participated in the research and could withdraw at any stage from being part of the study.

I kept the door open to teachers of all subject areas because instructors of various courses have admitted that they could benefit from tools that improve student engagement (see Dichev & Dicheva, 2017). There were enough eighth- to 10th-grade teacher-participants because many senior teachers (11th and 12th-grade) also teach junior courses. The initial plan was to interview teachers from all courses offered to junior high students; therefore, this was essential in choosing participants.

Personal interviews allow researchers to immediately experience teacher participants' feelings and engage in a meaningful conversation (see Matua & Van Der Wal, 2015). Therefore, I assumed the interview's agenda and nature to be a professional and productive topic of interest to the teachers, administrators, technology departments, and the district. In the new era of education, these assumptions are most likely correct. However, I also assumed teachers would share their honest understanding, address their abilities and potential barriers to consistent TBG implementation, and offer ways to remove internal and external obstacles. If this assumption were not valid, interviewing teachers would not be helpful. Therefore, I chose a scope for this study to contribute to the literature gap and assist the local schools.

Scope and Delimitations

This research study was in the Mountain Lake school district, where I have taught for 15 years and thus have access to other teachers. Therefore, I chose eighth to 10th-grade teachers called junior high teachers in the school district as the study population. According to the technology-support teacher-librarian at the study site, teachers of these grades experience a minor engagement and motivation among the students.

Elementary students are often naturally engaged, and it is easy to gamify lessons with the least effort in those classes. Thus, there might be no need for TBG when a simple game element, such as badges, is sufficient. Senior high students are also mainly engaged. According to the school principal at the research site, 11th and 12th-grade students are more mature and dedicated to increasing their average and grade point average for their diploma and preparations for postsecondary studies. In addition, senior students know what they want from education. The technology-support teacher-librarian at the study site shared that the dedication of senior students is experienced at least in this district, and teachers have a minimal problem with the engagement of senior students. Nevertheless, junior high students are in the middle of not being entertained easily and not deciding what they can expect from their studies. Therefore, this study focused on teachers who deliver junior high courses.

The other specific aspect of the research problem was the Mountain Lake district's locality in BC, Canada. The school district has invested time and capital in engaging students by equipping teachers to perform their best in engaging students (Computer Using Educators of British Columbia, 2020). This study sheds light on their future

investment and expectations by addressing a gap in the literature and the teachers' practice in western Canada.

Another aspect of the study addressed by the RQ1 was identifying the barriers for teachers in consistently implementing TBG. The school principal at the study site claimed that finding the obstacles could help the administration and information technology (IT) departments plan proper training and professional development by removing the identified barriers for the junior high teachers challenged by students' lack of engagement. Also, by identifying the potential barriers and how influential they are, many junior high teachers interested in implementing TBG may systematically approach removing them by actions such as peer-coaching.

The other important aspect addressed by the RQ2 was the potential solutions teacher-participants shared during the interviews. Many researchers have argued that teacher voice in decision-making is absent in education while they are most engaged and knowledgeable about local practices (see Gozali et al., 2017). Jesmin and Ley (2020) stated that teachers openly share their opinions during interviews. Thus, I benefited from discussions and invested my time hearing the teachers and passing the collected information to the school administrations and district directors. Also, interviews with those teachers helped find new ideas about how they could benefit from services such as direct/on-sight IT support or peer coaching.

Researchers have used different factors to discuss teachers' acceptance and adoption of TBG. F. Huang et al. (2019) researched the individualism-collectivism index, power distance, uncertainty avoidance index, and indulgence-constraint index offered and

used by former researchers and theorists. They compiled a set of influencing factors affecting teachers' acceptance and adoption of TBG. However, some of the indicators used by F. Huang et al. did not fit with CGAM. For example, CGAM does not check power distance and indulgence versus constraints as the predictors that F. Huang et al. used to study Chinese and Spanish instructors where the education philosophy differs from North America. However, discussions during the interviews naturally addressed some aspects used by F. Huang et al. For instance, in the Canadian educational society, the power distance is well defined. It is a traditional factor determining the distance between colleagues. Indulgence versus constraints addresses the gratification of teachers' needs and enjoyment in accepting and adopting TBG and is again well-addressed in teacher preparation programs in western Canada. Hence, teachers have had minimal problems with these factors in western Canada.

This study's outcomes can be generalized for other junior high schools in western Canada and regions with similar economic and teacher training. Future researchers may repeat this study with some context changes and set in areas with different economic and cultural requirements and expectations. However, the future researchers' responsibility is to do a thorough work of describing the central assumptions and context of the study and transferring the results to a different environment where teachers' BI in implementing technology is at stake. Previous studies informed the literature of the limitations in sampling. This study also had limitations in sampling described in the next section.

Limitations

A limitation of this study's sample was the wide range of teacher participants' experience with TBG. Therefore, it was not easy to identify and invite teachers with TBG's exact level of expertise to the interviews. For example, there was an outlier on both ends of teacher participants' interest in integrating TBG: a teacher highly comfortable consistently implementing TBG and the other highly opposing implementing TBG. Consequently, I ensured that the combined information collected from interviews was not biased. In addition, I sought teachers' experience level with TBG before their enrollment using a recruitment survey. Therefore, I excused potential identified outliers from participation to avoid collecting biased data.

Another limitation of the study sample was the 18 subject areas junior high teachers offer at the Mountain Lake district. If I had collected data from teachers of the same subject area, the study outcomes could better help future professional development focusing on that subject area. Instead, I collected data from teachers of various subject areas, so the study outcomes may help prepare general professional development programs. Future studies may portray any of these two situations as a limitation, depending on their study's characteristics.

Another possible limitation, common to almost any qualitative study with interviews, was that a few interviewees avoided answering a couple of questions. Those questions were about the solutions to the barriers to consistent TBG implementation. Participants limited their answers to some short responses such as "I have no updated knowledge of it." For example, some teacher-participants had no experience with "access

to peer-coaching," one of the CGAM factors, to share their feelings about it or see it as a solution. I noticed a couple of participants avoided mentioning or opening the impact of teachers' computer anxiety, a CGAM factor affecting teachers' decision to implement TBG, for personal reasons. Nevertheless, teachers knew what they wanted from the interview and made their job easier and their careers more meaningful (see Gozali et al., 2017). By addressing the limitations of this study appropriately and by choosing a proper approach, this study has offered a significant set of results.

Significance

Studies such as this are needed to find meaningful ways to help already overburdened teachers continue to grow professionally in an ever-changing, often highly technological era (see Sanchez-Mena & Marti-Parreno, 2017). This study can contribute to positive social change (see Donohoo, 2017). Gamification is still growing in both practice and literature (Dichev & Dicheva, 2017). According to Sobocinski (2017), gamification was at the peak of the Gartner Hype Cycle. Therefore, in 2 to 7 years from this study, it will be on the plateau of its productivity. Thus, there is still time to enlighten teachers interested in implementing TBG into their teaching practices after seeking the reasons for their inconsistent implementation.

Outcomes attached to each CGAM factor of this study solely and combined with other factors offer a set of information that can affect positive social change in teachers' and students' lives. Gamification positively affects students' motivational affordances and psychological and behavioral outcomes (Fadhli et al., 2020; Pektas & Kepceoglu, 2019). Gamification also often engages students better than in non-gamified environments (Tsay

et al., 2018) and positively impacts learners' knowledge retention (Putz et al., 2020). This study, within its scope, contributes to a gap in the literature and opens a door for future research to encourage teachers to apply TBG by being informed of all CGAM-related factors. The study enables BC teacher preparation programs to include gamification in their syllabus and train future teachers with TBG tools while addressing CGAM factors such as teacher's preparation time and teacher's experience with technology. Also, BC school districts can use the study outcomes to manage the enabling environment, plan for local professional development programs, and improve technological facilities and the environment. Computer Using Educators of BC (CUEBC) can use the outcome of this study to address curriculum fit and subject area appropriateness and design TBG workshops dedicated to junior high teachers. Teachers can benefit from the study's results in managing students' acceptance and anxiety when designing TBG. The study outcomes empower teachers to make informed decisions when implementing TBG. Outside of this study's scope, the literature now offers a study focusing on junior high teachers and TBG implementation. Researchers can rely on the findings and be encouraged to repeat and expand this study with their region and subject of interest. Succeeding studies can benefit from CGAM in their studies and extend it further.

Summary

Several studies have proven that gamification, including TBG, improves student engagement (see Sanchez-Martin et al., 2017). Ozcinar et al. (2019) stated that researchers had addressed factors affecting teachers' decisions to accept and adopt TBG into their teaching practices. However, according to Fadhli et al. (2020), there are limited

studies about why teachers avoid using TBG. The purpose of this study was to investigate junior high teachers' perceptions about their implementation of TBG within class activities. The main RQ addressed why junior high teachers do not consistently implement TBG despite studies showing it as a valuable educational tool. Seventeen teacher-participants participated in interviews in a basic qualitative approach to share why they do not consistently implement TBG even when the proper training and tools are available. Participants also shared the barriers in implementing TBG and solutions they could summon to remove the obstacles. The study contains a generated model, CGAM, by combining the models of previous research studies.

The 23 influential factors affecting teachers' decision to accept and adopt TBG is a comprehensive set of elements offered by a gamification study. However, there are limitations in sampling, and only 17 junior high teachers of four neighboring schools in the Mountain Lake district participated. Another potential limitation was that this study's outcomes represent the teachers' perceptions in western Canadian school districts, which might not represent all teachers in Canada and the world. However, outside this study's scope, future related literature may benefit from at least one study conducted on implementing TBG with junior high teachers-participants. Researchers can rely on this study's findings and repeat or expand them within their subject area and region of interest. Succeeding studies can benefit from CGAM in their studies and extend it further.

In Chapter 2, I discuss a suitable conceptual framework for this study. The framework played a vital role in designing the study pathway, collecting data, and interpreting the findings.

Chapter 2: Literature Review

Research studies have shown that many junior high teachers do not consistently implement TBG within class activities despite evidence showing it as a useful learning tool (Khan et al., 2017; Stieler-Hunt & Jones, 2017). The school principal and a technology-support teacher-librarian at the study site confirmed this gap as a meaningful local problem in the Mountain Lake school district. Therefore, the purpose of this study was to investigate the reasons many junior high teachers at Mountain Lake school district do not consistently implement TBG within class activities despite evidence showing it as a useful learning tool.

There is a lack of research on why junior high teachers do not consistently implement TBG within class activities. In this chapter, I report that the studies closely related to the acceptance and implementation of TBG reveal why this topic is researchable and why its outcomes are appreciated. This chapter also demonstrates how the TAM and DOI theory can be combined as a conceptual framework for specialized educational technology audiences to understand why teachers do not consistently implement TBG.

BC teachers have tried to engage students in the class activities and gain their attention; however, students' interest in lessons is short-lived when there are no game elements (Johnson & Delawski, 2013). Gamification uses game design elements (see Khaleel et al., 2016; Pektas & Kepceoglu, 2019) in a non-game context. It enhances learning engagement (see Albertazzi et al., 2019) and is a practical approach for increasing students' attention (see Buckley & Doyle, 2016; Khan et al., 2017; Stieler-

Hunt & Jones, 2017). Students' achievement often rises when they are engaged in their class activities involving gamification (see Bicen & Kocakoyun, 2018; Orhan Goksun & Gursoy, 2019; Pektas & Kepceoglu, 2019; Sanchez-Martin et al., 2017). According to de Lope et al. (2017), gamification also meets students' diverse needs beyond the report card and subject curriculum. B. Huang et al. (2018) mentioned students engaged in gamification are more likely to complete their pre-class and post-class activities on time.

Despite numerous technology-related professional development events, teachers have openly acknowledged gamification's positive effects on students' peer interactions (see de Lope et al., 2017). Nevertheless, teachers have typically reported that applying TBG to lessons has been challenging (see Sanchez-Mena & Marti-Parreno, 2017; Sobocinski, 2017). According to Cheok and Wong (2015), although technology is helping the education system with student engagement, the adoption rate has been below expectations. Teachers have also reported and viewed themselves as technically unprepared for integrating TBG into their lesson plans (see Sanchez-Mena & Marti-Parreno, 2017; Sobocinski, 2017). Moreover, they have identified the lack of time (Sobocinski, 2017), resources and training, and the absence of self-efficacy in using technology as barriers to use technology gamification (see Sanchez-Mena & Marti-Parreno, 2017). As crucial as these expressed needs underpinning a gap in practice were, equally important was the literature gap at the time of this study regarding effective and efficient means for addressing those needs.

Scholars have answered many questions, but some questions have remained unanswered. Questions such as what gamification is (Albertazzi et al., 2019; Pektas &

Kepceoglu, 2019; Sobocinski, 2017), how practical and valuable it is for students' engagement (Araujo & Carvalho, 2017; Buckley & Doyle, 2016), and what gamification should do for teachers (Sobocinski, 2017) have been answered. Researchers have also responded to questions such as what some of the obstacles for instructors are when using gamification (Bourgonjon et al., 2013), how challenging it is to identify active games for engaging students (Araujo & Carvalho, 2017), and what associated emotions influence students' achievements when teachers apply gamification (Araujo & Carvalho, 2017). Some other answered questions include how attitudes of school principals affect teachers' intentions and ability in implementing gamification (Machado & Chung, 2015), how to optimize students cognition when preparing TBG (Miller, 2014), how insufficient the support is for teachers in implementing TBG (Araujo & Carvalho, 2017; Hill & Valdez-Garcia, 2020; Sobocinski, 2017), and why before teachers can effectively gamify the lessons, they need to benefit from effective professional development programs to equip themselves with proper skills (Bourgonjon et al., 2013; Hill & Valdez-Garcia, 2020).

Questions such as why many junior high teachers do not implement TBG within class activities (see Sobocinski, 2017), what are the specific obstacles for junior high teachers in implementing TBG into their class activities (see Hill & Valdez-Garcia, 2020), and what are teachers' perception of potential solutions to overcoming these obstacles in implementing TBG into their class activities (see Sobocinski, 2017) have remained either unanswered or only partially answered. Therefore, there is a gap in the literature.

Three significant sections of Chapter 2 provide a synthesis of the literature review. First, in the literature search strategy section, I explain the journey of collecting and reviewing some peer-reviewed articles. By that, I establish a strong understanding of why gamification is a valuable educational tool and why it is essential to discover reasons junior high teachers do not consistently implement TBG in their classes. The section also includes the list of the accessed library databases and search engines, the key search terms, combinations of search terms, iterative process of finding valuable articles, and strategies of handling challenges in locating reliable sources used for the search.

The conceptual framework section introduces the fundamental theories related to gamification and seminal research that helped me choose an adequate framework for this study. Studying theories was eye-opening. The section also includes critical statements and definitions of previous studies on gamification and the researchers who conducted those studies. This section brought the most valuable set of information to the study.

In the section, literature review related to key variables and concepts, I share an exhaustive review of the existing literature about gamification drawn from acceptable peer-reviewed academic journals. The section addresses studies associated with the construct of my interest in TBG, and a short section explains the chosen methodology and methods consistent with this study's scope. However, the review of the process appropriate for this study is in Chapter 3. In this section, I also discuss the ways researchers have approached teachers' intentions of accepting and adopting gamification and the strengths and weaknesses inherent in their approaches. Therefore, this section justifies the rationale for selecting TBG and variables from the literature. It includes the

key concepts of the phenomena, what is known about it, what has been controversial, and what has remained studied.

At the end of this chapter, I offer a summary of the significant themes of technology-related gamification in the literature, what was known and unknown about TBG before the time of this study, how this study helps fill a gap in the literature, and how it will extend the knowledge related to practice using TBG. I had a strategy to locate peer-reviewed articles to identify the gap in the literature about TBG.

Literature Search Strategy

I began with a local observation and experience that the junior high teachers in the Mountain Lake district do not consistently implement TBG in their practice. Walden University's library was the starting point for searching for peer-reviewed articles to discover if junior high teachers' lack of interest in integrating TBG is a severe and widespread gap in practice and education literature. In many cases, the library search engine automatically offered articles from Science Direct, Taylor & Francis, Pro-Quest Central, Directory of Open Access Journal, and ERIC database. However, the Walden Library databases and linked database were sufficient unless local supporting data were required. In that case, I used Google Scholar, snowballing, related dissertations, logging, outlining, and write-ups in known websites to access first-hand and helpful information. An example of those local supporting sources was the University of British Columbia Educational Technology Support website.

Key search terms and combinations of search terms used for identifying proper resources fit into three categories:

- terms related to the definition and aspects of student engagement,
- words searching for the articles, papers, and books about gamification and TBG, and
- phrases are seeking proper methodologies and frameworks.

The key search terms for student engagement were *motivation, engagement, participation, involvement, class activities, high school students,* and *student attention*. The key search terms related to gamification were *games, using game elements, gamification and teachers, gamification and high school, gamification and teachers and use, games and teachers, gamified classes, gamified courses, utilizing gamification, technology-based gamification, integrating gamification into teaching, implementation, game-based learning, teacher preparation, teachers' self-efficacy, professional development,* and *junior high teachers*.

The key search terms for seeking proper methodologies and framework were *TAM model, framework, qualitative studies, mixed-method studies, basic qualitative, behavior intentions, Rogers's diffusion theory,* and *Davis model*. For all three categories, using synonyms, expanding out acronyms, looking for the combinations that Walden Library suggested, applying the option find similar articles, and using articles in the reference pages were the key to a successful search. I also benefited from my searching skills gained during the Masters' thesis and my courses at Walden University.

Searching for factors affecting student engagement was the straightforward use of databases with many articles, dissertations, and available books. Even the studies conducted in the past four years could offer much information for the study.

Nevertheless, there is much less consistent research about gamification and its effect on learning. According to Bourgonjon et al. (2013), gamification was far from stable in the Hype Cycle plateau as an educational trend. Consequently, using studies on gamification outside North America was inevitable, and I found many related successful studies in Turkey, Australia, and Spain. In addition, I have attended several local professional development events designed by CUEBC, where the sessions were explicitly about applying technology in education. As a result, I collected valuable information about the newer technologies for education in local events. I am also an Academia member, where many technology-related articles are available for review.

There was a shortage of Canadian-based articles related to TBG at the time of this study, which became evident during the search. However, approaching experienced members of the education community, principals, and information technology specialists to cast their opinion about teachers' use of TBG helped identify a gap in practice and related literature. However, it was crucial to employ an adequate framework to design a practical research study with the right questions and choose the proper instruments to collect and interpret its findings.

Conceptual Framework

In 1989, Davis introduced the TAM built on "perceived usefulness," "perceived ease of use," and "user acceptance of information technology" as a human social behavior model toward accepting technology. Since then, many studies have applied TAM for different work environments and industries to discuss technology users' intentions and attitudes. Perceived usefulness (PU) is the degree to which individuals believe technology

will help achieve specific tasks successfully (see Davis, 1989). The human behavior of accepting a technology is crucial and necessary, but acceptance does not guarantee the human behavior of using technology (see Davis, 1989). Therefore, the second part of Davis's model, perceived ease of use (PEU) of technology, completed the model. PEU is the degree to which individuals believe that applying technology is easy enough to be worth trying. Sobocinski (2017) stated that it seems reasonable to think that users accept technology and adopt it if the benefit of using technology outweighs the effort in applying it.

Although TAM's use began as a quantitative framework, it has been adapted and used thoroughly in qualitative research, especially studies that involved teachers as technology users. For example, Aman et al. (2020), in the qualitative section of their research, interviewed teachers to find their perceptions on the use of learning management systems (LMS). The main factors they were searching for were TAM's PU and PEU. In addition, the authors searched for the following elements: value for effective learning, difficulty integrating with lessons, need to meet the needs of the digital age, expectations of lecturer and peers, and anytime/anywhere access to m-LMS.

These TAM-related factors and how authors sought after teachers' perceptions are similar to what I aimed for in this study. For example, Ng et al. (2013) involved seven student-teachers in interviews during their practicum to find their perceptions on the digital portfolio platform and plan for TAM's future development when used as a research framework. The authors noticed that the attitude participants showed during the

interviews directly related to BI to use e-portfolio and was well discussed and addressed by TAM in a qualitative approach. Therefore, I also explored teachers' BI for this study.

Another example of using TAM with qualitative study is the work of Wong. Wong (2015) investigated the attitude of preservice teachers toward the use of educational technology. In the qualitative part of the study, Wong interviewed 14 participants and found that PU is more influential than PEU, which is heavily related to facilitating conditions rather than technical experience. Therefore, a TAM-based framework was suitable for Wong's study. Conducting the same type of interviews, Watson and Yang (2016) explored inhibiting factors that United States teachers have found affect their decision to implement games in their classes. They interviewed male teachers and junior high teachers and found that effectively implementing games was a barrier. Female teachers found perceived challenges with using technology and challenges obtaining games more dominant. Although the authors did not mention TAM as a model, their indicators were similar to TAM-related factors. Their questions were also "what" questions identical to this study's. Therefore, this qualitative study benefited from TAM and personal interviews.

Semistructured interviews have been a helpful tool for collecting data in qualitative studies. Zinckernagel et al. (2017) used a qualitative study based on semistructured individual interviews of 16 high school teachers to identify meaning patterns. Their framework was TAM, with a focus on PU and PEU. Although their goal was to find teachers' perceptions of deliberators in the class, they successfully used a TAM model in a qualitative study where teachers were involved. Coleman (2015) also

used semistructured interviews and a TAM framework to discover the extent to which middle school teachers integrate technology. Coleman interviewed teachers in a qualitative approach in semistructured interviews. Coleman believed that a quantitative approach would not provide detailed information on teachers' opinions. Numeric data only collect how often technology is used by a teacher and indicate only summative scores from technology use. Colman believed a qualitative study is sufficient if a researcher is required to understand why people use technology. These reasons helped justify using a qualitative approach combined with TAM-related factors for this study.

TAM can be combined with other theories and models to help qualitative studies. For example, Lawrence and Tar (2018) combined TAM and DOI, similar to what I planned, to address teachers' acceptance of information and communications technology (ICT). They collected in-depth qualitative data from four teachers in semistructured interviews. Their study revealed that it is meaningful to combine TAM with DOI to address both the acceptance and adoption rates of new technology. Their success in combining TAM and DOI confirmed that this study could benefit from this approach. Therefore, I decided to combine TAM and DOI as a framework.

Researchers have successfully used TAM for interviewing high numbers of participants. Dube (2017) studied the perception of 15 teachers on the use of the combination of traditional instructions with modern gamification. Dube used a qualitative approach and TAM model to check PEU and PU. Dube's study is similar to this research considering the participants' size, institute, and approach. Because Dube collected valid data with 15 participants, I decided to perform the same with 17 participants.

TAM and qualitative approaches have also contributed to research in the field of gamification. An example of those studies is the work of Dele-Ajayi et al. (2017). The authors searched to find whether TAM is suitable for teachers' BI in using game elements in their classes. They interviewed ten teachers in the qualitative section of their study and noticed that TAM might be insufficient to address all influential aspects. Therefore, TAM was needed to be extended for future studies. However, the combination of TAM, teachers, qualitative approach, and game elements fit effectively together in their research. Therefore, I noticed extended TAM should work in this study, too.

Researchers have been using TMAs factors for decades. For example, Schultz and Slevin (1975) discussed and studied the impact of PU on system utilization. Their study model addressed the manager's job performance. They found it positively correlated with their study's self-predicted use of a decision model . Likewise, Daniel Robey (1979) used the Schultz and Slevin questionnaire to research the system's performances and concluded that a system that does not help people perform their jobs is not likely to be received favorably despite careful implementation efforts. Therefore, aspects discussed by TAM influenced the industry for decades and still are educationally sound factors.

In 1982, Bandura discussed and supported the PU as a determinant of the technology user behavior and a vital judgment factor about how well one can execute to complete a task. However, the TAM model is not flawless (see Scherer et al., 2019). It fails in some internal and external predictors from study to study (see Zehra & Bilwani, 2016). For instance, PEU, a key variable in TAM, did not significantly influence users' attitudes to technology in China and Turkey. Teachers of these countries are usually

diligent and focused on how technology enhances their teaching effectiveness and efficiency (see F. Huang et al., 2019). F. Huang et al. (2019) stated that teachers prefer to conform to expectations in some countries with collectivist cultural values instead of making decisions based on personal likes or dislikes.

On the contrary, in another study comparing Chinese and American samples, PEU had a strong relationship with the American sample's BI (see F. Huang et al., 2019). Therefore, several local, cultural, and financial factors that make every TAM-based study unique to its study environment might influence the behavior of a technology user. I decided to benefit from some local elements, too. Nevertheless, TAM is the primary model for this study because junior high school teachers should first accept TBG as a helpful student engagement method. The TAM is suitable for approaching the problem, collecting related data, and interpreting the findings when teachers' BI is at stake (see Adukaite et al., 2017; Marti-Parreno et al., 2018; & Sanchez-Mena et al., 2017).

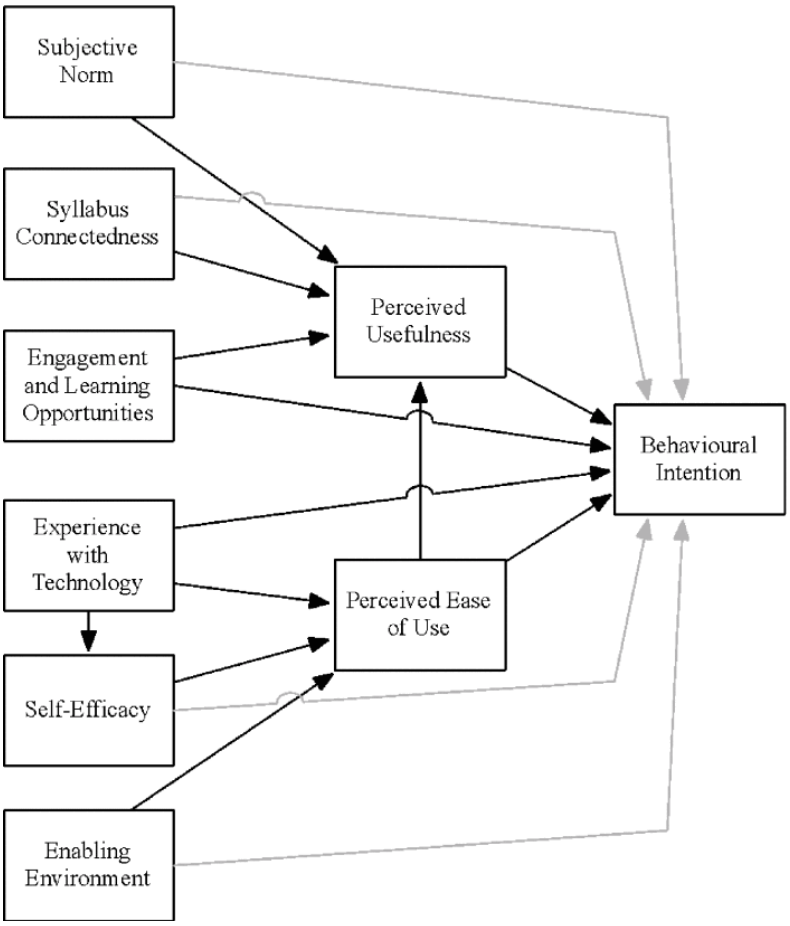
Researchers have been utilizing and offering different approaches to the TAM framework in studies where teachers' BI has been the main target of the investigations (see Adukaite et al., 2017; Sanchez-Martin et al., 2017). For example, Bourgonjon et al. (2013) conducted a study on teachers and admitted TAM is an inconsistent model, unable to account for individual, organizational, and contextual characteristics involved in the research. The authors also concluded that the education community was far, in 2013, from making teachers ready to use technology for gamification, even if they benefit.

Whereas, Dele-Ajayi et al. (2017) studied previous research from 2013 to 2017 on the teachers' acceptance of digital games as the quantitative part of their study. They

interviewed four teachers as the qualitative part of their research to determine whether the TAM is sufficient to measure the teachers' attitude toward gamification. Authors found that teachers' technology experience, curriculum fit, enabling environment, and self-efficacy directly influence teachers' intentions to accept digital games. The authors admitted that a modified TAM, presented in Figure 1, is required to generate more inclusive results. They offered an extended TAM to seek teachers' BI better.

Figure 1

Modified TAM



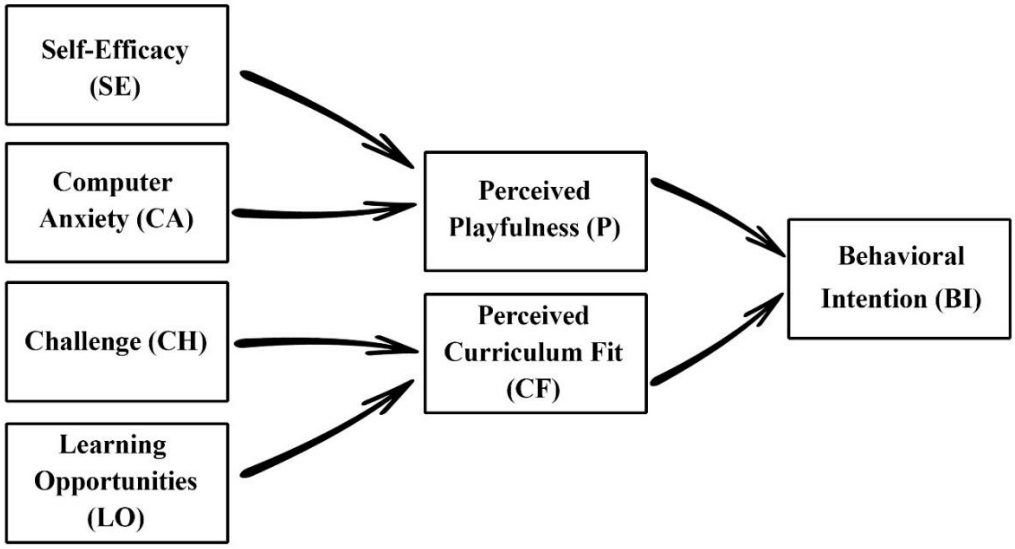
Note. Adapted from "A Modified TAM for Predicting Acceptance of Digital Educational Games by Teachers," O. Dele-Ajayi, R. Strachan, J. Sanderson, & A. Pickard 2017, 2017, *IEEE Xplore Global Engineering Conference (EDUCON), Athens*, 961-968. https://doi.org/10.1109/EDUCON.2017.7942965

The success in using technology depends on the teachers' attitude (see Adukaite et al., 2017; Asiri, 2019; & Dele-Ajayi et al., 2017). Teachers' attitude and intention is the central aspect behind the RQs of this study. For example, perceived playfulness and

perceived curriculum fit have a positive, direct impact on the construct of teachers' BI in using TBG (see Adukaite et al., 2017). In addition, the construct of challenges, learning opportunities, teacher self-efficacy, and computer anxiety indirectly affect BI via perceived usefulness or perceived curriculum fit (see Adukaite et al., 2017). Adukaite et al. called the terms mentioned above the six predictors of teachers' decisions about utilizing TBG and offered the diagram presented in Figure 2.

Figure 2

Hypothetical Model



Note. Adapted from "Teacher Perceptions on the use of Digital Gamified Learning in Tourism Education: The Case of South Africa Secondary Schools," A. Adukaite, I. van Zyl, S. Er, & L. Cantoni, 2017, *Computer & Education, 111*, 172-190. https://doi.org/10.1016/j.compedu.2017.04.008

Their study proved that the same questions and research would have significantly different outcomes in different countries depending on the factors that define the states' societies, cultures, and needs. Adukaite et al. did not use a TAM model for their study. Their study had a quantitative approach, and they separated teachers' acceptance of gamification from its adoption. They conducted a study in an economically disadvantaged region; however, their findings and the factors helped this study and contributed to the conceptual framework diagram and the CGAM.

Asiri (2019) examined the relationship between teachers' BI and the rate of adopting gamification. In addition to general TAM indicators, the author selected variables including teachers' attitude, cognitive attitude, and social influence to predict the teachers' BI toward gamification while inclusive with regional factors. Asiri mentioned that the strength of factors' relationship with the teachers' behavior was equal. For example, teachers' awareness of TBG benefiting students influenced teachers' BI as much as social influence. Asiri conducted the study in all-female students and schools. His choice was a limitation of that research. Nevertheless, it became evident that the cultural forces that shape peoples' habits, values, and interpretations of student success and engagement should be predictors of teachers' BI toward gamification (see Adukaite et al., 2017; Asiri, 2019). These findings and approaches helped shape this study's model for the teacher acceptance of TBG.

TAM can only discuss the TBG acceptance intentions of teachers, not the adoption of TBG. Therefore, this study will also use Rogers' (2003) DOI theory to discuss and address the length of the time and conditions required for teachers to pass the

decision-making period about accepting TBG and moving to adopt TBG. Everett M. Rogers, the most recognized name in the diffusion of innovations, introduced the study of diffusion across disciplines (see Al-Suqri & Al-Aufi, 2015). DOI theory originated to explain the approach and time required for a new idea to gain momentum and diffuse in a social system. Al-Suqri and Al-Aufi (2015) stated that the result of a proper diffusion is that the adoption rate of a new idea will be higher. The adoption rate is the relative pace that society accepts and uses a new idea (see Rogers, 2003). The key to a higher adoption rate is that a community member must perceive the new concept. Through this first section, diffusion is possible (see Al-Suqri & Al-Aufi, 2015). However, Rogers had mentioned that a degree of uncertainty causes humans to adopt new ideas and innovations at different rates.

Adopting a new idea, Rogers (2003) believed that some people act faster than others, and peoples' characteristics and interests play a crucial role in the adoption rate. No matter an early adopter or late adopter, Rogers introduced five main relative variances in the rate of adoption of a new idea by technology users: 1) relative advantages, 2) compatibility, 3) complexity, 4) triability, and 5) observability. These factors have been used as a model in education when adopting new technologies was at stake. DOI can be used as a conceptual framework to discuss and assess the factors affecting teachers' decisions about implementing TBG (see Afridi & Chaudhry, 2019). For example, researchers have used a DOI-based framework to search whether computer-based learning (CBL) is a desirable teaching method and found the helpful framework (Bourgonjon et al., 2013). Before adopting CBL, instructors had to identify whether CBL

has a relative advantage over traditional teaching methods or is compatible with their program. They also had to determine whether CBL is or is not too complicated for them to use and whether they could try it and observe it before offering CBL to the learners. Therefore, DOI factors were practical.

Researchers have used DOI variances in varieties of studies. Stieler-Hunt and Jones (2017) discussed how digital gameplay made teachers feel different from other teachers about delivering the lessons and engaging their students in activities. The authors applied Rogers' DOI factors affecting the adoption rate of digital gameplay and successfully interpreted the data using DOI. F. Huang et al. (2019) established their BI model for cultural values and technology adoption, comparing Chinese and Spanish university professors, using Rogers' DOI model, and found the model appropriate. Jesmin and Ley (2020) found Estonian primary teachers were in the late majority stage of the technology adoption curve introduced by Rogers (2003), while secondary teachers were at the beginning of the early majority stage when playing games at school. The model helped them to discuss the adoption rate productively.

Researchers in North America have also benefited from the DOI theory. For example, Hill and Valdez-Garcia (2020) used DOI theory, in part, to study the perceptions of physical education teachers of southwestern United States regarding the use of technologies in the classroom and applied DOI in part for interpretation of the findings. The studies mentioned above looked for the factors influencing the adoption rate of technologies and games and how they played a role in teachers' decisions. Many of these studies, quantitative or qualitative, found that relative advantage is the strongest

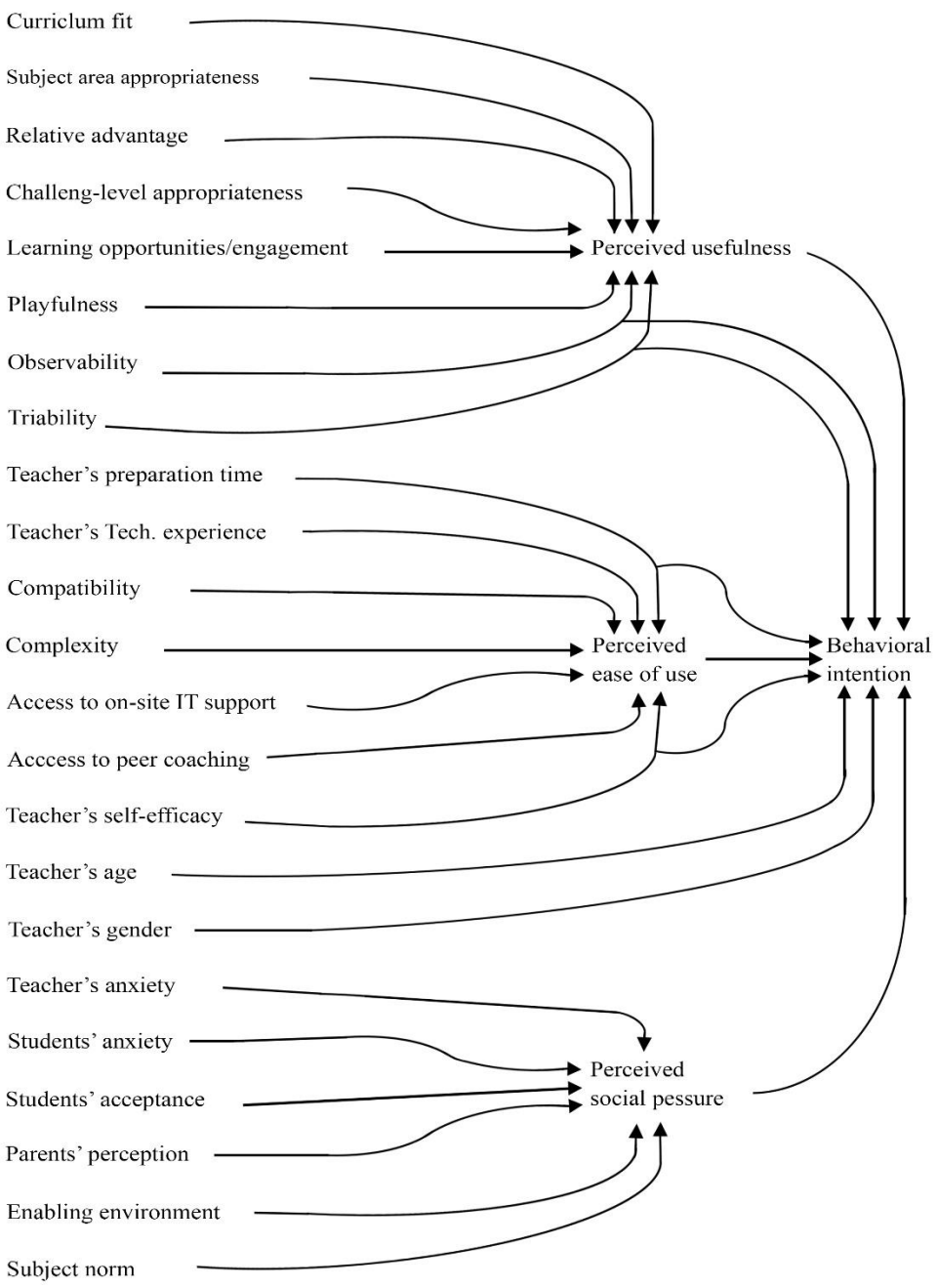
predictor in teachers' decision to adopt technology-related games. The other four DOI factors (compatibility, complexity, triability, and observability) have been influential on different levels explaining subject areas, cost-effectiveness, and technology support accessibility.

This study benefitted from researchers' and authors' seminal work mentioned above to introduce CGAM, presenting influencing factors affecting teachers' decisions about accepting and adopting TBG. Six factors of Adukaite et al. (2017), extended TAM offered by Dele-Ajayi et al. (2017), Rogers' (2003) most relative variance influencing the rate of adopting gamification, and extra local, cultural, and societal factors, together made the framework of this study and guided the interview in a basic qualitative approach.

There are constantly influencing factors that are unknown or become a surprise because, within each study, the sample, the region, courses and programs, grades, and nature of the institutes are different (see Adukaite et al., 2017; Dele-Ajayi et al., 2019). Researchers should be ready and act upon the differences with the flexibility to interpret the specifically collected data in their study. There are always factors that exist, but they are hardly related to the study (Rogers, 2003). As a result, I considered as many potential factors as possible for this study, with possible overlaps, and offered the CGAM represented by Figure 3 for approaching, collecting, and interpreting this study's data.

Figure 3

Comprehensive Gamification Acceptance Model (CGAM)



Following is the definition of the listed terms inside the CGAM:

- *Challenge-level appropriateness* concerns the level of the challenge TBG offers to any specific class and grade (Adukaite et al., 2017).
- *Curriculum fit* is the extent that TBG can be used to support a subject's traditional classroom curriculum. It also explains the ways and the capacity that TBG can meet the curriculum (Dele-Ajayi et al., 2017).
- *Enabling environment* is the degree to which the infrastructure (power, Internet, devices) supports TBG use (Dele-Ajayi et al., 2017).
- *Parents' perception* is the parents' awareness and belief about TBG. It implies the extent to which parents' gender, age, and characteristics affect their assumption on TBG's usefulness (Eutsler et al., 2018).
- *Playfulness* is the level that TBG is attractive and generates a desire for students. It is the extent that TBG reduces self-consciousness and keeps surprised, entertainment, and voluntary feelings (Pavlidis & Markantonatou, 2018).
- *Relative advantage* is a product's degree of superiority or attractiveness to customers over existing products. It refers to how TBG is perceived as better than the idea it supersedes (Rogers, 2003).
- *Students' acceptance* is the degree to which the performance expectancy, effort expectancy, social influence, facilitating conditions, the voluntariness of use, and students' age, gender, and experience may affect how students accept participating in TBG-based activities (Yalcin & Kutlu, 2019).

- *Subject norm/Social pressure* is the degree to which the stakeholders believe TBG is beneficial and should be utilized at schools (Dele-Ajayi et al., 2017).
- *Subject area appropriateness* discusses whether TBG meets the core curriculum and detailed educational purposes (Adukaite et al., 2017).
- *Teachers' computer anxiety discusses the extent of teachers' negative experiences,* fear, or apprehension working with computers, affecting teachers' decision to accept and adopt TBG (Adukaite et al., 2017).

Teachers' use of TBG has a journey starting from the studies around teachers' BI. The literature brought to the education community about the teachers' BI toward accepting and using technology has a deep root in theories and theorists' work. It traces from the work of Schultz and Slevin (1975), Robey (1979), Bandura (1982), and Davis (1989) in technology. Then narrowed down to TBG by recent studies (Araujo & Carvalho, 2017; Bourgonjon et al., 2013; Cheok & Wong, 2015; Machado & Chung, 2015; Sanchez-Martin et al., 2017; and Sanchez-Mena & Marti-Parreno, 2017), and enriched by enhanced framework and model of studies (Adukaite et al., 2017; Asiri, 2019; & Dele-Ajayi & Strachan et al., 2017) for discussing teachers' BI of integrating TBG. In recent studies about teachers' BI in using gamification, researchers used collections of influencing factors to accept and apply gamification. They prepared the right RQs for questionnaires or interviews. They also used the influencing factors to interpret the collected data and express their conclusion. However, there are limitations to these studies.

Each of the existing studies had a limitation on the sample or the place of the investigation. Many had employed pre-service teachers' examples (see Ortega Sanchez & Gomez Trigueros, 2019; Unal et al., 2017; & Yapici & Karakoyun, 2017). Their participants had not experienced actual classrooms as practicing teachers and could not easily foresee the timing, classroom management, and assessment challenges in yearlong programs. Second, some researchers sampled elementary-grade teachers with only one group of students who accepted gameplay solely for the entire year (Kuo et al., 2018; Ortega Sanchez & Gomez Trigueros, 2019). Third, some studies searched between the instructors of higher education. The professors' attitude is generally different from K-12 teachers as they have adult students, and their service directly impacts their pay compared with the public-school teachers (see Sanchez-Martin et al., 2017; & Sanchez-Mena et al., 2017) who have a fixed salary. Fourth, some researchers surveyed teachers who deliver the same subject area (see House & Telese, 2016; Yong et al., 2019).

Some searched the opinion of teachers of students at educational or social risk (Rowan, 2017). In these studies, researchers only heard the voice of one group of educators, which is a limitation. This research avoided the rules mentioned above, learning from shortcomings in similar studies by reaching out to a range of teachers of different grades and subject areas. This matter is more discussed in Chapter 3. However, many of the variables previous researchers chose were suitable for this study.

Literature Review Related to Key Concepts and Variables

Studies have revealed that high school students positively perceive TBG use (see Buckley & Doyle, 2016). Nevertheless, few studies have researched from teachers' perspectives about TBG, and there is a gap in the literature about why teachers do not consistently use TBG (Marti-Parreno et al., 2016). The literature gap is even more profound for why junior high school teachers do not consistently implement TBGs (Fadhli et al., 2020). As a high school teacher, I noticed the gap in BC's district's practice, identified the literature gap, and became interested in finding the reason(s) junior high teachers do not consistently implement TBG. I reviewed related literature and became familiar with the researchers' theories to define and design their study. Previous theories played the leading role in selecting the key variables of the study. I divided the related literature into four categories based on the number of theories I have identified as follows:

The majority of previous studies related to gamification and the factors affecting teachers' BI have employed only one theory. According to Orhan Goksun and Gursoy (2019), this is because research about teachers' BI in using gamification has been limited. For example, Suh et al. (2018) applied only the cognitive evaluation theory introduced by Deci (1975) and measured factors such as autonomy, competency, and relatedness, which influence South Korean teachers' satisfaction with using digital games. Furthermore, they targeted only the internal indicators of teachers' decisions and willingness because the external factors such as access to direct/on-sight IT support were not an issue in Korea. However, they could have benefited from some of Rogers' DOI-related factors such as

complexity, compatibility, and triability, which are internal indicators, also to check the adoption rate of gamification by Korean teachers.

Bourgonjon et al. (2013) conducted a DOI-based study to discuss Belgium's secondary school teachers' acceptance of game-based learning. However, the authors did not consider teachers' technology experience and anxiety. At the end of their study, they noticed that teachers need more professional development to overcome their technical skills. Afridi and Chaudhry (2019) also applied Rogers' DOI theory to explore university professors' and administrators' perceptions in Punjab using technologies in the courses. However, they dismissed the effect of curriculum fit/syllabus connectedness and challenge-level appropriateness to study, although these factors influenced instructors' decision to integrate TBG.

Stieler-Hunt and Jones (2017) also used Rogers' DOI to discuss that digital gameplay makes Australian teachers feel alienated. They benefitted the most from DOI factors such as relative advantage and compatibility to answer their RQs. Still, they could have benefitted from curriculum fit/syllabus connectedness, subject norm, and teacher's self-efficacy to collect more related data about why and how teachers feel alienated. Finally, Jesmin and Ley (2020) employed Rogers's DOI and categorized Estonian teachers' technology adoption of their K-12 system. They used all five perceived attributes of innovation defined by Rogers and found them satisfactory for their studies. Still, the depth of their investigation was questionable because no external factors were involved with their questions. However, not all researchers approached their research with one theory in mind.

Some studies used one theory with some modifications. For example, Sanchez-Mena, Marti-Parreno, and his team conducted three studies from 2016 to 2017 (Aldas-Manzano was a team member in two of them only), all in the same institute and discipline. The three related topics were teachers' intentions to use video games, the role of perceived relevance, and drivers and barriers influencing teachers' decisions. In all of them, the authors used TAM as their primary model. However, the authors added more to TAM factors to measure more factors affecting teachers' decisions using gamification because TAM was not sufficient. In addition, their study was more inclusive in employing elements measuring teachers' BI because they added factors such as teacher's age and gender to search whether these factors influence teachers' decision to adopt video games.

On the contrary, some researchers described and searched teachers' BI without bringing a theorist's name (see Huizenga et al., 2017; Kuo et al., 2018; Tuparova et al., 2018). These studies had a limited number of factors influencing teachers' BI and had limited data for interpreting their findings. The authors of these studies admitted the limitations and suggested that future researchers consider more influencing factors.

Some researchers put together a combination of predictors taken from different theories. For example, f. Huang et al. (2019) adapted BI from Davis' (1989) work, subject norm from Fishbein and Ajzen (1975), individualism-collectivism index, power distance index, uncertainty avoidance index, compatibility and complexity from Rogers (2003), and indulgence-constraint index from Hofstede (2011). They made a suitable model for their study. As the authors compared Chinese and Spanish teachers' BI, their model

differed in the number of participants and the influential factors. They considered cultural influences, regional characteristics, financial conditions, factors that influenced the adoption rate by Rogers' DOI, and the difference between private and public sectors to touch more potential external predictors affecting teachers' decision to accept and adopt TBG. Although their outcomes were somehow complicated and required a specific coding system to explain and interpret, they had extended interpretations and conclusions.

In another way, Dele-Ajayi et al. (2019) studied the use of TAM by the way Yusoff et al. (2010) offered to investigate the attitude of learners in serious games but combined it with the work of Bourgonjon et al. (2013). The latter had used TAM to explore the acceptance of games by secondary teachers. The authors then added extra factors such as constructs of syllabus, connectedness, engagement and learning opportunities, experience with technology, self-efficacy, and enabling environment to investigate teachers' BI and achieved one of the best models for studying teachers' intentions in using TBG. In another study by Dele-Ajayi et al. (2017), researchers had reviewed the history of factors brought to the educational community by the work of Ng et al. (2013) and Cheok and Wong (2015) and used the same modified TAM, explained above, for predicting acceptance rate of educational games by teachers of South Africa. They called their model a modified TAM and used it to generate better-related questions, collect much more data, and analyze them more effectively.

The literature review demonstrates that as technology and the use of TBG become popular, researchers have combined or added more predictors to consider in their studies.

However, Pektas and Kepceoglu (2019) believed there was a lack of infrastructure with research around gamification. Therefore, I decided to combine most of the abovementioned factors that can sit into one model and add additional local-related aspects. Thus, I called it the comprehensive gamification acceptance model.

From the 23 factors in the CGAM, eight are categorized under perceived usefulness because teachers are the best to decide how and to what extend TBG is beneficial for their classes. Seven factors are under perceived ease of use, which relates to how complicated TBG could be for teachers who want to prepare TBG for classes and whether teachers commit to designing and adopting TBG. This combination made a meaningful, influential set of factors for teachers. The six predictors under the perceived social pressure measured the influence teachers who may implement TBG could feel from the environment and other stakeholders, including students, parents, and administrators, to whether to implement TBG or not. Two factors of teacher's age and teacher's gender had been controversial as there were different results about them for researchers depending on the country and region. This study experienced one of the two factors, teacher's age, playing a measurable and essential role in teachers' intentions to accept and adopt TBG.

Toward 23 predictors offered by CGAM, I added subject area appropriateness and access to direct/on-site IT support because they were locally influential factors for BC teachers (Computer Using Educators of BC, 2020). Finally, I added access to peer-coaching, a new significant factor, after studying Bandura's (1997) theory of self-

efficacy. However, this study faced and experienced some limitations in the data collection process.

I have noticed some controversial outcomes from previous research and some opposing findings by researchers who have conducted similar studies. Alabbasi (2018) stated that the lack of supporting literature is the first reason for controversial studies about teachers' perception of gamification. House and Telese (2016) mentioned that some studies research teachers' experiences based on the data retrieved from archival databases. Another potential issue is the answers to some questions these years might be different years ago because of the fast-growing and changing technology. Some researchers did not differentiate teachers by their specific subject areas (see Loperfido et al., 2019; Marti-Parreno et al., 2018; Putz et al., 2020; Sanchez-Mena & Marti-Parreno, 2017; Sanchez-Mena et al., 2017; Tuparova et al., 2018). Teachers benefit from TBG differently in different subject areas. For example, Jueru et al.'s (2019) study was on teachers of language courses, and Adukaite et al.'s (2017) and Pektas and Kepceoglu's (2019) studies were about the teacher of one grade. These two types of studies generated not pertinent data for many other studies and could not be generalized. When Alabbasi's (2018) study was on graduate students only, Asiri's (2019) research was on female teachers only, a problem with generalization. Researchers could take the limitations mentioned above as the nature of qualitative studies; however, some studies represented different outcomes that readers do not expect to confront.

In some studies, teachers reported failure in their attempt to use TBG because of students' lack of technology-related skills (see Yapici & Karakoyun, 2017). On the

contrary, some teachers-participants successfully used games and were happy with the results (see Huizenga et al., 2017) and will continue using games (see Tuparova et al., 2018), and reported no lack of students' technology skills. Marti-Parreno et al. (2016) mentioned that gender was not influential in their research. Asiri (2019) addressed that studying a female-only sample teacher was not a good idea because a female-only sample did not represent the teachers' population. In most of the studies mentioned above, researchers admitted that their research and its outcomes were somehow controversial and not inclusive either because of the study sample or lack of a proper set of influential factors affecting teachers' BI in their model. I have planned to minimize the controversial outcomes by using CGAM and be as inclusive as possible with junior high courses.

Summary

BI is affected significantly by perceived usefulness (Alabbasi, 2018; Asiri, 2019; Dele-Ajayi et al., 2017; & Sanchez-Mena & Marti-Parreno, 2017), the attitude of teachers as the change agents (Alabbasi, 2018; Asiri, 2019), and perceived social pressure (Asiri, 2019). From another lens, the ease of use, positive technology experiences, and teachers' self-efficacy influence teachers' BI (Dele-Ajayi et al., 2017). Curriculum fit and enabling environment also directly correlate with teachers' intentions in using TBG (Dele-Ajayi et al., 2017). Teachers may also believe or have experienced a gamified activity that had damaged their relationships with other colleagues who disapprove of gamification. For example, students make noise during playing time and cause noise issues for other classes (see Sanchez-Mena & Marti-Parreno, 2017). Nevertheless, according to Rogers (2003),

when most teachers adopt TBG, laggards may not complain about the new circumstances and join the teachers who gamify as the late majority.

Despite increasing academic research exploring the use of gamification in education, the literature review revealed only a few studies conducted on TBG (Bourgonjon et al., 2013; Fadhli et al., 2020; Marti-Parreno et al., 2018; & Sanchez-Mena et al., 2017). Some studies sought game-based learning and discussed online games. This type of learning is different from gamification in courses that do not offer game-based learning (Kuo et al., 2018; Marti-Parreno et al., 2018). Studies that addressed TBG investigated specific applications such as Kahoot, Socrative, or E-Quizizz (see Bicen & Kocakoyun, 2018; & Zainuddin et al., 2020), and researchers interpreted the collected data specific to those applications. However, this study focused on TBG. It kept the door open for the teachers to share their opinions on all existing TBG applications that they have tried in their classes.

To some extent, literature has not addressed teachers' attitudes as the change agent in school (Marti-Parreno et al., 2016), and most had been focused on the students' BI of playing games. There is little research about teachers' main drivers and barriers to using gamification in their courses (see Fadhli et al., 2020; Ozcinar et al., 2019), which is a more severe gap in teachers' use of TBG. The teachers who participated in this research shared their opinion about implementing TBG. CGAM helped interpret the data with its 23 factors. This study also allowed junior high practicing teachers to name and discuss the barriers they experienced in preparing and consistently implementing TBG. This

study's teacher-participants were encouraged to share minor and significant internal and external obstacles, which discouraged them from consistently executing TBG.

A few studies have considered a variety of subject areas teachers deliver to hear teachers' more diverse voices but not at the junior level, and most studies collected the data from teachers of one specific subject area. This study looked for information from different and all subject areas of junior high schools, including core subjects and electives, to diversify the results. In addition, it was open to teachers of grades eight to 10 to expand the potential outcomes. This approach filled a gap in the literature about the lack of a range of teachers and subject areas searched by one study.

Previous studies had a limitation about the interpretation and conclusion of data because they did not include the crucial influencing factors affecting teachers' BI toward TBG. CGAM, with its range of factors, offered a comprehensive and cohesive lens for interpreting the data and making conclusions. I considered 23 influencing factors affecting teachers' BI in accepting and adopting TBG during the interviews with teacher-participants. Furthermore, CGAM represented the sum of previously used predictors of teachers' BI plus some regional aspects. Therefore, the results were more inclusive of why junior high teachers do not consistently implement TBG.

Some studies searched for teachers' opinions on the obstacles and saught teachers' needs to improve acceptance rate. However, there is a lack of serious discussion about the solutions suggested by teachers (see Bicen & Kocakoyun, 2018; Huizenga et al., 2017; Marti-Parreno et al., 2016; & Sanchez-Mena et al., 2017). In particular, there is a minimal voice of junior high teachers. There is also no search on the BI of junior high teachers of

BC. This study investigated the obstacles to implementing TBG and potential solutions shared by practicing junior high teachers of BC. Practicing teachers knew of their district abilities and facilities, their limitations, if any, and their capabilities; so, they were the best to figure out why junior high teachers do not consistently implement TBG. The CGAM factors suggested by this study included the regional and local predictors affecting the decision of the junior high teachers of BC in consistently implementing TBG, which is a gap in the literature.

This study employed a qualitative approach with the specification described in Chapter 3 to investigate junior high teachers' opinions of why they do not consistently implement TBG. Chapter 3 consists of seven sections. Introduction, research design and rationale, and my role open the chapter. Then under the methodology section, I have discussed participant recruitment, instrumentation, procedure for recruitment, participation, data collection, and data analysis plan. Finally, and before the summary, there exist two sections of trustworthiness and ethical practices.

Chapter 3: Research Method

The purpose of this study was to investigate junior high teachers' perceptions about their implementation of TBG within class activities. The main sections in this chapter are the research design, the rationale behind choosing the design, my role, and methodology. I address how to ensure trustworthiness and ethical procedures before summarizing the chapter.

Research Design and Rationale

This study followed a basic qualitative approach. I did not use an established qualitative approach, such as ethnography or grounded theory (see Kahlke, 2014). I also did not examine data to discover or construct a theory. For this study, I used existing theories, such as the diffusion of innovation theory . Therefore, a grounded theory was not the right choice for this study (see Burkholder et al., 2016). There were neither observations of teachers while they used gamification nor a fieldwork condition. Therefore, an ethnography approach was not suitable for this study either. A case study that defines in-depth boundaries and solves a problem (see Burkholder et al., 2016) was inadequate for finding teachers' BI with overlapping CGAM factors.

I sought to understand how teachers interpreted and made meaning from their experiences with implementing TBG. A basic approach by definition and practice was suitable for that goal, as none of the other known approaches were justifiable. I explored the teachers' views and their experiences with implementing TBG by basic approach . I sought their perspectives to change teachers' practices positively.

I employed an interpretive approach within this study rather than a descriptive approach. Using a descriptive approach, I would have observed teachers' struggle with implementing TBG to generate first-hand knowledge of teachers' feelings (see Matua & Van Der Wal, 2015). Therefore, I would have needed to be present when they prepared TBG. While this is a goal for a project study, it was not a goal for this dissertation. Instead, consistent with an interpretive approach, I focused on the teachers' experience-based perspectives and interpreted their experience working around TBG and their attributes to their expertise (see Kahlke, 2014). Therefore, I explored a deep understanding of teachers' challenges and feelings within their sociocultural being (Matua & Van Der Wal. 2015) and interpreted my findings using CGAM. Future studies can benefit from new influencing factors identified in this study .

The following RQs guided this study:

RQ1: What are teachers' perceptions about consistently implementing TBG within class activities?

RQ1a: What are teachers' perceptions of the obstacles for teachers in consistently implementing TBG into their class activities?

RQ1b: What are teachers' perceptions of potential solutions to overcoming these obstacles in consistently implementing TBG into their class activities?

Role of the Researcher

During the interviews, my role was to prepare an atmosphere where teacher-participants felt comfortable speaking up about their feelings and even terms and situations they usually feel reluctant to communicate. To build an atmosphere of trust, I

began each interview with a brief statement, explaining the study's reason, assured the confidentiality of their responses, and expressed my gratitude for their participation. Of course, I also had a couple of questions about ice breakers .

I was an observer and an active member of the dialogue when appropriate. However, I balanced my participation, listening, and collecting data while getting the next step of the interview ready. In-depth interviews require both qualitative research skills and an artful interviewer (Gorton & Copland, 2010) to maintain the conversation's structure while allowing participants the opportunity to share their perspectives. As a people person, I had the communication skills to start and proceed with the interviews productively.

I was not an instructor or supervisor of any of the teacher-participants. Therefore, there was no biased environment due to power imbalance. According to Gorton and Copland (2010), in some of these "acquaintance interviews," researchers may collect information and data not available in traditional interviews. However, I knew teachers who volunteered for participation, but this did not reduce the interviews' productivity. I maintained the usual interviewer and interviewee relationship during the interviews (Gorton & Copland, 2010) with those teachers I knew. The only possible biased condition that could have occurred was if I knew a participant well, and I was aware of the participant's interest level in consistently implementing TBG. I held a consistent interview frame for each interview (see Gorton & Copland, 2010). I continued with the same procedure in exploring that participant's potential struggle with consistently implementing TBG and possible solutions for barriers.

I considered no incentives; however, I offered a $10 gift card to the interviewees to encourage participants to join the study quickly after the interview. In addition, I shared the details of the process with interviewees in an invitation email. I had planned the data collection process to be complete within two weeks, but it took more because there was a 2-week spring break between the first and last interview.

Methodology

Preparing the data collection is a long and tedious process. In the case of this study, I had to meet the ethical and procedural expectations of both Walden University and the Mountain Lake school district. For example, the school district wanted the confirmation of the study permission first, while Walden University wanted the consent for the study at the school district first. These two requests were against each other when I tried to obtain them from any party. Finally, the educational technology department provided a conditional confirmation first, and I received the study permission from the district. The pandemic condition added to the considerations, and in some areas, slowed down the process. In some cases, I had to change plans. For example, I had to omit the face-to-face interview option because, by the time I conducted the study, the district had canceled any nonemergency face-to-face interactions due to pandemic statistics.

Participant Recruitment

This study's population was junior high teachers at Mountain Lake district in BC, Canada. Young et al. (2016) stated the best possible interpretation is generated when the sampling is purposeful. Therefore, I chose a purposive sample of that teacher population with specific characteristics and interests based upon the following criteria:

- The participants were willing to participate in an interview knowing the nature of the study.
- Teachers had been attempting to prepare and use TBG at least once.
- Teachers could have been trying to implement TBG and later quit using them or reduced the times significantly they used TBG.
- Teachers who consistently implemented TBG exited the recruitment process as their perception least accommodated the study.

I used a purposive sampling of junior high teachers of four schools in the same school district to describe teachers' perceptions of TBG, such as what Li et al. (2017) performed with five schools when they sought teacher's technology acceptance. According to Vogt (2018), researchers can identify 94% of codes within the first six interviews and 97% within 12 interviews. Therefore, 17 interviews were a good number for a meaningful interpretation of the teacher's perception in the four schools.

I chose participants from as many as 18 academic subject areas to have the maximum variation. I aimed to discover teachers' opinions in different subject areas and wanted the sample to be as representative as possible. I recruited at least one teacher from Korean 10, Mandarin 9, Spanish 10, Fine Arts 9, Mathematics 8, Social Studies 8, Science 10, Media 10, English 9, ELL 9, Hair Dressing 10, Home Economic 9, Business Education 9, and Guitar 10 program for the interviews. The school principal at the research site shared that the teachers of core subject areas such as science and English reported more student engagement issues. The goal was to recruit up to three teachers from each core subject area, but this changed based on teachers' interests and availability.

I accepted the interest of a couple of teachers who delivered both junior and senior courses from participating to ensure enough interviews.

I prepared a recruitment survey (Appendix A), attached to an invitation email containing an invitation letter (Appendix B) and a consent form, both sitting in the body of an email under a few encouraging sentences from the principals of the district schools. Principals used teachers' school email addresses to mass email the invitation after submitting the district's permission to principals. I explained the study, how it worked, and the interview goals to the teachers in the invitation letter . I asked about teachers' previous experience with TBG and how often they attempted to prepare and adopt any TBG within the recruitment survey. If a teacher replied that there had been no attempt, the teacher did not participate. Also, if any teacher shared that they consistently implemented TBG, the teacher did not participate. I tried to recruit teachers attempting to implement TBG and later quit consistently using TBG or had significantly reduced implementation. I also asked about the years of teaching experience and the subject(s) they instructed in the invitation email. If I received an email from a teacher, it meant that the teacher had read the consent form and had given me the consent by sending the email to me.

In the invitation, I requested teachers to read the consent, fill the survey, and send it to me by email. Within those emails from the teachers who were willing to participate, I received their full name, the school they were teaching, and the grade(s). After choosing the participants based on their overall qualifications to participate in the study, I informed the enrolled teachers using my Walden email account with an enrollment email. Within

the enrollment email, I asked teachers to choose a day and time for an interview from at least three options I had offered. Next, I interviewed 17 teachers who met screening criteria. Finally, I informed teachers who took part in the study to ask any questions by email before the interview for clarification on the invitation and enrollment emails.

Instrumentation

I held open-ended individual interviews with 17 teachers who were the best fit to participate in the study. The interview protocol (Appendix C), which I prepared for this study, was the primary instrument for collecting data. Interviews in the Zoom online environment were audio- and video-recorded automatically by a laptop, the primary device. In addition, MS Word dictated the words heard by a tablet using external speakers attached to a laptop computer.

Interviews are the right tool to collect a rich source of information from a small sample of participants and target attributes, behavior, preferences, feelings, attitudes, and opinions (Matua & Van Der Wal, 2015). Therefore, they are beneficial for qualitative research and interpretive approaches (Brod et al., 2009), such as this study. Teachers expressed their opinions adequately, and interviews were a vital tool to seek their views (see Matua & Van Der Wal, 2015). Interview questions addressed teachers' opinions around CGAM factors designed based on the extended teacher acceptance model by Dele-Ajayi et al. (2019) and six influencing factors by Adukaite et al. (2017) adapted from Rogers's (2003) DOI and TAM, and some cultural and regional factors I added. The questions addressed all 23 aspects in the three categories of perceived usefulness, perceived ease of use, and perceived social pressure. Before analyzing the transcription, I

asked the interviewed participants to review their transcripts for discrepancies as a member-checking tool. However, only five participants showed interest in studying their transcription. Nevertheless, they were comfortable with what they had shared and trusted me in recording data.

The interview questions addressing RQ1, the study's central question, encouraged teacher-participants to explain their opinion about why they consistently implemented or why they consistently avoided implementing TBG. Thus, the information about teachers' perceptions of all 23 influencing factors of the CGAM model was in-depth. Furthermore, interviewees had several chances to engage and explain themselves openly.

Interviews offered a suitable environment where I collected valid data because the discussions were flexible, unlike questionnaires. Firm questions such as those in questionnaires were not proper for asking CGAM-related questions because some CGAM factors had overlapped. Nevertheless, during the interview conversations and dialogue, both parties in the interview could address overlapping factors. Although there were specific questions to ask from every interviewee, I allowed the talks to flow naturally. However, I guided the conversations to ensure the dialogue addressed every RQ and covered every CGAM factor.

For RQ1a, which addressed the participants' opinions about the barriers to consistent TBG implementation, I did not seek teachers' views on each factor in the CGAM list. Instead, I allowed participants to speak openly around any barrier that had challenged them while implementing TBG. Asking whether each CGAM factor had been

a barrier or not would have made teachers responsible for finding and offering an answer. Still, I wanted them to feel comfortable to call anything a barrier whenever they wanted.

With this method, I saved time on the interviews, and participants spent time on the factors they found more important. I also did not push teachers to think of barriers that were not significant. This process helped keep the natural response toward each of the 23 factors without creating biased results. For example, if I did not mention the barrier to student computer anxiety and a teacher did not say anything about students' computer anxiety, the teacher had not observed or experienced it before. Therefore, the reality was that the teacher never experienced this barrier and was not among the teachers who had experienced students' computer anxiety as a barrier.

For RQ1b, I proceeded the same as with RQ1a. I did not recommend any solution for any specific barrier. Instead, I allowed participants to provide potential solutions based on their experience in the subject area, grade, school, and whenever they wanted. However, if any interviewee answered, I naturally participated in that conversation about the solution with my input as a teacher with experience delivering junior high courses in the same district.

Researcher-Developed Instrument

Like the instrument, the interview questions were from literature, plus my experience and familiarity with the local schools. Researchers have discussed factors influencing teachers' acceptance of technology for decades (Ozcinar et al., 2019). Researchers have also discussed factors influencing teachers' technology adoption rate (B. Huang et al., 2018). As mentioned in Chapter 2, based on a literature review, I

identified factors affecting teacher acceptance and adoption rate and some cultural and regional factors meaningful in the western Canadian education system, making a robust set of factors for this study.

I ensured the content validity of the research approach and instrument by the interview process . The purpose of the interviews was to generate new information and confirm the existing data (see Brod et al., 2009) about teachers' perceptions of consistently implementing TBG. The discussions were semistructured with the interview protocol that I developed based on the CGAM model designed for this study. Table 1 shows the three main RQs (see the first column) that I asked all participants and a set of potential related interview questions asked during the interview (see the third column). However, if participants naturally explained their opinion about any CGAM-related factors (see the middle column of Table 1), I marked that factor. Therefore, I avoided questioning that factor a second time. However, if participants did not mention a factor during the interview, I asked questions related to that missing factor to ensure that the CGAM factors were covered.

I considered the same procedure for RQ1a and RQ1b. In other words, when and if needed, I specifically asked questions about barriers and solutions if I noticed the participants forgot about them. Table 1 also shows the alignment of each question with the purpose and RQs of the study.

Table 1

Interview Questions

Research question	CGAM factor	Related interview question
Ice-breaker questions		How long have you been teaching in total and at this school? Have you been in any PD sessions related to the gamification of lessons or using TBG?
What are teachers' perceptions about not consistently implementing technology-based gamification within class activities?	Curriculum fit	Do you think that there is a relative advantage in applying gamification for student engagement?
	Subject area appropriateness	How important is it to quickly find appropriate TBG for the subject area(s) you teach? Are those TBG connected to the syllabus? Are they fit in the ever-changing curriculum?
	Challenge-level appropriateness	What about the challenge-level appropriateness? Are they challenging enough for your courses and students?
	Learning opportunities/engagement	Do you feel the available TBG engages students well and provides them with learning opportunities beneficial for them?
What are teachers' perceptions of the obstacles for teachers in consistently implementing technology-based	All CGAM factors above	Any barrier so far for the factors we have discussed?

Research question	CGAM factor	Related interview question
gamification into their class activities?		
What are teachers' perceptions of potential solutions to overcoming these obstacles in consistently implementing technology-based gamification into their class activities?	All CGAM factors above	Can you think of any solution for the barriers you shared?
What are teachers' perceptions about not consistently implementing technology-based gamification within class activities?	Playfulness	How playful are those TBG that you have tried or have observed/heard other teachers utilizing?
	Observability	Have you observed students improve engagement while you have used TBGs? Was the improvement justifying the effort of preparing and using TBG?
	Triability	Were you able to try the gamification before offering them to the class? How triability of a TBG was an essential factor in choosing the TBG?
	Teacher's preparation time	What is your opinion about the average time it usually takes to prepare proper gamification?
	Teacher's tech. experience	How much your previous experience with technology and computers has helped you save time in preparation?

Research question	CGAM factor	Related interview question
	Complexity	How complex is the existing TBG that you have applied? Can you work with them efficiently?
	Compatibility	How compatible are the existing TBGs or those you have applied with the systems, Internet speed, and expectations at school?
	Access to on-sight IT support	If you have ever needed help and support, did you have access to direct support or on-sight IT help at school?
	Access to peer-coaching	What about receiving help from a colleague or a peer who can coach you, and you can coach back with how to use TBG effectively?
What are teachers' perceptions of the obstacles for teachers in consistently implementing technology-based gamification into their class activities?	All CGAM factors above	Any specific barrier so far for the factors we have discussed in the past questions?
What are teachers' perceptions of potential solutions to overcoming these obstacles in consistently implementing technology-based gamification into their class activities?	All CGAM factors above	Can you think of any solution for the barriers you shared?
What are teachers' perceptions about	Teacher's self-efficacy	In total, how can you explain your self-efficacy, if you wish, in utilizing TBG about

Research question	CGAM factor	Related interview question
not consistently implementing technology-based gamification within class activities?		identifying, choosing, and preparing proper TBG for engaging your students?
	Teacher's age	Are you getting better at preparing and applying TBG as you get older?
	Teacher's gender	Do you think your gender has anything to do with my questions about your capabilities and skills in using TBG?
	Teacher's anxiety	Think of a time when you felt uncomfortable integrating TBG. Was it in part because of your computer anxiety?
	Students' anxiety	Have you noticed students' computer anxiety, and it caused failing your gamification?
	Students' acceptance	How accepting are students in your classes when you offer TBG?
	Parents' perception	Have you received any direct or indirect parents' complaints or encouraging words about their perception of TBG activity in your classes?
	Subject norm	Do you feel that pressure from peers or administrators around you encourages or forces you to apply TBGs?
	Enabling environment	How do school culture, services, class size, computers, and students' devices enable an appropriate environment for you to feel comfortable/encouraged to implement TBG?

Research question	CGAM factor	Related interview question
What are teachers' perceptions of the obstacles for teachers in consistently implementing technology-based gamification into their class activities?	All CGAM factors above	Any specific barrier so far for the factors we have discussed in the past questions?
What are teachers' perceptions of potential solutions to overcoming these obstacles in consistently implementing technology-based gamification into their class activities?	All CGAM factors above	Can you think of any solution for the barriers you shared?
All RQs	All CGAM factors above	Is there anything else that I have forgotten to ask you about the factors affecting your decision to accept and consistently implement TBG?

The predefined questions above shaped the interview protocol for monitoring and running the interviews. The protocol's flexibility enabled me to pursue new avenues of discussions that were not suggested or planned when the protocol was initially developed (Brod et al., 2009). The protocol probated new ideas and potential questions, and discussion areas were discovered and identified during the early interviews. Any opinions that unfolded during any of the interviews were added to the protocol better to understand teacher-participants (see Brod et al., 2009). For example, while the first question was "Do you think there is a relative advantage in applying gamification in student engagement?" a question in the middle of the interview was "How complex are existing TBGs in your opinion?" This type of questioning helped participants face the reality of what supported their needs. However, I reviewed the protocol after each interview

The interview process was iterative as each interview informed the next and helped explore issues raised in previous discussions (see Matua & Van Der Wal, 2015). For example, when a teacher admitted that TBG is inappropriate for teaching lessons and is suitable for reviews, I added the phrase TBG as review/preview to the protocol. I even searched this new opinion for the remainder of the interviews to see whether other teachers teach lessons by TBG or use it as a review and preview.

The interviews helped to clarify the presence of the 23 CGAM factors. In addition, interviews determined factors that were not experienced by participants and factors that CGAM did not foresee. The final goal was not to reach a consensus but to collect as much information as possible to interpret, analyze, and conclude the study (see Brod et al., 2009; Matua & Van Der Wal, 2015). And in that line, I was a facilitator.

As a facilitator of interviews, I reminded teachers of local-related movements, arguments, events, professional developments, and training available in the schools under the study whenever appropriated and as much as a reminder only. However, I avoided forcing teachers to discuss an idea that was not essential for them, their students and classes, their subject, and their grades. As a result, each interview's outcomes were valid and impacted the research's total interpretation and conclusion. At the end of each interview, I asked the question, "Is there anything else that I have forgotten to ask you about the factors affecting your decision to accept and consistently implement TBG?" I also asked teachers at the end to stay out of the box and share anything they wanted that they thought would help this study. I asked this question after teachers were utterly engaged in the research and were aware of the research goals and questions.

Procedures for Recruitment, Participation, and Data Collection

I received two documents,"Guidelines for conducting research studies" (Appendix D) and "Proposal to conduct research and surveys in Mountain Lake school district" (Appendix E), from the school district research director. As I wanted the study to be grade inclusive, I invited principals of the district schools with junior high programs to send the invitation email to their staff. The School district research department head provided me a signed letter of permission and suggested giving the letter with my request to the district's principals and inviting their teachers. Asking all teachers from these schools improved the likelihood of receiving emails from enough teachers to select 17 participants who met the study's participation criteria.

Principals wrote their short announcements and put my invitation letter and the consent form in the body of their email. The invitation letter explained the study, how it worked, and the goals of the interview. Inside it, I invited teachers to read the consent in the body of the email below the invitation, then answer questions of an attached recruitment survey to identify their previous experience with TBG and how often they had attempted to prepare and adopt TBG. Sending the survey to me after reading the consent was the volunteers' consent. If a teacher replied that there had been no attempt, I did not recruit the teacher. If a teacher admitted consistent implementation of TBG, I also did not recruit the teacher to participate. The survey helped to find the best-fit teachers for this study.

In the invitation, I also asked for some information such as the subject(s) teachers instructed, grade(s), and gender (optional). I also requested them to indicate their willingness to participate, their full name, and their school name. The consent form was an agreement between the participants and me outlining the roles and responsibilities the two sides are taking to see (Matua & Van Der Wal, 2015). I used the Walden University consent form. I looked forward to hearing from the teachers.

I gradually received emails from teachers and accordingly sent them enrolment emails after reading the survey they had completed. Enrolled teachers could ask any questions by replying to the enrolment email before the interview. When teachers replied to the enrolment email chosen the date and time of the interview that was offered in the enrolment email, I sent a confirmation email for the interview time. Inside that email was the Zoom link; some suggestions included being in a quiet room with no background

noise and addressing any participants' questions in the enrollment email. Thus, participants were set for the interview.

Online interviews were after-school hours and convenient for both interviewer and interviewees. One interview was face-to-face, at school, after school hours based on the participant's request. I still used the equipment for that interview. There was one online interview before school hours. Some interviews occurred on weekends. A day with two interviewed repeated twice, and there was one day with three interviews. I ensured at least half an hour between interviews to rest, take notes, and prepare for the following interview with the updated protocol. All interviews took more than half an hour, but none was more than an hour. I used two recording devices, a tablet to dictate the conversations automatically and a laptop to audio- and video-record the interview saving on the computer by Zoom software.

I mentioned to all interviewees that they could decide to exit the study before or during the interview, and their names would no longer be on the interviewees' list without any possibility of anyone knowing that they had exited the study. As a result, no teacher existed in the interview. Only one of the 18 teachers that I initially had chosen to interview and had sent the confirmation email contacted the day before and mentioned that I could not interview due to illness in the family. At the beginning of each interview, the debriefings ensured that the teacher-participants were fully informed about their anonymity. The debriefing also confirmed that participants were safe against any psychological harm in any way by their experience of participation in the interview (see Research Administration and Compliance, 2019). I deleted the video-recorded discussion

from one of the computers after checking the transcription of interviews, But I kept it in a safe coded external storage. In addition, I kept a copy of the audio of every and all discussion in that external storage. Transcriptions provided references for further readings on the topic.

At the end of the interviews, I asked whether participants would like to receive an email with the transcribed interview for member-checking. Member-checking was a platform for the participant to reflect on their input to the study (see Candela, 2019). If yes, there was the fourth email, member-checking email, as soon as the transcription was ready. I requested participants' feedback to enhance the results (see Birt et al., 2016). Participants either replied to the member-checking email or asked for a phone call to share their feedback. However , after each interview, I immediately started organizing the data extracted from the transcriptions.

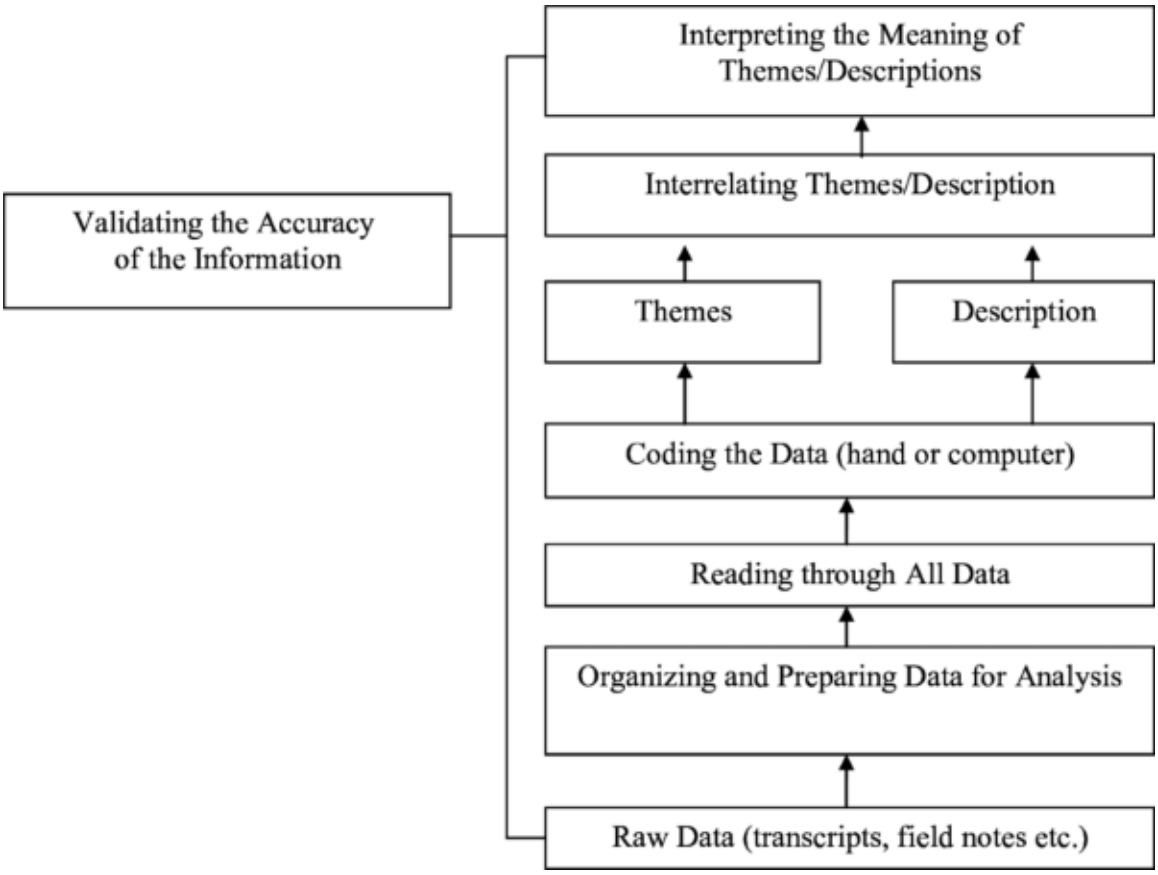
Data Analysis Plan

After each interview, I looked for patterns in teachers' responses to the questions, factors they called importantly, barriers they indicated, and potential solutions they offered. Each CGAM-related question brought corresponding data to one of the three main themes, perceived usefulness, ease of use, and social pressure. There was a constant comparison of similarities and differences in the raw data (Brod et al., 2009). Therefore, the interview protocol was constantly evolving.

I needed to organize the data as it was 17 interviews, each with an average of five to six pages of words. The design offered by Creswell (2014), shared in Figure 4, was used to process the raw data for coding and interpretation.

Figure 4

Data Analysis in Qualitative Research



Note. Adapted from *Research design: Qualitative, quantitative, and mixed methods approaches* (4th ed.), 2014, Sage Publication.

I used Quirkos software, a UK-based online qualitative data analysis software (see Quirkos, 2021). Quirkos software made exploring qualitative data visual and engaging. It has a unique flexible interface that is easy to learn (see Quirkos, 2021). In addition, Quirkos software cloud lets researchers save the data in a secure cloud server with unlimited access to anywhere and share and work with others.

After uploading the first source, I highlighted meaningful comments of the interviewee to make quirks or bubbles. I could name bubbles, indicate a color for them, and leave them on the canvas for further activities. As a quirk/code was repeated, the size of the bubble increased. By the end of the coding process for 17 interviews, some quirks were critical of others and had similarities to be in the same category. Similar codes sat together to make categories; however, some codes had a singleton code. Finally, categories sat together as themes. The detail of this process is reported in Chapter 4. Qurikos's features for reporting process included word cloud, frequency table, and short and long written reports with proper tables.

I tried two other software, Raven's Eye and Dedoose, before using Quirkos software. Quirkos website offers an adequate number of online tutorials for learning how to use Quirkos. The software is user-friendly with no hassle. It helped me to reach reliable results in a short time without extended training. I had to ensure that the collected data was trustworthy and education community could benefit from scholarly empirical research that they could rely on in the future.

Trustworthiness

The credibility of a qualitative study depends highly on how accurate researchers and participants find the study's outcomes (Birt et al., 2016, Creswell & Poth, 2018). Thus, I used the following strategies to ensure the credibility of the study:

- Data saturation during the interviews was the primary strategy of noticing and measuring the study's credibility (the internal validity). I experienced and compared while collecting data because teachers repeated more and more words during interviews. When teachers did not add any new information to the collected data, the investigation experienced saturation.
- Member-checking, also known as participant validation, was a supplementary strategy for assuring the study's credibility after the interviews were over. This internal validity tool enhanced the study's trustworthiness (see Birt et al., 2016). I returned the transcribed data to the interviewees by email, if they agreed, to check for accuracy with their interview experience and if they wanted to add or remove any sentence. However, as it was evident that some interviewees did not like to participate in the member-checking process, I only performed this process for five participants who accepted the member-checking offer.

Following the interviews' completion, I established a new level of content validity based on the information generated during the interviews (see Matua & Van Der Wal, 2015). I checked the transferability (external validity) of this study's finding by employing the following procedure:

- I used a detailed, thick description to convey the findings. In addition, a detailed description of the setting offered many perspectives about the study's theme, and the outcomes became more realistic and more productive (Creswell & Poth, 2018). This section is explained in detail in Chapter 4.

This qualitative research may be transferable to different contexts, for example, future studies in which researchers seek TBG implementation in other grades, programs, and regions. Future researchers can use the data collected and interpreted by this study in up to three secondary education grades for similar studies. Then, considering three grades for this study has been a significant advantage. Interviewing 17 teachers of 18 different junior courses helps future researchers who conduct investigations related to every single subject area involved in this study. Finally, the study's selected region opens the door for many potential studies in the future when researchers are looking for Canadian-based studies and the Western Canadian education system.

If other researchers or Mountain Lake school district authorities look over the data collected by this study, I wanted to make sure they arrive at similar interpretations and conclusions. According to Creswell and Poth (2018), dependability is essential to the trustworthiness and shows consistency with findings. Therefore, I invited an inquiry audit as an external audit to confirm the accuracy of the results. I requested my Research Committee Chair to be the external audit for this study. This section is reported in Chapter 4.

The study's confirmability is also essential as the study's results will be compared with other studies' outcomes to check the similarity and differences. In addition, future

researchers bring new perspectives to this study and literature, and the degree to those studies confirm this study out crucial (see Creswell & Poth, 2018). I used an audit trail technique to establish confirmability. Within that section, which is explained in Chapter 4, I have steps of understanding data, coding, categorization, and themes of the study and shared and confirmed the validity of those procedures with my Committee Chair. I also clarified the study's bias caused by the nature of interviews and shared words and comments by the participants.

In the clarification, in Chapter 5, I brought a self-reflection with an honest narrative of a set of comments explaining the data collection process, data analysis, and interpretation of the data. I told the readers how characteristics, such as culture, history, and socioeconomic conditions, may have affected the data and the interpretations of the findings. I also wrote any exciting topic, conversation, and data shared during the interviews and wrote down my thoughts about those new data in Chapter 4. Finally, I added a rationale for why and how I merged codes and the themes. I have noticed and summarized the ethical procedure and issues during the data collection in Chapter 4. I had to consider the ethical principles of both Walden University and Mountain Lake school district.

Ethical Procedures

I used the research ethics planning worksheet offered by Walden University to meet this study's ethical procedures. As I got closer to the actual interviews, I reviewed the worksheet and ensured that nothing new had been added to Walden University's worksheet. I considered and followed some items related to the code of conduct and ethics in the Mountain Lake school district.

Over a third of the teacher-participants were from my workplace. However, this was not an issue for the administrator and the district. I had no authoritarian relationship with any of the interviewees. I started inviting teachers from my workplace after ensuring that there were not enough participants from other schools. Several factors such as a pandemic, a new quarterly system, and several research studies looking for participants simultaneously caused insufficient participants from other schools.

I hold on to the records of the interviews for five years. However, data is kept safe in external storage in a secure box until destruction. Therefore, no one has access to the data; however, Walden University officials and my committee members can request to review the data if they see a reason to inspect the collected data and compare the data with the interpretation and conclusion of the study.

I confidentially addressed the only refusal of participation from a candidate for the interview. The reason was family member illness during the pandemic, and I accepted the refusal immediately and debriefed the teacher. I discussed the incentive (a gift card of $10) with the district and found that it was appropriate. All emails to and from the

interviewees were by my Walden email address. The School district suggested that I use teachers' school email address for communication.

Summary

This study followed a basic qualitative tradition. I sought to understand how teachers interpret and make meaning from their experiences with implementing TBG by conducting semi-structured one-to-one interviews with 17 junior high teachers at the Mountain Lake school district. I used an interpretive approach to explore a deep understanding of teachers' challenges and feelings using the CGAM model as a guide to preparing interview questions, interpreting the data, and analyzing the findings.

The recruitment process followed the routine of Walden University and Mountain Lake district, and the ethical considerations assured the safety and integrity of teacher-participants. There was an appropriate protocol for interviews and proper member-checking steps to actively and effectively involve participants in the study. I guaranteed the study's trustworthiness by saturation of data, thick description, and self-reflection. I used Quirkos software as a data analysis tool to sort data and draw conclusions. The study results, including the report of the collected data, graphs, and diagrams representing data, and the analysis of those findings are shared in Chapter 4.

Chapter 4: Results

The purpose of this study was to investigate junior high teachers' perceptions about their implementation of TBG within class activities for increasing student engagement. The following RQs guided this study:

RQ: What are junior high teachers' perceptions about not consistently implementing TBG within class activities?

RQ1a: What are junior high teachers' perceptions of the obstacles for teachers in consistently implementing TBG within class activities?

RQ1b: What are junior high teachers' perceptions of potential solutions to overcoming these obstacles in consistently implementing TBG within class activities?

In this chapter, I explain the setting of the study, the data collection process, and the data analysis steps. Then I give the results and evidence of trustworthiness before sharing the summary of the chapter.

Setting

The pandemic, which started in the middle of the 2019 to 2020 school year, caused teachers to deliver lessons online to communicate with their students and assess their progress remotely. Consequently, teachers practiced and sometimes trained for engaging students in online activities using TBG. This condition positively influenced the outcomes of this study because at the time this study was conducted, more teachers met the study's criteria of at least once implementing TBG. Also, teachers shared their first-hand knowledge and experiences of the available TBG in the education sector at the time of the study.

I had planned to interview an equal number of eighth, ninth, and 10th-grade teachers for a total of 18 teacher-participants. However, I found only four Grade 8 teachers who met the criteria to participate in the study. Thus, only a total of 17 participated in interviews. In addition, unlike the plan to include three schools from the Mountain Lake district, the collected data were from four schools within the school district. I also recruited teachers of 18 junior high courses into the study to share the voice of teachers from different subject areas.

Table 2 summarizes the participants' demographics and characteristics relevant to the study.

Table 2

Participants' Demographics and Characteristics Relevant to the Study

Interviewee	Grade	Subject area(s)	Years of teaching
NB	8	Science/Math/English	4
AC	8	Food/Social studies/English	7
EM	8	Social studies/English	8
LL	8	Learning Centre/Student service	More than 15
MI	9	English/ELL	1
JL	9	English	2
DB	9	Digital Literacy/English	3
JC	9/10	Guitar/ELL	2
KW	9/10	Spanish	8
JaB	9/10	Business education	12
JK	9/10	Korean/Hair design/ELL	12
AL	9/10	Mandarin/ELL	More than 15
CC	9/10	Visual Art/Ceramic/Math	More than 15
GJ	9/10	Science	More than 15
JB	9/10	Math	More than 15
SP	9/10	Home Economic	More than 15
AH	10	Leadership/Student-council	More than 15

Note. Forty-one percent of participants had more than 15 years of teaching experience before the interview. However, 23% of participants were newer teachers with three and fewer years of teaching experience.

Data Collection

A total of 17 junior high teachers participated in individual interviews for up to 1 hour. They gave consent by completing the recruitment survey and accepted the online interview condition. Most of the interviews were conducted after school hours, using my personal computers, equipment, and Zoom account. Interviews were scheduled between 9:00 am and 9:00 pm on weekends and spring break and between 3:00 pm to 9:00 pm on weekdays, based on participants' requests. No interview took more than 1 hour; however, a few of them took less than 45 minutes.

I used a laptop, a tablet, and a set of speakers to record data. The laptop computer held the meeting on the Zoom application, which automatically recorded two audio-only and video files on the cloud storage. Later, I transferred the video file to a locking external storage folder for the record and used the audio-only file to listen to the recording to fix transcription mistakes and inaccuracies. I kept the audio-only files and their transcriptions in both computers and the external storage for the interviews and data analysis. The tablet automatically transcribed the conversations ran through external speakers attached to the laptop. On the tablet, I used the dictate feature of Microsoft Word for this purpose. Most of the interviews were about eight pages, but after editing them and canceling my words, they were about six pages per interview on average.

I only kept the words by participants and canceled the ice breakers and wrap-up conversations. When reviewing and editing the transcriptions, I listened to the conversations recorded on the laptop and corrected and edited the interviews by opening MS Word on the tablet. Completing the transcription of each interview took

approximately one and a half hours, which I made sure to end right after each interview. At the same time, I remembered the nature of the comments and points of the interviewees. This method of recording interviews allowed me to stay focused during the interview and be an active listener. I only took short notes on my interview tally sheet (Appendix F). If, for example, I wanted to record an understanding beyond the recorded words of participants, I took notes. I connected with the interviewees and was part of a natural conversation with open-ended questions by implementing this method.

The interview protocol had 26 questions, but the questions asked varied depending on the conversations and the shared opinions. During one interview, the interviewee mentioned that she suddenly could not see me but heard me. I could both see and listen to her, and she requested to continue as only a few questions were left. Another interview was disrupted several times as the interviewee's dog entered the room and had to take care of his dog. The dictate feature of MS Word stopped working a few times during each interview, and I had to turn it on quickly; however, I resolved this issue by listening to the audio-only files. I opened one folder for each participant with a code name attached to the folder. I recorded a code instead of a name at the top of the interview tally sheets . However, I recorded the time and date of each interview on the tally sheets. Data analysis started and continued as interviews occurred.

Data Analysis

The data analysis process was an evolving procedure that started from the first interview. I transcribed interviews and immediately started coding using Quirkos software, software with both online and desktop versions. I used the online version of

Quirkos software as it was saved automatically on the safe and secure Quirkos software cloud. Several codes emerged from transcriptions.

Emerging Code-Units

I started reading the transcribed interviews as I conducted interviews and made a code-unit for any meaningful opinion or comment related to implementing gamification. In the beginning, I did not look for CGAM-related factors; instead, I noticed and recorded what was naturally shared by the participants. However, I coded any potential factor affecting the teachers' decision in accepting and adopting TBG if it clearly and directly addressed a CGAM-related aspect. I had over 50 code units after finishing all interviews. Quirkos software enabled me to generate a colored bubble that I could choose for each code unit. First, I added repeating codes to existing units (bubbles); then, the number presented by the bubble and the bubble's size became more prominent. Later, bubbles with similarities sat together to make categories.

Emerging Categories

As codes became essential or were repeated by interviewees, the size of the bubble containing codes grew. Soon, I identified code units that could fit in the same category. This process helped me avoid generating too many code units for the 17 interviews with an average of six pages. I had an eye on CGAM factors while categorizing code units. Table 3 presents 52 code units, their name, number of hits for each, and their category. The table is organized based on ascending number of hits from most significant to lowest for each code. The table also contains the category number to which the code belongs.

Table 3

Most Common TBG-Related Codes Generated From Interviews

Code number	Code description/name	Number of hits	Category number
1	Quick preparation of TBG is a factor	38	5
2	Teacher's technology. expertise is a factor	34	4
3	Teacher's learnability is a factor	33	7
4	TBG provides learning opportunity/engagement	29	1
5	Teacher's anxiety is a factor	28	7
6	Fast-changing technology is a barrier	27	10
7	Teacher's self-efficacy is a factor	26	4
8	Concerned with students' ability to partake	24	7
9	TBG offers academic advantage/engagement	24	1
10	Insufficient TBG examples/tools is a barrier	21	10
11	Insufficient technology leadership is a barrier	21	10
12	Triability of TBG is a factor	19	0
13	On-site IT support is a factor	19	5
14	Teacher's resilience is a factor	18	0
15	Teacher's peer support is a factor	18	5
16	Available engaging software is appreciated	18	0
17	Enabling environment is a factor	17	0

Code number	Code description/name	Number of hits	Category number
18	No parents' prejudice against TBG	17	9
19	Teacher's general knowledge is a factor	16	4
20	TBG is a tool for students' connection/sociability	16	3
21	No pressure from admin on implementing TBG	15	9
22	TBG's curriculum-fit is a factor	15	0
23	TBG is a preview/review tool	14	2
24	Students' acceptance of TBG is not a factor	13	8
25	Insufficient effective Pro-Ds is a barrier	13	10
26	TBG is a formative assessment tool	13	2
27	Insufficient district direction is a barrier	13	10
28	Teacher's gender is not a factor	12	0
29	Students' academic level difference is a factor	11	8
30	TBG usage is context-specific	11	0
31	Standardization of TBG is a solution	11	11
32	TBG's challenge-level appropriateness is a factor	11	0
33	TBG is more of a learning tool than playing	11	2
34	Complexity of TBG discourages teachers as a factor	11	6
35	Platform cost is a barrier	11	0
36	TBG's playfulness is a factor	11	3
37	Students' acceptance of TBG is a factor	10	8

Code number	Code description/name	Number of hits	Category number
38	Time, in general, is a barrier	10	0
39	Measurement of teachers' practice is a solution	10	11
40	Subject area appropriateness of TBG is a factor	10	0
41	Teacher's age is a factor	9	0
42	Too frequent TBG is a barrier	9	0
43	Students' safety and district protocol is a barrier	9	0
44	Compatibility of TBG is not a factor	7	6
45	Reusability of TBG is a factor	7	6
46	Teacher's age is not a factor	7	0
47	Government support is a solution	6	11
48	Compatibility of TBG is a factor	6	6
49	Teacher's peer pressure is a factor	6	9
50	Students' anxiety is a factor	6	8
51	Observability of TBG is a factor	6	0
52	TBG is a summative assessment tool	6	2

Note. Code 16, available engaging software is appreciated, is not relevant to this study, but I collected those data during interviews. Therefore, this code was not part of the categorization.

Category 0 represents necessary code units unlike any other code unit and does not fit any existing categories. Thus, each constitutes its category. Table 4 presents the 11 categories with more than one related code unit and 16 singleton categories named Category 0. Some categories have a new name resembling all containing codes. The table also shows the total number of hits for each category. The table is organized based on ascending number of hits for the categories from most significant to least. The horizontal borders separate potential categories that belong to the same theme.

I compared the categories with the CGAM model and noticed themes. The main three branches of CGAM matched the combination of some categories, including those that are singleton. That is why in Table 4, Category 0s are sitting right below a group of other categories to indicate they belong to the same theme. As a result, categories that fit into three main divisions (three branches of CGAM) represented factors affecting teachers' decisions to implement TBG consistently. In addition, there exist a category as barriers and one as solutions. The three divisions mentioned above are the emerged themes. There is one theme as barriers and one as the solution, too. I have discussed the emerging themes next.

Table 4

Most Common Categories Generated From Codes

Category number	Category (Codes included)	Number of codes included it	Number of total hits
1	A relative advantage as an engagement tool (4, 9)	2	53
2	TBG as learning object (23, 26, 33, 52)	4	34
3	Students' sense of community/belonging (20, 36)	2	27
0	Triability of TBG is a factor	1	19
0	TBG's curriculum-fit is a factor	1	15
0	Challenge-level appropriateness of TBG is a factor	1	11
0	TBG usage is context-specific	1	11
0	Subject area appropriateness of TBG is a factor	1	10
0	The observability of TBG is a factor	1	6
4	Teacher's expertise/general knowledge (2, 7, 19)	3	76
5	Teachers' preparation time/support (1, 13, 15)	3	75
6	Quality of TBG (34, 44, 45, 48)	4	31
0	Teacher's gender is not a factor	1	12
0	Teacher's age is a factor	1	9
0	Teacher's age is not a factor	1	7
7	Teacher's internal pressure (3, 5, 8)	3	85

Category number	Category (Codes included)	Number of codes included it	Number of total hits
8	Student-related pressure for teacher (24, 29, 37, 50)	4	40
9	Subject norm (18, 21)	2	38
0	Teachers' resilience is a factor	1	18
0	Enabling environment is a factor	1	17
0	Teacher's peer pressure is a factor	1	6
10	Insufficient training is a barrier (6, 10, 11, 25, 27)	5	95
0	Platform cost is a barrier	1	11
0	Time, in general, is a barrier	1	10
0	Too frequent TBG is a barrier	1	9
0	Students' safety and district protocol is a barrier	1	9
11	Solutions (31, 39, 47)	3	27

Emerging Themes

The first three categories and the six singleton categories below in Table 4 resembled TBG's perceived usefulness (PU) suggested in CGAM and are a theme. The following three categories (Categories 4, 5, and 6) and two singleton categories below them in Table 4 resembled perceived ease of use (PEU) of TBG suggested in CGAM and are a theme. Categories 7, 8, and 9 with two singleton categories below corresponded to perceived social pressure (PSP) of CGAM, influencing the teachers' decision to accept and adopt TBG, and are a theme. Category 10 and the three singleton categories below presented barriers in constantly implementing TBG and became a theme. Lastly, category 11 represented potential solutions teachers suggested to improve TBG's use and became a theme.

Perceived Usefulness

Category 1 (with two Codes 4 and 9) represented the relative advantage of TBG as an engagement tool with 53 hits in a total of 17 interviews. Interviewee DB said, "I think it [TBG] brings up energy in the classroom, especially for competitive students who sometimes can be students that are less inclined to participate." Category 2 (with four Codes 23, 26, 33, and 52) shared the educational use of TBG as learning objects in teachers' practices with a total of 34 hits. Interviewee EM suggested, "[TBG] gives them [students] a way to practice something they learned."

Category 3 (with two Codes 20 and 36) represented teachers' opinions on using TBG for the student's sense of community and belonging at school, with a total of 27.

Interviewee AH emphasized, "There are those [students] like non-social introverted type kids, and they needed something because they are not in the community."

Category 0, triability of TBG is a factor, was a factor for teachers choosing whether to use TBG with 19 hits. Interviewee JaB shared, "I do all the gaming part myself first; so, I can know what skills they [students] need to succeed." According to participants, the curriculum fit of available TBG is not guaranteed; therefore, TBG's curriculum fit is a factor, a Category 0 with 15 hits. Interviewee AL confirmed, "I have to customize it to what I am teaching. I always customize it," proving this category is essential. Category zero, challenge-level appropriateness of TBG is a factor, with 11 hits as participant JK brought, "I need to put my time to alternate [TBG] personally; so, the question is if I think that all this is too difficult or too easy." Another Category 0 is subject area appropriateness of TBG is a factor, with ten hits. JaB said, "It [TBG] is time-consuming, but it is really not hitting the learning objective that I am looking for; so, I think that is a big challenge." Finally, the observability of TBG, a factor with six hits, is another Category 0. Interviewee JC shared, "I can see who is engaged and who is not, by watching other people [students] play the game and how they are contributing."

All codes mentioned above can fit into the theme PU. Interviewees admitted that they use TBG for specific contexts. This Category 0 has 11 hits, and interviewee AH said, "it [TBG] is context-specific. So, yes, I would say, but I think it depends on where you are and what you are doing for the learning." This category addresses teachers' focus on the subject area they deliver and uses TBG for specific subject area(s). Teachers also mentioned that they should consider purposeful gamification. I explained this outcome

more in Chapter 5. Challenge-level appropriateness of TBG (Code 32) is regarded as a factor affecting teachers' decision in accepting and consistently adopting TBG with 11 hits and is a Category 0. However, challenge-level appropriateness was not essential for five interviewees, or at least it was not a factor stopping teachers from using TBG. Five interviewees believed that students' academic level difference is a factor when choosing TBG. If several students have a gap in academic skills, teachers do not use TBG because it will be challenging to run the activity.

Teachers, in general, confirmed that TBG has an academic advantage and perceived usefulness; total hits as a central theme for the study was 186 representing a significant section of CGAM. However, teachers demonstrated some concerns with the difficulties they experienced while applying TBG.

Perceived Ease of Use

Category 4 (with four Codes 2, 7, 15, and 19) addressed the effect of the teacher's expertise/general knowledge in accepting and adopting TBG with a total of 94 hits. Interviewee SP mentioned the teacher's self-efficacy and said, "Because I do not use them [TBG] very often, I would say I am like minimally meeting. I would be less than comfortable. Most people are comfortable." I asked KW, a department head that "can I say that because of your computer knowledge and experience with computers, you feel comfortable, and perhaps your computer expertise is helping find proper TBG and use them?" KW responded, "Sure, yes, and I help other teachers in the department." NB, another participant, mentioned the effect of peer-coaching and said, "Back in the spring, I

was somebody along with a bunch of other people [teachers] at my school that were asked, you are a little more tech-savvy."

Category 5 (with Codes 1 and 13) presented teachers' preparation time for TBG and how it will affect their decision to implement TBG consistently. Interviewee JB said, "I just had to type in the questions. It will take me 20 minutes to make it because it is just writing; so, I have the template already there," and interviewee CC said, "Time is always a factor." When I asked DB about "how important is the time for you? " He replied, "I would say that is probably the biggest factor in terms of why I do not do it that much." Interviewee AL mentioned IT support and said, "I agree most teachers can pick up whatever technological skills given some support."

Category 6 (with four Codes 34, 44, 45, and 48) discussed the effect of TBG quality in teachers' decision to adopt TBG with a total of 31 hits. According to participant EM, "if you have sort of inability to understand it [platform] right away … makes you pass; makes you go somewhere else." The complexity of TBG discourages teachers as a factor that influences EM's decision. Interviewee GJ mentioned reusability of TBG is a factor by saying, "I would do [TBG], and I can use it again. If I am going to take two hours to build it, but I can use and use it again in another class, in another way, I do not mind putting two to three hours out in the initial development of a good educational game or tool." Interviewee JB explained that the compatibility of TBG is a factor and emphasized its importance by saying, "I would rather use something more compatible like a PDF document or some other documents."

Category 0, teacher's gender is not a factor, was discussed in all interviews, and the participants confirmed that with 12 hits. Interviewee LL mentioned, "I think, if you had asked me 10 or 15 years ago, I would have said yes, but I do not think so. Not anymore."

Category 0, teacher's age is a factor, in implementation of TBG, had a total of nine. Participant MI shared, "The older you get, it is more difficult to ask questions." Meanwhile, seven participants believed that the teacher's age is not a factor and made this code a Category 0. Interviewee LL emphasized, "If somebody been doing [no gamification] for 20 years, it is hard to have a shift like that. You are taking a mountain and trying to shift it. I think that is really hard. However, I do feel though, as educators, we have been asked to do so much in the past year [pandemic remote learning]."

All categories mentioned above fit into the same theme, PU, and make another main branch of CGAM with a total of 210 hits. In addition, teachers addressed the pressures they feel like the agent of education responsible for their student's safety and the quality of their courses.

Perceived Social Pressure

Category 7, with a total hit of 85 (with the three Codes 3, 5, and 8), discussed the internal pressure that may affect teachers' decision to accept and adopt TBG. Interviewee CC shared, "I want to try; I am not nervous, but for my confidence, I need to know that this new thing [TBG] works and makes my class better," while DB said, "You have kind of tried to plan for what can go wrong, but it is not always … has to be perfect before I bring it in. Sometimes it is fun to be a bit messy with it." DB also mentioned, "There is

much apprehension with technology that teachers are constantly worried that things will go wrong when they need the most because of bad experiences they have had." Therefore, teacher's anxiety is a factor.

Interviewee AL was concerned with students' ability to partake and shared, "I would not push it [TBG] too hard because I do not want them [students] to have added anxiety to learning the content itself. I need to be very responsive to their comfort level." According to interviewee EM, teacher's learnability is a factor. EM said, "Not everyone is just going to Google, and they find it difficult and give up everything about it [TBG]." GJ also shared this with a different approach and said, "I think a lot of this digital stuff may also come down to the compatibility of how teachers are compatible with their material." CC admitted, "I would rather have a volunteer student do it [TBG] first time for me."

Category 8, student-related pressure for teachers (with four Codes 24, 29, 37, and 50), had a total of 40 hits. It emphasizes the pressure from students that may affect teachers' decisions in consistently implementing TBG. Interviewee MI mentioned that students' acceptance of TBG is not a factor and will not change the decision to implement TBG. MI shared, "I have had a few times where students did not want to participate in TBG … they did not want to show [their ID to] the other students like if they know something or not … for those cases, I just get them to write their answers on a piece of paper." Meanwhile, other teacher participants believed that students' acceptance of TBG is a factor. KW mentioned, "Too much usage of it [a particular TBG] actually causes me to slow down because it loses the meaning [for students]." She meant that she cared

whether students accepted TBG. Students' anxiety is a factor in the adoption rate of TBG by teachers. NB shared,

> I have got a couple of kids that fit into that category [students with computer anxiety] for me. I can start my lessons and say: here is the short link that I have created; I will often be front-loaded. So, I will pop over like here is the link; I want you to open it up early; we will go to this website and get it loaded. So, when we start, you are already going.

Students' academic level difference is a factor for teachers' use of TBG and how often they integrated it into their practice. "Even though I am face to face with my students that if there is a difficult website if it is long to load and there are more steps to it, I am hurting my lowest kids," NB said.

Category 9, subject norm, represented the combined result of the pressure from the community, parents, and administrators on teachers in applying TBG into their practice. It has two codes, 18 and 21, with 38 hits, and is explained next. No parents' prejudice against TBG, with 17 hits, was a discussed factor that every participant agreed that they never had an issue with a parent about applying TBG. JC mentioned, "No issue with parents in the recent years. I think parents are getting more progressive." Category no pressure from admin on implementing TBG had 15 hits, by which teachers agreed that there is no pressure from the administrators to apply TBG. When I asked whether you feel pressure from principal or vice-principals in using TBG, JaB replied, "First of all, I do not see that as a clear legal culture; so, I never had that pressure anyways."

Category 0, teacher's resilience is a factor, with 18 hits, was a popular item. JK said, "We try to see if it [TBG] works and if it does not, we will find a solution for it or try to improve it." JC also shared, "I do not feel discouraged when things did not go my way. I try out, and if it does not work, I figure out, can I solve it."

Category 0, enabling environment is a factor, with 17 hits discussed the facilities that allow teachers and students to engage in online activities. Interviewee AC reported," I have had powerful students in the past who are sitting there clicking and going. I am clicking the button, but it is not like their end, just not. They [TBG] are not getting recorded fast enough." DB also shared,

> When you are teaching [and] you have got an audience of 30 people, your shortcomings are magnified, and it can be a really stressful experience. That is why most teachers do not rely on them because they are worried about Wi-Fi going down. They are worried about the service itself going under maintenance or not working as it should. I would guess that is probably the biggest obstacle for people.

For a small percent of teachers, 19%, enabling environments such as Wi-Fi and school facilities such as projectors, computers, and the class size was not a factor, unlike what is noticed above. As this code unit was too small, I did not count it for the total hits of this theme, and I did not discuss it in Chapter 5.

Category 0, teacher’s peer pressure is a factor, with six hits. It discussed how peer pressures might affect teachers' decisions in consistently implementing TBG. Regarding the existence of pressure from another teacher, AC said that

> Personally, [if] I get someone is doing it [TBG] next door, then for me, I want to try. I am curious about nature. If they [other teachers] are doing something, and I see a class with a good time enjoying themselves while also learning, I will try to do so. Then [it is a] positive pressure.

Another way of experiencing peer pressure was shared by GJ when she said that

> I do not feel as comfortable expressing my thoughts on that [how to use TBG]. Being probably one of the older ones in the department, many younger ones like to follow the plan. I do not follow the plan the same way they said, and that is a problem for me, but I did not say it verbally in my department.

All the singleton and combined categories mentioned above with a total of 198 hits are fit into PSP, one of the main branches of CGAM. However, the social pressure opened the barriers to consistently implementing TBG significantly and added concerns during perceived ease of use.

Barriers to Consistently Implementing TBG

Category 10, insufficient training is a barrier (with five Codes 6, 10, 11, 25, and 27), and the total of 95 hits represented the barriers to consistently implementing TBG. Many interviewees mentioned fast-changing technology is a barrier. AH said, "If you get past the threshold, that is where correcting it becomes a problem." DB also mentioned, "They are ever-changing, much more than tangible services or things that we can have." Regarding insufficient technology leadership as a barrier, interviewees had a similar opinion. JC stated that "it is hard to have leadership in anything here because we have too many people calling the shots. Whoever is calling the shot is not just one person; It is not

like there are five chefs in the kitchen, [there are] five chef teams in the kitchen." Teacher participants shared their opinion that insufficient TBG examples/tools is a barrier. JL said, "If I were recommended a new platform to use, I would be interested in trying it."

JaB brought the problem with insufficient practical professional developments is a barrier by saying: "I think, probably the two most beneficial Pro-Ds I ever went to was one we just had in another school when one of our colleagues actually just taught us how to, [not by the system]." Jk shared opinions about the insufficient district direction is a barrier, saying: "I wish I can use different types of game platforms and games, but the one thing it is just I am frustrated at that I am not really familiar with how to use [platforms] so … If we have a designated person who can support me that will be fantastic."

Category 0, platform cost is a barrier, with a total of 11 hits, for teachers who practice implementing TBG in their lessons. Interviewee MI said, "Sometimes the paywall for … [a platform] limits my ability to make TBG as well because I do not have this function, so I do not use it often enough to pay." JC said, "But we culturally are so money-driven, especially the companies that are not public companies." EM mentioned, "TBG with pictures that I created before are now not showing the pictures. I have to pay to display the pictures."

Category 0, time, in general, is a barrier with ten hits, was also a noticed barrier. I discussed this category as Category 5, affecting teachers' decisions about implementing TBG under PEU. It was also a significant barrier for some teachers. AL said, "For me, the number one concern is time." JK said, "It takes longer than when we prepare our

regular lessons and when you bring these activities, so, yes, I wish we do have a little more preparation time."

Category 0, too frequent TBG is a barrier with nine hits, was a barrier for some teacher participants. JL shared, "I still use [a platform] occasionally, but I do not use it as much maybe because I think some students are kind of so used to seeing [the platform] that the almost like it is not new for them anymore." AL went even further and said, "With games, you cannot do it too often because teaching is primary, the game part is secondary. So you cannot do it to replace teaching."

Category 0, students' safety, and district protocol is a barrier, with nine hits, was a barrier for teachers in integrating TBG into their practices. This category came to the study as a surprise. DB shared,

> I cannot remember what we asked, but one malicious actor in the audience decided to start posting some pretty inappropriate messages and, like this, was being broadcast to the entire grade nine population. So that was definitely that I think could be a significant obstacle for teachers worrying that students were abusing the platform or taking anonymity and then using it to be an audience to do things that are not kind.

This interviewee also mentioned, "That [protocol] is a huge problem for any time that teachers use the service that students have to sign up. Realistically they should be sending letters home in advance and getting parent permission, especially if the information is not

stored in Canada." JaB also mentioned, "Got to see if it [platform] passes district protocol for safeties, like if it is based on a US server."

The categories mentioned above together made a theme, barriers, and address RQ1b. It is not a branch of CGAM but could be used as CGAM-extended. This matter is discussed more in the result section of this chapter. Teacher participants were fair enough to suggest solutions to the barriers they mentioned.

Solutions

Category 11, solutions (Codes 31, 39, and 47), with 27 hits, summarized the opinion of teacher participants who were willing to offer solutions for lack of consistency in implementing TBG. JC shared the idea that the standardization of using TBG is a solution by saying: "I still feel like there is no leadership needed to make sure everyone is on the same page in using technology. Lack of standardization is a regression." JaB shared,

> We should have some kind of program developed for curriculum-based grade nine gamification already accessible to us to try it more and make changes according to our wishes. Nevertheless, if we have to produce it ourselves, that will be much harder for us to use.

To emphasize the importance of having a measurement for teachers' practice is a solution on gamification as a solution to inconsistent implementation of TBG, JC said that

> No standardized teaching or like no one right textbook? At least for the gamification aspect, have one platform where different subjects are listed, and levels are listed, and then based on teacher

> experience, we can grade educational games. If the teachers are bored, let be it, because we are such as customer service representatives.

When I asked if there is a solution for the technology-related problems, JaB said, "I think our districts pushing digital literacy on our students, all have laptops and stuff like that. Now provide the supports for teachers so they can [support] students effectively use their technology." JC mentioned that regarding government support as a solution, "If the companies are government-funded and the government continuously upgrades and makes changes to the platforms, it is better." On the other hand, interviewee NB said, "Students on old devices are not using updated properly, and then they have a more difficult time getting on. So there have been impediments." The outcomes of interviews answered RQ1, 1a, and 1b in an individual approach and a holistic approach, which I have addressed below.

Results

The RQs consisted of one central question and two underlying questions. In this section, I have reported the results corresponding to the RQs. I have indicated discrepant and non-confirming cases, too. Then I reviewed the steps taken for ensuring the trustworthiness of data, including an audit trail, before offering a summary for the chapter.

The Central Research Question

What are junior high teachers' perceptions about not consistently implementing technology-based gamification within class activities? Participants from grade eight to 10 teachers in the Mountain Lake district-provided information to answer the question by sharing opinions and commenting during the interviews. Table 5 shows the percent of participants who shared views on each category. It also provides the themes' names. For example, all 17 participants shared opinions and agreed that TBG has a relative advantage as an engagement tool. Still, only 76 percent of the participants shared ideas about TBG's academic advantage/use or agreed that it influences their decision. Addressing these differences is left to Chapter 5.

Table 5

Influencing Themes to Teacher's Decision in Consistently Implementing TBG

Theme name	Category (Codes included)	Percent of interviewees
	TBG relative advantage as engagement tools (4, 9)	100
	TBG as a learning object (23, 26, 33, 52)	76
	Students' sense of community (20, 36)	88
Perceived	Triability of TBG is a factor	88
Usefulness	TBG's curriculum-fit is a factor	82
	Challenge-level appropriateness of TBG is a factor	53
	TBG usage is context-specific	53
	Subject area appropriateness of TBG is a factor	53
	The observability of TBG is a factor	18
	Teacher's expertise/general knowledge (2, 7, 19)	100
Perceived	Teacher's preparation time/support (1, 13, 15)	100
Ease of	Quality of TBG (34, 44, 45, 48)	65
Use	Teacher's gender is not a factor	100
	Teacher's age is a factor	53
	Teacher's internal pressure (3, 5, 8)	100
	Student-related pressure for teacher (24, 29, 37, 50)	71
	Subject norm on using TBG (18, 21)	100

Theme name	Category (Codes included)	Percent of interviewees
Perceived	Teacher's resilience is a factor	71
Social	Enabling environment is a factor	71
Pressure	Teacher's peer pressure is a factor	35

Note. I have deleted that the impact of the code teacher's age is not a factor as it was small, and the data regarding this code was inconsistent. Young teachers shared their opinion by guessing about this factor.

Research Question 1a of the Study

What are junior high teachers' perceptions of the obstacles for teachers in consistently implementing TBG within class activities? Table 6 shows the percent of the teachers who shared or agreed on any barrier. If a barrier has been too small, I did not report it.

Table 6

Barriers to Consistently Implementing TBG

Theme Name	Category (Codes included)	Percent of interviewees
Barriers	Insufficient training is a barrier (6, 10, 11, 25, 27)	100
	Platform cost is a barrier	41
	Time, in general, is a barrier	47
	Too frequent TBG is a barrier	53
	Students' safety and district protocol is a barrier	18

Research Question 1b of the Study

RQ1b asked junior high teachers' opinions on potential solutions to overcome obstacles in consistently implementing technology-based gamification within class activities. Teacher-participants believed that standardization of TBG is a solution (with 11 hits). They were hoping for standardization to effectively solve inconsistent TBG integration. They also mentioned that the measurement of teachers' practice is a solution around TBG (with ten hits). It would encourage teachers to apply TBG consistently. Lastly, interviewees mentioned that government support is a solution (with six hits) to solve the inconsistent implementation of TBG.

Discrepant and Non-confirming Cases

While challenge-level appropriateness of TBG, a category under PU, was critical as an affecting factor with 11 hits, another five hits disagreed with this result. They explained that challenge-level appropriateness was not essential for some teachers. Teacher's age as a factor influencing their decision in accepting and adopting TBG was a divisive code under PEU. Nine teachers reported that they believed that the teachers' age is a factor, while seven teachers thought it was not a factor.

Teachers are known for thinking about sharing and group-working; however, one hit against peer-coaching to prepare TBG. Although many participants agreed that teachers' experience is a factor, two hits indicated that teachers' experience with a computer is not a factor in saving time and preparing TBG. However, the most divided code was the effect of students' acceptance of TBG as a factor affecting teachers' decision to adopt TBG. Ten hits represented teachers who agreed and another ten for those who

disagreed that students' acceptance has anything to do with their decision. I expected to see at least one hit about the subject norm for teachers from the administrators for implementing TBG, but it was none, and 15 hits were in favor of no pressure from administrators. The same condition appeared to be true for pressure from parents. Meanwhile, there were six hits for teacher's peer pressure is a factor.

There were nine hits for teacher's concerns about following the safety and district protocol and called it a barrier to consistently implementing TBG. The literature review had not brought this item up as an influencing factor. I had planned for the trustworthiness of data and had considered potential ways of ensuring the outcomes of the interviews were trustworthy. From those strategies, I applied the following ways.

Evidence of Trustworthiness

I established evidence of trustworthiness by ensuring the study has credibility, transferability, dependability, and confirmability. To provide proof of the trustworthiness of the data collected for this study, I described the steps and procedures I considered and shared them in this section beginning with credibility.

Credibility

The primary strategy for the credibility of data collection was to look closely at the data saturation during the interviews. The study's credibility (internal validity) showed itself after the ninth interview. I started hearing most of the words that interviewees had used repeatedly after the ninth interview. The repeating demonstrated data saturation and provided evidence that what was shared and collected was credible as the information was consistent across interviewees. After the twelfth interview, I

experienced more data maturity because teachers repeated words more often during interviews. However, every interview had new items, and no two interviews were the same.

I invited all and every participant to participate in the member-checking process for validity as a supplementary strategy for assuring the study's credibility. However, only five participants volunteered to engage in member-checking for accuracy.

In this chapter, I used a detailed, thick description of the data collection as an audit to convey the findings. This description is a self-reflection on the data collection process with an honest narrative of a set of comments that tell the readers how characteristics, such as culture, history, and socioeconomic conditions of the Mountain Lake district, may have affected the data and coding process.

Transferability

Similar studies can use the data collected and interpreted by this study in up to three high school grades. Considering three school grades for this study has been a significant advantage. I interviewed 17 teachers, although I had planned for up to 18. This is more than the number of interviews most qualitative studies have considered around gamification in education. However, I have covered 18 different courses that the district offered to junior high students at the time of this study. This choice was the most valuable consideration of this study compared with other similar studies where only one subject area of high school had been the focus of the research subject. I summarized this information in Table 2. Future assignments where researchers conduct studies in every subject area or grade involved in this study can benefit from the outcomes of this study

for comparison and contrast. The participants' opinions and comments were a fair and productive outcome representing the teaching practice in Western Canada. Future studies in Canada may benefit from this Canadian-based study conducted in the Western Canadian education system for comparison and contrast.

Dependability

Dependability shows consistency with findings. Therefore, I invited my committee to be the external audit for this study to ensure the study's dependability. To complete this task, I arranged to share a copy of the report generated by the Quirkos software containing the codes, categories, themes, summary of participants' participations, and stats. I also reviewed how to use Quirkos software with my committee Chair and the second committee member to use the software properly.

Confirmability

I compared the outcomes of this study with the results of other studies to check the level of similarity and differences. Many of these comparisons are in Chapter 5. In addition, there are new information and data generated and collected by this study. For example, I shared segments of the conversations during the interviews in this chapter and reviewed some in Chapter 5. However, I kept the interviewees' words unchanged, as conversational instead of written sentences, to better understand their feelings to the readers. Additionally, I wrote a rationale for how I conducted the data collection and merged codes in the audit trail of this chapter.

Audit Trail

An audit trail established the confirmability of the findings of this study. The audit trail showed whether the study's outcomes were realistic and productive (see Creswell & Poth, 2018). It ensured the findings resembled interviewees' responses instead of the interviewer's opinions.

Participant Recruitment

I had no interference with participants coming forward for the interviews. They all received the invitation email from their principal, and if they were able to interview in the suggested time interval, they contacted me, indicating their interest in participation. I had provided the criteria for the study enrollment in the invitation email; As a result, teachers who read the consent and completed the recruitment survey met the criteria. This method of invitation and recruitment made the responsibility of choosing between the potential participants minimal. I selected 18 teachers for the interview and replied to them with the enrolment and then a confirmation email containing the schedule for the interview. Only one could not make it in the time interval due to family illness issues. Seventeen participated voluntarily.

Interview Process

Participants did not know the interview questions before the interview. As potential interview questions, I shared only three sample questions with teachers in the recruitment survey . Therefore, the participants had little information, and I did not prepare them for the interview. They did, however, know the title of the study and a short description in the invitation email. From over 20 interview protocol questions,

participants could have guessed a few of them, so, mostly, I explored the natural reaction and responses of the participants to the questions they had never heard before. That is why interviews were exciting for participants and sometimes even challenging for them. There were instances where the participants chose not to answer a question. For example, when I asked MI her idea about the effect of gender on the adoption rate of TBG, she replied, "I do not know if I could say that with certainty."

I reduced my spoken word to the minimum to avoid giving hints to participants. However, I did ask clarifying questions. For example, when I was not sure about a comment shared by interviewee NB, I asked, "Time is not necessarily an influencing factor [for you] in deciding whether to use a TBG. Am I right"? I completed my understanding from his previous comment with his answer to this question . Sometimes participants did not get the purpose or the meaning of a question, and I had to explain a bit about the question. For example, I asked JK about the teachers' anxiety as a factor affecting their decision to apply TBG; she needed some information. I explained an instance when she offered a TBG that did not go well; she felt unhappy and that it had caused embarrassment, and perhaps her staying away from doing TBG. JK understood my question and answered the question.

Coding Process

While conducting interviews, I found meaningful comments related to the CGAM factors affecting teachers' acceptance and adoption rate of TBG. Those comments became codes, and if it was any repeated code, I used Quirkos software to pile up the similar codes into the same bubble. Consequently, bubbles grew more extensive, and each

bubble showed the number of times a code was repeated and added to the bubble. I was careful not to count my words for coding. Therefore, I had no interference with the numbers representing the number of hits for codes. The first three interviews made the highest number of new codes, and this was a natural process as there were several unheard words and comments in the first three transcriptions. The rest of the interviews either added a couple of new codes not mentioned before or stacked repeating codes, sometimes with minor differences. If the differences were significant to make a unique code, I considered a new bubble. Appendix G to J present four figures of the initial set of codes.

My live communication with participants occasionally affected my decision to consider a code as a new bubble. This effect was beyond their words. For example, the data revealed that teachers' technology expertise directly affected TBG preparation time, an influencing factor. AH said, "If I do not have enough knowledge and technology, finding unique TBG is going to be harder. My expertise is going to be the precursor of any access." AL said, "They have to spend time learning it first," while DB said, "I am a child of the Internet, so I do not think it takes a lot for me to get burnt out on technology." Although these three comments are somehow different words, they sat in the same bubble. When I heard their words, I noticed that all three talked about the effect of teachers' expertise on the preparation time.

I have explained another example of my minimal interference with the coding process below: Teachers identified an insufficient technology leadership as a barrier to the consistent implementation of TBG. JC shared, "There is not enough leadership in

technology usage. It is hard to have leadership in anything here because we have too many people calling the shots." JL commented, "A solution is to give feedback to the people [who are in charge] and people who can follow up with the problem you have with technology." However, JaB's comment differed slightly. He said, "Most of us are looking for leadership from that to be passed down to us going here are some simple ones versus teachers having to spend time because we are like we do not have enough time." While JaB's comment differed from other participants, it was in part about time. However, I coded this comment with the top two statements about the lack of leadership and ignored JaB's comment on time as I had previously coded a barrier as time from his interview. JaB, a business education teacher, was highly disappointed about the lack of leadership, clear pathway, resources, and expectations from the district in the extent of TBG use, and I tried to stay with his line of concerns.

It was challenging to code some of the comments without reading a couple of extra sentences. Lines before and after the focus line helped to understand the true meaning of the comments. The live interviews helped with this issue and recognize the feelings and depth of interviewees' concerns . These moments proved to me that choosing a qualitative approach was the right decision. For example, students' acceptance is a factor for the two codes, and students' acceptance is not a factor; better communication was necessary to understand interviewees' opinions. When AL mentioned, "Kids are very tech-savvy nowadays. They are smarter than me," I took it as she had no problem with offering TBG, and for her, students' acceptance is not an influencing factor. However, when EM said, "Kahoot music is already catching students' attention," I noticed that it

was vital for him to catch students' attention. Students' acceptance was a factor for him. However, in the same interview, EM mentioned, "Students like games and craving Kahoot." This time, I took it as when he uses Kahoot, he does not think a second time about whether students will accept it. Therefore, I coded this one opposite to the EM's first comment. EM had demonstrated two opposite opinions around one factor, depending on the situation, and I took and counted both of them. Again, an excellent example of a productive way of using a qualitative approach. A questionnaire was not able to identify the details that I mentioned above.

Category Generation

The main canvas of Quirkos software became full of different bubbles, and it was hard to add any new bubble. I noticed the similarity between some bubbles with an eye on the three main branches of CGAM, barriers, and solutions. I used color-coding for bubbles to categorize them. However, not all codes were combined.

I could not combine some code units with any other code to make more significant categories, as they were unique and significant but not similar to any other code. I made these codes, singleton categories which became parts of themes. These codes have no brackets in the second column of Table 4. Also, some generated codes had too few hits to be an essential singleton category. An example of these codes was the failure of students does not stop teachers from using TBG. Only two teachers mentioned this code. These codes were merged into more significant codes if there were similarities, and if not, I have omitted them.

Some more minor codes were not even similar to any other code to merge into an existing bubble. For instance, the code forcing to share TBG is a barrier mentioned by one teacher. I considered this type of code to sit in the main canvas and calculated them as the total number of hits in the related themes but did not discuss their effect in the analysis section because they were outliers. I did not share them in the tables and figures. They did not become part of a category. Figure 5 shows the same group of codes presented in Appendix G after I categorized and connected them to themes. The thicker the arrows indicate the transition, the more significant hits for the study's code, category, and themes.

Figure 5

Categories and Themes Related to Perceived Usefulness Codes

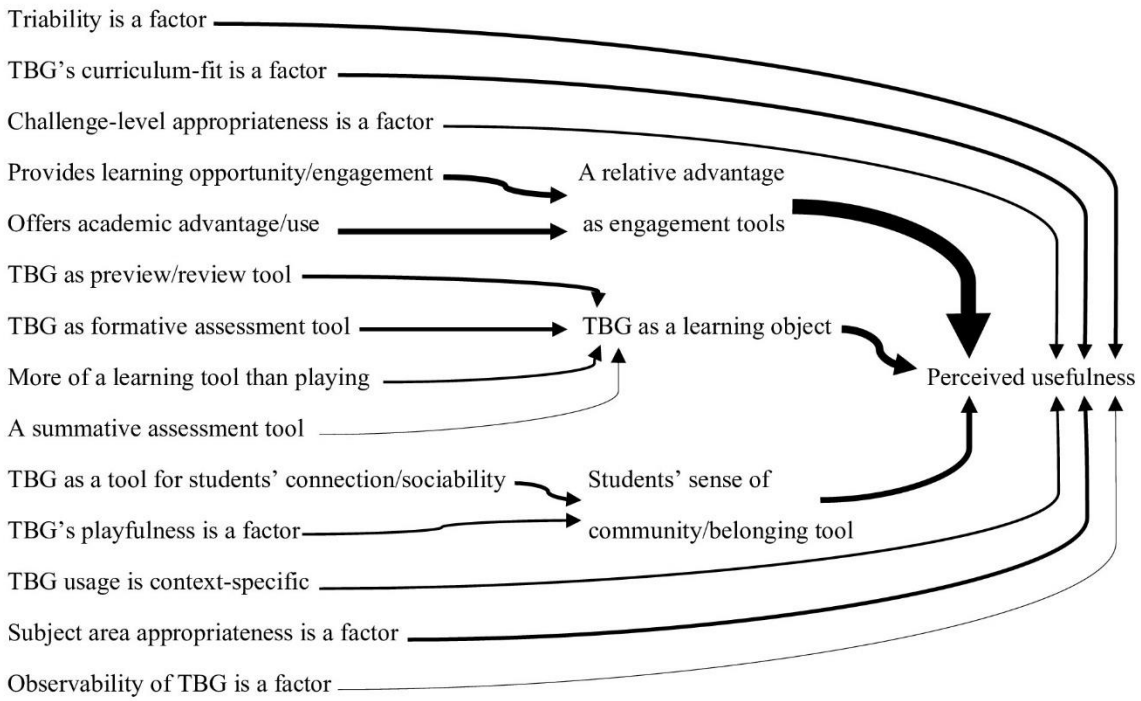


Figure 5 presents one of the three themes affecting teachers' decision to accept and adopt TBG and matches perceived usefulness, one of the three main branches of CGAM. I experienced that the codes in Figure 5 resembled and addressed the lack of students' engagement which is a primary issue according to the problem statement of this study and supported by the literature. The relative advantage as an engagement tool category was the most outstanding among other categories. I also noticed that TBG as a learning object was one of the main reasons junior high teachers use TBG. Both resembled PU in CGAM. Finally, students' sense of community/belonging tool, which is advantageous for engagement, seemed to be a category linked with PU. These categories were the primary reasons a junior high teacher may accept TBG based on the TAM. Therefore, I figured out that PU is the first theme of the study containing these three categories and some singleton categories presented in Figure 5.

Figure 6 shows the same group of codes presented in Appendix H after I categorized and connected them to themes. I followed the same procedure and steps to identify PEU as another theme. Codes in Figure 6 that addressed factors affecting TBG adoption rate were fit in the definition of DOI theory and made PEU. The teachers' expertise/general knowledge category contained some of the main reasons concerning the adoption rate. Teacher's preparation time/support and quality of TBG also played an essential role in the teachers' decision to adopt TBG and were also categories. When I saw these three categories addressed and explained PEU, I put them together as a theme. Some singleton categories also addressed PEU. The thicker the arrows show the transition, the more significant hits for the study's code, category, and themes. Therefore,

Figure 6 presents one of the three themes of factors affecting teachers' decision to accept and adopt TBG and matches perceived ease of use, one of the three main branches of CGAM.

Figure 6

Categories and Themes Related to Perceived Ease of Use Codes

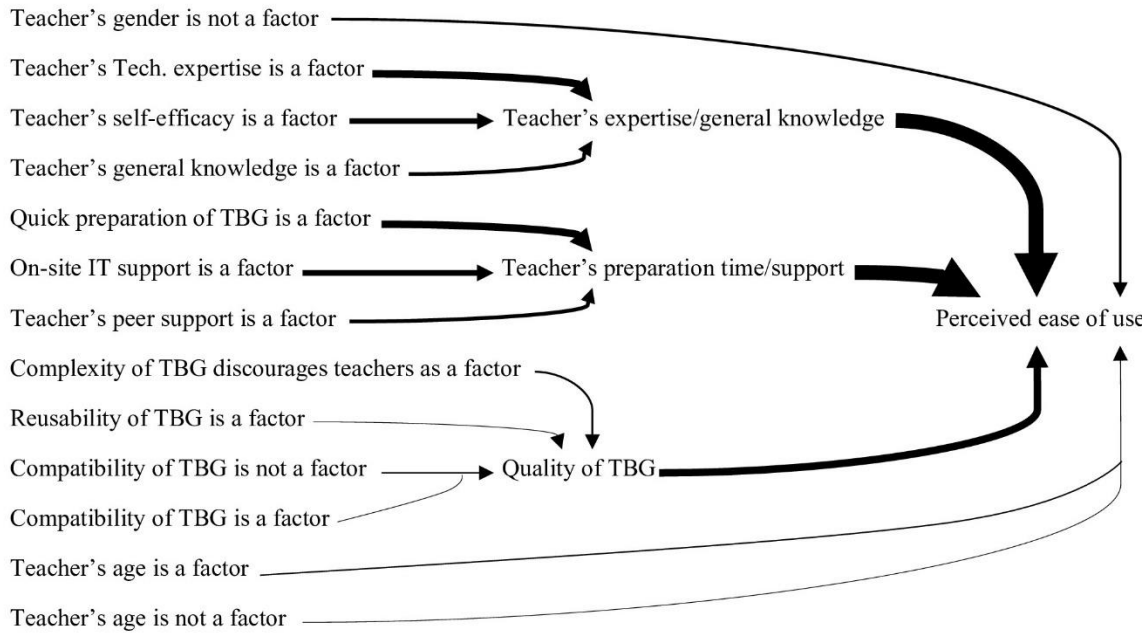


Figure 7 shows the same group of codes presented in Appendix I after I categorized and connected them to themes. Factors categorized under teacher's internal pressure, student-related pressure for teacher, and subject norm, in Figure 7, resembled the PSP in CGAM, each with some codes involved. These factors played a role in teachers' decision to implement TBG consistently, and literature reviews have proven essential factors. Before finishing coding and categorizing this section, I identified some singleton categories combined with the three categories mentioned above to make PSP a theme for this study. The thicker the arrows show the transition, the more significant hits for the study's code, category, and themes. Therefore, Figure 7 presents one of the three themes of factors affecting teachers' decision to accept and adopt TBG and matches perceived social pressure, one of the three main branches of CGAM.

Figure 7

Categories and Themes Related to Perceived Social Pressure Codes

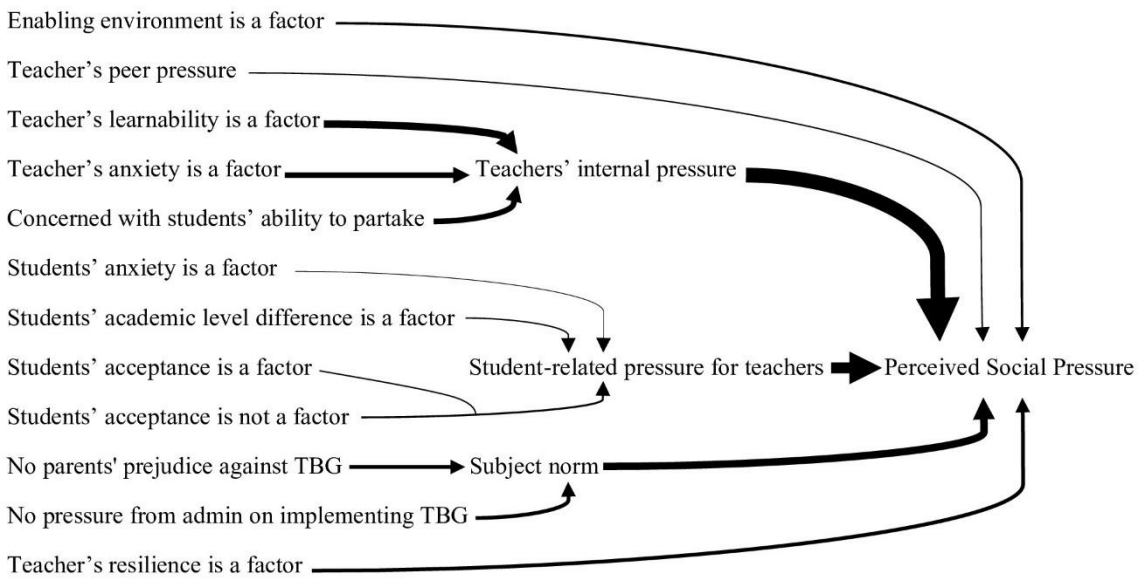
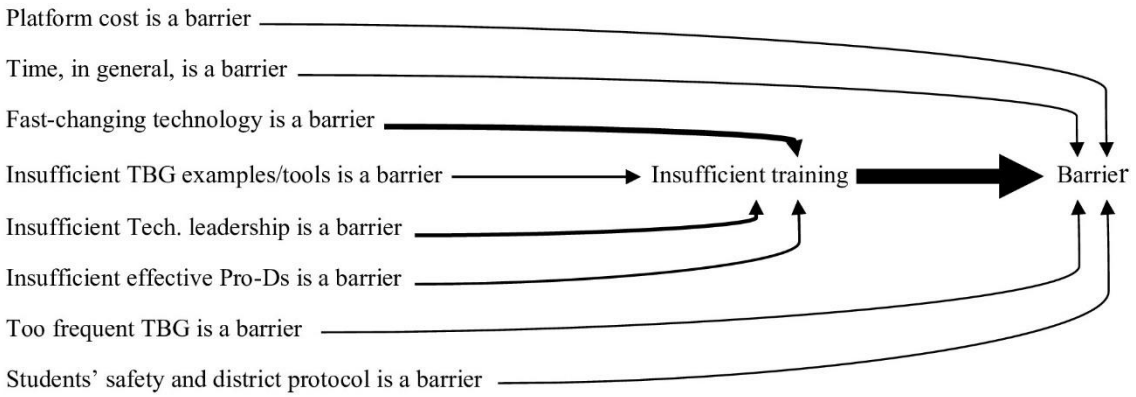


Figure 8 shows the same group of codes presented in Appendix J after I categorized and connected them to themes. As I reached closer to the last interview, the codes resembling barriers to consistently implementing TBG grew bigger and contained all barriers teachers mentioned during the interviews either directly or indirectly. These codes resembled and addressed RQ1a. Insufficient training is a barrier was the main and only category with more than one code. Some significant singleton categories emerged, too. An insignificant code, teachers' control on students' devices, was not part of any of the other categories, but I calculated it as the total hit of barriers. All the above items together made the theme, barriers. The thicker the arrows show the transition, the more significant hits for the study's code, category, and themes. This theme was not in CGAM because it represents barriers while CGAM contains influencing factors.

Figure 8

Categories and Themes Related to Barrier Codes



Lastly, I noticed that interviewees had shared a set of codes that addressed solutions to the barriers to consistently implementing TBG. This theme, solutions, answered RQ1b, and it was much easier to notice it while interviews were in progress. For example, teachers offered standardization of TBG is a solution and measurement of teachers' practice is a solution, and government support is a solution as the three leading solutions to the inconsistent implementation of TBG. All other codes in this area were insignificant. Therefore, solutions were one category with three code units.

The Bias of the Study

Some opinions shared by teachers were not expected or did not confirm any other views shared by other teachers. For example, when all the teachers agreed and somehow complained that the professional development sessions were not helpful or sufficient for improving teachers' technical skills or gamification skills, one teacher was impressed with those sessions. However, I did not count these types of opinions which resembled outliers.

There were words in the interview that were not answering RQs. Most of those words were extra details of teachers' practices in their teaching subject area. Some of them were examples they shared about the use of TBG. Although those words did not influence or answer RQs, I have shared some of them in Chapter 5 while analyzing the findings.

Summary

Chapter 4 represented the study's findings by discussing the data collection process. It also discussed the variations of data collection from the plan suggested in the study proposal. Before this chapter shared the methods of reaching out the results to answer the RQs, it reported the trustworthiness of the data collection process.

I posed RQ1 to explore teachers' perceptions of consistently implementing TBG. The data collected to answer this question revealed those junior high teachers at the Mountain Lake district believed that TBG is an effective student engagement tool. It can also be used for academic purposes such as formative and summative assessments, preview and review of lessons and chapters, and more. They also have experienced a sense of community and belonging when applying TBG in the class. Teachers like to try TBG before offering it to the students, and they would somewhat like TBG be fit into the curriculum and be appropriate for the subject area they teach. These two factors affected their decision on choosing and adopting a platform over others. In addition, teachers would like to offer TBG challenging enough for their students and be playful and fun. Finally, teachers would like to try TBG before offering and observe TBG while being applied.

The study outcomes confirmed that preparation time and teachers' expertise in finding and preparing proper TBG were the most significant predictors influencing TBG adoption rate. That is why access to IT personnel, peer support, teachers' general and technical knowledge, and self-efficacy were among the factors affecting their approach to implementing TBG. The quality of platforms was also a factor, for they liked the

platforms to be user-friendly, less complex, compatible, and reusable TBG. According to the data, teachers' decisions on applying TBG could also be influenced by their age but not by gender.

Internal and external pressures influence teachers' decisions on accepting and adopting TBG. Although teachers "do not walk away from stress," they feel pressure from their peers, experience students' anxiety, deal with students' acceptance of TBG and their academic level difference. These factors affected their adaption rate of applying TBG in the class. However, teachers of this study have not experienced any pressure from the administrators or parents and guardians for applying TBG. Teachers were highly anxious. They had to learn how to use technology, deal with the potential delivery problems, reflect on their practice, and justify their effort and time. The students' wellness was an influential factor in deciding any educational move, including implementing TBG. Participants were concerned about whether students equally take part in the activities. Many participants were unsure if TBG is a practical academic tool for lesson delivery. However, how they learned and how fast they learned from their practice influenced the implementation of TBG. Lastly, the productivity and quality of the facilities at school, such as computers and Wi-Fi Internet, had caused teacher encouragement and discouragement of adopting TBG.

I also posed RQ1a to explore the barriers for teachers in consistently implementing TBG. Teachers admitted that lack of training and leadership in identifying, using, and applying effective TBG is the most critical barrier, impacting their time as the second significant barrier. Teachers also said they could not do TBG too often as students

will lose interest, mainly if they use the same platform. In addition, teachers need more examples, effective professional development programs, and direction from the district to cope with the fast-changing technology. The cost of using the better features of platforms was also a factor that teachers hoped to receive support. Lastly, following the district's safety and protocol was a barrier that forced teachers to avoid using platforms that are not Canadian base.

RQ1b sought the potential solutions teachers could offer to remove the barriers. Teachers believed that there should be a measurement of teachers' practice using TBG. They appreciated a standard on how often and from which platforms they can offer TBG. This request requires government support as the private sector is profit-driven and changes the media constantly to attract educators and students. Teachers believed that private companies might sacrifice TBG's quality and curriculum-related matters for profit. Still, if the government cooperates with the private sector, the result will be different. In Chapter 5, I have discussed the study outcomes, interpreted and shared participants' comments, and concluded the study by sharing my thoughts on the CGAM model.

Chapter 5: Discussion, Conclusions, and Recommendations

The purpose of this study was to investigate junior high teachers' perceptions about their implementations of TBG within class activities to increase student engagement. This chapter discusses and interprets the study findings corresponding to the CGAM and from the study's conceptual framework lens. Then I conclude the study, explaining the limitations and implications, followed by some recommendations.

I conducted this study using an interpretive, basic qualitative research method and interviewed junior high teachers to determine their perspectives. Personal interviews provided the opportunity to engage interviewees and interviewer in meaningful discussions and interactions (see Matua & Van Der Wal, 2015). In addition, open-ended questions actively engaged the interviewees in communications and helped me explore the growing technological education industry concerning TBG (see Fadhli et al., 2020; Suh et al., 2018; Zainuddin et al., 2020).

From a list of junior high teachers willing to participate from four neighboring schools (the initial plan was for three schools) of the Mountain Lake school district in BC, I interviewed 17 best-fit teachers. I video- and audio-recorded the sessions, so I could engage in the interview discussions comfortably. The interviews were semi-structured using a written protocol with specific questions; however, the interviews had no time limit and went on as long as teacher-participants preferred to explain their feelings and experiences applying TBG. No interview was less than half an hour or more than an hour.

This study, within its scope, contributed to a gap in the literature and opened a door for future research to encourage teachers to apply TBG by being informed of several factors influencing their decision in acceptance and adoption of TBG. The results of this study encourage BC teachers to consistently integrate TBG into their practices by reporting barriers to consistently implementing TBG and potential solutions to those barriers. BC school districts can use the study's outcomes to address teacher-identified factors such as enabling the environment to plan for effective local professional development programs and support junior high teachers and students.

CUEBC can use the outcome of this study to address areas of concern identified by participants, for example, curriculum fit and subject area appropriateness, to design TBG workshops dedicated to removing the barriers for junior high teachers. In addition, teachers can benefit from the study's results addressing teacher-identified factors such as students' acceptance and students' anxiety when designing TBG. The study outcomes can also help the government hear junior high teachers' voices about the potential support to address factors, such as platform cost, teacher's preparation time, and insufficient training/tools. Finally, this study offers a CGAM containing several factors for future research.

Interpretation of the Findings

Findings of this study confirmed, and in some areas disconfirmed, the existing literature. In some areas, the results offered an extension to the current knowledge around the topic of the study. I generated code units from the participants' comments and answers to the interview questions. The names of emerged codes during interviews were

updated as the data were processed for making categories and themes. During the analysis and interpretation process, I compared the names of categories and themes with the names in CGAM factors and RQs, which addressed the key concepts of the study. The results were presented in several tables and figures in Chapter 4 that readers should chronologically follow to understand the data collection analysis process.

Findings Related to Key Concepts

This study addressed a set of factors that explain teachers' perceptions of TBG implementation. These factors that confirm the existing literature are described below in no specific order. High school teachers have a positive perception of TBG use, and they like applying TBG; therefore, this confirms Buckley's and Doyle's (2016) opinion. The outcomes of the interviews demonstrated that teachers believe TBG enhances student engagement practically as Albertazzi et al. (2019), Araujo and Carvalho (2017), Buckley and Doyle (2016), Khan et al. (2017), Johnson and Delawski (2013), and Stieler-Hunt and Jones (2017) mentioned. The data collected during the interviews also showed that gamification meets students' diverse needs beyond the report card and subject curriculum, as de Lope et al. (2017) shared.

Participants of the study emphasized the benefit of TBG on improving students' peer interactions. De Lop et al. (2017) endorsed students' peer interaction in their research. However, this study revealed that integrating TBG is not a priority for junior high teachers, similar to Khan et al.'s (2017) and Stieler-Hunt and Jones's (2017) studies. Teachers who reported using TBG successfully and felt happy with it supported what Huizenga et al. (2017) mentioned about a satisfactory feeling among teachers who apply

technology into their practices. These teachers also admitted that they would continue using TBG as much as possible. Their opinion resembled those of Tuparova et al. (2018). Teacher participants did not guarantee that they would implement technology consistently because preparation time is one significant barrier. However, teachers' opinions disconfirmed some literature.

Disconfirming the Peer-Reviewed Literature

I collected data that disconfirmed general expectations or peer-reviewed literature in this study . Teachers' opinions and approaches to teaching were the main reasons for finding disconfirming results. One of the participants demonstrated very little interest in integrating TBG, believing that TBG does not help with the delivery of lessons and does not influence students' average scores. This teacher was interested in traditional lesson plans. This approach to TBG did not match Asiri's (2019) opinion and many other researchers about the interest of teachers in integrating TBG. However, the participant admitted being ready to try TBG more often if somebody such as a colleague or student prepared TBG for him. Many findings were directly or indirectly related to CGAM factors. Comments related to CGAM factors were readily recognizable.

Findings Related to the Influencing Factors

CGAM contains influencing factors suggested by theoreticians and used by several researchers. I added some significant local aspects for teachers at the Mountain Lake district based on my years of teaching practice in that district. A set of findings directly addressing CGAM factors is explained below in no specific order. Although there has been much improvement in teachers' skills in preparing and offering TBG in the

past four years, lack of training was a significant barrier for participants. Sanchez-Mena and Marti-Parreno (2017) and Sobocinski (2017) also mentioned high school teachers had viewed themselves as unprepared for integrating TBG into their lessons. In addition, teacher participants admitted that TBG preparation time had been a significant barrier. This outcome confirmed the results of Watson and Yang's (2016) study.

Teacher participants of this study indicated that some students demonstrated anxiety mainly because of insufficient technological skills. They admitted that students' subject knowledge levels were different. Students' lack of subject knowledge was also a student-related pressure on the teachers who planned to implement TBG as teachers must plan for activities that meet the needs of all students. Yapici and Karakoyun (2017) had mentioned that students' lack of technological skills caused TBG activities to fail. Teachers were highly concerned about the wellness of their students. They had avoided gamification if they found applying gamification was discomforting some students. They did not want to cause stress for the students, resulting in an unequal level of student participation.

Nevertheless, teachers mentioned that they usually had a Plan B, modified activities, shorter TBG, or extra help and instruction before starting TBG for the students who needed additional assistance. Again, preparation time showed itself as a barrier confirming previous studies. Some of the outcomes disconfirmed, in part or total, factors discussed in former studies.

Disconfirming the Outcomes of Previous Studies

Some influencing factors in previous studies were not influential for the teachers at this district. For example, most teacher participants of this study had not been challenged when they were finding and applying TBG. They announced being comfortable with their technical expertise in preparing TBG. However, one of the main concerns of researchers such as Sanchez-Mena and Marti-Parreno (2017), Sobocinski (2017), and Yapici and Karakoyun (2017) has been the technical challenges that teachers faced while using TBG. However, a few teachers who participated in this study mentioned improving their skills year by year. The different opinions about the technical challenge level between former studies and this study could be explained by the 4-year time interval between the former studies conducted in 2017 and this study conducted in 2021.

In the past four years, the Mountain Lake district teachers had improved their technology integration skills, especially from a year before this study was conducted when teachers had to practice online due to pandemic conditions. However, the Mountain Lake district has invested much time in training teachers, and most of the teachers of this district seemed to be comfortable finding and preparing TBG. Schools have also planned for technology teams at the individual schools to help with technology issues.

In accepting and adopting TBG, the teacher-participants of this study, unanimously, did not feel any pressure, encouraging or discouraging, from school principals to integrate TBG into their practice. This idea is unlike what Machado and Chung (2015) mentioned about the effect of principals on teachers' decisions in accepting

and adopting TBG. This behavior of the principals of this district may be due to the allowed high level of teacher's autonomy in the western Canadian school system. Mountain Lake district teachers chose their materials, planned their lessons, and assessed their students as they wished because they were trained to complete these tasks. However, principals had intended and encouraged teachers to improve their technical skills through professional development activities at the school level.

I considered teacher's gender as a CGAM factor to search the opinion of teachers at the Mountain Lake district because literature had reported controversy about the effect of teachers' gender on implementing TBG. Some researchers had admitted that gender is a factor in the TBG adoption rate, and some disagreed. Participants of this study unanimously refused to recognize their gender as an influencing factor in accepting and adopting TBG. As a result, I confirmed the opinion shared by researchers such as Marti-Parreno et al. (2016) that teachers' gender is not a factor in some regions. Teacher's gender that once influenced their decision to implement gamification is not a factor in western Canadian school districts. This result disconfirmed the results of many previous studies. However, some teachers admitted that women had little interest and expertise in using the technology until a decade before this research. This matter might still be a valuable argument in some Canadian districts. Still, teacher participants avoided discussing it because it is socially unacceptable in western Canada to admit a difference between or caused by genders.

As a factor in the adoption rate of gamification, teachers' age also has been a controversy in the previous studies. That is why I added it to CGAM and sought teachers'

opinions about the effect of their age on the TBG adoption rate. I experienced a half and half agreement among participants about whether their age-related to the TBG adoption rate. However, I found this outcome inexplicit as 42% of the participants, younger teachers, had to guess the impact of age on their practice in the future. However, the difference in the teacher's age and gender with previous studies could be about the method of conducting investigations. Most studies researching the effect of teachers' age and gender on their technology adoption rate were quantitative, without giving teachers a chance to elaborate. This study was qualitative, and teachers explained and commented on their opinion, so in total, they were divided. In general, none of the teachers saw gender and age as a barrier to consistently implementing TBG. However, participants mentioned some barriers to their practice and suggested some solutions for those barriers.

Findings Related to Barriers and Solutions

Teacher participants of this study were divided about some barriers but undivided about others. They unanimously confirmed insufficient training as a barrier to consistently implementing TBG. Participants mentioned that they needed more tools and examples to prepare proper TBG for their subject area and grade. Bourgonjon et al. (2013) and, years later, Hill and Valdez-Garcia (2020) stated that teachers need to improve their skills through professional development programs before effectively applying them to gamification. Also, insufficient tools and examples were a noted barrier by existing literature (Watson & Yang, 2016). This issue has been ongoing as technology changes fast and teachers constantly feel falling behind.

Participants suggested that the district design effective professional development programs to improve and upgrade their technical skills because teachers wanted to have purposeful gamification that the district approves in case anyone questions teachers. Participants announced the role of the government as crucial in this matter because some investments are beyond districts' capacity. Government support was one of the participants' leading solutions to remove the barriers mentioned above.

According to the collected data, most teacher-participants of this study possessed adequate self-efficacy to use the internet and search for proper TBG. The more significant barrier for teachers was the preparation time and lack of resources. Sanchez-Mena and Marti-Parreno (2017) mentioned that their study participants in Spain had identified self-efficacy as a severe barrier. However, they admitted that preparation time and lack of resources are significant barriers. Participants of this study suggested and appreciated leadership by the district in identifying well-designed platforms that meet the subject area appropriateness for teachers to save time when preparing TBG.

Most teachers who participated in this study agreed that the monthly fee of some platforms is beyond their pocket. The better features of platforms were expensive for them, and they had no subsidy for this purpose. As Hill and Valdez-Garcia (2020) stated, the cost of new technology is a barrier for districts and schools. Therefore, the solution for the cost as a barrier, suggested by participants, was government funding and localizing platforms. They also told cooperation between government and private sector.

Teachers emphasized that they could not do TBG more often. It would become repetitive for students, and they would lose motivation. Teachers shared moments that

students in afternoon blocks said they had a TBG from the same platform in their morning blocks in other classes, and they were not enthusiastic enough to play again. Teachers added that perhaps there were unknown good and different platforms. With government support, teachers and districts could work together to identify those platforms and apply a variety of TBG as a solution to repeating TBG. Another suggestion was cooperation between the governmental and private sectors to help teachers reduce TBG preparation costs and time.

Findings Related to the Locality

A barrier to consistently implementing TBG is that teachers "cannot do it too often." Teachers strongly emphasized that the overuse of TBG could affect students' interests and cause students to lose motivation. According to Cheok and Wong (2015), the adoption rate of TBG has been below expectation. The interviewees confirmed this idea. They disagreed that TBG should be used constantly, for example, every day, and several teachers questioned the definition of the accepted adoption rate. Their favorite adoption rate was once or twice for every unit if a potential TBG activity fit into the syllabus.

Most study participants integrated TBG into their practices as lesson review or chapter preview tools. They did not intend to use TBG to deliver lessons because they believed their standard delivery had been highly effective. This opinion resembled the expectations of teachers and families about the academic quality of schooling in the Mountain Lake district. According to B. C. Ministry of Education (2019), 75% of the students of this district who graduated in the school year 2016/2017 attended post-

secondary education by fall 2017. This number does not include those who attended outside of Canada or those who attended later. The stakeholders in this region cared about the academic skills and achievements more than anything else, and they liked being heard by the district authorities.

Teachers were happy to "have a voice" and be vocal. However, they stated that the support for teachers in applying TBG had been insufficient. Gozali et al. (2017) and Jesmin and Ley (2020) mentioned similar opinions about teachers' voice in education. Araujo and Carvalho (2017), Hill and Valdez-Garcia (2020), and Sobocinski (2017) had stated that the support for teachers had been insufficient. This study proved that the teachers confirmed this matter existed in the Mountain Lake district. Teachers shared that implementing TBG from the district could have improved resources and training for the short and long term. They were concerned that the district was not doing enough for the fast-changing technology, and more direction was needed. They viewed implementation supported by a block per day for a TBG teacher who could help others with their TBG-related questions. They called it "a meaningful plan" at the school level, but teachers knew that the district must invest in other vital projects such as student safety and cyberage protocol.

Since teachers started using computers and the Internet at schools, student safety has become an ongoing concern for administrations and school districts. Miller et al. (2009) offered strategies to protect students in the cyber age. In addition, chapter 7 of Web 2.0: New Tools, New Schools, published by the International Society for Technology in Education (2007), was dedicated to Internet users' online safety and

security. However, students' safety never became a barrier for teachers of this district when they prepared activities that required the Internet until there were reports of cyberbullying and life-threatening incidents for young adolescents in the district.

Teachers proved to be conscious and concerned about the safety of students in online environments. The district protocol also has become more robust over the past few years. However, the protocol somehow limited the search options for teachers. Teachers have tried to avoid using platforms that are not Canadian-based if the platforms require students' personal information, such as email addresses. Thus, there were "grey areas for teachers." Teachers viewed student safety to be secured by the government, supporting Canadian-based platforms for teachers and students. Participants mainly liked it but were skeptical whether the government followed this plan because it continually looks for cost-effectiveness like Hill and Valdez-Garcia (2020) shared in their study. However, the scope of this study did not allow me to investigate and search whether the BC government has done enough for technology support in the past few years. This topic could be a meaningful study for future researchers.

Teacher participants offered a couple of solid and meaningful solutions to the barriers of consistently implementing TBG. First, they announced that standardization of TBG would put it on the agenda of all teachers, and districts will be responsible for supporting teachers for this purpose. Second, they asked if gamification is a valuable educational tool. Why do not teacher preparation programs contain the proper training, and why do districts not officially invite or obligate teachers to integrate TBG? The other

solution offered by participants was to design a measurement for the teachers' practice on consistently implementing TBG.

If a measurement exists, teachers will be responsible for planning their lessons to engage students by integrating gamification in the intervals or as often designated for each subject and grade. Both solutions mentioned above require a wide range of investigation and discussions beyond this study's scope. However, it was evident that the governments or districts plan to investigate how often applying gamification is adequate for any course. The input of teachers will be the first source of information to obtain, and this study can facilitate such investigations.

Interpreting Findings From the Lens of the Content of Conceptual Framework

Building blocks of this study were Davis' (1989) teacher acceptance model and Rogers' (2003) diffusion of innovation. However, the CGAM that I designed for this study was the aggregate of the factors in Dele-Ajayi et al.'s (2019) extended TAM, Asiri's (2019) social influence, and Adukaite et al. 's (2017) hypothetical model used in their research, plus some regional and local factors that I have included. The factors fit into three main CGAM branches: perceived usefulness (PU), perceived ease of use (PEU), and perceived social pressure (PSP), addressing the teacher's BI in using TBG. Exploring teachers' BI by seeking the factors of CGAM is what this study planned to perform. Therefore, interpreting the finding addressing PU, PEU, and PSP was one of the main goals.

Interpreting Findings Related to Perceived Usefulness

Teachers should first accept TBG as a valuable tool for educational goals and tasks to commit using them. The finding of this study confirmed that TBG is an invaluable educational tool for assessment purposes and, if appropriately implemented, has a relative academic advantage, as Rogers (2003) suggested. Relative advantage is connected to teachers' BI through PU. Participants also strongly agreed that TBG offered student engagement and different learning opportunities, a factor used by Dele-Ajayi et al. (2017) and Adukaite et al. (2017). However, the findings were not limited to the CGAM factors.

Extending the Knowledge of the Discipline

Some teachers agreed on the use of TBG to develop students' sense of community and connection. This influencing factor that encouraged teachers to use TBG was emerged in this study, although it was not inside the interview questions protocol. Although researchers such as Raza and Reddy (2021) and Lukosch et al. (2019) have mentioned the effect of gamification on students' sense of community, they have not considered it a factor influencing teachers' acceptance adoption of TBG.

What teacher participants brought to this study about students' sense of community was an original finding of this research. Teachers stated that some junior students could not connect properly with other students and the school community. These teachers have used TBG to bring students together and have experienced a significant impact. They have noticed this problem even harder during the pandemic. Students' sense of community might be even more severe in Canada with multicultural perspectives and

constant migration. The high level of international students studying in BC could have made students' lack of belonging even more powerful. Therefore, the factor student's sense of community/belonging is a significant factor related to BI. This factor should be discussed more in future qualitative research studies and explored by quantitative analyses.

Curriculum fit was a significant factor for participants. Teachers were mainly disappointed by the general approaches of platforms and the lack of specific subject area TBG, a problem mentioned by Dele-Ajayi et al. (2017) and Adukaite et al. (2017). However, this was understood as platforms intended to meet different curriculums in different countries for any subject. Teachers admitted that they usually made their own TBG or edited those existing TBG shared by other users.

Challenge-level appropriateness, used by Adukaite et al. (2017), was an essential factor in teachers' decision to use a TBG. Many teachers did not desire to use existing TBG on platforms because they found them too general, too easy, and below the level they intended to challenge students. Consequently, they had to upgrade the existing TBG or start from scratch.

In this study, subject area appropriateness was another factor in line with other top two factors that required the teacher's preparation time. Therefore, if a platform offers existing TBG that fits the subject area, teachers benefit from it. However, based on the opinion of teacher participants, it is difficult to find appropriate TBG for some subject areas such as business economy, food, second language, fine art, and students with a learning disability.

The playfulness of TBG, a factor used by Adukaite et al. (2017), proved to be controversial in this study. Teachers affirmed that TBG should be playful to change the class atmosphere and the monotonic language of many subjects such as mathematics, but the purpose of using TBG should not be solely playing games. Teachers of many subject areas emphasized that there is no extra time to play games; implementing TBG should help with covering the curriculum. For example, teachers must have prepared and offered a chapter review to their classes. Instead of a traditional review, teachers used a TBG to spend the same amount of time preparing. The same thing was right about chapter previews before starting them. For example, a social study teacher mentioned that he assessed students' background knowledge on WWII before beginning the chapter World War II by making a TBG. He noticed students had a range of knowledge corresponding to the education in their country of origin. He had used a TBG in here as a learning object.

Observability of TBG, suggested by Rogers (2003), was a factor but of lower importance for teachers. Some teachers confirmed that they reflected on the benefit and outcomes of TBG and brought it to their next TBG. This reflection was impossible if TBG was not observable while students participated in gamification. Teachers also admitted that nowadays, they all have laptops and tablets, and while their classes were playing games, they could either play with them or observe students' achievement and scores.

Triability of TBG, suggested by Rogers (2003), was an essential factor as teachers affirmed that they tried TBG before offering them to the class to make sure nothing was

going wrong, out of control, or questionable. This process was crucial for teachers who frequently used existing TBG prepared by other teachers or offered by platforms. Teachers who prepared their TBG from scratch knew their learning objects and were less anxious about the quality and security. The district's student safety and ethical protocol also enforced another layer of precociousness that teachers met by trying TBG before offering it to the class.

The factors mentioned above fit in the PU of CGAM. Teacher participants well-received interview questions which addressed PU factors. They were excited to share information and feelings around the usefulness of TBG and how it positively changed the class environment and as a social change. Their comments proved that teacher's BI in implementing TBG relates to the TBG's PU, a significant theme in the study's data. Employing Davis' TAM and Rogers' DOI as theories for this study helped interpret participants' opinions around their acceptance of TBG and the adoption rate of TBG.

Interpreting Findings Related to Perceived Ease of Use

Teachers' acceptance of TBG as a valuable educational tool is an essential step toward implementing TBG. However, Teachers' acceptance does not guarantee a high adoption rate of TBG. According to the collected data during the interviews, if teachers noticed that they did not have access to proper resources or it was hard to find appropriate TBG, their BI was affected. Consequently, they avoided consistently implementing TBG. However, one of the main factors for them has been preparation time.

Participants unanimously mentioned that searching the Internet to find proper TBG, learning how they addressed subject areas and grades, preparing appropriate

activities, and planning to integrate activities into their lesson plans were possible, but it was time-consuming. For most of the participants, time was the main barrier to consistently implementing TBG. Teacher participants addressed preparation time as both a factor related to the adoption rate and as a barrier. Most participants appreciated TBG's value and spent time implementing TBG into their practices. Nevertheless, this was about one or two times per unit because teachers had limited preparation time. Teachers divided their time to meet several tasks such as preparing tests, quizzes, lesson plans, and process marking and report cards. Some teachers admitted that they had used their time after school to complete TBG preparations at home because their one block every two semester for preparation has not been sufficient. However, some teachers mentioned that they did not mind spending their time if technology leadership and guidance by the district were in hand.

Teacher's technology experience, used by Dele-Ajayi et al. (2017), as a predictor was a challenging factor to discuss because it seemed some teachers did not want to discuss their level of expertise in using technology openly. Some teachers confirmed that they did not have good experience but still could achieve preparations. However, IT support, peer support, and teacher's self-efficacy were the most common factors affecting their adoption rate. Teachers of this district have improved their technology skills significantly in the past four years. Teacher’s technology background and expertise were not a severe factor in western Canada because of technology improvement in teacher preparation programs, but teachers' skills still play a role.

The teacher's self-efficacy was an essential factor. It was used by Dele-Ajayi et al. (2017) and Adukaite et al. (2017) as a predictor and showed itself in several moments during the conversations in this study. Teachers proved to be life-long learners. None of the participants admitted being unable to prepare and deliver TBG-related activities. However, they mentioned that self-efficacy is required. Therefore, it is a factor, and it is related to the teacher's BI.

On-sight/IT support was closely related to time as a factor when the discussion was related to PEU. Teachers strongly believed that there was a need for IT support, and this was an essential factor. Even those teachers who claimed they did not need IT support agreed that they could have benefited from a person with one block of IT support per day. They like to approach and ask potential questions or get help if anything goes wrong while preparing or delivering TBG. Two participants had become emergency IT supporting staff during the remote schooling on the 2020 pandemic and had experienced the importance of assigning one or two teachers per school for on-sight support. The main desire for this support was saving time but increasing the quality of TBG with the help of IT support was also in participants' minds.

I had included teacher's peer coaching as a factor in this study after reading Bandura's (1997) "Self-efficacy. The Exercise of Control" about peer coaching. I noticed its importance in sharing knowledge, spirit, positive energy, frustration, and time. Whenever I asked teachers' opinions about seeking help from a colleague, they were excited to share their experience and appreciation. Those teachers had benefited either from the general technology-related knowledge of other teachers or the specific expertise

of colleagues about platforms or TBG. Even teachers with a high level of technical experience admitted that they sometimes approached others who had experiences with a platform to seek help and save time. It is a known fact that teachers learn from each other quickly and meaningfully because they know the common education language and pedagogy. Therefore, access to peer coaching was a factor for the participants in consistently implementing TBG.

I combined the comments about teachers' general knowledge, their awareness of available supportive services, and their mastery of existing TBG platforms and made a minor code teacher's general knowledge a factor. It was evident from participants' words that if teachers stop searching and improving their education philosophy and skills in identifying and using TBG, they will fall behind. This code was later merged to teacher's technology expertise as a category.

Conversations around teacher's age and teacher's gender, used by many researchers, generated unexpected results. Younger teachers had to guess the impact of their age in the future on the TBG adoption rate. They had no knowledge of their physical and mental conditions in the future and the effects of their age on implementing TBG years from their interview. Their guess was equally divided between "yes" and "no" to the teacher's age as an influencing factor. The senior teachers did not see their age as a factor. They had dedicated themselves to their professional growth; however, some mentioned that they had slowed down a bit due to age.

The result was again half and a half between age to be a factor or not. The data were not as meaningful as I anticipated them to be based on prior research. Perhaps,

future researchers can use a better protocol question to investigate this factor. I had a chance to hear teachers in a qualitative study and found their answers to explain their comments. However, approaching this question in quantitative research may confirm or disconfirm the findings of this study. The teacher's age is directly related to the teacher's BI and does not connect with PEU as no participant mentioned that age makes TBG preparation and implementation difficult or easy (See Figure 6).

Regarding teacher's gender, a couple of female participants mentioned that if I had asked this question ten years ago, they would be answered differently. They noted that female teachers possessed a lower technological skill and perhaps were shy to approach IT persons or peers, to seek help years ago. However, based on their opinion, nowadays, female teachers are as competent as male teachers. Similarly, male teachers of the new generation of educators also mentioned that they had seen no difference in the expertise and courage of any gender teacher candidates during their teacher preparation program. Therefore, the teacher's gender to influence TBG adoption rate was "not at all." However, this CGAM factor may be influential in other regions of Canada or other countries.

Quality of platform was a category of discussions with codes discussing TBG's complexity, reusability, and compatibility. As I was conducting more interviews, I noticed that teachers expect some support from software developers by designing user-friendly platforms. The complexity of TBG, suggested by Rogers (2003), was the basis for this category and had an opposite relation with the consistent implementation of TBG. "The more complex the platform, the less attractivity" was a precise wording by several

teachers who visited the platform and prepared TBG. Nowadays, this is a known issue, and programmers know that the success of their platform in attracting clients is partly related to the level of complexity of their platform. Participants confirmed this factor as essential as I considered in CGAM.

Reusability of TBG was a factor that no former researcher had suggested as an influencing factor of consistently implementing TBG. I was not planning to seek the opinion of teachers around it either. However , during this study, reusability became part of the natural conversation in open-ended communications. Teachers liked to reuse TBG, and they needed district leadership in the safe storage of data to make this activity meaningful and secure. Participants viewed creating a TBG bank supported by the district or schools as a safe and effective solution. They mentioned that the school district is a source that all district teachers can rely on its value, upgraded and updated condition, lower cost, and cyberage safety. It offers the option of reusability of TBG.

The compatibility of TBG, suggested by Rogers (2003), was a controversial factor with an equal number of "yes" and "no" responses. Teachers were divided on whether it is a factor influencing their decision to integrate TBG. Even those who believed that TBG's compatibility is a factor did not take it as demanding as other factors related to the quality of the platform and TBG. Because of the significant improvement to educational technology, compatibility, which was an essential factor in 2003 when Rogers discussed it, was much less problematic for programmers, school systems, and end-users by the time of this study. This factor might still be influential in regions with different education systems or lower levels of supportive programs and facilities. However, ongoing

investment is required in human resources and capital to keep the compatibility at a "standard" and acceptable level. According to participants, western Canadian districts were in good condition at the time of this study, and TBGs were easily compatible with the school facilities. That is why this factor was minor.

In total, how easy it is to identify platforms, prepare potential TBG using platform features, and the quality of finished TBGs are essential qualities teachers consider necessary. Therefore, the category, quality of TBG, fits under PEU. Thus, employing Rogers' DOI theory helped discuss and interpret the collected data related to the adoption rate of TBG.

Perceived Social Pressure

Another central branch of CGAM was dedicated to the social pressures that teachers may feel when they implement TBG. This branch also addresses the social pressure teachers feel from others for implementing TBG. Many comments and words of participants fed this branch of CGAM as teachers felt anxious in different ways and at different levels. Three main categories under this branch were teacher's internal pressure as professionals, student-related pressure on teachers, and subject norm. Some singleton factors also existed (See Figure 7).

Teacher's Internal Pressure. Under the teacher's internal pressure, there was teacher's anxiety, a factor used by Adukaite et al. (2017), a significant concern for participants in different ways. Some teachers admitted that they were nervous when looking for platforms and preparing TBG. They needed more training to be thoroughly competent when working with TBG. Some suggested specific training on identifying

good platforms and how to make a proper TBG. Their concern was beyond preparation and continued well into their class.

Some teachers felt uncomfortable delivering a TBG before being entirely sure of its success. They liked to check it with another teacher before applying a TBG. They were also nervous about the level of their computer skills compared with their students. Some teachers did not want to take risks. They needed an IT or a TBG teacher to check their TBG before offering TBG to the class. They did not want to feel disappointed in class for TBG to be out of the ordinary, too easy, too hard, or with shortcomings in delivery. They were other areas of concern for teachers.

Teacher's anxiety is not limited to technology-related anxiety. Participants were constantly concerned about the class time and curriculum coverage. If a TBG did not support their lesson plans or caused them to spend unpredictable extra time in the class, they preferred to avoid implementing it to escape the pressure they would feel in the days to come to cover the curriculum in a shortened time.

I learned that teacher's learnability is a factor in how often they implement TBG for teachers in this district. How teachers know to use technology as a general approach has been discussed in the literature by many studies, for example, Teachers and Technology: Making the Connection, published by the Congress of the U.S.'s Office of Technology Assessment (1995). However, teachers' learnability on how to adequately implement TBG has not been discussed in the literature. Some participants of this study were severe about reflecting on their gamification in different aspects such as preparation time, syllabus connection, students' reactions, and more. That is why they preferred to

implement meaningful TBG. As a result, each preparation time was longer, and they did not apply TBG often. Some called themselves slow learners and followed a personal teaching and learning pathway, and again, prepared only a few TBG per semester. They were uncomfortable and overwhelmed with fast- and ever-changing platforms. Nevertheless, some teachers took risks and learned better from their mistakes.

A particular concern for teachers was about students' ability to partake in TBG-related activities. This factor grew during this study and was not initially a CGAM factor. Concerned with the students' ability to partake was not a student-related pressure for teachers. It was a pressure that teachers as professionals felt if their TBG implementation went wrong in any way. I have listed the concerns and questions teachers had in mind in no order as follows:

- Did students receive TBG and benefit from it equally?
- Did students feel comfortable being part of TBG?
- How was the day for my students with educational disabilities different?
- Were my students with ELL condition part of the activity equally?
- How does my TBG affect gender equity?
- What was the students' emotional state during and after the activity?
- Did my TBG negatively touch or address any cultural values?

The level of care that teachers demonstrated was evident. One participant showed an existing TBG in a platform with two ethical and cultural issues from her point of view. Therefore, concerns with the students' ability to partake as a factor related to PSP.

However, I categorized this factor with the top two factors under the teacher's internal pressure, sitting under the PSP theme.

Student-Related Pressure for Teacher. In the student-related pressure for teacher category, I noticed unexpected results. Only half of the participants identified students' anxiety as a factor affecting their decision. When they prepared TBG, they also designed a "plan B," so they were not empty-handed if anything went wrong in the class, including students' anxiety. When they knew that they had students with potential resistance or limitations to participate in TBG, they prepared a similar but easier activity for those students. This process had affected their preparation time for some, but some teachers did not see it as an essential factor. Some had a teacher assistant in their classes for the students with learning disabilities; they explained the TBG to the assistants before the class started to assist students during the activities.

Teachers with students with learning disabilities studied their students more closely before selecting or preparing a TBG. They wanted to ensure every student received the same level of instruction and chance to complete TBG. They did not want students to feel upset about their scores on the monitor in TBG competitions. They invited the slower students to start the activities earlier or eliminated some TBG parts for the slower students. Therefore, students' anxiety influences how often they adopt TBG because not every class has a teacher assistant. All extra steps to support students required time, which had always been a factor.

On the other hand, some teachers said students usually did not digest lessons at the same rate and depth, and TBG had the same condition; "this is what it is." Thus, this

group did not feel that students' anxiety should influence the TBG adoption rate. Instead, they have identified computer anxiety as a society-wide issue not related to education only, and everyone is dealing with it at a different level.

Students' acceptance of TBG, a factor used by Yalchin and Kutlu (2019), also had a half and half response. Half of the participants had not experienced students' rejection of TBG to the moment of the interview; their students had accepted TBG at all times. The other half had noticed instances that students rejected participation for different reasons. The main reason mentioned was students' devices that were sometimes not upgraded enough to handle the Wi-Fi connection or upload a bigger TBG. A few teachers related this matter to the students' unfamiliarity with computer programs' interface. They also noted ELL students' English skills and reading comprehension as a factor associated with the performance of those students and demonstrating rejection. This factor sits under the student-related pressure for teachers category, connected to PSP. Discussing students' acceptance during the interviews usually discussed students' academic level differences.

Students' academic level differences were a self-generated predictor in this study. I had identified studies such as the one Visser et al. (2018) conducted to see how students' academic level influenced their learning. However, I did not consider the effect of students' intellectual differences in participating in TBG in the interview protocol. Unexpectedly, participants of this study repeatedly mentioned that when their students were not at the same academic level, they felt reluctant to implement TBG. They emphasized that students' academic level difference is an all-time issue. For example, five students below the academic level of their grade were a norm for teachers for a class of

30 students. A class with more than five students in lower educational levels did not consistently implement TBG because they spent time interacting with those students rather than offering TBG to the entire class. Therefore, this is also a factor under the student-related pressure for teachers category, connected to the PSP theme (See Figure 7).

Subject Norm. Category Subject norm with two codes inside it sat under PSP. Teacher participants confirmed that they experienced no pressure from administrators in consistently implementing TBG. Only one of them mentioned that her admin encouraged her to use TBG, but she was not pressured. Therefore, the code, no pressure from admin, once used by Dele-Ajayi et al. (2017), is not an influencing factor for the teachers at the schools located in the Mountain Lake district. However, it could be a factor in other regions and countries.

Participants unanimously affirmed that there is no pressure from parents and guardians about why, how, and how often they implement TBG. Therefore, no parents' prejudice against TBG, used by Yong, Gates, and Harrison (2016), is not an influencing factor in this region. That in part resembled the general knowledge of technology among parents in this district. It also demonstrated that parents trusted teachers in safely and adequately using technology. However, a couple of teachers mentioned that they had collected parents' consent before engaging students in activities on some occasions. Therefore, no pressure from the admin and no parents' prejudice against TBG fit the category subject norm under the PSP theme.

Singleton Categories Under PSP. Less than one-third of participants had experienced pressure from other teachers in using TBG, teacher's peer pressure. These pressures were usually in the shape of encouragement or a department decision and interest in using TBG. A few participants compared their practice with other teachers and felt pressure without anybody asking them to use TBG. They also called it peer pressure, although it was not intentionally coming from a colleague. These teachers were newer teachers who saw themselves responsible for constantly moving forward and believed that the department heads watched them and their practices from a distance. I do not think this is a valuable factor anymore in this region. Even if it exists, it is there for a short career and only by a few percent of educators. Teachers have autonomy in this province on preparing lesson plans, materials and sources to use, and how to deliver the lessons. Therefore, the teacher's peer pressure as an influencing factor was at the bottom of the CGAM factors in weight but directly connected to PSP and a singleton code. Therefore, I did not categorize it under any categories in this branch of CGAM.

An exciting code that came up in almost all interviews was the teacher's resilience. This code was not a planned factor in the interview protocol. I took it as a common practice and characteristic of educators who have learned to cope with work pressure and addressed it adequately. Teachers proved during the pandemic that they were flexible and responsible toward their careers in the past year . This code proved that all social pressures that negatively impact the teachers' decision to accept and adopt TBG consistently are manageable. Teachers were well-trained to approach problems and fight the barriers to implementing TBG. Teachers have learned "not to walk away from

pressure." Teacher's resilience is a factor directly related to PSP as a singleton code and not attached to any of the categories under PSP.

The last singleton factor to discuss under PSP is the enabling environment, used by Dele-Ajayi et al. (2017), with low hits among junior high teachers participating in this study. School atmosphere and facilities played a role in the decision of some teachers who implemented TBG. When the Wi-Fi connection was better, teachers felt more comfortable spending time preparing TBG. Nowadays, teachers have tablets, which help them spend time at home searching for and preparing proper TBG. The district had adopted the bring your own device (BYOD) program, and every student has a mobile device in the class, so they can connect to the Internet and play games or take part in gamification whenever one is required. No one is left behind because schools have several laptops to lend to the students who, for any reason, attended school without a device. BYOD has guaranteed that the enabling environment at school will support the teachers' plan to integrate TBG. BYOD has caused schools' culture to become technology-friendly. The district renewed teachers' tablets once every two years. However, teachers still saw the enabling environment as an influencing factor and would like the school district to continue upgrading the facilities.

Limitations of the Study

I reviewed my research design several times to ensure feasibility during the pandemic and western Canadian school districts. However, there were limitations while I conducted the study. I experienced two types of limitations that were not under my control but mattered. It was challenging to measure the impact of these limitations on the

study's outcomes. However, I classified them into two groups of sample-related limitations and interview-related limitations.

Sample-Related Limitations

I had planned to invite three neighboring schools from the district, but I had to request teachers from four schools to ensure enough interviews. However, teachers at the school where I taught showed more interest in participation. As a result, I could not recruit an equal number of eighth-, ninth, and tenth-grade teachers to participate in the study. As a result, there were only four eighth-grade teachers in a total of 17 interviewees.

Another limitation of this study's sample was the wide range of teacher participants' experience with TBG. It was not easy to identify and invite teachers with the same level of expertise with TBG to the interviews to experience the difference between several subject areas under the study. A similar issue with the range of the age of participants caused problems with some interview questions such as teacher's age as a factor in accepting and adopting TBG.

Interview-Related Limitation

I had planned to use member-checking for all interviews. Still, only five participants wanted to be part of it, and only three of them sent feedback, mostly short confirmations of their satisfaction with the transcription. Two of them just replied, "perfect." The short number of member-checking responses was because participants saw the interview condition trustworthy and that I was audio recording the interviews and would lose nothing in transforming data. In addition, some of them knew me well and

that I was a dedicated person in doing things right. The other reason for the low number of member-checking participation was the pressure and time limitation teachers experienced in 2020-2021 when this study was conducted. We had a quarter system schooling to meet the pandemic regulations, which was hectic for both students and teachers. Thus, teachers wanted to be excused from member-checking, and I appreciated their commitment to being part of this study as much as they showed interest in that difficult time.

The conversation around solutions was significantly shorter than other interview sections, and I found this a limitation. This study was designed as qualitative research with personal interviews used as the data collection method. At the end of the data collection process, I noticed that a focus group in which interested teachers could have participated would have been another way of collecting data. Especially, answering RQ1b, solutions to the barriers of consistently implementing TBG could have become more profound in a focus group (i.e., group interview). It was possible to retrieve more helpful information when teachers openly communicated and shared their opinions regarding barriers and solutions in a face-to-face situation.

A couple of participants avoided answering some of the questions clearly or openly. They said that they had no updated knowledge on the questions or said they had no idea. I felt they decided to use their right to avoid answering questions. I found this a limitation to personal interviews versus questionnaires.

One interviewee requested to interview after school hours at his school. This interview type was not my general plan, but to meet his request, I accepted it.

Unfortunately, the Wi-Fi of the school and the password protection did not allow me to connect my laptop to the Internet to run the Zoom application. Consequently, I had to rely on the tablet to hear the interviewee and dictate the interview. I tried my best to take notes. However, when I reviewed the interview transcription, I noticed that interview was as short as three pages, unlike other interviews, which were a minimum of five pages of communication. Therefore, one limitation of personal interviews was that there is no guarantee to occur as planned.

This study covered 18 subject areas junior high teachers offered in the Mountain Lake district. Therefore, its outcomes are more practical to prepare general professional development programs. If I had collected data from teachers of the same subject area, the study's outcome could help focus on professional development programs. However, inviting teachers from all subject areas was a specific characteristic of the study. It offered particular advantages, such as experiencing a range of responses toward TBG implementation in different subject areas. During the recruitment and data collection process, I learned a lot and can share some recommendations for future research.

Recommendations

Teachers' skills and characteristics constantly evolve. People's skills develop and affect their characteristics and interest. Peoples' characteristics and interests play a crucial role in the technology adoption rate (see Rogers, 2003). Teacher preparation programs also constantly add newer technology to their programs. Therefore, researchers should commit to reconducting a similar study to this study, for example, in five years, to

experience different potential outcomes to some extent. A similar study in other regions and countries would also generate different results.

I recommend using CGAM to study similar topics in different regions for future research . There was initial qualitative evidence in this district that some CGAM factors were not relevant, and some other factors emerged that were not present in the original model. I also recommend that researchers validate the CGAM model using a larger sample of participants in quantitative approaches. Factors that emerged in this study could be added to the CGAM, as researchers wish, to make it an extended CGAM. I have mentioned some essential emerging factors further in this chapter.

Teachers do not see TBG as a way of delivering lessons. They also do not see any benefit in doing TBG too often. Therefore, platforms may consider these elements in designing adequate features that meet the needs of teachers. Most teachers need subject-specific TBG, and platforms should consider teachers' needs to serve their clientele better.

Future researchers should check the number of potential participants for their study to prevent collecting enough data. The period that the data collection is planned is also crucial as it may coincide with a summative examination, report cards preparations, or the holiday season for teachers. Meeting the districts' requirements is a process parallel to receiving IRB approval. It is much better to communicate with the school district ahead of time about what they need to complete IRB better and faster, or it might be a loop of back-and-forth action taking valuable time. Finally, communicating with principals is a crucial step before inviting teachers. When principals identify a study as

helpful and practical, they encourage staff to participate. This study offers valuable suggestions to the technological education community and concrete outcomes, explained in the interpretation section.

Implications

This study offers pathways to positive social change for stakeholders in various ways. Each K-12 stakeholder as a potential agent of change may take these implications, investigate in their environment, assess the effect, and apply it if they find them feasible and profitable.

Implications for Teachers

The positive social feedback offered by this study to individual teachers was that they had a voice sharing their feelings and frustrations around the consistent implementation of TBG. They felt closer to the district by sharing their opinion in a professional way of a research study about barriers to consistently implementing TBG and potential solutions to those barriers. They felt proud to admit that they identified TBG as a valuable educational tool. Teachers enjoyed communicating their experience in implementing TBG in classes. They were curious to know whether their practice has been educationally sound, and this proved that teachers at the Mountain Lake district are life-long learners. Teachers demonstrated that they would like to make informed decisions when preparing TBG. They noticed that I agreed with their feelings during the conversations and encouraged them to adopt TBG meaningfully.

Implications for School Leaders

Schools and districts benefited from the result of this study. After reviewing the outcomes of this study, departments can work better together toward a common ground about TBG implementation instead of being on different pages regarding what to do with TBG and how often to use them. Districts can use the data to plan for proper professional development knowing teachers' desires and the rationale behind their requests. They may invest in platforms that meet the teacher's needs closer and are backed with the updated literature. Districts may initiate a technology leadership position to answer questions asked in this study or suggestions brought by teachers. Assigning a TBG coordinator at the main office to support TBG teachers with a TBG bank will positively change TBG practice.

School principals can use the data to arrange for enabling environment that teachers suggest. They can remove barriers such as Wi-Fi, preparation time, and TBG cost by planning course load and school budget accordingly. Principals may consider a portion of FTE to assign a teacher to be the peer coach, TBG teacher, to other teachers about TBG implementation. Finally, principals would benefit from the new assignments to communicate with the community and parents about the school programs' improvements regarding TBG applications.

Ministry of education and government may check their short- and long-term plans and budgeting on technology integration and required human resources with this study to engage students better with the proper rate of implementation of TBG. This study is just

one additional source of information collected from local schools and junior high subject areas, supported by recent research and literature.

Implications for Students and Community

Students will benefit from this study as their teachers look for better platforms, prepare more effective TBG, watch for potential safety and ethics issues, and take TBG as learning objects, not marks/grades. Therefore, students participate in the activities with less pressure and more fun while communicating with each other. In addition, many students in grades eight and nine new to high school will soon find friends in an environment that offers communication through gamification.

The social impact of this study on families is that students arrive home happy and excited about practical and fun gamification at school. In addition, whenever parents ask teachers about the rationale behind implementing TBG and its benefits, they hear meaningful, educationally sound, and similar responses from teachers. Teachers' adequate responses with good examples and data make parents and guardians comfortable with their children's schooling.

The wider community can review this study's findings and notice that teachers do not just offer playing games to the students. Instead, teachers apply knowledge and spend time to bring new learning opportunities to the students. In addition, the community will notice that TBG is a more productive way of using cellphones and personal computers, technology that society is always concerned about teenagers' over-using.

Implications for Succeeding Researchers

The qualitative approach was a suitable choice for hearing junior high teachers at the Mountain Lake district about the inconsistent implementation of TBG despite showing a valuable educational tool. The qualitative approach allowed teachers to share their true feelings without being bound in the predesigned questionnaire. Participants offered their experience with implementing TBG openly in open-ended discussions without limiting the number of questions. The time considered for the interviews was enough to saturate data, and teachers felt they shared everything they wanted.

This study proved that TAM is still a useful model, and the extended TAM can be expanded with qualitative studies. However, a few new factors may be added or lost due to the application in different regions and grades. Likewise, Rogers' DOI is still a helpful model explaining factors affecting the adoption rate of technology, and it is also suitable for qualitative studies. However, the weight of the factors is now different and will evolve due to innovations, environments, and regions. Finally, CGAM proved to be a valuable model for addressing gamification use, and this study has already offered new potential factors to CGAM to extend the model.

Table 7 shows the most significant new factors that emerged during this study and their relations with CGAM main branches. Future studies would benefit future studies to review all factors used by qualitative studies or all predictors used by quantitative studies to apply a comprehensive model for their studies. In addition, researchers may check the convergence of the factors and compare them with local characteristics to accommodate their studies.

Table 7

Emerged Factors Affecting Teacher's Decision in Implementing TBG

Emerged code	Category	CGAM theme
TBG as a tool for students' connection/sociability	Students' sense of community/belonging tool	PU
The reusability of TBG is a factor	Quality of TBG	PEU
Teacher's learnability is a factor	Teacher's internal pressure	PSP
Concerned with students' ability to Partake	Teacher's internal pressure	PSP
Students' academic level difference is a factor	Student-related pressure for teacher	PSP
Teacher's resilience is a factor		PSP

Conclusion

This study found that junior high teachers' perception of consistently implementing technology-based gamification was positive. Teachers did not see TBG as a lesson delivery tool but a fun and engaging way of providing a review, preview, and similar class activities. Junior high teachers appreciated the educational value of TBG; however, consistently implementing TBG meant twice per unit of study. They reported not benefiting from using TBG too often. However, there were barriers to teachers' consistent implementation of TBG.

While barriers varied by subject area and grade level, there were some common barriers. Business education, home economics, and Fine Art courses experienced difficulties finding appropriate platforms and TBG for their classes. Teachers needed leadership from authorities to provide proper ongoing training, funding, and IT support. Preparation time was one of the most discouraging barriers, but teachers foresaw reducing the time required for TBG preparation with proper training and support. Factors such as teacher's age, parents' and administration pressure, which once were considerable in research, were not influencing factors anymore, at least in the Mountain Lakes school district. However, the items called above stay as factors in CGAM.

Even the teacher's age seemed to be not a profound influence. Instead, new factors such as concerns with the students' ability to partake, students' safety and district protocol, and teacher's general knowledge were more important among the factors identified by this study. Teachers believed there should be standardization on what platforms to use and what acceptable and effective TBG for different subjects. There

should be a measurement for teachers' practice on implementing TBG to ensure proper student engagement and adequate frequency of integrating TBG. Districts can assign a TBG teacher per high school (one block per day) to support on-sight help instead of email and phone communications. Districts can also assign a TBG coordinator to lead the TBG teachers with updated information on platforms and new TBGs. The district TBG coordinator can generate a TBG bank in different subject areas to share with TBG teachers.

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Appendix A: Recruitment Survey

The purpose of this survey is to find out your history of applying technology-based gamification (TBG) within class activities. Your name and answers to these questions stay confidential with Walden University and will be deleted five years after the study is completed. I would invite teachers who have implemented TBG at least once. If you have questions or need clarification about the criteria mentioned above, please contact me via email …….., or call me at ……. after school hours. Please, email the completed survey within one week. For each statement below, indicate your agreement or disagreement level by checking one of the answers.

Below is some information in the literature about gamification and examples of TBG. Gamification, defined as using game elements in a non-game context such as classrooms, helps teachers enhance learning engagement in a non-entertainment milieu. Examples of TBG are Kahoot, Quizlet, Quizizz for general applications, and apps such as Yousician and Tinycards for specific subject areas.

Using the above information as a baseline, please check one response for each of the statements in the table:

(SD) Strongly Disagree, (D) Disagree

(NA/ND) Neither Agree nor Disagree, (A) Agree, (SA) Strongly Agree

I feel confident that I can use computer capabilities to gamify my lessons.

SD D NA/ND A SA

I can identify software and apps available to gamify my classes to engage students better.

SD D NA/ND A SA

I have the IT support at school to access/apply the available software to gamify my classes.

SD D NA/ND A SA

Gamification has helped me to deliver my lessons in more fun ways. Students are engaged better.

SD D NA/ND A SA

I feel confident I can regularly implement technology-based gamification into my lessons.

SD D NA/ND A SA

I use TBG in each of my junior classes (grade 8 to 10) at least once a week.

SD D NA/ND A SA

I use TBG in each of my junior classes once a month.

SD D NA/ND A SA

I only have time to prepare and use TBG for my junior classes once every four months.

SD D NA/ND A SA

I have used TBG tools and have regretted it.

SD D NA/ND A SA

I have never utilized TBG for one of many reasons I can think of, although I heard it is helpful.

SD D NA/ND A SA

I know or heard that applying TBGs is challenging.

SD D NA/ND A SA

My teaching experience is 0 – 2, 3 – 7, 8 – 15, more than 15 years.

The subjects and the grade I have taught/used TBG for are as follows (choose as many):

Subject Area	Grade 8	Grade 9	Grade 10
English			
Math			
Science			
Social Studies			
PE			
Language Art			
Tech Ed.			
Fine Art			
Business Ed.			
Media Design			
Other: Please specify:			

Your Full Name: Current School:

Gender (Optional):

Appendix B: Invitation Letter

Hello Teacher,

There is a new doctoral study at Walden University called "*Junior High Teachers Do Not Consistently Implement Technology-Based Gamification.*" It could help identify the reason(s) junior high teachers' acceptance and adoption rate of technology-based gamification (TBG) is low. For this study, I will examine your perception of using TBG (such as Kahoot) to engage your students, the barriers you have identified for applying TBG, and the potential solutions you can think of for removing those barriers.

About the study:

- 10 to 15 minutes recruitment survey.
- Up to one-hour personal, individual online interview if selected.

Volunteers must meet these requirements:

- Taught at least one grade eight, nine, or ten currently or in the past.
- Used TBG (such as Kahoot) at least once.

I will inform you of the study result at the end of the research.

I invite you to participate in this doctoral study for a positive change. Please let me know, within a week, by email if you are interested in participating. Before that, you will provide me with your consent that is attached to the invitation email. Attached to the invitation email is a recruitment survey, too. Please use your personal email and my Walden University email to contact me.

Respectfully,

Walden University graduate student

Appendix C: Interview Protocol

Junior High Teachers Do Not Consistently Implement Technology-Based Gamification

Time of Interview:

Date:

Method of the interview:

Interviewee:

Script: Good afternoon: My name is , and I am a doctoral student in the Educational Technology program at Walden University. Thank you again for agreeing to participate in my study. The purpose of this interview is to understand why junior high teachers do not consistently implement technology-based gamification despite it showing a valuable educational tool. To protect your identity, I ask you to please refrain from using your name during this interview. I will be recording this interview to obtain a permanent transcribed record. You can pass answering any question or say that you do not have any specific answer. You can decide to exit the interview now or at any time during the interview. You can call something a barrier for consistently implementing TBG at any time and during any question or even offer a solution for removing barriers. However, after a few questions, I will remind you to identify obstacles and offer solutions if you have any. Is there any question before we start the interview? Is it okay with you if I begin recording now?

(Record the meeting).

Questions:

- How long have you been teaching in total?
- Have you been in any of the PD sessions related to gamification or TBG?
- Do you think that there is a relative advantage in applying gamification for student engagement?
- How important is it to quickly find appropriate TBG for the subject area(s) you teach?
- Are those TBG connected to the syllabus? Are they fit in the ever-changing curriculum?
- What about the challenge-level appropriateness? Are they challenging enough for your courses and students?
- Do you feel the available TBGs engage students well and provide them with learning opportunities beneficial for them?
- Any barrier or solution so far for those we discussed?
- How playful do you find those TBGs that you have tried or have observed other teachers utilizing?
- Have you observed students improve engagement while you have used TBGs.? Was the improvement justifying the effort of preparing and using TBG?
- Were you able to try the gamification before offering them to the class? How triability of a TBG was an essential factor in choosing the TBG?
- What is your opinion about the average time it usually takes to prepare proper gamification?

- How much has your previous experience with technology and computers helped you save time in preparations?
- How complex are existing TBGs, in your opinion? Can you work with them efficiently?
- How compatible are the existing TBGs or those you have applied with the systems, Internet speed, and expectations at school?
- If you have ever needed help and support, did you have access to direct support or in-sight IT help?
- What about receiving help from a colleague or a peer who can coach you, and you can coach back with how to use a TBG effectively?
- Any barrier or solution that you would like to name or suggest?
- In total, how can you explain your self-efficacy, if you wish, about identifying, choosing, and preparing proper TBG for engaging your students?
- Are you getting better at preparing and applying TBG as you get older?
- Do you think your gender has anything to do with my questions about your capabilities and skills in using TBG?
- Think of a time when you felt uncomfortable integrating gamification. Was it in part because of your computer anxiety?
- Have you noticed students' computer anxiety, and it caused failing your gamification?
- How accepting are students in your classes when you offer gamification?

- Have you received direct or indirect parents' complaints or encouraging words about their perception of TBG activity in your classes?
- Do you feel that a subject norm or social pressure around you encourages or forces you to apply TBGs?
- How does school culture, services, class size, computers, students' devices, and administration's approach enable an appropriate environment for you to feel comfortable/encouraged to implement TBG?
- Would you like to name barriers or suggest any solution?
- Is there anything else that I have forgotten to ask you about the factors affecting your decision to accept and consistently implement TBG?

At this time of the interview, you may go out of the box and share whatever you like to enrich this study. I appreciate your participation in this study. Is there anything you would like to add before I end this interview?

Again, thank you for your time. I appreciate your participation and input. As stated previously, your responses will remain confidential. Would you like me to contact you for the member-checking process to review your information and my interpretations of your opinions? This 20 to 30 minutes optional communication option is phone or email.

I will mail an appreciation gift to your school or an address of your choice without my name and address to keep our interviews confidential.

I will share the result of the study when I complete it with you .

Appendix D: Guidelines for Conducting Research Studies

1. Research requests are usually accepted from Mountain Lake school district teachers and administrators, university graduate students, faculty members, and professional educational associations. Only under exceptional circumstances will research proposals from others, such as undergraduate students, be considered.

2. Proposed research projects by graduate students must be endorsed by a full-time academic staff member (usually the thesis supervisor) and supported by the Ethics Review Committee of the respective institution.

3. Requests to conduct research studies must be submitted on a research application form (attached).

4. At least two weeks lead time is required to process a request.

5. One copy of the completed application form should be returned to the Assistant Superintendent .Copies of questionnaires, inventories or tests to be used in the study must be attached to the application form.

6. The Superintendent's office will review all requests based on the following criteria:

- Purpose and relevance of the study
- Quality of the instrument
- Qualifications of the surveyor
- Benefits to the student, school or district
- What the study will add to the literature
- Impact on student, teacher, and class time
- Impact on administration time

- Other demands placed on the target audience
- Sensitivity of the subject matter
- Costs

7. Approval of a proposal at the District level does not obligate schools or individuals to participate in the study. After District clearance is given, participation by students, teachers and administrators is voluntary.

8. The administration to students of tests, inventories or questionnaires usually requires the written consent of parents. This requirement may be replaced by a passive consent approval process where this is deemed appropriate. In addition, tape-recordings, pictures, films and video tape-recordings of students should not be made without written consent of parents and the district.

9. The anonymity of students and teachers who cooperate in research studies must be maintained.

10. All researchers are expected to provide the District with a summary of research results.

11. Fees will be charged for costs incurred by the District, payable in advance, where appropriate.

Appendix E: Proposal to Conduct Research & Surveys

Name: Date:

Address: City: Province: Postal Code:

Email: Telephone: Fax:

University/Agency: Department:

Position/Rank: Degree Held/Sought:

Faculty Advisor:

Title of Study:

Proposed Start Date of Study: Proposed End Date of Study:

Proposed Duration of Study:

I. PURPOSE OF STUDY: (character limit – 2300, please attach additional sheet(s) if necessary)

II. RESEARCH HYPOTHESES: (character limit – 2300, attach additional sheet(s) if necessary)

III. EXPERIMENTAL DESIGN AND PROCEDURE Please include information on the following topics: (character limit – 2300, attach additional sheet(s) if necessary)

(a) selection and description of sample - number of students and/or teachers to be used, grade level(s), method of selection, amount of in and/or out of school time required of subjects.

(b) outcome criteria and measurement procedures.

IV. SELECTED BIBLIOGRAPHY: (character limit – 2300, please attach additional sheet(s) if necessary)

V. ATTACH COPIES OF QUESTIONNAIRES TO BE USED OR OTHER MEASUREMENT INSTRUMENTS: (character limit – 2300, please attach additional sheet(s) if necessary)

Email completed proposal to:

Appendix F: Interview Tally-Sheet

Date: Time: Interviewee:

CGAM	Predictor	---------- Description -----
1	Curriculum fit/Syllabus connectedness	
2	Relative advantage	
3	Subject area appropriateness	
4	Challenge-level appropriateness	
5	Engagement & learning opportunities	
6	Playfulness of TBG	
7	Observability of TBG	
8	Triability of TBG	
9	Teacher's preparation time	
10	Teacher's experience with technology	
11	Complexity of TBG	
12	Compatibility of TBG	
13	Access to direct/in-sight IT support	
14	Access to peer-coaching	
15	Teacher's self-efficacy	
16	Teacher's age	
17	Teacher's gender	
18	Teacher's computer anxiety	

19	Students' computer anxiety	
20	Students' acceptance of TBG	
21	Parents' perception of TBG	
22	Subject norm/Social pressure	
23	Enabling environment	
24		

Note: ……..

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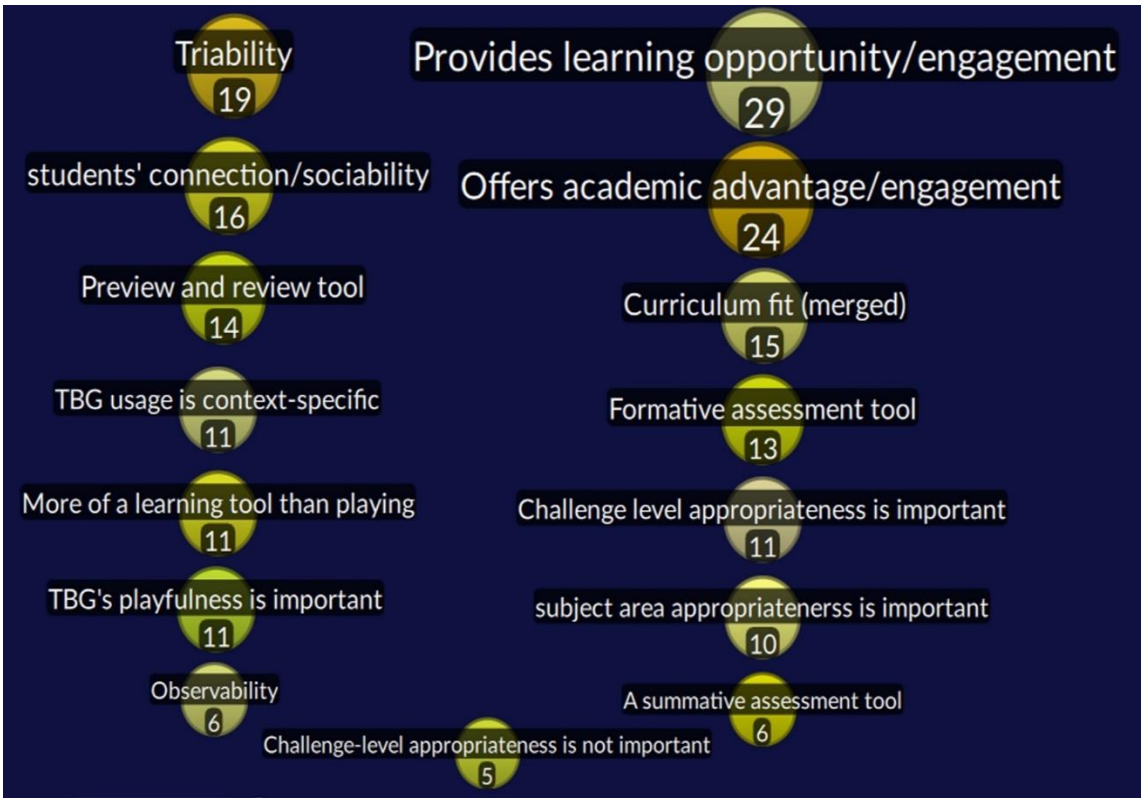
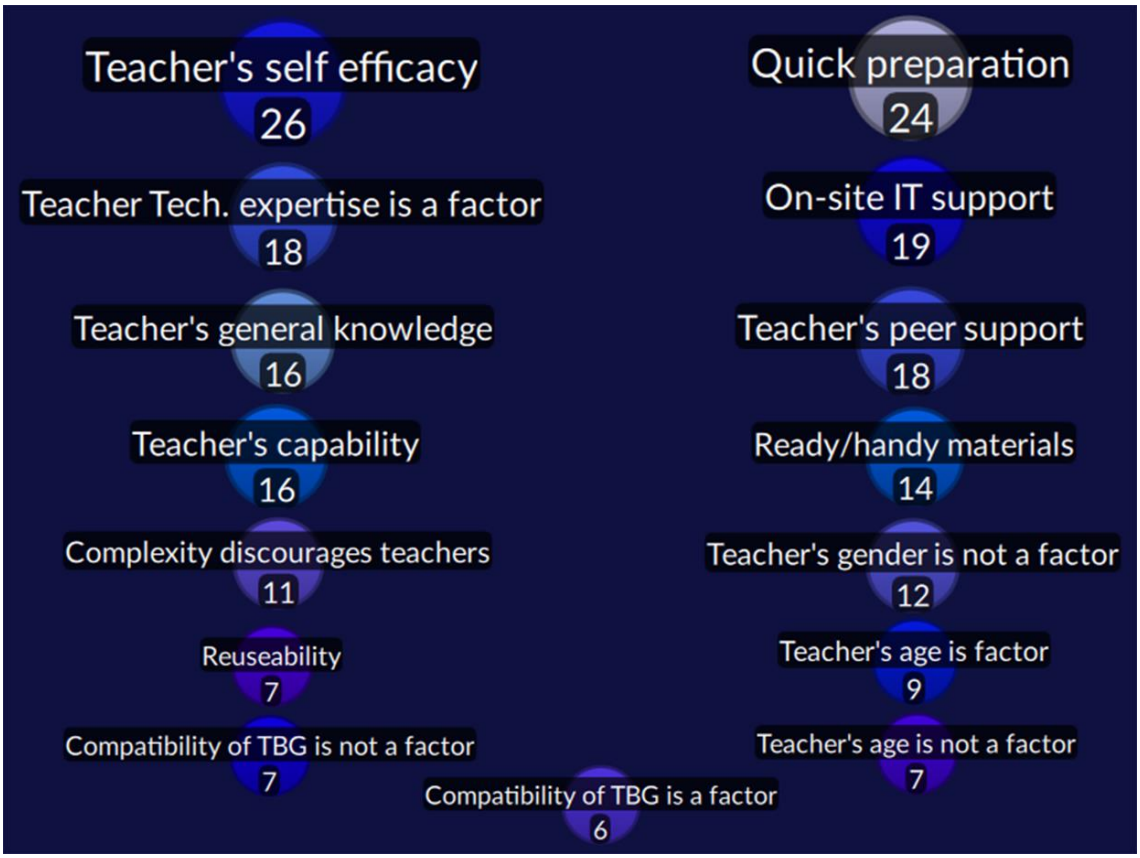
Appendix G: Initial Codes Resembling Perceived Usefulness



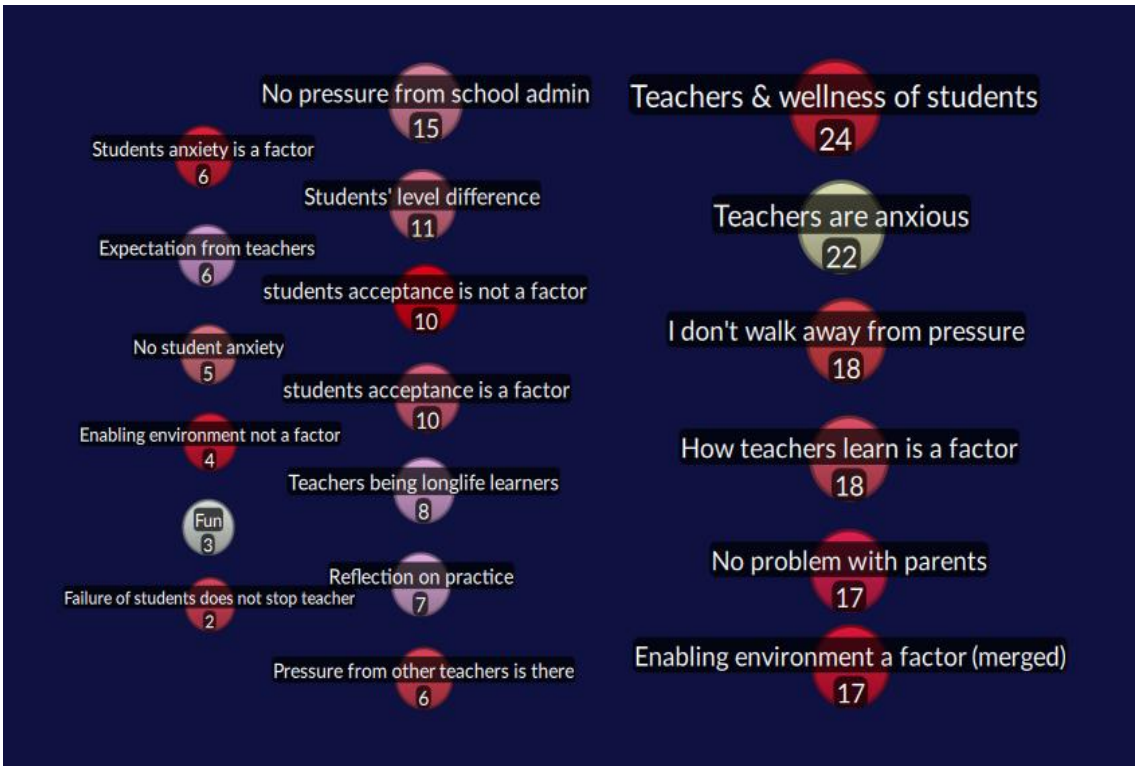
Note. Challenge-level appropriateness had two codes. The small one with five hits is in this figure but was not significant enough to impact the total hits of this theme.

Appendix H: Initial Codes Resembling Perceived Ease of Use



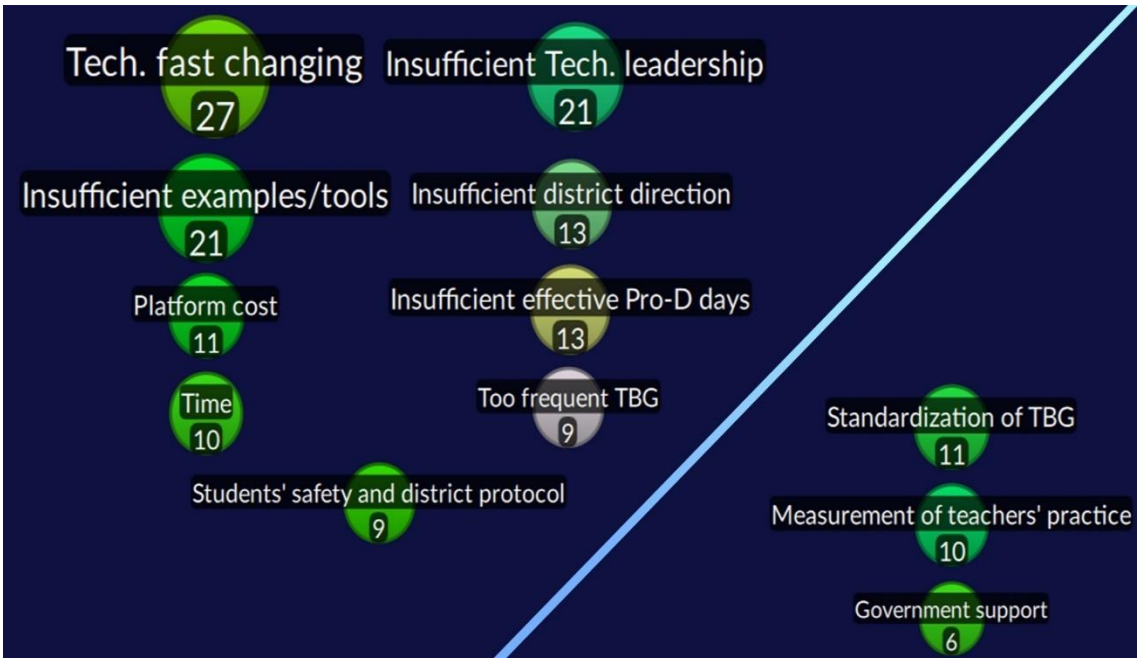
Note. The teacher's age and compatibility of TBG had two codes each.

Appendix I: Initial Codes Resembling Perceived Social Pressure



Note. The category "Fun" was not initially in this group. It seemed more appropriate to include within PU because teachers mentioned that they use TBG to experience fun, particularly in courses such as math that might be challenging and monotonous. However, this small category later looked more fit with PSP.

Appendix J: Initial Codes Resembling Barriers and Solutions



Note.: Codes with lower than six hits are not included in this diagram. Solutions are in the bottom right corner of the figure.