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INVESTIGATING THE IMPACT OF LEADERBOARDS, BADGES, AND EBUCKS ON HIGH SCHOOL ENGLISH LANGUAGE LEARNERS' COGNITIVE ENGAGEMENT, SELF-EFFICACY AND INTRINSIC MOTIVATION TOWARD READING IN ENGLISH

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Dissertation

A dissertation submitted in partial fulfillment of the requirements for the degree of Doctorate in Education in the College of Education at the University of Kentucky

By

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2023

ABSTRACT OF DISSERTATION

INVESTIGATING THE IMPACT OF LEADERBOARDS, BADGES, AND EBUCKS ON HIGH SCHOOL ENGLISH LANGUAGE LEARNERS' COGNITIVE ENGAGEMENT, SELF-EFFICACY AND INTRINSIC MOTIVATION TOWARD READING IN ENGLISH

This study examines the impact of gamification elements, in particular leaderboards, badges, and eBucks, on the cognitive engagement (CE), intrinsic motivation (IM), and self-efficacy (SE) of English Language Learners (ELLs) at a high school in the Southeastern United States. The investigation, conducted during optional weekly readings, utilizes a mixed methods design to investigate the effects of gamification on ELLs' learning experiences. Through pre-post surveys and semi-structured interviews, data was collected to assess the gamified intervention's impact. Utilizing a one-way covariate analysis (ANCOVA) in IBM SPSS Statistics (version 29), the study evaluates the effect of gamification while controlling for grade, gender, academic performance, reading importance, and gaming importance. Results indicate that while gamification elements did not significantly enhance CE and IM, they did result in a meaningful increase in SE among ELL students. Specifically, the impact of leaderboards and rewards varied based on individual preferences and learning goals. This study underscores the necessity for a personalized approach to address the diverse needs of ELL students in K-12 settings in the United States, advocating for adaptive technology and tailored learning experiences to cater to their unique requirements.

Keywords: Gamification, leaderboards, badges, cognitive engagement, intrinsic motivation, self-efficacy.

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12/18/2023
Date

INVESTIGATING THE IMPACT OF LEADERBOARDS, BADGES, AND EBUCKS ON HIGH SCHOOL ENGLISH LANGUAGE LEARNERS' COGNITIVE ENGAGEMENT, SELF-EFFICACY AND INTRINSIC MOTIVATION TOWARD READING IN ENGLISH

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To my late Mom and Dad, and to my late brother Ammar; you sacrificed everything to pave a path for my dreams to live and flourish.Your absence is a void that can never be filled, but your memory lives on, etched in the deepest chambers of my heart.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER ONE: INTRODUCTION

Background

Reading proficiency (RP) is a crucial educational skill, and students' failure to develop it has a detrimental impact on their motivation and self-efficacy toward learning (Siah & Kwok, 2010). Nevertheless, the RP remains a major challenge for high school students, particularly English language learners (ELLs). The reading report by the National Assessment of Educational Progress (2022) indicates that ELLs have been experiencing stagnation since 2002 regarding their reading progress. In startling statistics, the assessment's results indicate that ELLs' proficiency in reading English has remained basic over the years in both middle and high schools, unlike native English speakers whose scores are typically between proficient and advanced.

The National Center of Education Statistics (2022), on the other hand, shows that the ELL population is on the rise in the US. In a recent report, 10.4 %, or 5.1 million students of the total enrollment of public schools (Pre Primary, Elementary, and Secondary Education) in 2019 were ELLs, which is 4% higher than in 2010. That is to say, there is a 4% increase over a decade. In light of these statistics, teachers may face a real challenge to provide support to ELLs and keep them motivated and engaged. Currently, most high school students, including ELLs, are tech-savvy, aka Gen Z, which makes it difficult to engage and motivate them by using traditional didactic methods (Zichermann & Cunningham, 2011). Hence, gamification, adding gaming elements to instructional practices, has been proposed as a solution to invite learners to the learning content by motivating them to exert the required effort to learn and sustain learning (Deterding et al., 2011; AlSawaier, 2018).

O'Brien and Pitera (2019) argue that new instructional strategies are necessary for delivering content effectively and preparing students for life beyond the classroom. They assert that teachers are responsible for creating independent lifelong learners who are capable of learning new things and adapting to the fast-changing requirements of the working conditions in the 21st century. Seaborn and Fels (2015), on another note, have called for gamifying the market to increase sales and attract new customers. To increase benefits and maximize revenues, they contend that gamifying experiences is crucial to attract and engage a wide variety of customers. Therefore, the current study seeks to investigate whether gamification has the same positive effect on learning environments.

Statement of the Problem

The growing number of ELLs poses a challenge for teachers in creating a successful learning environment for students from multiple cultural and linguistic backgrounds (Valdés & Castellón, 2011; Khong & Siato, 2014). Hence, they are not only struggling academically but also socially and culturally. ELLs are more likely to feel isolated and alienated, and are therefore less likely to interact with their teachers and peers who are native speakers of English (Lucas, 2011). Such barriers can impede their linguistic growth and cultural development. As Kam and Lazarevic (2014) point out, many ELLs are not only stressed and self-conscious about using English with their teachers and peers, but they are also embarrassed by their parents' limited English abilities. As a result, they need an environment where they feel included, accomplished, rewarded, and satisfied with their learning experience to improve their English proficiency.

On top of the above challenges, Zichermann and Cunningham (2011) argue that most high school students in the USA, including ELLs, have access to technology and mobile devices, which can distract them from the intended learning activities. As a result, they prefer playing video games on mobile devices rather than listening to instructions in class. Prensky (2001), on a similar note, claims that current generations are cognitively different from previous generations; i.e., they are more adept at using digital games and media products on a daily basis for entertainment. He, therefore, recommends that schools provide learning experiences that fit students' lifestyles in order to minimize distractions and maximize learning opportunities. Moreover, Prensky coined the term "Edutainment" to describe the combination of both education and entertainment that makes learning more engaging and motivating.

In light of the above, gamification has been suggested as a solution to break classroom boredom and monotony. Researchers such as Domínguez et al. (2013), Rojas-López and Rincón-Flores (2018) and Fotaris and Mastoras (2019) argue that gamification, using game-design elements such as leaderboards, progress bars, rewards, levels, trophies, badges, etc., in the learning activities, can enhance ELLs' learning experience by supporting their cognitive, emotional, and social statuses in the classroom. They argue that it creates a game-like experience where students are engaged and motivated to learn.

They also claim that recognizing students' accomplishments with points, badges, and any other form of recognition provides emotional support and satisfaction for the students. Similarly, leaderboards, progress bars, and collaborating teams improve students' social relationships, which positively affect their English skills. Based on these

advantages, the current study investigates whether gamification through leaderboards, Badges and eBucks can enhance the learning experience of ELLs when it comes to reading in English.

Definitions of Key Terms

In this study, I will investigate if gamification through leaderboards, badges, and eBucks can improve ELLs' cognitive engagement (CE), intrinsic motivation(IM), and self-efficacy (SE) when reading in English as a second language in a high school in the Southeast of the United States. ELLs will have to do daily gamified reading activities in and outside the classroom. The daily Sustained Silent Reading (SSR) will serve as an anchor to invite ELLs to read English texts and break that linguistic barrier.

Gardiner (2001) considers the SSR to be one of the most effective reading strategies in the classroom; it involves the instructor and the student reading texts without interruption during a predetermined period of time. To enhance the SSR, gamification will be utilized to attract and engage ELLs while reading. The research defines gamification as the integration of game design elements into non-gaming contexts in order to create a game-like experience to increase motivation and engagement (Deterding et al., 2011). In this study, two game-design elements are examined: leaderboards and rewards (badges and eBucks).

Leaderboards are visual representations of participants' achievements in a given game (Christy & Fox, 2014).They provide learners with feedback about their performance as they progress through the game. Rewards, on the other hand, can take many forms and styles. They can be points, badges, virtual dollars, trophies, etc. (Huang et al., 2019; Li & Chu, 2021). Rewards in this study will be badges that are worth

eBucks, which are virtual dollars that are credited by teachers to students through the school system.

The gamified SSR in this study is intended to increase CE, SE, and IM. CE is defined as learners' observable interactions with peers and instructors, as well as active participation in learning activities (Corno & Madinach, 1983 & Zhu, 2006). Rotgans and Schmidt (2011), on the other hand, defined CE as a psychological state associated with active participation in the learning environment and observed through sustained attention and persistence over a long period of time.

IM, on the other hand, is defined as a mental or emotional impetus that drives learners to learn and sustain learning. In particular, learners may enjoy specific activities for reasons such as entertainment, curiosity, satisfaction, fulfillment, and personal challenge among students (Augur & Woodman, 2016 & Martin, 2017). In brief, CE may be defined as an action/behavior initiated by an emotion/IM. Conversely, learners' SE refers to their collective beliefs about what they can accomplish in a given situation. In other words, the more learners believe in their abilities, the better they manage their anxiety and stress levels (Bandura, 1977, 1997; Zimmerman, 2000).

Purpose of the Study and Research Questions

The goal of this study is to investigate how gamification impacts ELLs' overall learning experience in a USA high school environment, specifically how leaderboards, badges, and eBucks affect IM, SE, and CE for developing reading skills in English among ELLs. The problem stems from the conflicting empirical evidence concerning the effects of gamification on learners' performance in the literature. The purpose of this

study is to provide evidence-based instructional practices for enhancing ELLs' reading skills. Therefore, the current study seeks to answer the following questions:

Research Questions

1. Does the use of leaderboards and rewards increase ELLs' intrinsic motivation when reading in English? How?
2. Does the use of leaderboards and rewards increase ELLs' self-efficacy when reading in English? How?
3. Does the use of leaderboards and rewards increase ELLs' cognitive engagement when reading in English? How?

The study will be conducted in ELL classrooms in a high school in the southeastern United States, where students are learning English as a second language. The research will last for 14 weeks. Two groups of ELL students will be assigned either traditional or gamified SSR time. The progress of both groups will be assessed through pre- and post-surveys, followed by semi-structured interviews.

The study will use Huang and Hew's (2018) GAFCC framework (See Figure 2), which incorporates flow theory, goal-setting theory, social comparison theory, and behavior reinforcement theory as a theoretical foundation for implementing the intervention. The GAFCC model includes five levels - goal, access, feedback, challenge, and collaboration - and serves as a guide to align each level with specific gamification elements based on the aforementioned motivational theories. The methodology involves analyzing the learning context, considering technology affordances and learner qualities, selecting suitable gamification elements, aligning them with learning objectives, and continuously assessing and refining the design for improvement.

Limitations

The study did not use random sampling at the individual student level due to logistical constraints within the school. Rather, the sampling was done conveniently at the class level. Specifically, different ELL classes were assigned to either the gamified or regular group.

G*Power analysis confirmed the study's ability to detect moderate effect size 0.381, with a significance level of 0.05 through its power of 0.80. However, the study's sample size may not be large enough to detect smaller effects. To improve the accuracy and generalizability of the study results, it is essential that future research should employ a larger sample size.

Reading can be a solitary activity, and the SSR activity aims to encourage student-controlled reading where the student selects their reading material and determines the pace at which they read. Therefore, grading SSR will be challenging since the graded logs contain generic open-ended questions that may not accurately reflect the students' state during these readings, i.e., self-reported data. Additionally, as this is the first time students will read silently in the classroom over an extended period of time, it is also expected that they will have difficulty understanding the weekly reading activities at first.

Since different teachers will be teaching the experimental and control groups, the quality of instruction may vary, thereby affecting the internal validity of the study. Furthermore, the researcher assumes that a minority of ELLs will refuse to read or report any changes in their learning experience due to preconceived ideas about reading and gaming in the classroom. Despite these challenges, conducting a study of this nature is

worthwhile in providing evidence-based practices for classroom instruction in K-12 settings that incorporate game design concepts.

Significance of the Study

Since 1992, the reading scores of ELLs have consistently fallen behind those of native speakers, according to the National Assessment of Educational Progress (2022). This can be attributed to various factors such as socioeconomic status, and cultural and political differences (Aghajanian & Cong, 2012; Pereze & Morrison, 2016). Several solutions have been suggested, including training teachers to handle ELL classrooms and accommodations under No Child Left Behind to support ELLs during assessments (McGee et al., 2015). However, this study aims to improve ELLs' English reading performance by using innovative instructional strategies like gamification.

Gamification is utilized to encourage ELLs to read English texts more frequently. Despite the promising results of gamification in existing literature, its effects on learning performance have been inconsistently reported. Therefore, the current study addresses some of the following gaps:

- First, it tests the controversial role of competition and social comparison in educational settings over a more extended period with a diverse sample size to assess its probable positive effect on learning outcomes (Chapman & Rich, 2018; Ortiz et al., 2019; Cechella et al., 2021).
- Second, in contrast to gamification studies focusing on a variety of gamification elements at once and asking broad research questions (Dichev & Dicheva, 2017; Zainuddin et al., 2020; Kim & Castelli, 2021), the current study focuses on

specific elements, such as leaderboards and rewards, and targets a highly diverse population of ELLs in a high school setting in the Southeastern United States.

- Third, it adopts a clear and adequate theory, the GAFCC model proposed by Huang and Hew (2018), to guide the implementation of gamified instruction in the classroom, unlike previous studies that lacked a comprehensive theory (Alsawaier, 2018; Huang & Hew, 2018; Li & Chu, 2021).

CHAPTER TWO: LITERATURE REVIEW

This chapter places the present study in context with other gamification studies conducted in K-12 and higher education. The chapter is divided into five sections: (1) ELLs' Linguistic and Cultural challenges, (2) Gamification, (3) Cognitive and Motivational constructs, (4) Sustained Silent Reading (SSR), and (5) Previous Related Work. For background knowledge, some sections include a description of the learning context, methodologies, and treatments' design.

Background

According to the World Economic Forum (2019), technological advancements have shifted instructional practices into more personalized, student-centered approaches where learners have more control over the content. Alexander et al. (2019) contend that innovations in technology can be used to promote creativity, resilience, cooperation, multi-tasking, collaboration, and problem-solving among learners to effectively transfer their knowledge into the outside world.

He further argues that such advances in technology, for example, the invention of learning management systems, have provided a vehicle for gamification and game-based learning (GBL) to be used in a variety of settings and for a broad range of purposes. AlSawaier (2018) and Taraldsen et al. (2020) assert that gamification provides learners with authentic learning experiences such as working in teams and working under time constraints and challenges similar to those of real-world working environments.

Similarly, Seaborn and Fels (2015) suggest that the success of digital games in entertaining and engaging the youth has led corporates to adopt them to attract and

engage customers to increase sales. The authors claim that gamifying experiences for target populations has increased revenues and benefits since the late 1990s.

The current information technology revolution and digital gaming have provided different innovations for content design and delivery that can act as a smart mediator between content, teachers, and learners (Eleftheriou, 2017). Digital gaming can, however, deplete learners' energy and distract them, decreasing engagement and motivation (Flood, 2015; Kucirkova & Flewitt, 2020). Therefore, the present project explores whether gamification, through adding leaderboards and rewards to traditional instruction, can improve the learning performance of ELLs when reading in English.

ELLs in the United States come from a wide range of cultural backgrounds, speak different languages, possess different learning styles, and possess various levels of technological proficiency. Therefore, it can be challenging for teachers to engage and motivate students from diverse backgrounds **(**Khong & Siato, 2014**).** Recent reports, however, have shown that using gamification and using GBL strategies can minimize instruction and maximize learning benefits for students with varying levels of skills (Subhash & Cudney, 2018).

ELLs' Linguistic and Cultural Challenges

ELLs face linguistic, cultural, and social challenges in the US educational system that may impede their progress and academic performance (Lucas, 2011;Valdés & Castellón, 2011; Khong & Siato, 2014). On that note, Gardner (2007) argues that learners' attitudes toward the learning environment can have a significant impact on learning. For example, Kam and Lazarevic (2014) point out that many ELLs are not only self-conscious about their English abilities but also embarrassed by their parents' limited

proficiency in the language. As a result of their limited linguistic capabilities, some immigrant parents are hesitant to communicate with teachers and schools about their children in the US. Peguero and Bondy (2011) maintain that many ELLs speak English with an accent, sometimes a heavy one, which exposes them to racism and discrimination, not only from their classmates but also from their teachers and schools. As a result, ELLs are likely to be anxious about their English usage with their teachers and peers. Thus, isolating themselves and building stronger relationships among themselves, minimizing their interactions with teachers and native English peers, which adversely impacts their English development.

Following up on the foregoing, Gardner (2007) suggests three major factors that affect the learning of a foreign language: language anxiety, feedback, and encouragement. He further argues that minimizing anxiety and maximizing feedback and encouragement will lead to a feeling of integration and self-efficacy that will result in improved learning outcomes. Hence, gamifying learning tasks reduces anxiety and maximizes a sense of achievement and accomplishment, creating an inclusive environment conducive to learning (Hamari, 2017; Rojas-López & Rincón-Flores, 2018). This study, therefore, hypothesizes that leaderboards will increase ELLs' sense of accomplishment and social satisfaction, while rewards, such as badges and eBucks, will enhance their emotional satisfaction.

Gamification

What is Gamification?

Kapp (2012, p.11) defines gamification as “using game-based mechanics, aesthetics, and game thinking to engage people, motivate action, promote learning, and

solve problems." Although there is no consensus on the definition of gamification, most of the researchers define it as the process of enhancing a variety of content by adding gaming elements and mechanics such as competition, rewards, badges, points, avatars, and levels to increase engagement and motivation to attract and engage end-users (Zichermann & Linder, 2010; Hamari et al., 2014; Alsawaier, 2018). In this sense, gamification is an approach to enhancing performance by increasing motivation and engagement in the same way that games do. The idea originated in business and marketing settings to boost productivity and was then applied to educational settings (Seaborn & Fels, 2015).

Gamification has been shown in several studies to have positive psychological and behavioral outcomes for its users as it elicits the same feelings as playing games. It promotes active learning through active participation and interactions among participants. Essentially, it motivates and makes it enjoyable to interact with the content (Freudmann & Bakamitsos, 2014; Hamari & Koivisto, 2014; Kyewski & Krämer, 2018). In educational settings, for instance, Alsawaier (2018) and Rincon-Flores (2021) argue that gamification can provide solutions for unmotivated students in traditional classrooms.

In their literature review of gamification, Hamari et al. (2014) review multiple empirical studies and conclude that although gamification has multiple positive effects on users in different contexts, its effectiveness is dependent on the context of use and the characteristics of the target audience. In other words, whether gamified content is effective or not depends on who uses it and for what purpose, as different individuals will approach it differently. They also argue that while most of the studies they have reviewed on gamification in educational and academic settings reveal positive results, many other

studies point out that gamification can be counterproductive for some users due to competition and reward pressure.

Furthermore, Hamari (2013) claims that the nature of the content plays a significant role in whether or not gamification would be effective. He contends that sophisticated content, such as e-commerce and some scientific content, may be difficult to gamify and may lose value and impact if gamified. Therefore, the author suggests that gamification does not always provide effective solutions for students who are unmotivated and unengaged. In addition, Hamari et al. (2014) report that some users are motivated by higher rankings when interacting with gamified content, while others are not. They also note that gamification does not always have a positive impact on content when it is designed for purposes other than entertainment.

It is worth noting that gamification differs from GBL in that the former transforms the whole learning task into a game-like experience by incorporating game design elements into non-game contexts in order to improve engagement and motivation, whereas the latter involves the use of actual games to enhance learning (Hursen & Bas, 2019).

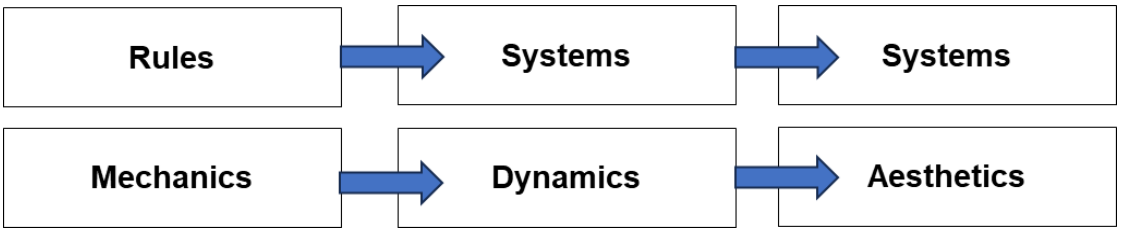
Key Elements of Gamification

There is nomenclature dissension among the different frameworks when defining and classifying gaming elements. However, most gamification frameworks classify gaming elements depending on their functions and purposes. For example, leaderboards and progress bars are considered feedback features whereas points, badges, and rewards are considered social achievements and extrinsic motivators (Chapman & Rich, 2018; Rojas-López & Rincón-Flores, 2018; Toda et al., 2019).

Hunicke et al. (2004) categorized games into three interrelated components: rules, systems, and fun, and have formulated mechanics, dynamics, and aesthetics into the MDA framework (See Figure 1). Mechanics are the game's components, such as points, badges, levels, rewards, etc., while dynamics are the user's inputs and interactions with the mechanics, that is, performance is determined by their actions. Aesthetics, on the other hand, refers to the emotional state of users while playing a game. That is, can a game make a user feel happy, accomplished, confident, or frustrated?

Figure 1

MDA Framework: Game Components and their Counterparts



Note. Adopted from Hunicke et al. (2004)

Zichermann and Cunningham (2011, pp 35-36) and Deterding et al. (2011) argue that the interplay among the aforementioned three components creates a sense of a game-like experience for interactants in different contexts. Hunicke et al. 's (2004) MDA framework above informed Werbach and Hunter's (2015) framework for classifying gaming elements into dynamics, mechanics, and components. Hence, they define dynamics as the context of use in which mechanics are observed; therefore, mechanics are those components that motivate users to complete gamified tasks. On the other hand, the components are the objects of the game such as badges, rewards, challenges, and ranks, which serve as intrinsic motivators and feedback mechanisms.

Although Werbach and Hunter (2015) designed their model as a gamification tool-kit for business purposes, Rojas-López and Rincón-Flores (2018) used it in their study to test the effect of points, badges, avatars, leaderboards, and social challenges on students' performance in a programming class in a Mexican university. Thus, three dimensions have been identified: (a) social dimension where components like leaderboards, badges, and progress bars promote social interaction among players; (b) cognitive dimension where immediate feedback encourages players to reflect upon their performance, and (c) emotional dimension when players are recognized and rewarded for their achievements by getting badges and trophies, for instance.

On the other hand, Palmer et al. (2012) outline the following four elements of gamification to attract and engage customers.

(A) **Progress Paths:** Palmer et al. (2012, p. 56) define this element as “the use of challenges and evolving narratives to increase task completion.” To put it differently, these paths are determined by the users, that is, tasks' difficulty levels adapt to users' levels. Novice learners would face easier tasks than experienced learners. Conaway and Garay (2014) say that task adaptation to the varying experience levels of users keeps experienced learners engaged and novice learners rewarded.

(B) **Feedback and Rewards:** This element is defined as "the use of rapid indicators of success through virtual and monetary rewards." (Palmer et al., 2012, p.56). Conaway and Garay (2014, p. 11) argue that although many marketing customers would like instant monetary rewards, many others prefer power, responsibility, and leadership. Therefore, it is hypothesized that

learners in K-12 settings would be motivated and engaged to receive virtual rewards such as badges, points, or virtual money.

(C) **Social Connection**: Gamified content creates a sense of competition and community among customers when interacting with it. In other words, gamified content enhances social connections among users (Conaway & Garay, 2014). It can be inferred, therefore, that social interaction or learners' social presence in K-12 settings can be enhanced through leaderboards.

(D) **Interface and User Experience:** This element relates to the attractiveness and ease of use of digital games (Palmer et al., 2012). Therefore, gamified content should be appealing and relevant to learners' interests in order to be satisfying and effective.

Furthermore, Nah et al. (2013) identified 5 gaming elements to gamify the learning experiences for learners in educational settings:

(A) **Goal orientation**: Educational games should have long and short-term goals to accomplish at each level of the game, and learners should be aware of them.

(B) **Achievement**: Learners should be recognized for their accomplishments, by rewarding them with trophies, levels, points, etc., in the game to motivate them during the learning process.

(C) **Reinforcement**: Learners should receive immediate feedback and rewards to reinforce their behavior during the game and to motivate them to play.

(D) **Competition**: Rules should be explicitly defined for learners to manage the way they interact with each other and with the game content; explicit rules motivate learners to learn and engage in the game.

(E) **Fun orientation**: Fun is an essential component of engagement and motivation. Therefore, it is imperative that educational games should be fun and interesting to engage and motivate learners to learn and sustain learning.

By utilizing leaderboards as the method of socializing students' accomplishments, the gamified intervention in this study is intended to socialize the students' accomplishments on a weekly basis. A reward system will also be implemented based on the students' ranks and points in the leaderboard. As a result, a gamified experience is created in order to encourage students to compete constructively. That is, leaderboards are intended to enhance social interaction, while badges and eBucks will encourage participation and competitiveness among students.

Theoretical Perspectives on Gamification

According to Huang and Hew (2018), the majority of gamification studies rely on the self-determination theory (SDT). But, there are four additional theories that could serve as a strong foundation for gamification: flow theory, goal-setting theory, social comparison theory, and behavior reinforcement theory. As a result, they developed the GAFCC model consisting of goal, access, feedback, challenge, and collaboration, based on the aforementioned theories and as follows:

1. According to the social determination theory (SDT), humans become motivated when they feel: autonomous, competent and accomplished, and connected to the task at hand (Deci, 1971; Lopez-Garrido, 2021). A person who is intrinsically motivated is motivated by an inherent interest in the subject matter they are completing, and therefore they are persistent and

productive in completing the tasks assigned to them (Deci & Ryan, 1985; 2000).

2. In the flow theory, Nakamura and Csikszentmihalyi (2009) propose that individuals would be highly motivated when they are completely absorbed in their experiment and that this complete immersion signifies their exceedingly high intrinsic motivation, i.e., reaching the flow experience. According to Csikszentmihalyi (2000), flow experiences can be achieved through five factors: (1) clear and manageable goals, (2) immediate feedback, (3) total immersion, (4) good control, (5) and intrinsic rewards.
3. The goal-setting theory suggests that setting goals and attaining them are closely related. Two factors indicate the importance of goal-setting: (a) there is a strong association between the difficulty of a goal and performance (b) difficult, clear, and specific goals are more effective than abstract and general ones (Locke & Latham, 2019).

    On another note, they assert that goals influence performance via four mechanisms: focusing participants' attention on goals, exerting the effort needed to achieve goals, enhancing participants' self-efficacy, enhancing persistence to accomplish goals, and developing better plans to accomplish goals. Therefore, Tondello (2018) argues that gamification based on difficult and specific goals results in better performance.
4. Social comparison theory, on the other hand, suggests that humans are innately inclined to compare and examine their performance in relation to that of others (Festinger, 1954). Consequently, leaderboards give participants a

sense of accomplishment and emotional satisfaction by socializing their achievements and providing them with feedback regarding their status and progress toward their goals (Rojas-López & Rincón-Flores, 2018). Hamari (2017) also observes that leaderboards, ranks, and badges enable participants to display their accomplishments publicly despite Hanus and Fox (2015) warning that such socialization undermines intrinsic motivation. They also contend that competition can be either constructive or deconstructive and that leaderboards act as deconstructive comparisons.

5. The behavior reinforcement theory views learning as an outcome of the interaction between learners and the environment. Learning is a continuous process of change or improvement throughout one's life. Behavioral scientists such as Ivan Pavlov, John B. Watson, and B. F. Skinner contend that the environment influences individual behavior. That is, reinforcing people's positive behavior increases it, and vice versa (Weegar & Pacis, 2012). Despite the warning in the literature that extrinsic motivators can damage intrinsic motivation, Kumar & Herger (2013) argue that badges and rewards can provide positive reinforcements for participants' desired behavior.

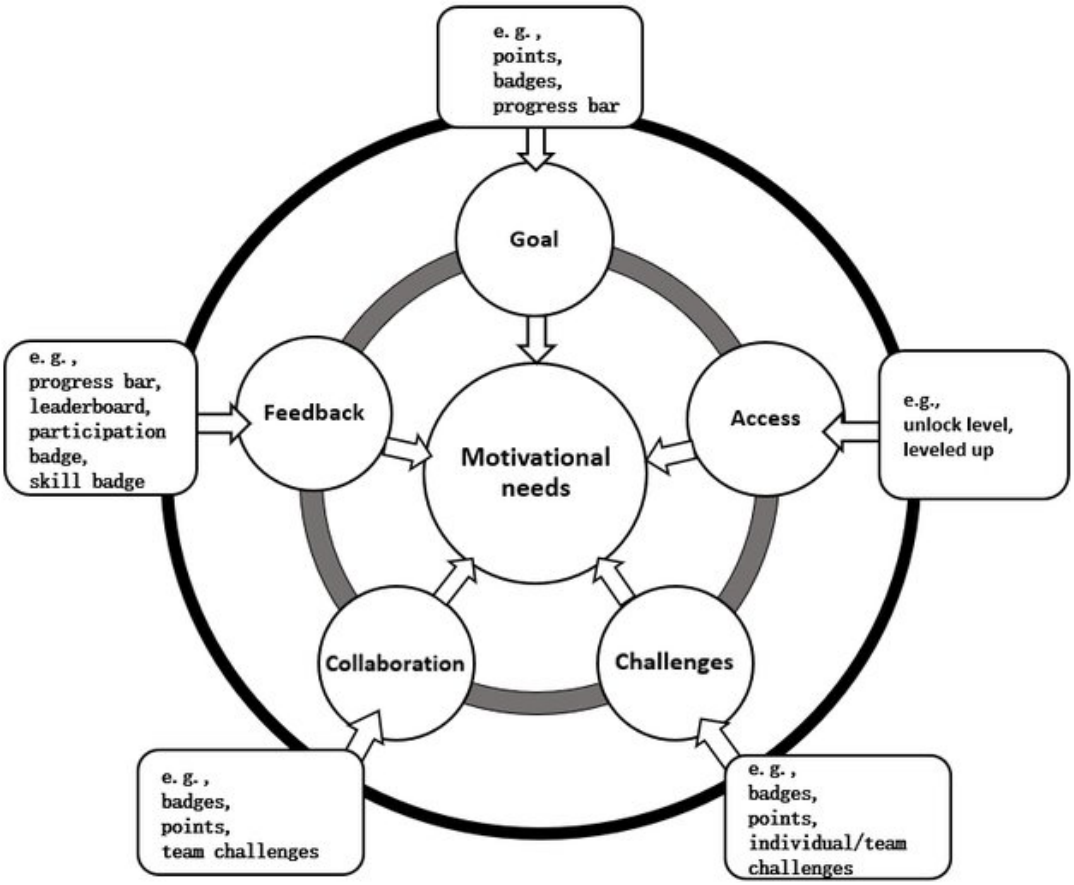
In addition, Hung and Hew (2018) have matched each level of the GAFCC model with the appropriate gamification elements based on the five motivational theories listed above (See Figure 2) and as follows:

1. Examine the context of learning as relating to technology affordances and learning outcomes and the qualities of learners.

2. Choose which gamification elements such as badges, leaderboards, points, levels, etc, are most motivating for the context at hand to include in the design.
3. Match the gamification elements with the learning objectives.
4. Launch the gamified intervention.
5. Assess the design and search for improvements.

Figure 2

GAFCC Framework



Note. Retrieved from Huang and Hew (2018)

Cognitive and Motivational Constructs

Although bilingual children have displayed advantages across various areas of cognitive development, ELLs may find it challenging to keep pace with their classmates in academic environments (Perez & Morrison, 2016). Accordingly, this study focuses on ELLs' intrinsic motivation, self-belief, and cognitive engagement, in the learning content, and the following section provides a brief description of each:

A-*Intrinsic Motivation (IM)* Gardner (2007) defines motivation as a psychological state that affects language learning and teaching in different ways, including but not limited to, persistence in studying the language, learners' behaviors, and attitudes toward learning the language.

Bandura (1977) claims that different students in the same classroom can be motivated differently when learning; their interest in learning the target content can be a result of an inner impetus or interest in the subject or due to motives that are not associated with the content in question, i.e., to accomplish a task or to meet a need. The former is called intrinsic motivation, which is the focus of this study, whereas the latter is extrinsic.

B-*Self-Efficacy (SE)* According to Bandura (1977), SE is a behavioral trait influenced by expectancy, outcomes expected, i.e., positive outcomes reinforce certain behaviors and vice versa. Corno and Madinach (1983), on the other hand, argue individuals' beliefs about their ability to accomplish a particular task are closely tied to their willingness to achieve it.

In a similar vein, Zimmerman (2000) concludes that students' beliefs about what they can do can affect their academic performance, i.e., their beliefs influence their choice of activities and their difficulty level. According to him, such factors hinder

students' persistence and performance when completing learning activities. Thus, SE can be used to predict how much mental effort and persistence students will exert during learning activities. The more positive they feel about the learning activity, the more time and effort they devote to it. It can be said that students' beliefs in their academic abilities have a direct effect on their motivation.

Apparently, according to Bandura (1997), students' beliefs in their abilities to manage learning tasks affect their anxiety and stress levels related to completing the tasks, i.e., the more they believe in themselves to complete these learning tasks successfully, the better they handle their emotional reactions.

Zimmerman (2000) supports Bandura's (1997) argument, arguing that students' confidence in their abilities to complete tasks successfully aids them in developing self-regulated learning habits and strategies to overcome challenges. To put it simply, students' beliefs about their ability to succeed independently are related to their SE. As a result, cultural and linguistic differences between ELLs in diverse classrooms, and between ELLs and their teachers, may lead to communication gaps that increase self-consciousness about their performance in English and negatively impact their learning. By leveraging the affordances of gamification mentioned above, it is hypothesized that gamification may be an effective methodology for solving this problem and bridging this gap.

C- Cognitive Engagement (CE) According to Corno and Madinach (1983) and Zhu (2006), CE is observable during instruction when students are attentive to their instructor, and actively participating in their learning activities. In their research, they propose that sustained learning and persistence during learning activities are key indicators of CE. Cognitively engaged students are therefore engaged in active interactions both with one another and with the instructor.

Similarly, Rotgans and Schmidt (2011,p. 1) mention that “Cognitive engagement in the classroom can be characterized as a psychological state in which students put in a lot of effort to truly understand a topic and in which students persist studying over a long period of time.” Martin (2017) further states that CE is reflected in students’ actions that mirror their inner inclinations, activities, and thoughts.

It is worth noting that the demarcation line between IM and CE is that the former is a desire whereas the latter is an action reflecting this desire (NG & NG,2015 & Martin, 2017).

Sustained Silent Reading (SSR)

According to McCracken & McCracken (1978) and Gardiner (2001), Sustained Silent Reading (SSR) is a specific time frame where teachers and their students can read without being disturbed. They believe that SSR not only helps students to change their attitudes towards reading, but it also exposes them to the benefits of reading beyond entertainment, and helps them to improve their vocabulary, spelling, and reading skills. After completing the SSR, the researchers advised teachers not to assign any further work related to it. However, they allowed students to maintain a log in which they could jot down ideas, vocabulary, and information associated with the SSR.

Research on SSR suggests that it may have positive outcomes, but a study by Chua (2008) found no significant effects on reading achievement. Chua's research also found that SSR did not lead to an improvement in students' voluntary reading behavior, but it may enhance their emotional responses towards reading during their free time. Despite this, their rational reactions, such as their belief in the value of reading, remained the same. Another study conducted by Siah and Kwok (2010) revealed that students who

value reading tend to read more for leisure and perform better in SSR compared to those who do not place importance on reading.

The objective of this study is to motivate ELLs to read more and enhance their literacy abilities by utilizing a gamified version of the SSR. This approach aims to boost students' natural motivation, sense of achievement, contentment, and curiosity by implementing gamification. It acts as a foundation to attract students to the SSR and develop their understanding of the value of reading, thus amplifying their eagerness to read. The ultimate aim is to cultivate independent, lifelong learners who comprehend the significance of reading for their personal growth. The experiment is projected to result in long-term sustainability and effectiveness through gamified interventions.

Previous Related Work

Gamification has been the subject of a number of studies investigating its impact on learning achievement and participant performance. However, since gamification studies in the literature fluctuate, it is hard to predict how gamification improves participants' performance. Accordingly, the following sections provide a categorization of gamification studies by gamification elements, their findings, and the context in which they were conducted.

Leaderboards and Rewards

Leaderboards have been investigated as an effective gamification design element. Studies have shown that their use can have different effects on student learning outcomes. While some suggest that leaderboards can boost motivation and engagement by creating competition and social comparison, others have found that they can lead to negative effects such as anxiety or demotivation in certain students (Park & Kim, 2021). It's

important to note that the effectiveness of leaderboards may depend on various factors such as context, design, implementation, and individual differences among students (Bai et al., 2021).

Ortiz and Rojas et al. (2019) conducted a research study to examine the impact of leaderboards on students' learning performance, self-efficacy, intrinsic motivation, and engagement in introductory programming courses at a university level. The study involved 89 students who were assigned to either experimental or control conditions in a pre-post quasi-experimental setup. Several variables such as sex, previous experience with gamification, and undergraduate major were considered as mediators.

To evaluate self-efficacy, a 20-item scale was developed based on Bandura's (2006) guidelines. Intrinsic motivation was measured using the interest/enjoyment scale from Ryan et al.'s (1983) intrinsic motivation inventory. Engagement was measured by counting the optional activities students completed every week on the learning management system.

While the study showed positive results of gamification on students' learning performance in the experimental groups, no significant long-term effects were observed on their self-efficacy, intrinsic motivation, and engagement. The study researchers suggested that the competitive nature of the leaderboards and the difficulty of the content may have gradually undermined students' intrinsic motivation throughout the courses. Additionally, no direct influence was observed between the mediators and the participants' experiences. Thus, the researchers suggested using a larger sample size and conducting a longer experiment to gather more generalizable data.

A recent study by Cechella et al. (2021) examined the cognitive skills of managers in a Brazilian bank using gamification techniques. The study selected a sample of 35 managers who were randomly assigned to three groups, consisting of two quasi-experimental groups and a control group. The two experimental groups differed only in the type of training they received, with one group receiving gamified training over two consecutive days and the other group receiving traditional lectures and discussions. In the gamified group, avatars, leaderboards, team points, and digital feedback were utilized; participants also received extensive instruction on how to log into the gamified content and how to measure scores.

The study collected data using pre-and post-tests, and the results showed no statistically significant difference between the groups that received gamified training and those who did not. In fact, the study revealed that extensive training caused cognitive load and negatively affected participants' ability to learn.

Hanus and Fox (2015) warned that gamification can have adverse effects on students' performance. In their study on the effects of gamification on students' motivation, satisfaction, social comparison, empowerment, and academic performance, 80 students from two communication courses at Midwestern University in the US participated in their study and completed four surveys over the course of 16 weeks. The research showed that students who received gamified learning experiences were less motivated to complete learning activities, which ultimately affected their academic performance, satisfaction, and empowerment. The reward system and social comparison through leaderboards had a negative impact on learners' intrinsic motivation, which consequently affected their overall performance.

Nonetheless, the researchers noted that extrinsic motivators like badges, rewards, and leaderboards may be useful for bored or unmotivated students. However, they can harm students who are naturally motivated to learn the content depending on the context.

Badges

Zainuddin et al. (2020) conducted a thorough review of 46 research papers on the effects of gamification on learning and instruction. These papers were published between 2016 and 2019 in the Web of Science database. The review found that the role of badges in various learning settings is unclear and potentially harmful. The authors suggest further research with a solid theoretical foundation to explore the potential benefits of badges in promoting positive behavioral changes in learners.

A study by Kyewski and Krämer (2018) explored the impact of badges on students' motivation, activity, and performance in an online course. The study found that badges did not have a significant effect on students' motivation, activity, or performance. In fact, badges decreased intrinsic motivation for students who were already motivated. Interestingly, the students in the experimental and control groups responded similarly to the online experience regardless of whether they received badges. However, the study had some limitations. For example, badges were awarded only five weeks into the semester, and there was a considerable time gap between awarding badges and taking the performance test. Also, since attendance did not affect the grade, some students took the online course just to pass it, which may have affected their motivation and performance. Additionally, the course was online, and students did not know each other, so the impact of badges may have been less effective.

A recent study conducted by Rincon-Flores et al. (2022) analyzed the performance of undergraduate students in online calculus courses, focusing on their grades, emotions, quality of assignments, motivation, and participation. The courses were gamified by incorporating a reward system in the form of different badges that represented various achievements and were awarded points over a period of 10 to 15 weeks. The study involved 44 engineering students and 33 students from social sciences and economics majors. The researchers collected both qualitative and quantitative data through questionnaires and semi-structured interviews. The results showed that the gamification elements did not have a significant impact on students' performance in either group. However, it significantly improved their participation, motivation, and quality of assignments and made the online courses more engaging, and motivated them to complete assignments on time.

Gamification's Sustainable Positive Effects

In their meta-analytic review, Kim and Castelli (2021) investigated the impact of gamified interventions on student behavior in educational settings. The researchers conducted a thorough search of databases for relevant studies published between 2010 and 2019. They analyzed data from 18 experimental design studies and found that gamification has a positive and moderate effect on learners' behavioral change.

The study revealed that gamification was more effective for adults in higher education than for K-12 students. Short-term gamified interventions (lasting less than one week) were significantly more effective than longer interventions lasting up to 20 weeks. The researchers also found that gamification had a greater impact on learners' participation levels than on test scores.

The authors suggest that gamification can be a promising strategy to increase student engagement and motivation in educational settings. However, they also stress the importance of considering factors such as age, intervention length, and specific gamification elements when designing gamified interventions for learners. Further research is recommended to explore the optimal conditions for gamification implementation in educational settings.

In contrast, Dichev and Dicheva's (2017) critical review of multiple gamification studies argues that there is insufficient evidence to support its long-term positive effects. They believe that integrating game design principles into educational experiences remains challenging and lacks practical guidelines. The review highlights the need for systematic and rigorous empirical studies to explore the effects of gamification on motivation and learning outcomes across various learning contexts and learner groups. The focus of research questions should be narrowed down to specific elements and target certain populations to achieve successful gamification in learning environments.

Li and Chu (2021) conducted a study over a period of five years (2015-2019) in five primary schools in Hong Kong, China. Their aim was to investigate the impact of gamification elements, such as leaderboards, points, rewards, competitions, and badges, on students' second-language reading skills. The research team developed a gamified software called Reading Battle (RB) to help students, parents, and teachers access reading content online and communicate with each other. Reading activities were optional, designed to increase students' intrinsic motivation to read in English voluntarily.

To collect and analyze data, three sub-studies were conducted. The first study was carried out during the Fall semester of 2015-2016, where 57 primary school students used RB. The research team collected and analyzed students' reading scores on school reading

examinations before and after the use of RB. The second study focused on collecting and analyzing qualitative data through semi-structured interviews. The self-determination theory (SDT) was used to develop interview questions, which assert that human motivation is determined by three psychological needs: autonomy, competence, and relatedness. The third study investigated whether the positive effects of gamification continued even after participants had stopped using RB for one year.

The results from the first study showed that students' English reading, listening, and writing skills improved. However, the sample consisted of motivated readers who enjoyed reading English already and were active in Chinese writing and Mathematics. In the second study, participants reported feeling a sense of accomplishment, self-satisfaction, and curiosity as key elements of their intrinsic motivation. Furthermore, RB enhanced participants' social presence as it enabled them to actively engage and interact with each other during and after reading activities. However, some RB users found the gamified activities to be boring, and the researchers argue that these students were not motivated to read anyway.

As for the third study, the results indicated that RB helped students to internalize reading motivation by showing them the value of reading, pleasure, and satisfaction of reading. Therefore, rewards and other gamification elements were not necessary anymore to motivate them to read. The study suggested that a carefully designed gamification pedagogy is vital for supporting students' long-term learning needs.

The Effects of Gender and Technology Expertise on Gamification

In their study on students' perceptions of motivation, engagement, attention, and learning performance, when presented with gamified interactive response systems (SRSs) such as Kahoot, Barrio et al. (2015), found that students' familiarity with technology is a

decisive factor in their positive learning experiences with gamification. This study involved 131 students from different majors. There were 89 students enrolled in a telecommunication engineering course, 38 students enrolled in sociostatistics, and 55 students enrolled in an introductory high school computer course. Both the control and experimental groups included students from the three different majors.

Results from the experiment indicate that students with engineering backgrounds and high school students performed better than those with backgrounds in social statistics. Thus, students with high technology literacy learned more effectively than those with little or no experience with technology. Moreover, due to the competitive nature of the SRS, male students outperformed female students in both the control and experimental groups.

Similarly, Su and Cheng (2015) assert that an interest in learning the subject is a primary factor responsible for better motivation and achievement in learning. Specifically, intrinsic motivation can significantly influence learning outcomes. A study they conducted on the impact of gamified mobile learning systems on students' motivation and learning outcomes confirmed Barrio et al.'s (2015) findings and demonstrated that prior knowledge of mobile technology and gaming was crucial to student learning outcomes because students with prior knowledge outperformed those with limited knowledge.

There were also notable differences between the control and the experiment groups in how males and females perceived gamification, which was reflected in how they interacted with the gamified content. Therefore, males viewed gamified content as a technical challenge, whereas females perceived it as a behavioral challenge.

In their study on the effect of gamification on students' performance in online calculus courses, Rincon-Flores et al. (2022), introduced a reward system of badges to make the courses more engaging. The study found that the badge system had a positive impact on participation, motivation, and the quality of assignments. However, engineering students seemed to be more motivated by mathematical badges, while social sciences and economics students were more motivated by badges that represented class participation. The researchers suggest that this could be due to the different attitudes toward mathematics among students. Engineering students tend to have a more positive attitude towards mathematics than students in the social sciences and economics.

The Effects of Personal Traits, and Learning Styles on Gamification

According to Buckley and Doyle (2017), the effect of gamification is influenced by participants' personal traits and learning styles. They found that active learners, extroverts, and global learners tend to perform better in gamified learning experiences than those who prefer a more structured approach to learning and are hesitant to take risks. This is because gamification creates a complex learning environment that affects different learners in different ways.

However, Chapman and Rich (2018) argue that regardless of students' characteristics, gamification elements associated with feedback, social comparison, autonomy, and performance are the most motivating. They conducted a study on gamification elements and found that points/rewards and penalties, leaderboards, and competition had a significant impact on students' performance and motivation.

The researchers surveyed 124 students from six organizational behavior courses that were gamified using a platform with various gamification elements. They found that

while competition is often discouraged in gamification studies, it is still an important element that can affect students' perception based on their learning style and player type. They suggested that more research into personalized gamification is needed.

Sailer et al. (2017) argue that gamification elements affect individuals' psychological needs differently. They recruited 419 participants to take part in a gamified learning experience, where different gamification elements were used. The study found that leaderboards, progress bars, and badges were effective in satisfying the need for competence, while avatars, a meaningful story, and teammates affected social relatedness. Participants completed a post-questionnaire on their satisfaction with the online learning experience. The authors recommend explaining how to use gamification elements as well as noting their existence and functions in order to make students aware of them. They also suggest that aesthetics play a crucial role in the success of gamification.

In line with Sailer et al.'s (2017) study, it is important to choose the right gamification elements in the right context for the right participants, as gamification elements aligned with desired learning outcomes provide the motivation needed to achieve learning goals. The GAFCC framework proposed by Huang and Hew (2018) emphasizes this point and thus it includes goals, access, feedback, challenge, and collaboration to create an effective gamified experience.

A study by Huang et al. (2019) investigated the impact of gamification in a flipped classroom using the GAFCC framework. The results showed considerable differences between the experimental and control groups, with the gamified group performing better in all areas. This indicates that the GAFCC framework is effective in

gamification studies. Therefore, the current study aims to utilize the GAFCC framework to establish a purposeful gamified learning environment for ELLs.

Current Research Gaps and Next Steps

As indicated above, the literature on the effects of gamification on learning performance has yielded inconsistent results. Despite its potential, there are gaps that need addressing. This study aims to address some of the following gaps:

First, the controversial role of competition and social comparison in educational settings through game elements, such as leaderboards and rewards, should be tested on a larger and more diverse sample size over a longer period of time (Chapman & Rich, 2018; Ortiz and Rojas et al., 2019; Cechella et al., 2021).

Second, previous studies have typically focused on broad research questions and analyzed various gamification elements with less diverse learner groups, as evidenced by Dichev & Dicheva (2017), Zainuddin et al. (2020), and Kim and Castelli (2021). In contrast, this study will explore specific gamification elements - leaderboards, badges, and eBucks - within a highly diverse group of learners, specifically ELLs.

Third, few studies adopt a clear and adequate theory to guide the implementation of gamified instruction in the classroom. The current study, therefore, will use and test the GAFCC model proposed by Huang and Hew (2018) to guide the implementation of the intended gamified instruction.

CHAPTER THREE: METHODS

In this chapter, I will discuss the sequential experimental design for collecting and analyzing data in this study. Given the novelty of gamification as a research topic, the study prioritizes exploration over causation and doesn't have any predefined hypotheses. Thus, the chapter includes details about the study type, design, research questions, setting, participants, intervention, as well as assumptions and limitations.

Type of Study and Design Procedure

This study uses a sequential mixed methods design for collecting and analyzing data. Mixed methods research design is increasingly used in social sciences and applied sciences. This method combines methods from both designs and yields stronger results than single-design studies (Caruth, 2013; Maxwell & Loomis, 2003). Thus, in this study, surveys will be used to gather quantitative data, which will be used to inform and guide semi-structured interviews that follow.

The study will examine the effect of gamification through leaderboards, badges and eBucks on ELLs' reading in ELL English and Reading classrooms in a high school in the Southeast of the United States. Using Huang and Hews's (2017) GAFCC model, the study aligns its intended gamified procedure with motivation and engagement theories, gamification strategies, and the intended instructional objectives. In the GAFCC model, there are five stages: Examine, Decide, Match, Launch, and Evaluate. Figure 3 illustrates these stages as follows:

First Stage (Examine): During this stage, the class context, learners' characteristics, instructional objectives, and technology resources are examined.

- Instructional objectives: In ELL Reading and English classes, the main instructional objective is for students to read English texts successfully, understand the readings, and acquire new vocabulary.
- Learners context: Students come from a variety of linguistic and cultural backgrounds, as well as varying levels of technical proficiency. They usually complete the regular SSR activities in their classes, but they lack motivation and appear to be obligated to complete them.
- Technology resources: The class will be hosted on Canvas, a learning management system. Weekly leaderboards in which badges and rewards are located will be displayed on the SSR page on Canvas.

Second Stage (Decide): In this stage, it is important to consider the context of learning, instructional objectives, and technological affordances. The gamified version of the SSR activity will include motivational elements such as goal setting, access to resources, feedback, and challenges. However, collaboration will be excluded since the SSR is intended to be completed independently by students.

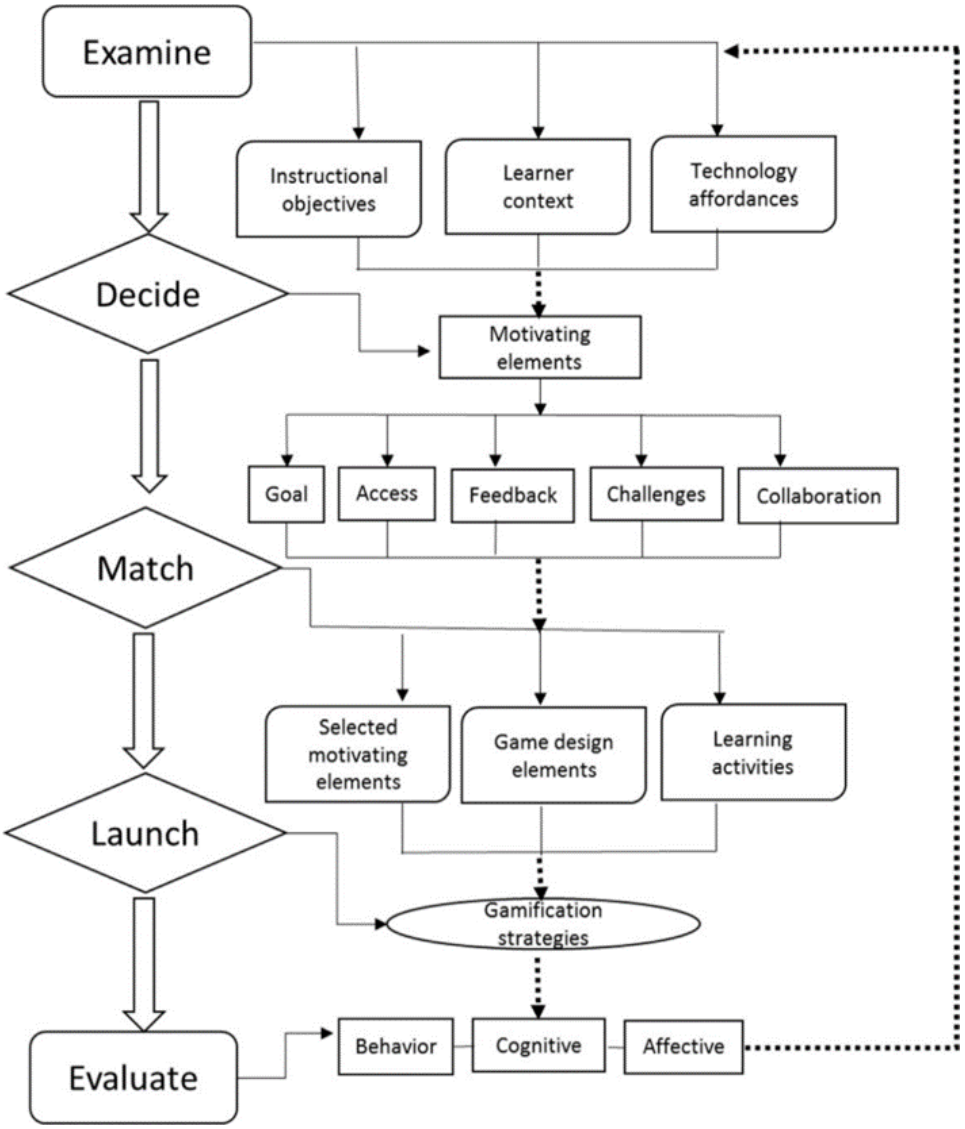
Third Stage (Match): In this stage, motivation elements will be matched with the gamification elements. To address goal and access, students will be given the opportunity to create their own weekly reading goals and based on their goal difficulty and achievement, they will be rewarded with badges and eBucks. To address challenges and feedback, a weekly leaderboard will be displayed on Canvas (See Figure 7) where students can see their positions and rewards.

Fourth Stage (Launch): In this stage, after matching the gamification elements with the motivation elements and with the learner context and instructional objectives, the gamified intervention will be launched.

Fifth Stage (Evaluate): In this stage, the design will be evaluated throughout the study, and results will be shared when the study is complete.

Figure 3

Gamification: Five Stages Design Procedure



Note. Retrieved from (Huang and Hew, 2018, P. 259)

Research Questions

The study aims to investigate the impact of gamification on ELLs' learning experience in a USA high school setting, in particular, how leaderboards, badges, and eBucks impact cognitive engagement, self-efficacy, and intrinsic motivation towards reading in English among ELLs. Hence, the current study seeks to answer the following research questions:

1. Does the use of leaderboards and rewards increase ELLs' intrinsic motivation (IM) when reading in English? How?
2. Does the use of leaderboards and rewards increase ELLs' self-efficacy (SE) when reading in English? How?
3. Does the use of leaderboards and rewards increase ELLs' cognitive engagement (CE) when reading in English? How?

Settings and Participants

The current study took place in a high school setting in the Southeast of the United States over the course of 14 weeks during the Spring semester. During Week 1, students were acquainted with the study and provided responses to the pre-study survey. In Week 11, the post-survey was administered for them to complete. As part of an intervention aimed at improving ELLs' reading skills, gamified reading activities were introduced. Students were given the option to participate voluntarily, with teachers posting a reading log each week online on Canvas.

Due to school policies, the study sampled at the classroom level rather than at the student level. Hence, a total of 8 English and Reading classes for ELLs had been conveniently assigned to control and experimental groups. The study involved a control

group of 34 students from five classes, and an experimental group consisting of 22 students from three classes. The students in these classes are recent immigrants to the United States and have been here for under 10 years. They come from diverse linguistic and cultural backgrounds, speak different languages, and have varying levels of English proficiency and tech literacy.

The classes were taught by three teachers, one of whom was also the researcher. Two of the teachers were native English speakers who were born and raised in the United States, while the third teacher was an immigrant who was once an ELL student himself. All three teachers are certified to teach English and English as a second language and are trained to work with a diverse population of ELL students.

Both the experimental and control groups participated in the SSR activity. The experimental group received gamified SSR with eBucks and leaderboards while the control group received the usual extra credit. Prior to the study, students were informed that their participation is voluntary, that they could discontinue participation at any time, and that not participating in the study will not affect their grades. Also, both district and university consent protocols had been acquired.

As a result of data cleansing, only 56 ELLs' responses were counted in the study after removing duplicates and incomplete surveys. The group consisted of 28 males, 27 females, and one person who preferred not to say. The assigned ELL classes were taught by three different teachers and were held 2-3 times a week in the morning and afternoon.

Instruments

Both the control and experimental groups completed pre and post-surveys (See Appendix A) and selected students were asked to voluntarily participate in

semi-structured interviews to evaluate their learning experience (See Table 1). The survey includes multiple subscales that have been derived from validated instruments in the literature, which are shown in Table 2. The intrinsic motivation inventory (IMI) by Ryan et al. (1983) measures IM, with only the interest and enjoyment subscale being selected to identify IM. This subscale is defined as the motivation and desire to complete an activity due to enjoyment. It includes seven items, such as "I enjoyed doing this activity very much", "Reading in English is fun to do", and "I think reading in English is a boring activity."

On the other hand, Martin's (2017) engagement and motivation scale is used to measure SE. Only the SE subscale is taken from the scale to measure students' performance beliefs. There are four items included in it, such as "If I try hard, I believe I can read anything I want in English.", " If I don't give up, I believe I can finish any reading in English.", " If I have enough time, I believe I can read more in English." and " If I work hard enough, I believe I can understand everything when I read in English."

Table 1

Study Sequential Mixed Methods Design

56 ELLs	Experimental Group 22	Pre-Survey	Gamified SSR Time	Post-Survey & Interviews
	Control Group 34	Pre-Survey	Regular SSR Time	Post-Survey & Interviews

As for CE, Greene's (2015) motivation and strategy use survey was used. Only the persistence subscale, which contains eight items, was utilized. Example items include, " If I have trouble understanding an assigned reading text, I go over it again until I understand it.", "I try to complete my reading assignments as fast as possible without

understanding or checking the accuracy of my answers.", "When I read something in the book that doesn't make sense, I skip it and hope to understand it later.", etc.

Table 2

Foundation of Survey Development

Factors	Items No.	Reference
Cognitive engagement	1-8	Greene (2015)
Intrinsic motivation	9-15	Ryan et al. (1983)
Self-efficacy	16-19	Martin's (1999, 2022)

This survey consists of five parts and 19 items. CE, IM, and SE are rated on a 7-point Likert scale. Using the same survey as a post-intervention questionnaire, post-intervention data was collected. In addition, several background questions were asked to explore the role of reading and gaming in ELLs' lives, their academic performance in high school, and how often they engage in reading and gaming activities.

Intervention

The intervention is 10-15 minutes of SSR time for 14 weeks, in high school ELL Reading and English classes. For each week's SSR, teachers guide students to create a clear, challenging, and manageable objective to accomplish. Students are expected to spend the first 10-15 minutes in these classes silently reading without interruption.

In addition, they are expected to record how much time they spent reading daily inside and outside school in the weekly SSR reading log (See Figures 4, 5 & 6). The weekly SSR log will be available on Canvas, the learning management system that hosts the classes.

Figure 4

SSR Weekly Reading Log Home Page

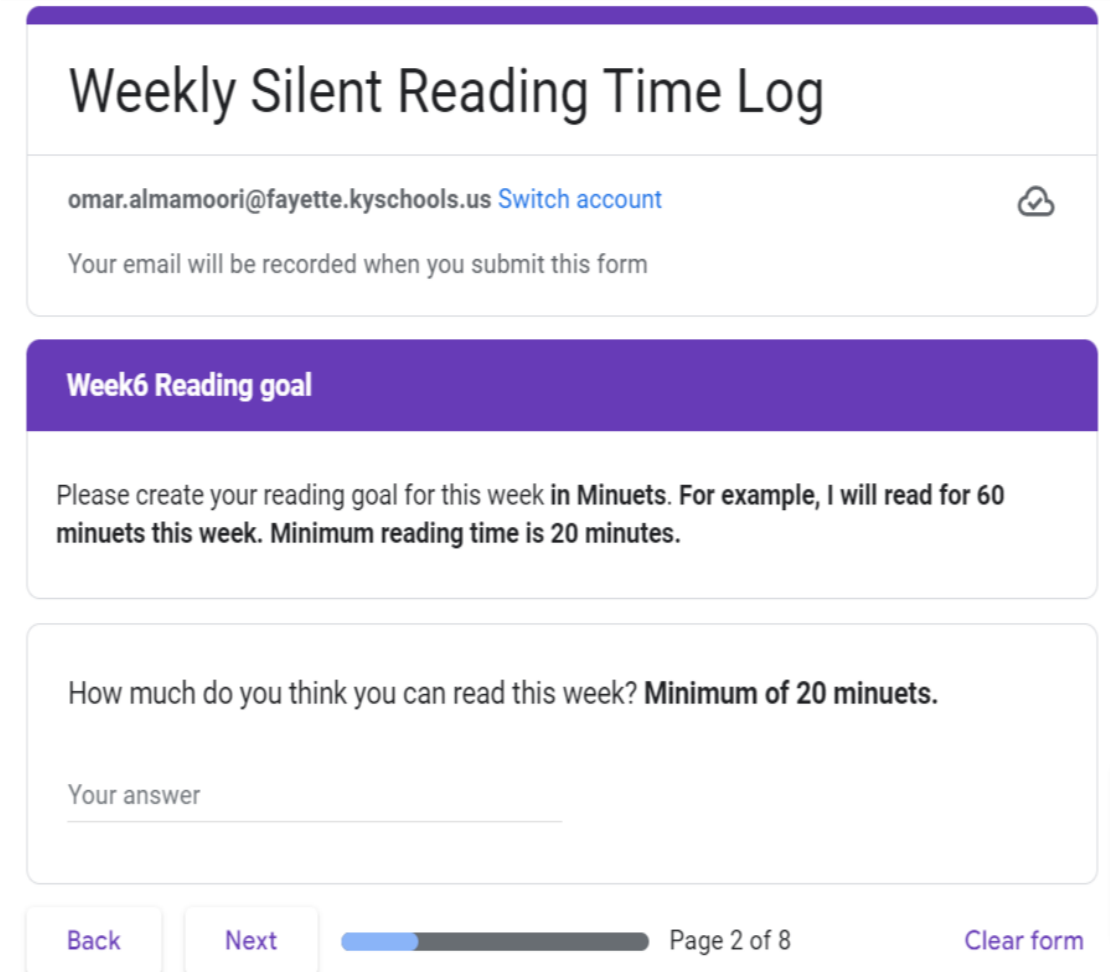


Figure 5

SSR Daily Readings Pages

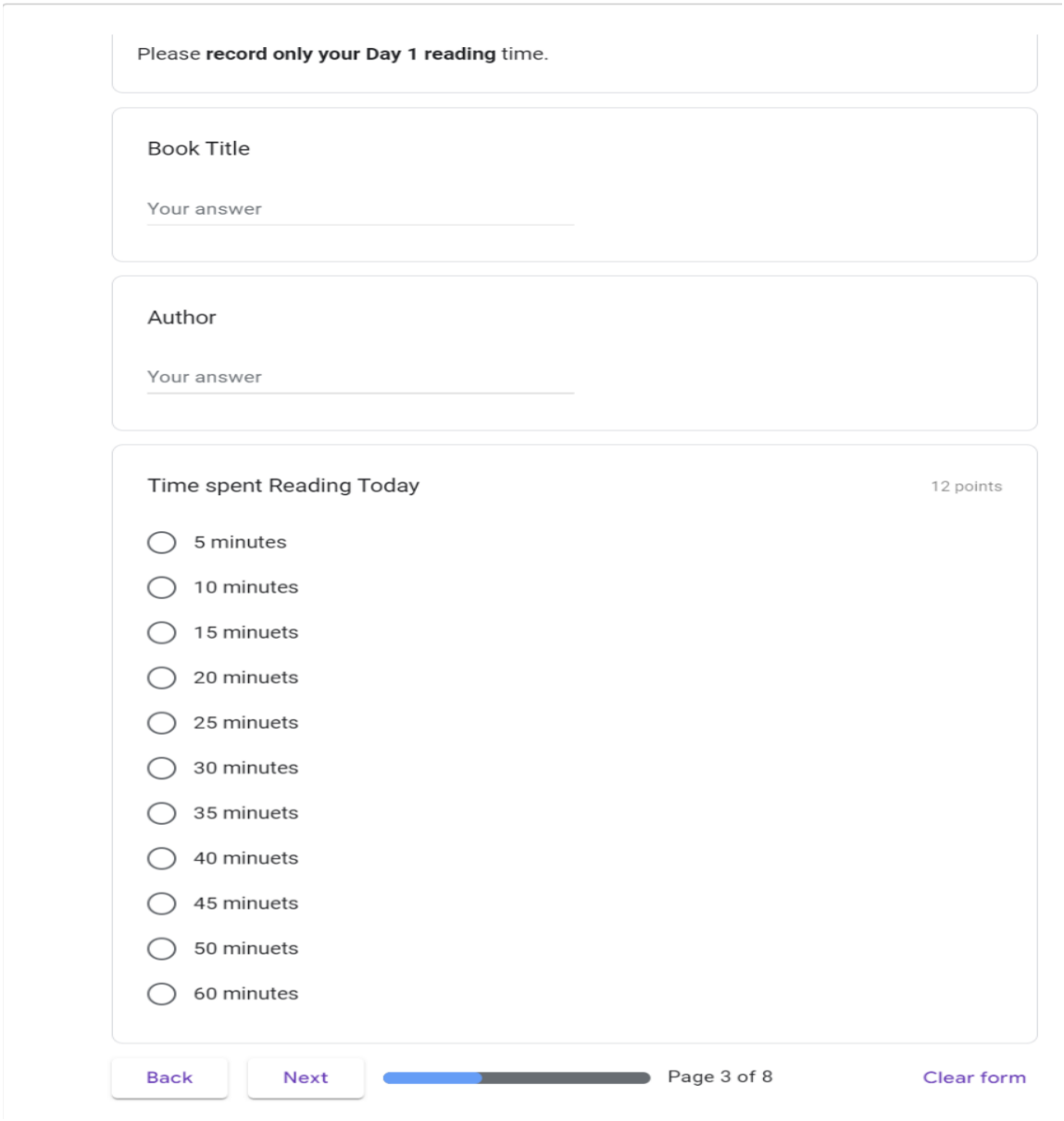
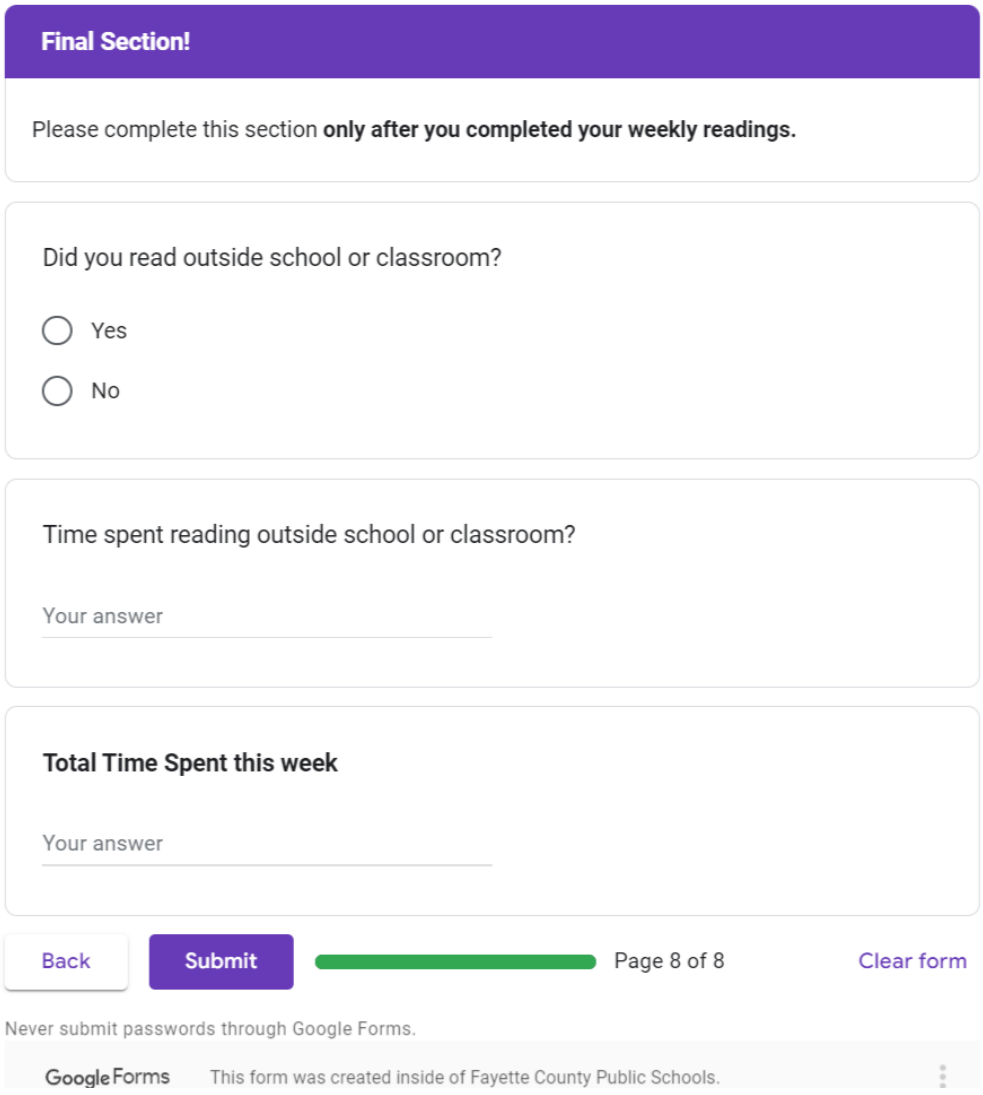


Figure 6

SSR Weekly Reading Log Submission Page



In addition to reading in class, students may need to read at home to accomplish their weekly reading objective and submit the log on Friday. They can read anything they choose to achieve the weekly objective. They can therefore borrow books from multiple sources such as the high school library, local public libraries, and from home. They can also read online and borrow or change their reading material as needed.

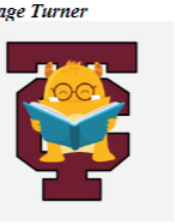
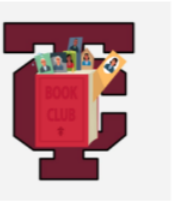
Depending on the completion of the weekly SSR logs, and the time spent reading English texts every week, students in the experimental group received badges and eBucks. A total of six badges are available: the Bookworm, the Early Bird, the Page-Turner, the Book Club Member, the Bookworm in Training, and the First-Time Reader, the highest being the Bookworm and the lowest being the First-Time Reader (See Figure 7).

Every five minutes of reading will earn students one eBuck, so the longer they read, the more eBucks they earn, and the higher their badge will be. Teachers assign these badges based on their students' achievements, with a leaderboard published each week on Canvas. The following figure depicts a snapshot of students' leaderboards on Canvas:

Figure 7

SSR Weekly Accomplishment LeaderBoard

Student Name	Total Time Reading	eBucks	Badge
[redacted]	115 minutes	**23 eBucks**	*Bookworm 
[redacted]	110 minutes	**22 eBucks**	***Early Bird** 

	100 minutes	**20 eBucks**	***Page Turner*** 
	75 minutes	**15 eBucks**	***Book Club Member*** 
	75 minutes	**15 eBucks**	***Book Club Member*** 
	60 minutes	**12 eBucks**	***Bookworm in Training***

Students can access their eBucks which can be used to purchase school supplies and food inside the school. In addition, they can ask their teacher to exchange their eBucks with extra credit on applicable assignments and buy a hall pass or a library pass to finish their class work in the hallway common area or in the library. Meanwhile, the control group only gets the usual extra credit for the completion of their weekly SSR log.

Data Collection and Analysis

Quantitative Data

The study employs a mixed methods design that utilizes various statistical analyses and semi-structured interviews. Apart from descriptive statistics, an analysis of covariates (ANCOVA) was conducted in IBM SPSS Statistics (version 29) to compare the means of intrinsic motivation (IM), self-efficacy (SE), and cognitive engagement (CE) between the gamified and regular groups while controlling for the effects of

variables such as grade, gender, academic performance, importance placed on gaming, and importance placed on reading.

In the current research, both gamified and regular groups filled out the pre-post study surveys. The data from each group was collected, cleaned, and coded separately. The two data sets were combined into one aggregated set for analysis in IBM SPSS Statistics (version 29). The same process was repeated for the post-study surveys, and the two aggregated data sets from the two groups were merged into one final SPSS file for analysis. To merge the data into one final data set, the responses of individual students from the two groups were matched between the pre-and post-surveys. The data set was then finalized by removing duplicate and incomplete responses. Students who missed 50% of the surveys, as well as those who had either post-data but no pre-data or vice versa, were excluded.

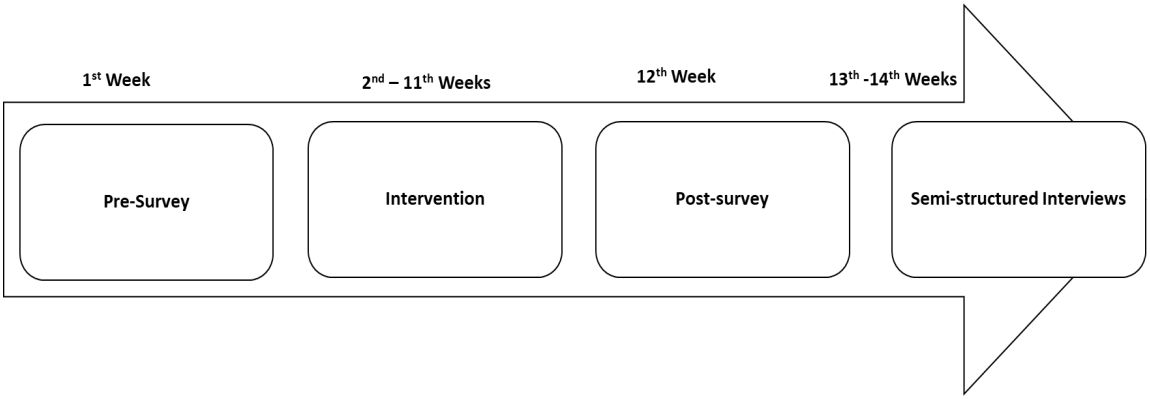
Using G*Power, a sensitivity power analysis was conducted, which showed that our study had 80% power to detect a moderate effect size of 0.381, with a significance level of 0.05. The effect size (f) of 0.381 demonstrated the influence of the independent variable (the gamified intervention) on the dependent variables (IM, SE, and CE).

Qualitative Data

To supplement the quantitative data, ten students (five from each group) were self- selected for semi-structured interviews. These students volunteered to participate in the interviews after conducting the pre-post surveys.

Figure 8

Sequence of Quantitative and Qualitative Data Collection Methods



During the interviews, students were asked multiple questions (See Appendix B). Regarding CE, for instance, participants were asked about the frequency of their participation in weekly reading activities, both inside and outside the classroom, and the factors influencing their choices. For example, " How often did you read for the weekly reading activity? And why? Did you read inside or outside of school? Why? Please elaborate. How did you feel while you were reading during the weekly readings and why?" They were asked about their emotional responses while reading, whether they found the material interesting, and if they could relate it to their personal experiences or existing knowledge.

For IM, the focus was on understanding the students' enjoyment levels during the reading activities. They were asked about their eagerness or reluctance to participate, the influence of extrinsic motivators like leaderboards and eBucks, and whether completing the reading log provided them with a sense of achievement. For example, "Did you enjoy the weekly reading activities ? If yes, what made them enjoyable? If not, what made them unenjoyable? Please explain. Did you eagerly look forward to participating in the weekly reading activities or did you find them burdensome? Why? Please elaborate. Did

completing the weekly reading log give you a sense of accomplishment or satisfaction? Why or why not?" Moreover, participants were asked if they felt the activities contributed to the improvement of their English reading skills.

The section on SE delved into participants' confidence in selecting reading materials, achieving their reading goals, and their perception of skill improvement. For instance, "Were you confident in your ability to read the books or articles you selected for your weekly reading.? Why and why not? Were you able to achieve the weekly reading goal you set for yourself with confidence? Please elaborate. As you continued with the weekly reading, did you feel like you were improving your reading skills? How and why?" I also asked about their sense of control over their learning during the reading activities and whether they felt they could apply the knowledge gained in broader contexts beyond the reading sessions.

The interview data underwent several stages of coding, categorization, and classification before being summarized and condensed. Then, they were analyzed thematically, identifying recurrent patterns and themes across participants' responses. These patterns were crucial in shaping the qualitative findings of this study, providing a rich understanding of the multifaceted aspects of ELLs' reading experiences.

Assumptions, Biases, and Limitations

Assumptions

The researcher assumes that the sample size is large, varied, and representative of ELL high school students in the Southeast USA so that the research results can be valid and generalizable. Moreover, given the voluntary nature of the intervention and the fact that this will be ELLs' first prolonged reading activity over an extended period of time,

it's possible they'll struggle to fill out a weekly reading log to get the rewards and badges, as they are prone to forgetting volunteer assignments.

The researcher also assumes that some ELLs prefer traditional instruction over gamification or refuse to report any changes in their learning experience because of preconceived notions about games in the classroom. Even with those challenges, a study of this nature is worth the effort to provide evidence-based practices to guide K-12 classroom implementation of game design to boost reading skills in English.

Biases

The researcher participating in this study is a high school teacher who specializes in teaching ELLs. He, along with two other teachers, is teaching the gamified and regular groups in this study. To ensure that his teaching approach is unbiased, a large sample of students has been recruited and divided into eight groups, with four experimental and four control groups.Thus, three different teachers, including the researcher, are teaching these groups to guarantee fairness and equal experimental conditions. The study assumes that having multiple teachers with different instructional strategies and styles will reduce instructional biases and ensure validity.

Limitations

The study was not able to randomly select ELLs at an individual student level due to school policy and logistical constraints. Instead, ELLs were sampled at the class level, with English and Reading classes being assigned to either the gamified or regular groups.

It is noteworthy that while the study demonstrated reasonable power to detect the observed effect size, the quantitative analyses indicate that the group was only significant for one of the three models (IM,SE and CE), implying that the effect size was smaller

than 0.381 for the other two. It is essential to differentiate between the results of the ANCOVA models and the sensitivity power analysis; the former presents distinct findings for each model, while the latter gauges the study's overall ability to detect effects if they exist. Therefore, it is recommended that future research should consider larger sample sizes to improve accuracy and generalizability.

Furthermore, the sustained silent reading (SSR) activity was optional, independent and student-controlled. As a result, the SSR log contained generic open-ended questions that may not have accurately reflected the students' comprehension during their readings. Additionally, many ELLs may have faced challenges in expressing their opinions or filling out surveys accurately due to linguistic or technical-literacy barriers.

It is important to note that the quality of instruction and the similarity of experimental conditions may not have been consistent since different teachers were instructing the experimental and control groups. This inconsistency could potentially affect the study's internal validity.

CHAPTER FOUR: RESULTS

Introduction

In this chapter, the results of an experimental design study are presented. The research focuses on the intrinsic motivation (IM), self efficacy (SE), and cognitive engagement (CE) of ELLs towards reading in English. The study combines quantitative data collected from pre-post surveys with qualitative insights gathered from semi-structured interviews. A total of 56 high school ELL students participated in the study, representing diverse backgrounds and languages. The research questions guiding this study aim to explore how gamification elements such as leaderboards, eBucks, and badges affected ELLs' IM, SE, and CE within both regular and gamified groups.

Descriptive Statistics:

A total of 56 high school ELL students from the Southeast United States participated in the study, consisting of 28 males, 27 females, and one who preferred not to say. The group consisted of individuals from diverse backgrounds and cultures, including 18 White, 18 African, 7 Asian, and 5 who identified as Other. These students spoke various languages, such as Arabic, Spanish, Farsi (Dari), Swahili, Kinyarwanda, Tagalog, Sango, Nepali, Chinyanja, and French. In terms of English proficiency, only three students categorized themselves as “fluent”, while 23 said they were "somewhat fluent," 16 as "intermediate," seven as "somewhat intermediate," and seven as "beginners." Also, the mean and standard deviation of each dependent variable IM, SE, CE are provided in Table 3 below:

Table 3

Mean and standard deviation of IM, SE and CE

		Intrinsic motivation	Self-efficacy	Cognitive engagement
Control Group (N = 34)	Pre-survey	4.073 (0.934)	5.007 (1.455)	3.583 (0.928)
	Post-survey	4.112 (0.977)	5.205 (1.446)	3.786 (0.779)
Experimental Group (N = 22)	Pre- survey	3.831 (0.988)	5.454 (1.255)	3.943 (0.777)
	Post-survey	4.020 (0.782)	5.154 (1.275)	4.017 (0.717)

The study considered a number of factors that might affect students' reactions to the intervention. For example, the importance of reading and playing games. The results of the survey show that reading is highly valued by most students, with 35 (62.5%) students considering it "Very Important", 20 (35.7%) rating it as "Somewhat Important," and only one (1.8%) finding it "Not Important." On the other hand, gaming is also significant for students, with 26 (46.4%) students rating it as "Very Important," 25 (44.6%) rating it as "Somewhat Important," and only four (7.1%) considering it as "Not Important-a waste of time."

Moreover, the survey examined other factors such as academic performance and frequency of playing games and reading English to gain a better understanding of the student's backgrounds. According to the data, five students, which accounts for 8.9% of the total, categorized their academic level as "low." The majority of the students, 37 (66%) in total , rated themselves as "intermediate," while only three (5.4%) students identified themselves as "high" achievers. The results also revealed that students spend

more time reading English texts than playing games. Out of the students surveyed, 11 (19.6%) never play video games, 32 (57.1%) sometimes play games, nine (16.1%) occasionally play games and only four (7.1%) always play video games. In contrast, 27 (48%) students sometimes read English, 13 (23.2%) occasionally read English, and 16 students (28.6%) always read English.

Quantitative Data Analysis

To investigate my research questions, I compared pre- and post-surveys for both groups - gamified and regular. The objective was to identify any differences in IM, SE, and CE between the two groups after the experiment. To identify the differences and to adjust for the covariates of grade, gender, academic performance, the importance of reading and the importance of playing Games, I conducted an Analysis of Covariance (ANCOVA) in IBM SPSS Statistics (version 29), which produced the following results.

For research question 1: **Does the use of leaderboards and rewards increase ELLs' intrinsic motivation (IM) when reading in English? How?** Students were asked to rate seven statements related to IM using a Likert scale ranging from 1 (Not at all true of me) to 7 (Very true of me). The statements included "I enjoy reading in English very much," "I think reading in English is a boring activity," and "I would describe reading in English as very interesting."

To calculate IMAverage, I merged the responses of students to the seven IM statements in the pre-and post-surveys of both regular and gamified groups using IBM SPSS Statistics (version 29). Then, I combined the IM averages from both groups into a single variable called IMAverage_diff by matching the pre- and post-survey answers of each student from both groups to calculate the difference in IM between the two groups.

A one-way ANCOVA analysis was conducted with the treatment groups (TreatGroup), regular vs. gamified, as the independent variable and grade, gender, academic performance, importance placed on gaming, and importance placed on reading as covariates. The following results were obtained:

According to the descriptive statistics provided in Table 4, the mean difference in IM scores (IMAverage_diff) was higher in the gamified group (M = 0.2857, SD = 0.77140) compared to the regular group (M = 0.0626, SD = 0.94066). Although the overall model (See Table 5) was marginally significant (F(6, 46) = 2.244, p = .056, R^2= .226), it suggests that the full model is better at explaining variability than a simpler, intercept-only model. However, post hoc analyses (See Table 6) using estimated marginal means did not reveal a significant difference in IM between the regular and gamified groups after adjusting for the above covariates (mean difference = -0.004, SE = 0.253, p = .986).

Table 4

IM's Descriptive Statistics

Dependent Variable: IMAverage_diff

TreatGroup	Mean	Std. Deviation	N
Regular	.0626	.94066	33
Gamified	.2857	.77140	20
Total	.1468	.87969	53

Furthermore, the results of the ANCOVA demonstrated that there was no significant difference in IM between the regular and gamified groups, after controlling for grade, gender, academic performance, importance placed on gaming, and importance placed on reading. Thus, the gamified approach did not lead to a significant increase in ELLs' IM when reading in English compared to the traditional approach. While the

overall ANCOVA model showed marginal significance, the specific effect of TreatGroup on IM was not significant in the post hoc analysis (See Table 6).

Table 5

IM's Tests of Between-Subjects Effects

Dependent Variable: IMAverage_diff

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	9.110[a]	6	1.518	2.244	.056	.226
Intercept	1.176	1	1.176	1.737	.194	.036
GRADE	.576	1	.576	.852	.361	.018
GENDER	.736	1	.736	1.087	.303	.023
IMPORTANTREAD	1.503	1	1.503	2.221	.143	.046
IMPORTANTGAME	5.367	1	5.367	7.930	.007	.147
ACADEMICPERFORM	2.231	1	2.231	3.296	.076	.067
TreatGroup	.000	1	.000	.000	.986	.000
Error	31.131	46	.677			
Total	41.383	53				
Corrected Total	40.241	52				

Table 6

IM's Pairwise Comparisons

Dependent Variable: IMAverage_diff

(I) TreatGroup	(J) TreatGroup	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a]	
					Lower Bound	Upper Bound
Regular	Gamified	-.004	.253	.986	-.513	.504

As for question 2: **Does the use of leaderboards and rewards increase ELLs' self-efficacy (SE) when reading in English? How?** The students evaluated their SE by

ranking four statements on a 7-point Likert scale, which ranged from Disagree Strongly to Agree Strongly. The statements were as follows: "If I try hard, I believe I can read anything I want in English", "If I don't give up, I believe I can finish any reading in English", "If I have enough time, I believe I can read more in English", and "If I work hard enough, I believe I can understand everything when I read in English".

Similar to the IM variable above, SE Average was calculated by merging students' responses to the four SE statements in the pre-post surveys in both regular and gamified groups using IBM SPSS Statistics (version 29). Then, the SE averages from both groups were combined into a single variable called SEAverage_diff by matching the pre-and post-survey answers of each student from both groups to calculate the difference in SE gains between the two groups. Hence, using the ANCOVA test where the TreatGroup (regular vs. gamified) was used as the independent variable and grade, gender, academic performance, importance placed on gaming, and importance placed on reading as covariates. The following results were obtained:

The descriptive statistics (See Table 7) revealed a meaningful difference in SE scores (SEAverage_diff) between the regular group (M = 0.2955, SD = 1.03164) and the gamified group (M = -0.3000, SD = 1.09304).

Table 7

SE's Descriptive Statistics

Dependent Variable: SEAverage_diff

TreatGroup	Mean	Std. Deviation	N
Regular	.2955	1.03164	33
Gamified	-.3000	1.09304	20
Total	.0708	1.08461	53

Although the overall model (See Table 8) was insignificant ($F(6, 46) = 1.273$, $p = .289$, $R^2 = .142$), that suggests the full model is better at explaining variability than a simpler, intercept-only model. Post hoc analyses (See Table 9) using estimated marginal means uncovered a significant difference. Specifically, the regular group had significantly higher SE compared to the gamified group, even after adjusting for the above covariates (mean difference = 0.693, SE = 0.328, p = .040).

Table 8

SE's Tests of Between-Subjects Effects

Dependent Variable: SEAverage_diff

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	8.708[a]	6	1.451	1.273	.289	.142
Intercept	.335	1	.335	.294	.591	.006
GRADE	.710	1	.710	.623	.434	.013
GENDER	1.422	1	1.422	1.247	.270	.026
IMPORTANTREAD	.389	1	.389	.341	.562	.007
IMPORTANTGAME	2.480	1	2.480	2.175	.147	.045
ACADEMICPERFORM	.148	1	.148	.130	.720	.003
TreatGroup	5.090	1	5.090	4.463	.040	.088
Error	52.464	46	1.141			
Total	61.438	53				
Corrected Total	61.172	52				

Table 9

SE's Pairwise Comparisons

Dependent Variable: SEAverage_diff

(I) TreatGroup	(J) TreatGroup	Mean Difference (I-J)	Std. Error	Sig.[b]	95% Confidence Interval for Difference[b]	
					Lower Bound	Upper Bound
Regular	Gamified	.693*	.328	.040	.033	1.354

To interpret these results, the ANCOVA revealed a substantial difference in SE change between the regular and gamified groups, taking into account grade, gender, academic performance, importance placed on reading and importance placed on gaming. Furthermore, ELLs in the gamified group had improved SE when reading in English. This highlights that the integration of leaderboards and rewards did increase SE within the context of English reading activities. Therefore, these findings highlight the significant impact of the gamified approach in improving SE among ELLs, which is an essential aspect to consider within the broader research question framework.

Finally, for research question 3: **Does the use of leaderboards and rewards increase ELLs' cognitive engagement (CE) when reading in English? How?** Students were asked to rate their CE experience with their weekly readings in English on a 7-point Likert scale (ranging from 1-Not True at all of me to 7-Very True of me). The question consisted of eight statements, including "If I have trouble understanding an assigned reading text, I go over it again until I understand it," "When I read something in the book that doesn't make sense, I skip it and hope to understand it later," and "When I run into a difficult reading, I usually give up and look for an alternative reading." The survey aimed

to determine whether the use of leaderboards and rewards increased ELLs' CE when reading in English.

To calculate the CEAverage, the responses of students to the eight CE statements were combined in IBM SPSS Statistics (version 29) for both the regular and gamified groups. The CEAverages of both groups were then merged into a single variable, CEAverage_diff. This was done by matching the answers of each student in pre- and post-surveys to determine the difference in CE between the two groups.

Similar to the previous two research questions, the CE gains of the two groups were analyzed using ANCOVA. The TreatGroup (regular vs. gamified) was used as the independent variable while grade, gender, academic performance, importance placed on gaming, and importance placed on reading were used as the covariates. The following results were obtained:

Descriptive statistics in Table 10 showed that the regular group had a higher mean difference in cognitive engagement scores (CEAverage_diff) (M = 0.2549, SD = 0.81940) than the gamified group (M = 0.0357, SD = 1.03844).

Table 10

CE's Descriptive Statistics

Dependent Variable: CEAverage_diff

TreatGroup	Mean	Std. Deviation	N
Regular	.2549	.81940	33
Gamified	.0357	1.03844	21
Total	.1696	.90771	54

The analysis presented in Table 11 showed no significance in the overall model (F(6, 47) = 0.802, p = .574, R^2= .093), which means that there was no substantial treatment effect on CE.

Table 11

CE's Tests of Between-Subjects Effects

Dependent Variable: CEAverage_diff

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	4.054[a]	6	.676	.802	.574	.093
Intercept	.077	1	.077	.091	.764	.002
GRADE	.870	1	.870	1.032	.315	.021
GENDER	.051	1	.051	.060	.807	.001
IMPORTANTREAD	.006	1	.006	.007	.935	.000
IMPORTANTGAME	2.971	1	2.971	3.525	.067	.070
ACADEMICPERFORM	4.495E-5	1	4.495E-5	.000	.994	.000
TreatGroup	1.411	1	1.411	1.674	.202	.034
Error	39.615	47	.843			
Total	45.223	54				
Corrected Total	43.669	53				

Further analysis using estimated marginal means from Table 12 confirmed these findings. Notably, there was no significant difference in CE between the regular and gamified groups, after adjusting for the above covariates (mean difference = 0.357, SE = 0.276, p = .202).

The above results indicate that the gamified approach did not enhance CE among ELLs during English reading activities. These results highlight that leaderboards and rewards did not have a positive impact on the CE of ELLs.

Table 12

CE's Pairwise Comparisons

Dependent Variable: CEAverage_diff

(I) TreatGroup	(J) TreatGroup	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a]	
					Lower Bound	Upper Bound
Regular	Gamified	.357	.276	.202	-.198	.913

Summary of the Quantitative Data

The results of the study showed that using gamification did not significantly improve ELLs' IM in English reading compared to the traditional approach. Although descriptive statistics suggested a higher mean difference in IM scores for the gamified group, the overall model was only marginally significant ($p = .056$). Additionally, post hoc analyses revealed no significant difference in IM between the regular and gamified groups after adjusting for covariates ($p = .986$).

In terms of SE, the overall ANCOVA model was insignificant ($p = .289$). However, there was a meaningful difference in scores between the regular and gamified groups. Post hoc analyses indicated a significant difference: ELLs in the gamified group had significantly higher SE compared to the regular group, even after adjusting for covariates ($p = .040$). This suggests that leaderboards and rewards had a significant impact on SE in the context of English reading activities.

Regarding CE, descriptive statistics hinted at a greater mean difference in CE scores for the regular group. However, the overall ANCOVA model did not attain significance ($p = .574$). Post hoc analyses further affirmed no significant difference in CE

between groups after adjusting for covariates ($p = .202$). Therefore, the gamified approach did not enhance CE among ELLs during English reading activities, highlighting the limited impact of leaderboards and rewards on reading in English among ELLs.

In conclusion, these findings raise questions about the effectiveness of this gamified method for motivating and engaging ELLs, highlighting the need for further exploration of alternative strategies to enhance language learning experiences.

Qualitative Data Analysis

To gain a better insight into the quantitative data, I conducted semi-structured interviews with ten students, five from the gamified group and five from the regular group. The students were not randomly chosen but instead volunteered for the interviews. During the interviews, it was evident that CE, IM, and SE are interdependent and fluctuate based on an individual's goals and expectations. As per scholarly research (Schunk & Pajares, 2005; Sansone & Thoman, 2005), eight themes have been identified that are interconnected among IM, SE and CE across both groups. These themes are as follows:

A- IM Related themes:

Three key themes emerged in relation to IM during the interviews. The first was ***the prioritization of practical self-development over reading activities***, with many students from both groups indicating a preference for self-development activities over school reading tasks. One student from the gamified group expressed, “Reading is not important to me! I can do better without reading! I do not see reading as a valuable academic activity. Instead of reading for hours and wasting my time, I would like to go out and work.” Another student from the same group said, “I read more at home than I do

in school because at home, I read for self-development, whereas I read at school for credit and rewards."

A third student from the regular group mentioned, "I only enjoy reading when it is my choice and when I do it for my personal development; when I read for History or English, I just do it because I had to or to get credit and rewards." Another student from the same group stated, "I usually read online articles when I want to learn about something, but I read no books. I feel it is a waste of time, and I do not see the purpose of reading."

The second theme was ***ambivalent feelings towards reading***, with several students from both groups stating that they do not enjoy reading, regardless of the rewards and credit offered. However, some students from both groups mentioned that they would read and continue reading if they found the right book. One student from the regular group said, "I do not like reading; I do not feel the urge to read books. I tried to make myself read, but I do not like it." Another student from the same group stated, "I do not read at home as I am not interested in reading, but I read in school and only in this class because of the extra credit." However, a third student from the same group expressed, "I try to read every night before bed. I do enjoy reading because it calms me down; I feel relaxed when I am reading."

Similarly, two students from a gamified reading group shared their positive experiences. One mentioned enjoying reading due to the importance emphasized by their teacher and learning about people from different cultures. The other student found it fun to read five days a week and was motivated by earning points and rewards.

The third theme is ***the varied levels of satisfaction and accomplishment in reading.*** Students from both groups argued that the sense of accomplishment and satisfaction in reading is derived from a sense of growth in reading skills and a complete understanding of all the words and concepts within the text. For example, one student from the gamified group said, “I feel accomplished after I finish reading, but I'm not satisfied! Because I like to finish what I started! I'm not satisfied because I am not interested in reading.” Another student from the same group mentioned, “I only feel accomplished and satisfied with my readings when I understand them; all the words.” A third student from the gamified group said, “I feel satisfied and accomplished when I see myself grow in vocabulary, grammar, and speaking.” In short, students are looking for a more motivating method of learning that is not dominated by external rewards and competition. They are looking for meaningful learning opportunities that align with their goals beyond the classroom.

B-SE Related themes:

For SE on the other hand, two main themes were identified. The first theme is the ***ambivalent confidence in reading and overcoming challenges.*** Students from both groups expressed varying levels of confidence in their ability to complete their weekly reading. They also acknowledged that they may struggle to meet their goals due to the level of other reading texts, schoolwork, and personal responsibilities. For instance, a student from the gamified group shared, "I feel confident reading basic English texts, but when it comes to high-level English texts with difficult words, I may struggle. Yet, with enough effort, I believe I can read anything." Similarly, a student from the regular group stated, "I have some confidence in reading English books, but some of them are too

advanced for me." Meanwhile, another student from the gamified group noted, "I am confident in my ability to read English texts, but I may not finish them. If I had more time and interest in the text, I would be more likely to achieve my reading goals." On the other hand, a student from the same gamified group declared, "I feel confident in reading books in English since I picked them myself and usually meet or surpass my weekly reading targets. Setting my own goals helps me stay motivated and focused."

The second theme relates to ***the concept of control over learning in relation to the concept of free choice.*** Both groups of students reported feeling in control of their learning because the reading activity was optional and they could choose the text they wanted to read. Although some students forgot to submit their weekly reading logs, they admitted to reading at least some materials during the week. For example, a student from the gamified group said, "I appreciate that reading is optional since I don't feel pressured to do it. This way, I have more control over my reading and it reinforces my discipline." Similarly, a student from the regular group noted, "I prefer when it's optional because I feel more comfortable and in charge of my learning, rather than being forced to do things I don't enjoy." Another student from the gamified group commented, "I feel in control of my reading since I do it every day, and if I miss a day, I don't worry since I can catch up the next day."

C-CE Related themes:

Three main themes, related to CE, were identified. The first is ***the practical application and transfer of knowledge***. Students, from both groups, expressed that they do not care about rewards/extra credit and competition as long as the readings are interesting and beneficial for them. They argued that they would be more engaged in

reading an English text if they knew that the skills they learned would be useful in the real world and vice versa. For example, one student from the regular group emphasized the need for a purpose and meaning in their readings, stating, “I do not need extra credit in this class but I need a purpose and meaning for my readings. Specifically, knowledge application in the world that benefits me.”

Another student from the same group felt that reading didn't add much value to their life inside or outside of the classroom, except for searching for specific information online, he remarked, “I don’t feel that reading can add much to me outside of the classroom except that when I need something or want to learn something, I can look it up online. ”

Students in the gamified group, on the other hand, shared that they engage with reading when it is for personal development only; one student argued, “I read for my personal development not for entertainment or rewards; I don't really care about badges, rewards or competitions.” Another student from the same group expressed the same idea, saying, “ I read for personal enjoyment; I don't really care about eBucks and rewards. They are not valuable things for me; I may get eBucks but I am not interested in them or in competition with anyone. If I like something I read it and continue reading it.”

The second main theme is the ***limited availability of reading materials for teenagers.*** Students from both groups mentioned that there are few books that interest them in the library. In addition, the majority of online resources are not free. For example, one student noted that most books in the library are old and not up-to-date and that more recent books would attract more readers. Another student suggested that the

library should acquire more book options related to personal development and growth, as the books currently available are outdated and not interesting to them.

The third theme relates to ***avoiding distractions.*** Students from both groups revealed that they can be easily distracted by peers, technology, and school work so they need a quiet environment for reading. A student from the gamified group explained, "This generation is distracted by technology and social media so it is better to prompt reading differently not using technology or reading online but by creating a desire in them for reading! The reading should be related to them so they can feel the desire to read."

On the other hand, a student from the regular group admitted, "I don't feel comfortable reading in class because I tend to get distracted by my peers." Another student from the gamified group mentioned that reading in school is challenging due to numerous activities and distractions. He stated, "I prefer reading at home because it allows me to concentrate better without any schoolwork or interruptions, whereas, in school, I have to juggle other tasks and often get sidetracked by my phone or classmates."

Summary of Qualitative Data and Students' Suggestions

Students in the gamified group showed little interest in competing with their peers and found the badge system to be meaningless. While some students showed some interest in eBucks, the majority did not see any value in the reward system. One student expressed, "I don't care about badges, but do we get them? I do care about eBucks though. I'm not concerned about where I rank on the leaderboard either." Another student shared, "I read for personal development, not for entertainment or rewards. Badges, rewards, and competitions don't matter to me." A third student added, "I may use eBucks

to make purchases, but I don't care about badges or the leaderboard. It doesn't matter to me if someone reads more or less than I do."

Similarly, students in the regular group did not show much interest in the extra credit, as they did not need it for their class. One student stated that they only cared about extra credit if it had a significant impact on their grade. He said, "If the extra credit had a huge impact, I would complete the logs." Another student argued, "Even without extra credit, I would still read if the book is interesting to me." Another student suggested that the teacher should use different types of credits, as the students were already doing well in the class and did not need the extra credit. They added, "With the activity being optional, no one will do it. We need another motivation!"

During a discussion on ways to enhance their performance in reading activities, students put forward some suggestions. These included implementing a reward system that they find appealing, such as offering candy, Takis chips, and various snacks, i.e., more tangible rewards. They also suggested making the activity more social and enjoyable by allowing them to earn snacks, listen to music, and compete in groups of readers. While keeping the activity optional, students should be held accountable for it. Some students expressed that making the activity mandatory would help them take it more seriously. For example, one student suggested adding daily or weekly quizzes or reflection forums to discuss their readings. Additionally, providing books that are interesting to teenagers is crucial. According to one student, the library's collection of books is outdated, and having more recent books would encourage more students to read.

While some Sophomore and Junior students appeared enthusiastic during the interviews about receiving eBucks to purchase items from the school store, the majority

of students interviewed sought reading tasks related to self-development and growth in Finance, Technology, and Real Estate, i.e., they thought about their professional endeavors after graduation from high school.

CHAPTER FIVE: CONCLUSIONS AND DISCUSSIONS

Introduction

This chapter is divided into six sections. The initial section provides a brief summary of the main findings of the study. The second section looks at the implications of the study for theory, practice, and policy. The third section highlights the contributions of the study to the field of gamification and also identifies gaps in knowledge that the study addresses. The fourth section discusses the limitations of the current study, and the fifth section offers suggestions and recommendations for future research. Finally, the last section of the chapter will discuss the conclusion and significance of the study.

The Main Findings of the Study

This project delves into the effects of gamification on ELLs' IM, SE and CE when it comes to reading English. By using both quantitative and qualitative methods, the study aims to determine whether leaderboards and rewards can improve reading English experience for ELL students. The quantitative analysis indicates that these gamification elements did not significantly increase CE and IM in reading English among ELL students. However, the results reveal that the gamified group had a higher SE average than the regular group after participating in the weekly reading activities.

These findings also highlight the intricacies of the relationship between gamification and ELL students' learning journey, and provide valuable insights into the advantages and limitations of incorporating gamification in educational settings. Lastly, this section will discuss each research question and its corresponding findings:

A- Research question 1: ***Does the use of leaderboards and rewards increase ELLs' intrinsic motivation (IM) when reading in English? How?*** This research question aimed

to determine whether leaderboards and rewards could help improve the IM of English ELLs while reading in English. According to previous research by Alsawaier (2018), Chapman and Rich (2018), and Facey-Shaw et al. (2020), points, badges, rewards, and leaderboards are the most effective elements of gamification that can enhance IM and students' satisfaction and progress in the learning area. However, the quantitative analysis of this study revealed that the gamified approach did not significantly increase ELLs' IM compared to the traditional approach. Although there was a marginally significant overall model ($p = .056$), post hoc analyses did not show a significant difference in IM between the regular and gamified groups after adjusting for covariates ($p = .986$). This suggests that, while there was a higher mean difference in IM scores for the gamified group, the effect was not statistically significant.

Insights from interviews with the students highlighted the complexity of IM, emphasizing the importance of personal development and meaningful learning opportunities beyond the classroom. Students expressed a preference for self-development activities over school reading tasks, and some revealed ambivalent feelings toward reading, stating that enjoyment and motivation were often linked to personal choice and relevance. For instance, Junior students in the gamified group reported increased motivation and excitement due to the presence of eBucks to buy candy and personal items, while Seniors did not find them particularly motivating as they were looking for alternative rewards and credit.

Moreover, the impact of leaderboards and rewards on ELL students' IM gains was limited and varied and was dependent on individual preferences and learning goals. As pointed out by Kim (2015) and AlMarshedi et al. (2017), people from different cultural

backgrounds are affected differently by gamification due to their different learning habits and experiences. Therefore, the students in this study, who came from diverse linguistic and cultural backgrounds, were affected differently by gamification, which needs to be taken into account when designing gamified learning activities for ELLs.

B- Research question 2: ***Does the use of leaderboards and rewards increase ELLs' self-efficacy (SE) when reading in English? How?*** The purpose of this question was to investigate whether leaderboards and rewards could improve ELLs' SE in reading English. Building on previous research by Tolentino and Roleda (2019) and Dela Cruz et al. (2020), which looked at the effect of gamification on students' interest and motivation in Physics and English reading, respectively. The statistical analysis showed that there is a significant difference in SE scores between the regular and gamified groups, with ELLs in the gamified group demonstrating significantly higher SE ($p = .040$), even after controlling for grade, gender, academic performance, and importance placed on reading and gaming. The results suggest that the use of leaderboards and rewards positively impacted SE in English reading activities.

Qualitative data supported these findings, with students in the gamified group feeling more in control of their learning due to the optional nature of the reading activity and the ability to choose their own texts. This sense of control was linked to a greater sense of confidence and empowerment, further supporting the quantitative results. Most students in the gamified group reported feeling a greater sense of accomplishment and confidence when achieving high rankings on the leaderboard or receiving rewards. While some students did not find the leaderboards and rewards motivating or meaningful indicators of their reading abilities, the majority of the students interviewed felt that

having the activity as optional allowed them to take control of their learning and progress monitoring throughout the week, boosting their confidence levels.

Nicholson (2015) suggested in his "A Recipe for Meaningful Gamification" that users should have a say in the gamified activities to personalize the experience, leading to long-term benefits. As a result, students in this study felt a sense of control over their learning and high satisfaction as they had the option to participate in weekly reading activities and receive rewards and social recognition. Therefore, this sense of accomplishment contributed positively to their overall sense of SE.

C- Research question 3: ***Does the use of leaderboards and rewards increase ELLs' cognitive engagement (CE) when reading in English? How?*** The goal of this question was to investigate whether the use of leaderboards and rewards could enhance ELLs' CE during reading activities. However, the statistical analysis did not reveal any significant difference in CE between the regular group and the gamified group, even after considering factors such as grade, gender, academic performance, and importance given to reading and gaming ($p = .202$). Although the descriptive statistics showed a slightly higher average difference in CE scores for the regular group, this effect was not statistically significant.

The study involved students from different academic levels, with varying degrees of English proficiency and tech literacy. The study aimed to examine if students' backgrounds and learning experiences may have affected their views or success in gamification. Unlike previous research on cultural differences and gaming, which found that age, gender, and cultural orientation can impact users' involvement and success in

gaming, the results of this study did not find any significant impact of these factors on students' views or success in gamification.

Several other studies have suggested that gamification is influenced by several factors such as learning experience and style, present academic level, personal traits, technology literacy, and interest in the subject matter. However, the quantitative analysis of this study did not show any significant influence of students' age, gender, learning experience or personal traits on their CE.

The qualitative findings of the study supported the quantitative results. The students felt that leaderboards and rewards did not improve their CE during English reading activities. They emphasized the importance of meaningful and applicable knowledge, and expressed concerns about distractions and a lack of appealing reading materials. The qualitative analysis revealed that students had diverse goals that aligned with their objectives of learning and personal development. While some students preferred reading materials that would aid in their personal and academic growth and development, others sought out subject matter that they could relate to as teenagers and culturally diverse individuals. However, most students gave little attention to the gamification elements in play.

Summary of the Main Findings

The use of a gamified approach was found to have a positive impact on the ELL's SE during reading activities. However, it was not able to significantly enhance their IM or CE. The complexity of factors affecting motivation and engagement, such as personal goals, relevance, and distractions, highlights the need for nuanced strategies to improve language learning experiences. Moreover, students' feedback on the approach was

valuable and suggested using tangible rewards, incorporating social elements, and offering relevant reading materials to enhance their learning experience. This emphasizes the importance of considering students' input when designing effective learning approaches.

During interviews, multiple students expressed a desire for a more meaningful motivation/reward system. It was revealed during interviews that personal reading preferences of ELLs, such as their preferred time, place, and text type played a crucial role in the results. Some students preferred reading at home to avoid distractions, while others preferred reading at school at specific times. Teenagers faced challenges accessing reading materials, as physical resources were limited, while online resources were expensive and inaccessible. Additionally, many students didn't take the activity seriously, as it was optional and had no consequences. Therefore, they prioritized mandatory school activities over earning eBucks, rewards, or extra credit.

It is hypothesized that a more valuable adaptive gamification system, integrated into classroom activities, would be more effective. Such a system should have consequences for students to facilitate reading skill development, which goes against the voluntary nature of gamification, as outlined by Stiegler and Zimmermann (2015).

Implications for K-12 Settings

The findings of this study have significant implications for the field of Education, in terms of theory, practice, and policy. In terms of theory, the study contributes to the existing literature on gamification, shedding light on the complex nature of its impact on the motivation, engagement, and self-efficacy of ELLs. The findings suggest that

gamification alone does not help students reach their full potential, especially with a diverse set of needs in K-12 settings. Hence, the study highlights the following impacts:

Leaderboards

According to the study, leaderboards did not have a significant positive impact on ELLs' IM for reading in English. The gamified group showed no higher level of IM compared to the regular group. However, leaderboards were associated with a significant increase in SE among ELLs. The gamified group demonstrated higher SE compared to the regular group, indicating that the competitive element positively influenced their confidence in reading. Nevertheless, leaderboards did not significantly enhance CE. Both groups showed similar levels of CE, suggesting that the competitive aspect did not substantially affect how deeply students engaged with the reading material.

Badges

The presence of badges did not lead to a significant increase in IM. The gamified group did not demonstrate a significantly higher IM compared to the regular group. However, the analysis revealed a significant positive impact on SE. ELLs in the gamified group exhibited higher SE compared to the regular group, suggesting that badges contributed to increased confidence in their reading abilities. Nonetheless, badges did not significantly influence CE. Both groups showed similar levels of CE, indicating that the badge system did not contribute significantly to how deeply students engaged with the reading material.

eBucks

The influence of eBucks did not result in a significant increase in IM. The gamified group did not show a significantly higher IM compared to the regular group.

However, eBucks had a significant positive impact on SE. ELLs in the gamified group exhibited higher SE compared to the regular group, indicating that the reward system contributed to increased confidence in their reading abilities. Nonetheless, eBucks did not significantly impact CE. Both groups showed similar levels of CE, suggesting that the reward system did not substantially affect how deeply students engaged with the reading material.

Extra-Credit Points

The study aimed to examine the impact of gamification elements such as leaderboards, badges, and eBucks on students' reading habits in comparison to extra credit points. The regular group was given one extra credit point for every five minutes spent reading, while the experimental group was offered gamification elements. However, the quantitative analysis revealed no significant differences between the two groups in CE or IM, but high significant differences in SE, where the gamified group scored significantly higher..

The qualitative analysis supported the quantitative results, with both high- and low-achieving students in the regular groups stating that they were not interested in earning extra credit. They believed that it would not impact their grades, and they were already doing well in their Reading and English classes. Some students did say that they would have read more if they had known that the credit would have a significant impact on their academic level. However, they preferred to read for self-development and growth rather than for credit in class. Although the students appreciated the fact that the activity was optional, they stated that they would prioritize mandatory assignments since they carried more weight on their grades.

From a practical standpoint, these findings are relevant for educators and instructional designers. They suggest that using leaderboards and rewards alone is not enough to improve English-language learning among ELLs. A more tailored approach that accounts for individual differences is necessary to improve CE and IM. However, gamification can still play a crucial role in fostering ELL students' SE and belief in their abilities, which can promote a growth mindset and empower them in their language-learning journeys.

At the policy level, when integrating gamification into educational systems, policymakers should consider the diverse needs, characteristics, and language proficiency levels of ELL students. A balance must be struck between leveraging gamification's motivational aspects and ensuring educational objectives are met. The findings recommend that the gamified activities should be optional but measures are needed to hold students accountable. The long-term effects of gamification on ELL students' language proficiency and academic performance require further research.

Ultimately, the implications of this study suggest that by leveraging smart technology, ELLs' varied backgrounds, and gamification strategies effectively, educators, instructional designers, and policymakers can support and enhance ELLs' language learning experiences.

Contributions of the Study

The contributions of the current study can be summarized as follows:

Intrinsic Motivation: A Nuanced Understanding

The research showed that leaderboards, badges, and eBucks did not have a notable effect on ELLs' improvement in reading English, which is contrary to prior studies. This

suggests that how gamification impacts IM may depend on the individual's preferences, objectives, and cultural context.

Positive Impact on Self-Efficacy

The study demonstrated a positive impact on ELLs' SE in reading English when using leaderboards and rewards. Students in the gamified group showed significantly higher SE compared to the regular group, indicating that the competitive and reward elements positively influenced their confidence and control over their learning.

Limited Impact on Cognitive Engagement

Gamification through leaderboards, badges, and eBucks, had positive effects on SE, but did not seem to have a significant impact on CE during English reading activities. This indicates that although gamification can increase confidence, it may not necessarily lead to increased motivation and CE with the content being read.

Identifying the Role of Individual Preferences

The research outlined in the study underscores how critical it is to factor in individual preferences, for example, personal reading selections, preferred timeframe and location for reading, and text genres, when designing gamified language learning experiences. These individual components had a great impact on the outcomes and the user's opinion of the gamification components.

Technology Solutions

The study suggests the need for adaptive technology to be incorporated in high school settings to effectively support ELLs and their diverse cultural and linguistic backgrounds. The fast-paced evolution of smart technologies calls for the adoption of innovative teaching techniques, focusing on the integration of adaptive and intelligent

educational technology software. This approach is crucial in providing ELLs with personalized, efficient access to a smart curriculum, enabling them to experience in-school learning that aligns with their everyday use of smart devices.

Additionally, the study points out that students expect more immediate and tangible outcomes from gamified experiences, similar to the instant feedback they receive from smartphone games. The study highlights the significance of timely access to results, feedback, and rewards to maintain student engagement.

Moreover, the study highlights the importance of 21st-century skills that focus on practical outcomes in self-development and growth beyond traditional academic contexts, aligning with the evolving job market and advancements in artificial intelligence.

General Limitations of the Study

The present study has several limitations that need to be considered. One of the major constraints was the absence of random sampling at the individual student level. This was due to logistical challenges within the school environment, so instead, convenience sampling was employed at the class level. The different ELLs classes were assigned to either the gamified or regular instructional group.

Although a sensitivity power analysis using G*Power was conducted for the study and achieved a power of 0.80, which confirms the study's ability to identify moderate effects, it is important to acknowledge that detecting smaller effects within the study's sample size may be challenging. Also, it has been found through quantitative analyses that the group had a significant effect on only one of the three models (IM, SE, and CE). This implies that the effect size was lower than 0.381 for the other two models.

It is important to distinguish between the results of the ANCOVA models and the sensitivity power analysis. The former provides individualized findings for each model, while the latter evaluates the study's overall ability to detect effects, if present. Therefore, it is recommended that future research should aim for larger sample sizes to improve accuracy and generalizability.

Throughout the experiment, three teachers were involved. However, there were operational issues with the planned weekly dissemination of reading logs and leaderboards on the Canvas online platform. One teacher was unfamiliar with Canvas and did not provide instructions to the class on its usage, resulting in a lack of timely submission of reading logs by students. Additionally, there were delays in posting weekly reading logs and leaderboards, which affected the experiment's adherence to the intended schedule. Because the experiment was voluntary and involved three distinct teachers using diverse instructional methods, a significant number of students preferred prioritizing mandatory assignments over participation in the experiment.

Efforts to include dedicated silent reading time and regular library visits faced challenges in implementation. The three teachers were unable to consistently allocate 10-15 minutes for silent reading or organize weekly library visits across all classes, despite requests. This affected the timely grading of students' reading logs, awarding of weekly extra credit, and updating of leaderboards with eBucks.

Apart from logistical challenges, the study also encountered limitations associated with the diverse backgrounds and preferences of participating students. The students came from varied cultural, socioeconomic, and linguistic backgrounds, reflecting a broad spectrum of reading interests that exceeded the resources available in the school library.

Both teachers and students noted deficiencies in the library's relevance to teens and diverse cultures. Furthermore, the accessibility and cost associated with online readings posed additional barriers for students.

Suggestions and Recommendations for Further Research

In view of the diversity of ELLs and their involvement in social media platforms and smartphone applications, the study recommends the use of the following gamified-based technologies to enhance reading instruction for ELLs. Further research should be conducted into each of these methods as well:

A- Adaptive Learning and Digital Reading Platforms

Using digital reading platforms with adaptive learning features can cater to the individual needs and learning preferences of ELLs. Adaptive smart-tech learning systems adjust the difficulty level and content based on the learner's proficiency, promoting personalized learning experiences. Cho and Choi (2017) conducted a study that investigated the effects of a personalized English reading program on Korean high school students' reading comprehension and motivation. The findings showed significant improvements in reading comprehension and intrinsic motivation among the participants. Further research is necessary in this area for ELLs in the USA.

B-Using Virtual Environments for Collaborative Reading

Collaborative reading in virtual environments can improve ELLs' engagement, interaction, and comprehension. Online platforms allow for shared reading experiences, text discussions, and comprehension activities. Research from Zheng et al. (2016) indicates that virtual collaborative reading positively impacts students' motivation and

self-efficacy. Further research is needed to confirm its effectiveness on ELLs' reading performance.

C-Apps for Interactive Language Learning

Using interactive language learning apps on smartphones can effectively promote reading skills in ELLs. These apps incorporate game-like features, exercises, and multimedia elements to enhance engagement and provide immediate feedback. A study by Ni et al. (2022) found significant improvements in reading performance and motivation among high school students who used a language-learning app. Further research is recommended to explore these promising results for ELLs.

Finally, the study calls for further research to explore the long-term effects of gamification on ELL students' language proficiency and academic performance. This implies a need for ongoing investigation into the sustainability and efficacy of gamified approaches in language learning.

APPENDICES

APPENDIX A: PRE-POST SURVEY

Part 1 Demographics

Q1 Please enter your student ID (Example: 12345678)

Q2 What is your school email address? (Example: ab123@stu.fayette.kyschools.us)

Q3 What is your year in school?
- Freshman
- Junior
- Sophomore
- Senior

Q4 What is your gender?
- Male
- Female
- Non-Binary/third gender
- Prefer not to say

Q5 What is your ethnicity?
- White
- Latino/Hispanic
- African/African American
- Asian
- Alaskan
- Native American
- Other

Q6 What is your first language?

Part 2 Learning Experience

Q7 How do you rate your English language proficiency?
- Fluent
- Somewhat fluent
- Intermediate
- Somewhat intermediate
- Beginner

Q8 How often do you read in English?
- Never
- Occasionally
- Sometimes
- Always

Q9 How often do you play games on your mobile phone or computer?

- Never
- Occasionally
- Sometimes
- Always

Q10 What is your opinion about the importance of reading in English in general?

- Very important
- Somewhat important
- Not important

Q11 What is your opinion about playing games in school to learn?

- Very important
- Somewhat important
- Not important-a waste of time

Q12 As a high school student, how would you rate your academic performance on the following scale? 1 to 4 are low, 5 is intermediate, and 6 to 10 are high.

1	2	3	4	5	6	7	8	**9**	**10**
Low				**Intermediate**					**High**

Part 3 Cognitive Engagement

Q 13 Please read each statement below carefully and think about **your current experience with reading in English.**

For each statement, select the number that best describes how true it is for you, from 1 - Not at all true of me to 7- Very true of me.

1	2	3	4	5	6	7
Not at all true of me	Untrue of me	Somewhat untrue of me	Neither true nor untrue of me	Somewhat true of me	True of me	**Very true of me**

[Note: The following items were randomized on Qualtrics.]

1. If I have trouble understanding an assigned reading text, I go over it again until I understand it.
2. I try to complete my reading assignments as fast as possible without understanding or checking the accuracy of my answers.
3. If I have trouble understanding a reading question, I'm more likely to guess to figure things out than try to understand.
4. If I have trouble reading a book, I read or copy down the information in the back/front of the book when asked about it.
5. If I have trouble understanding a reading assignment, I'll try to get someone else to finish it for me.
6. When I read something in the book that doesn't make sense, I skip it and hope to understand it later.
7. When I run into a difficult reading question, I keep trying at it until I think I have answered it right.
8. When I run into a difficult reading, I usually give up and look for an alternative reading.

Part 4 Intrinsic Motivation

Q 14 Please read each statement below carefully and think about **your current experience with reading in English.**

For each statement, select the number that best describes how true it is for you, from 1 - Not at all untrue of me to 7 - Very true of me.

1	2	3	4	5	6	7
Not at all true of me	Untrue of me	Somewhat untrue of me	Neither true nor untrue of me	Somewhat true of me	True of me	**Very true of me**

[Note: The following items were randomized on Qualtrics.]

9. I enjoy reading in English very much
10. Reading in English is fun to do.
11. I think Reading in English is a boring activity.
12. Reading in English does not hold my attention at all.
13. I would describe reading in English as very interesting.

14. I think reading in English is quite enjoyable.
15. While I am reading in English, I am thinking about how much I enjoy it.

Part 5 Self-efficacy

Q 15 Please read each statement below carefully and think about **your current experience with reading in English.**

Please indicate **to what extent you agree or disagree** with each statement, from 1 - Strongly Disagree to 7 - Strongly Agree

1	2	3	4	5	6	7
Disagree Strongly	Disagree	Disagree Somewhat	Neither Agree nor Disagree	Agree Somewhat	Agree	**Agree Strongly**

16. If I try hard, I believe I can read anything I want in English.
17. If I don't give up, I believe I can finish any reading in English.
18. If I have enough time, I believe I can read more in English.
19. If I work hard enough, I believe I can understand everything when I read in English.

Constructs	**Subconstructs**
Cognitive engagement	Persistence (8 items): 1-8
Intrinsic motivation	Interest and enjoyment (7 items): 9-15
Self-efficacy	Self-belief (4 items): 16-19

APPENDIX B: INTERVIEW QUESTIONS

Warm Up:

- This is a research project - we try to understand something that will benefit ELL's Reading.
- This is NOT an evaluation of you or your teacher.
- We try to understand your true experiences and opinions about reading. There is NO right/wrong or good/bad answer. Every student is a helpful piece of data to our puzzle.
- You will not be singled out and your response will not be connected to you in any way. There will be no retaliation
- So you are an ELL (grade?). What is your overall experience with reading English?
- Tell me a bit about yourself.
- Do you like reading in English? Do you honestly think that reading is helpful to what you want to do in the future? What is your overall experience with reading in English so far? Elaborate.

Cognitive Engagement:

1. How often did you read for the weekly reading activity? And why?
2. Did you read inside or outside of school? Why? Please elaborate.
3. How did you feel while you were reading during the weekly readings and why?
4. Did you find it easy or challenging to focus on your reading during the weekly readings? Why or why not?
5. Did you find the books or articles you read for the weekly reading activity interesting? Why or why not?
6. Did you make any connections between what you read and your own experiences or other knowledge you have? If so, how and why?

Intrinsic Motivation:

1. Did you enjoy the weekly reading activities ? If yes, what made them enjoyable? If not, what made them unenjoyable? Please explain.
2. Did you eagerly look forward to participating in the weekly reading activities or did you find them burdensome? Why? Please elaborate.
3. Did completing the weekly reading log give you a sense of accomplishment or satisfaction? Why or why not?
4. Did you feel like you were reading for your own enjoyment or were you motivated by the leaderboard and the eBucks? Please elaborate.
5. Lastly, did you feel like the weekly reading activities helped improve your English reading skills? If yes, how did you notice the improvement? Why?

Self-Efficacy:

1. Were you confident in your ability to read the books or articles you selected for your weekly reading.? Why and why not?
2. Were you able to achieve the weekly reading goal you set for yourself with confidence? Please elaborate.
3. As you continued with the weekly reading, did you feel like you were improving your reading skills? How and why?
4. Did you feel like you have control over your own learning during the weekly reading? How and why?
5. Lastly, do you feel like you can apply the knowledge gained from the weekly readings to other content areas or your life in general? Please explain.

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