

T.C.
BAHCESEHIR UNIVERSITY
GRADUATE SCHOOL
THE DEPARTMENT OF EDUCATIONAL TECHNOLOGY

**IMPACT OF DIGITAL ESCAPE ROOM GAMES ON ENGLISH PREP
STUDENTS' ACADEMIC SUCCESS, MOTIVATION, AND
COMMUNICATION**

MASTER'S THESIS

SEDANUR BİLİR

ISTANBUL 2024

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THESIS ADVISOR
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ABSTRACT

IMPACT OF DIGITAL ESCAPE ROOM GAMES ON ENGLISH PREP STUDENTS' ACADEMIC SUCCESS, MOTIVATION, AND COMMUNICATION

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This study aims to investigate the impact of educational digital escape room games on the academic performance, motivation, and communicative openness of students at a preparatory school during a fully online module. The study's participants were 30 prep school students who were enrolled in a private university in Istanbul during the spring semester of the 2022–2023 academic year. While the control group studied the topic using textbooks and online worksheets in a similar manner, the experimental group played 5 different instructional digital escape room games for 40 minutes each over the course of 5 weeks in the study, which was performed fully online. In order to collect data from the participants, a language achievement test, a motivation survey, a self-efficacy survey, and a willingness to communicate survey were used in the study. For the quantitative data, 2X2 mixed ANOVA was used. For the follow-up, Benferroni corrected between subject and paired samples t-test were employed by using SPSS 26.0 statistical package program. When the quantitative data were analyzed, there was no significant difference in the students' academic performance, motivation, self-efficacy, and willingness to communicate between the experimental group and the control group.

Keywords: Educational Digital Escape Room Games, Game-Based Learning, Escape Room, Distance Learning



ÖZ

DİJİTAL KAÇIŞ ODASI OYUNLARININ İNGİLİZCE HAZIRLIK ÖĞRENCİLERİNİN AKADEMİK BAŞARISI, MOTİVASYONU VE İLETİŞİMİ ÜZERİNDEKİ ETKİSİ

Bilir, Sedanur

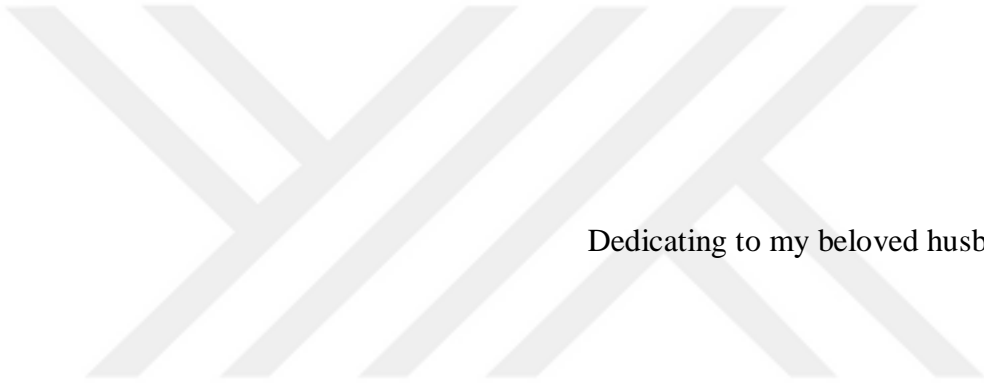
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Bu çalışma, eğitsel dijital kaçış odası oyunlarının, tamamen çevrimiçi bir modül sırasında bir hazırlık okulundaki öğrencilerin akademik performansı, motivasyonu ve iletişimsel açıklığı üzerindeki etkisini araştırmayı amaçlamaktadır. Araştırmanın katılımcılarını 2022–2023 eğitim-öğretim yılı bahar yarısında İstanbul'da özel bir üniversiteye kayıtlı 30 hazırlık okulu öğrencisi oluşturmuştur. Kontrol grubu benzer şekilde ders kitabı ve çevrimiçi çalışma kağıtları kullanarak konuyu işlerken, deney grubu tamamen çevrimiçi olarak gerçekleştirilen çalışmada 5 hafta boyunca her biri 40 dakika olmak üzere 5 farklı eğitimsel dijital kaçış oyunu oynamıştır. Araştırmada katılımcılardan veri toplamak amacıyla dil başarı testi, motivasyon anketi, öz yeterlilik anketi ve iletişim kurma isteği anketi kullanılmıştır. Nicel veriler için 2X2 karışık ANOVA kullanılmıştır. Takip analizi için, SPSS 26.0 istatistik paket programı kullanılarak denek ve eşleştirilmiş örnekler arasında düzeltilmiş Benferroni t-testi kullanıldı. Nicel veriler incelendiğinde, deney grubu ile kontrol grubu arasında öğrencilerin akademik performansları, motivasyonları, öz-yeterlilikleri ve iletişim kurma istekleri açısından anlamlı bir fark görülmemiştir.

Anahtar Kelimeler: Eğitsel Dijital Kaçış Oyunları, Oyun-Tabanlı Öğrenme, Kaçış Odası, Uzaktan Eğitim



Dedicating to my beloved husband, Can...

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LIST OF ABBREVIATIONS

EVT	Expectancy-worth Theory
GBL	Game-Based Learning
ICT	Information and Communication Technologies
SPSS	Statistical Package for Social Sciences



Chapter 1

Introduction

Digitalization opens up new educational possibilities. The use of data to improve student learning, teacher instruction, and administrative decision-making is a relatively new development, even though the education industry has long been rich in data, such as grades and administrative statistics (Vincent-Lancrin, 2022). Over time, new technological advancements have opened new opportunities and supports for teaching and learning methods. The understanding of learning and its fundamental mechanisms has advanced significantly along with technological advancements (Reiser, 2001). To accurately decide on learning technology practices and tactics, educators, researchers, and institutional leaders must conduct thorough and successful evaluations of technology use (Alqahtani & Rajkhan, 2020; Yang & Huang, 2015, as cited in Lai et al., 2020).

Gamification, the incorporation of game principles and aspects into non-game contexts, has drawn considerable interest from the academic, business, and industrial worlds. In industries like education, healthcare, marketing, and employee training, the use of game-based principles to engage users, encourage behaviors, and enhance learning experiences has become a common practice (Deterding et al., 2011). The origins of the term "gamification" can be found in early behavioral psychology and operant conditioning research from the middle of the 20th century (Hamari et al., 2014). The fields of game studies and game theory were used to inform later innovations, which included game design components like points, badges, leaderboards, and storylines (Werbach & Hunter, 2012). The theoretical foundation for gamification has also been significantly shaped by the Self-Determination Theory (SDT) and Flow Theory (Deci et al., 1991; Csikszentmihalyi, 1990). The diverse uses of gamification are seen in a number of industries. Gamified learning systems have been demonstrated to improve student motivation and participation in the classroom (Hamari et al., 2014). Gamification has been used in healthcare to treat chronic illnesses, increase patient compliance, and promote healthy habits (Johnson et al., 2016).

Despite the many advantages of gamification, there are still some problems, such as the possibility of overrewarding and eroding intrinsic motivation (Zichermann & Cunningham, 2011). Future studies should concentrate on improving gamification techniques to accommodate individual characteristics and cultural situations. Further research is needed to examine the long-term impacts of gamified therapies on behavioral change and skill transfer.

According to Deterding et al. (2011), the business sector has embraced gamification for employee training, loyalty programs, and customer engagement. Gamification's effectiveness depends on its capacity to engage both inner and extrinsic motivational variables. According to Deci et al. (1991), SDT sheds light on the significance of autonomy, competence, and relatedness in fostering persistent involvement. Engagement and immersion are further enhanced by gamification's capacity to elicit a state of flow in which abilities and difficulties are balanced (Csikszentmihalyi, 1990). Gamification has been shown to increase user motivation and engagement in numerous research. As an illustration, a study by Landers et al. (2017) showed that adding gamified components to e-learning platforms boosted user engagement and completion rates. By utilizing rewards and social interactions, gamification tactics have also been demonstrated to successfully promote long-term engagement (Hamari et al., 2014). Exploration of gamification's potential to improve educational experiences is widespread. According to research by Kaptein et al. (2015), gamified learning environments enhanced information retention. Additionally, a type of gamification known as simulations and serious games has been used for skill development and training in industries including aviation and the military (Deterding et al., 2011).

The popularity of educational escape games has grown as creative teaching aids that blend learning and pleasure. The goal of this review of the literature is to give a summary of the current research on the efficiency and effects of educational escape room games in various educational settings. Educators have consulted a number of learning theories to provide a framework for comprehending the educational potential of escape room games. Constructivism and experiential learning are two game-based learning theories that emphasize the importance of engagement and active participation in promoting deeper learning (Gee, 2003; Kolb, 1984). These theories are supported by educational escape room games, which

immerse players in problem-solving situations that call for teamwork, critical thinking, and knowledge application (Hamari et al., 2016). According to research, educational escape room games can increase student enthusiasm and engagement. According to Bartsch and Siems (2018), adding escape room aspects to lesson plans boosted enthusiasm and engagement among students. Additionally, engaging and difficult gameplay has been associated with feelings of accomplishment and satisfaction, which improve the entire learning experience (Kapp, 2012). Games like escape rooms naturally encourage cooperation and teamwork. Studies by Anderson and Barnett (2019) highlight the benefits of group problem-solving for skill acquisition and knowledge retention. In escape room environments, collaborative learning encourages peer engagement, communication abilities, and the sharing of various viewpoints (Squire, 2006). Games that simulate an escape room scenario can be used to teach a variety of subjects, including humanities and STEM. For instance, Kizilcec et al. (2017) looked at the use of escape rooms in computer programming instruction and discovered that participants had better problem-solving abilities and a deeper comprehension of programming topics.

Researchers have looked into how learning results in educational escape room games are assessed. Aligning assessment techniques with game-based learning objectives is crucial, as stressed by De Freitas and Oliver (2006). The use of content knowledge in the application of problem-solving techniques, creativity, and cooperation are all examples of effective assessment techniques (Bell et al., 2013).

1.1 Statement of the Problem

The widespread Covid-19 pandemic has had significant institutional and behavioral "shock effects" in a variety of human endeavors, including schooling. The effect on students is unprecedented: as of 9 April 2020, there will be more than 1,500,000,000 primary- through university-level students globally who are unable to attend school (UNESCO 2020). The COVID-19 epidemic has and will continue to have an impact on how information and skills are taught at all educational levels. Some children and adults will find it difficult to adjust to the new modalities, even though many will probably make up for the disruption of the traditional educational offerings (Hoofman & Secord, 2021). Students, however, were less enthused and

gave it a relatively low score when questioned about "focus and restraint," which obviously indicates a larger need to increase self-discipline and concentration among distractions like unreliable network speed, a noisy atmosphere, and a lack of professional equipment (Sun et al. 2020). Not all education occurs in formal classroom settings. The provision of education may be hampered by natural disasters, global crises, wars, international conflicts, and epidemics. 2020 (Burgess & Sievertsen). In the world of digital learning, students' reluctance to communicate has grown to be a major obstacle. Online platforms' accessibility and ease have changed education, but they have also created impediments to clear communication. Students may experience emotions of loneliness and disengagement if they don't have the same face-to-face interactions, physical classroom surroundings, and sense of community that traditional education offers. This reluctance to actively participate can be made worse by factors including technological issues, screen fatigue, and domestic distractions. In order to overcome this resistance, educators must use cutting-edge techniques that promote online engagement, promote open channels of communication, and provide a positive virtual learning environment that inspires students to communicate and work successfully.

1.2 Purpose of the Study

The purpose of this study is to determine how escape room games affect learners' willingness to communicate, self-efficacy, achievement, and academic motivation. The experimental group consists of students who use digital escape room games to study for 5 weeks, whereas the control group consists of students who receive traditional education during this period. The present study aims to address the following research questions:

- 1) Is there a statistically significant difference between the pre-test and post-test results of the experimental and control groups in terms of achievement?
- 2) Is there a statistically significant difference between the experimental group and the control group in terms of pre-test and post-test results of the academic motivation scale?
- 3) Is there a significant difference between the pre-test and post-test results of the experimental and control groups in terms of willingness to communicate scale?

4) Is there a significant difference between the pre-test and post-test results of the experimental and control groups in terms of the self-efficacy scale and its subscales?

1.3 Significance of the Study

Even though educational video games and simulations (edutainment) are becoming more and more common, little is actually understood about how they operate. Much of the research in this field has compared playing video games to lectures, which is frequently inappropriate because each is a unique pedagogical technique that typically embodies unique values on the part of the instructional designer and is suitable for unique kinds of learning experiences (Squire, 2003). As innovative teaching tools that combine learning and enjoyment, educational escape games have become more and more popular. This review of the literature aims to provide an overview of the most recent studies on the effectiveness and outcomes of educational escape room games in various educational settings. In order to establish a framework for understanding the instructional potential of escape room games, educators have studied a number of learning theories. Two game-based learning theories, constructivism and experiential learning, highlight the value of engagement and active participation in fostering deeper learning (Gee, 2003; Kolb, 1984).

1.4 Definitions

GBL: Game-based learning (GBL) is a method of teaching that applies gaming concepts to the classroom in an effort to improve student motivation, engagement, and academic results.

Chapter 2

Literature Review

The potential of educational games to improve learning processes has attracted a lot of attention. The impact, potency, and difficulties of educational games in various educational contexts are investigated in this overview of the literature. Highly engaging activities like educational escape rooms could offer instructors of face-to-face courses an extra value that can boost students' enthusiasm and get them back in the classroom as distance learning through MOOCs and virtual learning environments gains popularity (Lopez et al., 2019). This section is devoted to explaining technology integration during online education period. Moreover, motivation, educational digital games, game-based learning and educational escape room games.

2.1 Technology Integration in Education

The development of contemporary technologies has fundamentally altered how humans function, interact, and behave. The growth of ICT, among many other inventions, has significantly altered the world we live in today. The globe has become smaller as a result of it, and it has also made people's daily lives more comfortable and convenient. In fact, it has brought all available knowledge at everyone's fingertips. ICT has had a significant impact on human civilization's activities ever since it was invented, especially on the educational system (Dorji & Subba, 2022). Information and communication technologies (ICT) are used to help teaching and learning in a process known as technology-enhanced learning. Comprehensive pedagogical technology integration can result in an effective learning strategy (Suarez et al., 2018). Learning and teaching in blended environments using technology has become the norm in education thanks to the remarkable advancements in information and communication technologies (Bliuc et al., 2012). Numerous studies on the use of technology in education have found that parents, instructors, students, and administrators all have favorable perceptions of it. The failure to deliver the necessary level of technology integration, however, is a problem that needs to be fixed. It can be seen from a review of the literature that the

researchers concur that full technological integration is not possible. The fact that there is still no obvious solution to the issue of technological integration is also interesting to note (Tosuntaş et al., 2019).

2.1.1 Post-Covid-19 education and distance learning. Not all education takes place in classrooms. Natural disasters, global crises, wars, international conflicts, and epidemics might hinder education from being fulfilled (Burgess & Sievertsen, 2020). Sahu (2020) stated that many schools, colleges, universities, and other educational institutions have been forced to close as a result of efforts to stop the COVID-19 virus from spreading among children and adults. Over 80% of the world's student population has been affected by the closure of schools and educational institutions in 150 nations as of March 25. The majority/all leaders said that the pandemic has given online learning more credibility and respectability. It has emphasized the advantages of online education and insured that the future of higher education will be increasingly characterized by technology. Learning will increasingly focus on "stackable segments" and "just-in-time, not just-in-case" instruction. Indeed, there was a lot of enthusiasm for 'blended' university education that included both degree programs and short courses (Ewing, 2021). According to the ebbs and flows of the pandemic, adoption of online, blended, and hybrid formats for course delivery has possibly sped up the development of higher education. To deal with such a difficult circumstance, the higher education industry has undoubtedly gotten more creative by developing a wide range of innovative course formats. To successfully deploy blended learning and integrate online and in-person course delivery methods, it is essential to understand and evaluate students' opinions and learning experiences (Peimani & Kamalipour, 2021). On the other hand, Naidu (2021) stated that as more students and faculty turn to online learning and teaching, the traditional campus-based experience that was once the pride of many educational institutions is losing its appeal and value. Senior managers from many industries are increasingly seeing the need of online and blended learning for their long-term plans and perhaps survival. In the wake of the COVID-19 outbreak, several have already announced a full-scale shift to online teaching and learning, while others have started tinkering at the boundaries of traditional campus-based operations to survive in the medium term. The inclusion of preparedness-related material in the curriculum has been demanded.

In recent years, elementary and secondary schools have realistically implemented readiness frameworks into their curricula. Preparedness as an aim of education for young learners has received attention in several nations, including the Philippines (Kagawa & Selby, 2014; Valencia et al., 2018, as cited in Cahapay, 2020). Cahapay (2020) also stated that however, because preparedness is still in its infancy, it is unclear whether it is the same for all types of catastrophes, diseases, and disasters. It should be underlined that such preparedness goals must be contextualized within the pandemic perspectives in the new normal post-COVID-19 period.

2.2 Motivation

To explain motivation in education, a variety of hypotheses have been put forth. Self-Determination Theory (SDT) by Deci and Ryan (1985), which emphasizes the importance of autonomy, competence, and relatedness in generating intrinsic motivation, is one well-known framework. Expectancy-worth Theory (EVT), developed by Eccles and Wigfield in 2002, is another well-known theory that highlights the connection between an individual's motivation and their expectations of their talents and worth for a task. These theoretical viewpoints offer a basis for comprehending the complexity of student motivation.

The motivation of students in educational settings is influenced by various factors. The function of teachers is one important aspect. Brophy (2010) asserts that teachers' methods of education, methods of providing feedback, and interpersonal interactions have a big impact on students' motivation. The sociocultural backdrop is also extremely important. In especially among underrepresented groups, Steele's Stereotype Threat Theory (1997) emphasizes how unfavorable preconceptions can lower students' motivation and performance. Additional relevant aspects include the classroom setting, peer interactions, and individual characteristics (Pintrich & Schunk, 2002).

Educators employ various strategies to enhance student motivation. Goal-setting is a prevalent strategy supported by Locke and Latham's Goal Setting Theory (1990), which suggests that setting specific, challenging goals can increase motivation and performance. Providing constructive feedback, as advocated by Hattie and Timperley (2007), enhances students' self-efficacy and motivation to

improve. Additionally, implementing mastery-oriented practices, such as growth mindset interventions (Dweck, 2006), can shift students' focus from fixed ability to incremental improvement, positively impacting motivation.

Although it has frequently been ignored by educators, student motivation is a crucial component of academic and career success (Borah, 2021). There are several definitions for motivation. Lai (2011) defines motivation as the causes of behavior that is defined by willingness and volition. A theoretical concept used to explain the initiation, direction, intensity, persistence, and quality of behavior, particularly behavior that is goal-directed, is called motivation (Brophy, 2010). According to Freud, the id is the main driver of motivation (Ray, 1992). The id is often referred to as the origin of instincts (Marx & Tombaugh (1967, p.31 & 32) as cited in Ray, 1992). Motivation has two subheadings, internal and external motivation. Intrinsic motivation is defined as coming from a person's own self (Stirling, 2013). Stirling (2013) also stated that contrarily, extrinsic motivation offers encouragement to take part in activities that may not be naturally enjoyable or engaging but may bring advantages in terms of projected possible results.

According to Keller (2008), Schrader and Bastiaens (2012), Woo (2014), Nebel et al. (2015), and Westera (2015), educational games may improve learning processes by increasing motivation, but they may also demand more effort from the users for them to be successful gamers and, by extension, successful learners. Bixler (2006) indicated that the majority of educators would quickly concur that learner motivation is a crucial factor to take into account while creating, observing, and evaluating the instructional success of educational games. According to a study conducted by Partovi & Razavi in 2019 showed that compared to students who were trained using the conventional way, students who played educational computer games considerably outperformed them in terms of academic success and attitude toward science learning. Also, as demonstrated by the study's findings, students who used computer games had higher levels of academic motivation than those who received traditional instruction at the conclusion of the experiment. Additionally, this group's scores are significantly better than they were in the past, demonstrating the influence of the games category and, in particular, computer games on students' education (Partovi & Razavi, 2019). According to another study conducted by Vos & Meijden & Denessen (2011), the findings revealed a significant difference

between the two circumstances in terms of both deep strategy utilization and intrinsic drive. The construction condition benefited from the huge motivational and deep strategy use effect sizes. Gee (2003) hypothesized that this may be related to a higher activation of critical thinking abilities and self-regulated learning (Gee, 2003 as cited in Vos & Meijden & Denessen (2011)).

2.3 Willingness to communicate

The concept of student willingness to communicate (WTC), which captures language learners' inclination for oral communication, is important in the study of second language acquisition (SLA). Due to its possible effects on language learning outcomes and efficient language instruction, WTC has drawn a lot of interest. This review of the literature examines how student WTC is conceptualized, influences it, is measured, and how it relates to language proficiency in order to synthesize previous research on student WTC.

WTC was first described as a multidimensional construct by Macintyre et al. (1998), and it included two dimensions: willingness to initiate communication (WIC) and willingness to respond to communication (WRC). WRC stands for a student's propensity to reply to others, while WIC stands for their readiness to start discussions. WTC is a complicated construct, however, that is influenced by a variety of individual and contextual circumstances, according to later studies. The following elements have been noted as having an impact on pupils' willingness to communicate with others.

2.3.1. Anxiety and confidence. It has been discovered that WTC is adversely affected by communication anxiety and linguistic anxiety (Horwitz et al., 1986). On the other hand, WTC can be boosted by self-assurance and a supportive learning environment (McCroskey et al., 1987).

2.3.2. Social factors. WTC is greatly influenced by peer interactions, teacher-student chemistry, and classroom dynamics. Students are more likely to communicate in a welcoming and helpful setting (Yashima et al., 2004).

2.3.3. Cultural factors. Communication standards and preferences are influenced by cultural origins. When compared to individualistic societies, students from collectivist cultures may display different WTC patterns (Yashima, 2002).

2.3.4. Motivation. WTC is affected by intrinsic and extrinsic motivation. The WTC is frequently higher in learners who are driven by integration into the target language community (Gardner, 1985). Motivation and language anxiety are important determinants of student WTC. High anxiety levels can prevent students from communicating because they are afraid of making mistakes or getting a bad grade (MacIntyre & Gardner, 1994).

2.3.5. Language proficiency. Language ability and WTC are tightly related. Lower proficiency could lead to communicative anxiety, whereas better proficiency can boost confidence (MacIntyre et al., 1998). Language proficiency and WTC have a complex relationship. Early investigations (MacIntyre et al., 1998) revealed a favorable association. However, other studies have emphasized how context and individual variations can act as moderators (Yashima, 2002). Due to various impacting circumstances, even highly skilled people may nevertheless have low WTC, highlighting the construct's multidimensionality.

2.4 Educational Games

Significant attention has been given to educational games as a potential method for improving educational experiences. To engage students in a more interactive and captivating way, these games integrate elements of entertainment with educational material (Deterding et al., 2011). As technology advances, educational games are more available and adaptable than ever before, providing a range of advantages to students in a variety of age groups and academic settings.

Numerous studies have emphasized the advantages of instructional games for the brain. Gee (2003) stressed the ability of well-made games to foster players' capacity for critical thought, problem-solving, and strategic planning. Players are frequently forced to make decisions and deal with the repercussions in these games, which encourages analytical thinking and situation adaptation. Additionally, a meta-analysis of studies on educational games by Shute and Ke (2012) revealed that they

have a positive impact on students' cognitive abilities, including better memory retention and information recall. This is consistent with the notion that engaging learners through interactive and immersive experiences might improve their cognitive processes.

Increased motivation and engagement have been related to the use of gaming aspects in educational settings. Malone (1981) popularized the idea of "intrinsic motivation," arguing that video games might appeal to people's underlying desire for mastery and success. Through incentives and challenges, educational games can give players a sense of accomplishment that can increase their drive to actively engage in the learning process. The Self-Determination Theory, put forth by Deci et al. in 1999, emphasizes the value of autonomy, competence, and relatedness in boosting motivation. When created with these ideas in mind, educational games can enable students to take charge of their education, feel confident in their skills, and interact with peers, promoting a good learning environment.

Educational games' adaptability to learners' requirements and development is what gives them their wide range of applications. The ability of games to offer individualized learning experiences by altering the challenge level based on learners' performance was highlighted by Bower (2016). A productive learning pace can be maintained by using adaptive games to provide tasks that are appropriate for learners' present ability levels. This reduces frustration and boredom. Assisting students with various learning styles and capacities, adaptive learning is positioned within educational games in accordance with the concepts of differentiated instruction (Tomlinson, 2001). As a result, students can gain from a more personalized learning environment that takes into account their unique strengths and shortcomings.

Social components are frequently included in educational games, allowing students to communicate and work with others. Multiplayer video games encourage social engagement, teamwork, and communication skills, according to Deterding et al. (2011). Through debates and shared techniques, collaborative learning within games can improve problem-solving, ultimately encouraging a deeper comprehension of the subject matter. Johnson and Johnson (1994) highlighted the value of cooperative learning, emphasizing how it has the ability to enhance social skills and foster healthy interdependence among students. Collaborative educational games can aid in the development of these abilities in an interesting and fun setting.

2.5 Game-Based Learning

Game-based learning (GBL) is a method of teaching that applies gaming concepts to the classroom in an effort to improve student motivation, engagement, and academic results. GBL has drawn a lot of attention in recent years as a potential way to enhance learning in a variety of educational environments. The advantages of game-based learning have been emphasized in a number of research. Gee (2003) stressed the value of contextual learning and the ability to solve problems in games so that these skills might be applied in the real world. Deterding et al. (2011) developed the idea of "gameful design," which contends that games can foster gratifying feelings and engagement while strengthening the educational process. A meta-analysis by Connolly et al. (2012) found that GBL can enhance learning retention, motivation, and cognitive results.

The ability of GBL to increase student motivation and engagement is one of its main benefits. The idea of intrinsic motivation in games was first proposed by Malone and Lepper (1987), who focused on how obstacles and rewards in games might inspire learners' perseverance. The gamification of learning was further investigated by Hamari et al. (2014), who demonstrated how game components like points, badges, and leaderboards might encourage students to actively engage in the learning process. GBL has been reported to enhance critical thinking, problem-solving abilities, and creativity, which has been linked to cognitive benefits. Historical simulation games have the ability to foster critical thinking and a knowledge of complex systems, according to Squire (2003). According to a meta-analysis by Shute (2011), GBL therapies can significantly improve cognitive and problem-solving capabilities. The ability of GBL to make it easier to apply what is learned in a virtual environment to actual scenarios is a key feature. The alignment of game mechanics with learning objectives was emphasized in Mayer's (2014) discussion on the value of good game design in fostering learning transfer. The ability of GBL to improve practical abilities was demonstrated by Kiili's 2005 study on the transfer of programming knowledge from gaming environments to real-world applications.

Despite the positive potential of GBL, there are still issues that educators and designers must work to resolve. Boyle et al. (2016) talked about how games must be

properly included into the curriculum to guarantee that learning objectives are accomplished. The need to match assessment practices with game-based learning activities was emphasized by Hailey et al. (2016) in their discussion of assessment-related challenges in GBL. Researchers like Steinkuehler and Duncan (2008) have also brought up the digital divide and accessibility issues, underlining the significance of fair access to technology for successful GBL implementation.

2.6 Educational Digital Escape Room Games

In recent years, educational escape games have become incredibly popular as cutting-edge instruments for immersive learning experiences. These interactive video games make learning fun and memorable for students of all ages by fusing collaborative problem-solving, critical thinking, and storytelling. Educational escape games encourage active learning and improve cognitive abilities by immersing players in interactive environments where they must interpret hints, work out riddles, and solve mysteries. These games have demonstrated excellent results in fostering teamwork, increasing motivation, and enhancing retention rates among students, according to research by Anderson and Barnett (2018). Additionally, researchers like Hamari et al. (2016) emphasize the potential of gamification, of which escape games are a good example, to improve educational environments by using the intrinsic motivation and engagement produced. According to research by Whitton and Moseley (2012), escape games help students become more motivated and engaged in their studies, which is a benefit of gamification in education. The capacity of instructional digital escape room games to improve pupils' problem-solving abilities is one of their main advantages. These games promote critical thinking and creativity by requiring players to solve challenging puzzles and riddles in a constrained amount of time (Anderson & Dron, 2011). Technology-based instructional escape room games may present technological difficulties, such as device accessibility and conceivable technical hiccups (Lee & Hammer, 2011). Concerns can arise with ensuring equal access for all pupils.

Chapter 3

Methodology

In this chapter the methodology of the research will be presented. Research design, participants and the study's context, detailed information regarding the research procedure introduced, and lastly, limitations of the study will be provided.

3.1 Research Design

The present study employed a quasi-experimental research design with control and experimental groups. Quasi-Experimental research aims to examine relationships among variables. Due to practical or ethical limitations, quasi-experimental research works with pre-existing groups (Cook et al., 2002). A quantitative method was used to investigate the research questions. In order to collect data, participants were given an achievement test, willingness to communicate, and motivation scale before receiving the intervention. After seven weeks of study involvement, learners were given the same tests and scales as the post-test. Detailed information regarding the achievement test and scales was presented in the instruments section.

Table 1

Research Design

Groups	Intervention	Pre-Test	Post Test
Experimental Group	Escape Room Games X5	<ul style="list-style-type: none">• English Proficiency Test• Academic Motivation Scale• English Self-Efficacy Scale• Willingness to communicate Scale	<ul style="list-style-type: none">• English Proficiency Test• Academic Motivation Scale• English Self-Efficacy Scale• Willingness to communicate Scale
Control Group	Coursebook Activities	<ul style="list-style-type: none">• English Proficiency Test• Academic Motivation Scale• English Self-Efficacy Scale• Willingness to communicate Scale	<ul style="list-style-type: none">• English Proficiency Test• Academic Motivation Scale• English Self-Efficacy Scale• Willingness to communicate Scale

3.2 Setting and Participants

The present study was conducted at a private university in Istanbul, Turkey. English Preparatory program students were selected as participants in the study. Data was collected in the 2023 Spring semester. Two classrooms were selected as control and experimental groups. There are several criteria for selecting the classrooms as the study groups. Firstly, the researcher was also the instructor of the classrooms; therefore, immediate access of the participants was given priority to select the groups. Secondly, necessary consent was obtained from the institution to conduct the study in the classrooms, and lastly, participants' English proficiency level was considered as an inclusion criterion.

English Proficiency of the students was B1 according to The Common European Framework of Reference for Languages (CEFR). The Experimental Group consisted of 12 participants. 5 of them were female students. 7 of the participants were male students. The control group includes 12 participants. 8 of the participants in the control group were female students. 4 of the participants were male students. Learners who did not participate regularly in the classes and were absent from the examinations were not included in the research. Participants were young adults. Their ages varied between 18 to 21 years old.

The experiment's time frame was constrained to the tragic earthquake that struck our nation on February 6th. All colleges converted to online learning as a result of the earthquake, therefore the experiment that was intended to be conducted face-to-face could only be done so virtually. During this time, their motivation and anxiety levels were severely affected and they couldn't attend some of the lessons. Additionally, several students in the earthquake zone found it difficult to participate in class because of the region's inadequate resources and issues with internet connectivity.

Table 2

Participants

Groups	Female	Male	Total
Experimental	5	7	12
Control	8	4	12

The table shows the gender and number of the participants. They all agreed to participate in the study, and necessary consent was taken from the participants.

3.3 Procedures

Before the implementation of the intervention, five different escape room games with varying themes and target vocabularies were designed by the researcher using Genial.ly. The themes of the games were selected based on the Themes of the Units and synchronized with those units. Therefore, learners had the chance to be familiar with the vocabulary covered in the classroom. The research procedure is illustrated below.

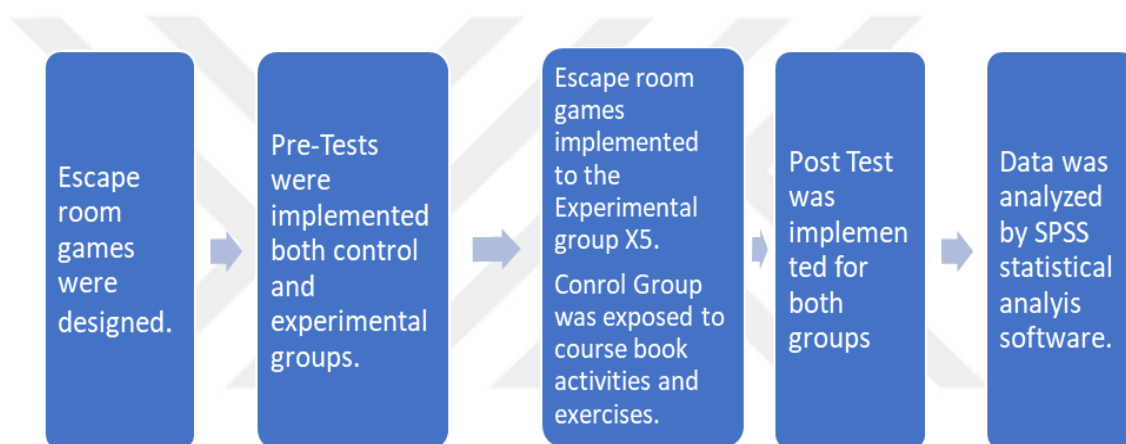


Figure 1. The order of the research procedure

Five different escape room games were implemented for the experimental group each week. The university uses a modular system, which includes 8 weeks for each English proficiency level. Therefore, intervention for the experimental took place from 2-6. The weekly pacing of the interventions was illustrated below.

Table 3

Procedures

Groups	Week 1	Week 2 to 6	Week 7-8
Experimental	Pre-Test	Escape Room games	Post Test
Control	Pre-Test	Coursebook exercises	Post Test

3.3.1 Instruments and tools. In the current study, participants' English self-efficacy levels were assessed using "The Self-Efficacy Scale for English," and their level of academic motivation on the course created with escape games was assessed using "The Academic Motivation Scale, and "Willingness to Communicate Scale" was employed to assess the willingness of the participants. "English Proficiency Test" were applied to as another data collection tool to obtain data about the participants' English proficiency levels. Required consent was taken from the owners of the scales before the data collection process.

3.3.1.1 English proficiency test. In the research, the final exams of a private university's preparatory school were used as an English achievement test, and the exam results were used as a pre-test and post-test. Exam questions were prepared by the university's testing unit experts. The Commission on English Language Program Accreditation has granted the university's English Preparatory Program accreditation for the years 2023 through 2033, with the understanding that it will adhere to the CEA Standards for English Language Programs and Institutions. As an accredited national organization for English language programs and institutions in the United States, CEA is acknowledged by the Secretary of Education of the United States. These exams were taken from the student affairs office with the permission of the university's preparatory school exam unit coordinator where the study was conducted. Verbal permission was obtained from the examination unit coordinator. The exam format includes multiple-choice, fill-in-the-blanks, and true and false questions about the learning outcomes of students' levels.

3.3.1.2 Academic motivation scale. The Academic Motivation Scale (Bozanoğlu, 2004) was used to examine the participants' academic motivation levels. During the development of this scale, 765 students studying in the first and second grades of randomly selected high schools from Ankara, Eskişehir, and Bursa were reached. The scale has been applied to several sample groups, including teachers (Saracaloğlu & Dinçer, 2009), and secondary school students (Karabacak, 2018) despite being designed and validated for use with high school students. To prepare the items, 15 high school 1st and 2nd grade students were consulted during unstructured 15-minute interviews. The opinions of these students were examined

one by one, some expressions were changed and have been turned into an item. The 20-item Academic Motivation Scale was created to measure the individual variations in students' academic motivation levels. The measured reliability and validity of the scale indicate that it is ready for use (Bozanoğlu, 2004). In order to determine the reliability of the scale, a test-retest study was conducted with 101 students and the correlation was found to be .87. Following a series of factor analyses, three factors with a total of 20 items and 42.2% of the variance were found. Regarding internal consistency and test-retest reliability, it was shown that the factors and the entire scale have good variability (Bozanoğlu, 2004). Internal consistency calculated as evidence of reliability coefficients (Cronbah's alpha) ranged from .77 to .85 in the same group at different times and it varies from .77 to .86 in different groups. The scale is composed of three subscales, according to the findings of the exploratory and confirmatory factor analyses. The first component accounts for %33 of the total 42.2% variance explained. The remaining 11.9% is explained by the second factor (6.9%) and the third factor (5.0%), respectively. The first subscale, titled "Self-exceeding," has seven items (e.g., everything I've learned piques my curiosity about learning more); the second, titled "Using knowledge," has six items (e.g., I enjoy sharing what I've learned with others); and the third, titled "Exploration," has seven items (e.g., I study a lot to learn something although it will not be graded). Five of the items in the academic motivation scale include Likert-type response formats (1 = Not suitable at all, and 5 = Perfectly suitable), and one item (item 4) has reverse coding. The minimum score that can be obtained from the scale is 20 and the maximum score is 100. A high score indicates high academic motivation. The researcher granted permission to utilize the scale through e-mail.

3.3.1.3 English self-efficacy scale. The self-efficacy scale for English was developed as a valid and reliable scale that can be used to determine high school students' English self-efficacy beliefs (Hancı Yanar & Bümen, 2012). The self-efficacy belief scale for English is a 5-point Likert type with 34 items (Hancı Yanar & Bümen, 2012). The 34-item scale is divided into four subscales: reading (e.g., I can understand the important points when I read English academic texts.); writing (e.g., I can rewrite an English text with my own words.); listening (e.g., after hearing an English conversation, I can answer questions about what I hear.); speaking (I can

respond to questions asked in English.) The English self-efficacy scale is a 5-point Likert-type scale (1 = Strongly disagree, 5 = Strongly agree). A high score obtained from the scale was accepted as an indicator of high self-efficacy belief in English. Factor loadings for the 34 items in the scale varies between 0.42 and 0.69. With values of RMSEA=0.044, SRMR=0.046, NFI=0.98, NNFI =0.99, PNFI=0.89, CFI=0.99, IFI=0.99, and RFI = 0.98, the results of confirmatory factor analysis, which was carried out with 296 students, validated the model fit of a four-factor. According to the Cronbach alpha coefficient results calculated to determine the reliability of the scale, the value obtained for the entire scale is .97. These values are for reading .92 for writing, .88 for listening, and .93 for speaking. The researcher granted permission to utilize the scale through e-mail.

3.3.1.4 Willingness to communicate scale. The Scale of willingness to communicate in the classroom was designed by McIntyre et al. as 27 items in a 5-point Likert type (2001). The scale was ranging from “almost never willing” to “almost always willing”. "Inside the classroom, outside the classroom, orientations for language learning, and social support" are the four primary components of the scale. The four ability categories for a second language—speaking (things 1–8), reading (items 9–14), writing (items 15–22), and comprehension (items 23–27)—are the foundation for the construction of the scale. Each section's reliability level was determined independently in the article MacIntyre et al. (2001). Additionally, each section's Cronbach alpha level was examined based on certain parameters. The scale was deemed reliable based on the Cronbach alpha values, which showed that the willingness to communicate inside the classroom scale had speaking skills as .81, reading skills as .83, writing skills as .88, and comprehension skills as .88. High scores obtained from the Scale indicate that the student tends to communicate in the classroom. The researcher granted permission to utilize the scale through e-mail.

3.3.1.5 Escape room games. Five different Escape Room games, which were appropriate and supportive of the subject and content of the week, were designed by the researcher before the experiment process. The games were designed using two different platforms which are called Genial.ly and Google Forms. Four games were prepared using Genial.ly and one of the games was designed on Google Forms. The

games were checked by a subject matter expert before the experiment process. The games were intended to match the theme and content of the lesson. For this reason, one of the games was designed on Google Forms with an appropriate theme and content. Each Escape Room game had a different story, and the themes were aligned with the unit of the weekly plan that was followed by the students and the instructor of the prep school.

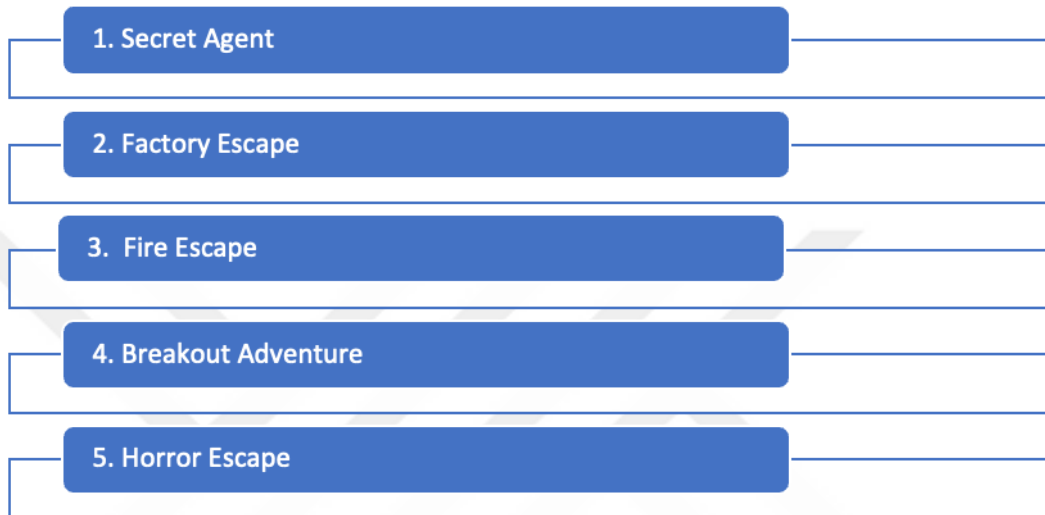


Figure 2. Names and the order of the escape room games

The story of the first game is a story and mission of a secret agent. As seen in Figure 2, the player was given the story and the mission in the beginning of the game. The player, who is a rookie in the beginning, tries to be a secret agent by following the instructions and collecting and combining the clues were given during the game to complete the mission. Each step includes questions related to the topic and vocabulary of the week in the prep school.



Figure 3. Mission and story of the first game

In the second game, the focus was the target grammar topic which was passive voice. The player was given a different story and he had to run away from a pesticide factory before an upcoming explosion by solving puzzles which were about the grammar topic of the week.



Figure 4. The beginning of the second game

The third game was designed on Google Forms by the researcher. The player was given another story in this game. He had to save the building which was on fire by following the same steps as the previous games. The objectives of the week were given as questions in each step for the students to solve the puzzles and save the building. As seen in Figure 4, players were given a plan showing all the steps they must follow as a road map.

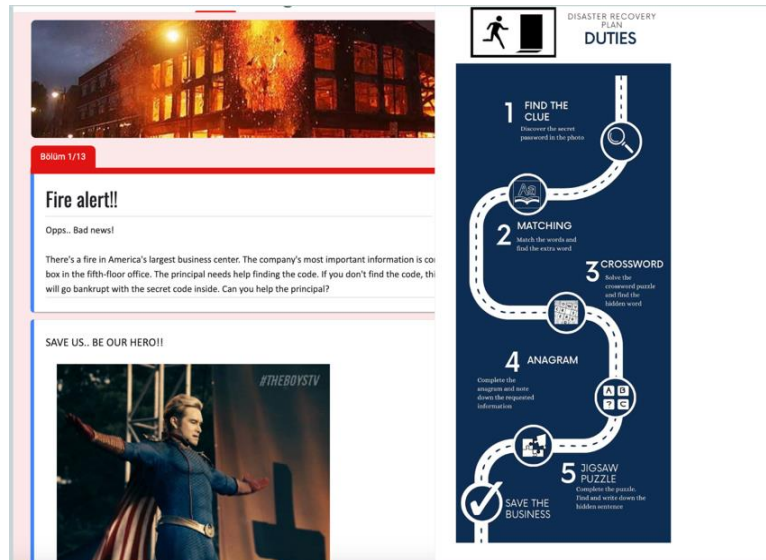


Figure 5. The story and the disaster recovery plan of the third game

Each game was designed using different platforms such as (Wordwall, JigsawPlanet, Airpano) to address the players to different websites to make it fun and to make the learning process more active. As seen in Figure 5, in the fourth game which is called adventure breakout, they had to visit different direction in the world to help and save the people according to a road map as it can be seen in Figure 5.



Figure 6. Road map and sample pages from the fourth game

The games were designed to go step-by-step, and students had to go back to the beginning and solve where they got stuck.



Figure 7. The beginning and the steps of the fifth game

3.4 Data Collection Procedure

English Proficiency Test, Academic Motivation, English Self-Efficacy Scale, and Willingness to Communicate Scale were used as pre-test and post-test in the present study. In the first week of the course module, they were implemented before the intervention. Forms for the scales were sent to the participants via Google Forms.

3.4.1 Experimental group. Within the scope of the study, pre-test was implemented for the participants. As an intervention, five different escape room games were conducted every week with the participants. Courses were fully online due to an Earthquake that happened in Turkey. The courses are fully delivered online via Microsoft Teams.

3.4.2 Control group. Same pre-test and post tests were implemented on the control group. They were exposed to coursebook exercises and worksheets while the experimental group used escape room games.

3.5 Data Analysis Procedure

In the present study, quantitative method was used to answer research questions. A quasi-experimental design was utilized to compare the control and the experimental groups' pre and post-test scores on the dependent variables of the research.

Table 4

Research Questions and Corresponding Analyses

Research Questions	Data Collection Tool	Data Analysis
1. Is there a statistically significant difference between pre-test and post-test results of the experimental group and the control group in terms of achievement?	Achievement Test	2x2 Mixed Design ANOVA Group comparisons, Bonferroni corrected independent sample t-tests Time comparisons, Bonferroni corrected paired samples t-tests
2. Is there a statistically significant difference between the experimental group and the control group in terms of pre-test and post-test results of the academic motivation scale?	Academic Motivation Scale	2x2 Mixed Design ANOVA Group comparisons, Bonferroni corrected independent sample t-tests Time comparisons, Bonferroni corrected paired samples t-tests
3. Is there a significant difference between pre-test and post-test results of the experimental group and the control group in terms of willingness to communicate?	Willingness to Communicate Scale	2x2 Mixed Design ANOVA Group comparisons, Bonferroni corrected independent sample t-tests Time comparisons, Bonferroni corrected paired samples t-tests
4. Is there a significant difference between pre-test and post-test results of the experimental group and the control group in terms of self-efficacy scale and its subscales?	English Self-Efficacy Scale	2x2 Mixed Design ANOVA Group comparisons, Bonferroni corrected independent sample t-tests Time comparisons, Bonferroni corrected paired samples t-tests

Table 4 comprehensively covers the research questions, data collection tools, and the analyses relevant to those questions of the research.

3.5.1 Quantitative data analyses. Data analyses of the study were carried out through SPSS 26.0. Skewness and kurtosis values were checked to ensure that parametric statistical tests could be performed. Skewness and kurtosis values are given in Table 7. Since all skewness and kurtosis values were within the ± 2 range, the normality assumption was met and parametric tests were conducted (George & Mallery, 2010). According to Bryne (2010) and Hair et al. (2010), data is deemed normal if the kurtosis falls between -7 and +7 and the skewness falls between -2 and +2.

Table 5

Skewness and Kurtosis Values of the Dependent Variables

Variables	Group	Skewness	Kurtosis
Achievement Pre	Control	-.46	-.30
	Experimental	.03	-1.28
Achievement Post	Control	.05	-.26
	Experimental	.35	.35
Motivation Pre	Control	.71	-.39
	Experimental	.38	.42
Motivation Post	Control	1.34	1.41
	Experimental	-.50	-1.06
Willingness Pre	Control	.12	-.85
	Experimental	-.71	.16
Willingness Post	Control	1.41	1.57
	Experimental	-.71	-.09
SE Pre	Control	.84	.25
	Experimental	-.71	.04
SE Post	Control	.82	2.06
	Experimental	-.87	.81
SE Reading Pre	Control	.66	-.17
	Experimental	-1.30	1.39
SE Reading Post	Control	.94	.53
	Experimental	-.42	-.04
SE Writing Pre	Control	.15	-.68
	Experimental	-.72	-.21
SE Writing Post	Control	1.37	1.73
	Experimental	-.70	-.85
SE Listening Pre	Control	-.06	-.75
	Experimental	-.39	-.16
SE Listening Post	Control	-.23	.44
	Experimental	-1.48	1.56
SE Speaking Pre	Control	-.62	-.93
	Experimental	.19	-.73
SE Speaking Post	Control	.31	-.22
	Experimental	-.85	-.18

In the present research, the experimental and the control groups' mean scores on a variety of dependent variables (i.e., achievement, willingness to communicate, academic motivation, EFL self-efficacy, and its subscales) in pre-test and post-test conditions were compared using 2x2 mixed ANOVA tests. For the interaction effects, Bonferroni-adjusted t-tests were employed.

3.6 Validity Reliability

The validity and reliability of the study were prioritized in the present study. Reliability refers to the consistency and steadiness of a measurement, test, or assessment tool. It indicates the degree to which a measurement produces dependable and trustworthy results when repeated under comparable settings (Roberts & Priest, 2006). The instruments used in the present research ensure the reliability and validity of the research.

The Cronbach's alpha coefficient of the Academic Motivation scale is .88, and those of the subscales are .76 (transcendence), .72 (using knowledge), and .73 (exploration), respectively. In addition, the test-retest reliability coefficient was measured as .87. Similarly, English Self-Efficacy Scale's Cronbach's alpha value of the Scales the alpha values of its sub-dimensions are as follows: reading .92, writing .88, listening .93, and speaking .92. Lastly, Willingness to Communicate Scale's original article only the alpha values of the sub-dimensions were given instead of the Cronbach's alpha value for the whole Scale. These are speaking .81, comprehension .83, reading .83 and writing .88, respectively. The scales adapted to Turkish by Başöz, and the alpha value of the whole Scales.93 (2018).

3.7 Limitations

The present study has different limitations. The number of the study participants is limited to 30 participants. If the same study is conducted with a different number of participants, it is possible that the results will vary.

The period in which the experiment was conducted was limited to the devastating February 6 earthquake that took place in our country. Due to the earthquake, all universities switched to distance education, and the experiment which was planned to be done face-to-face was limited to be conducted remotely. In this case, considering the physical and mental states of the participants would be an important part of the limitations. Their motivation and anxiety levels were terribly affected during this period. At the same time, there was a negative effect on the motivation and anxiety level of the research director due to the period. Moreover, some students in the earthquake area could not attend classes effectively due to the

limited resources and internet access problems in the region, and their participation was limited. If this research had not been limited to take place during the earthquake period, it would have been possible to obtain more effective results.



Chapter 4

Findings

In this part, the findings drawn from the analyses will be presented in the order of research questions.

4.1 Digital Escape Room Games and Academic Success

To test whether the experimental group (taught by 5 weeks of escape games) and the control group had different achievement scores in pre and post-tests, a 2x2 mixed ANOVA was carried out. Descriptive statistics of the control and experimental groups' pre and post-test results are presented in Table 6. The results of the mixed ANOVA are given in Table 7.

Table 6

Descriptive Results Regarding Pre-Test and Post-Test Results of the Control and The Experimental Group in Terms of Achievement

	Group	Mean	SD
Achievement Pre	Control	78.83	9.12
	Experimental	74.17	10.87
Achievement Post	Control	76.75	8.11
	Experimental	69.83	11.04

Note. SD denotes the standard deviation

Table 7

Results of the Mixed ANOVA Comparing Pre-Test and Post-Test Results of the Control and the Experimental Group in Terms of Achievement

	F	p
Time	3.31	.08
Group	2.56	.12
Time*Group	.41	.53

$p < .05$

As manifested in Table 9, there was no significant difference between the pre and post-test scores, $F(1,22) = 3.33, p = .08$, and no difference between the groups' overall achievement, $F(1,22) = 2.56, p = .12$. Additionally, there was no interaction effect between time and group, $F(1,22) = .41, p = .53$, which indicates that the two groups' achievement scores did not change differentially across time.

In order to test if the experimental group and the control group had different academic motivation levels in pre and post-tests, a 2x2 mixed ANOVA was conducted. Descriptive results are offered in Table 8. The inferential statistical results are presented in Table 9.

Table 8

Descriptive Results Regarding Pre-Test and Post-Test Results of the Control and the Experimental Group in Terms of Academic Motivation

	Group	Mean	SD
Motivation Pre	Control	72.42	7.59
	Experimental	68.92	8.76
Motivation Post	Control	76.25	9.40
	Experimental	64.92	14.85

Note. SD denotes the standard deviation

Table 9

Results of the Mixed ANOVA Comparing Pre-Test and Post-Test Results of the Control and the Experimental Group in Terms of Academic Motivation

	F	p
Time	.00	.96
Group	3.62	.07
Time*Group	4.68	.04

$p < .05$

As summarized in Table 9, there was no significant difference between the pre and post-test scores, $F(1,22) = .002, p = .96$, and no difference between the groups, $F(1,22) = 3.62, p = .07$. However, there was an interaction effect between time and group, $F(1,22) = 4.68, p = .04$, which shows that the groups' motivation levels changed in different ways across time. Following up on this interaction (Figure 8)

revealed that the groups had similar scores in the pre-test ($p = .31$), but the control group had more motivation in the post-test ($p = .04$).

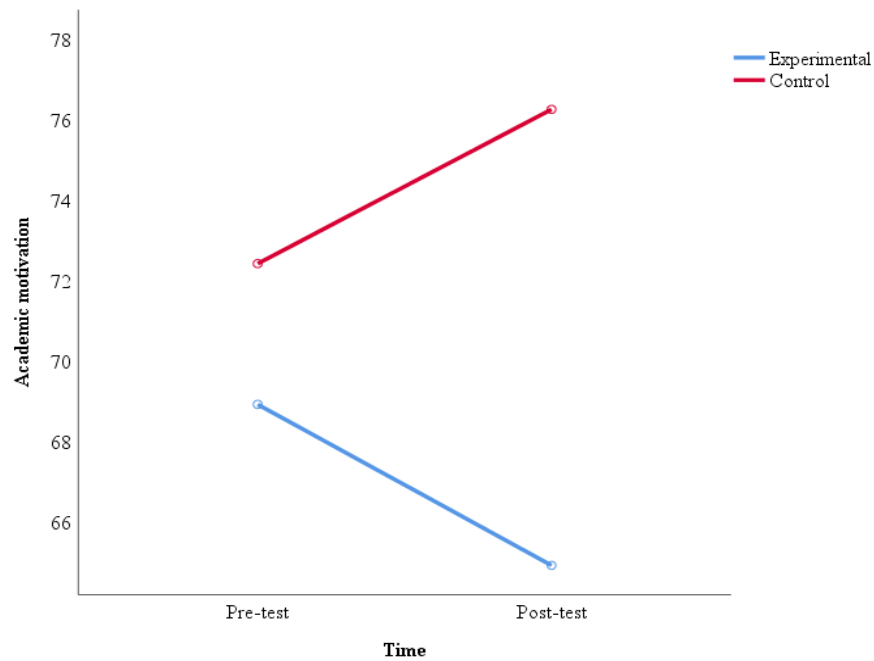


Figure 8. Academic motivation means of the experimental and the control group

A 2x2 mixed ANOVA was performed to test whether the experimental group and the control group had different willingness to communicate scores in pre and post-tests. The descriptive results of the analysis are presented in Table 10. The main results are given in Table 11.

Table 10

Descriptive Results Regarding pre-Test and Post-Test Results of the Control and the Experimental Group in Terms of Willingness to Communicate

	Group	Mean	SD
Willingness Pre	Control	89.67	18.47
	Experimental	74.25	7.68
Willingness Post	Control	97.58	14.68
	Experimental	84.92	20.54

Note. SD denotes the standard deviation

Table 11

Results of the Mixed ANOVA Comparing Pre-Test and Post-Test Results of the Control and the Experimental Group in Terms of Willingness to Communicate

	F	p
Time	6.79	.02
Group	6.46	.02
Time*Group	.15	.70

$p < .05$

As Table 11 showed, the initial main effect results pointed out a significant difference between the groups wherein the experimental group was less willing to communicate than the control, $F(1,22) = 6.46, p = .02$. There was also a main effect of time, which shows that participants had higher willingness to communicate scores in the post-test $F(1,22) = 6.79, p = .02$. Conversely, there was no interaction effect between time and group, $F(1,22) = .15, p = .70$, which means that group scores did not follow different paths in time.

Another 2x2 mixed ANOVA was done to check whether the group scores differ in terms of EFL self-efficacy in time. Means and standard deviations of the group scores in pre and post-tests are given in Table 12. The main outcome is presented in Table 13.

Table 12

Descriptive Results Regarding Pre-Test and Post-Test Results of the Control and the Experimental Group in Terms of EFL Self-Efficacy

	Group	Mean	SD
Self-Efficacy Pre	Control	111.83	13.94
	Experimental	109.00	19.63
Self-Efficacy Post	Control	120.25	19.61
	Experimental	112.92	23.16

Note. SD denotes the standard deviation

Table 13

Results of the Mixed ANOVA Comparing Pre-Test and Post-Test Results of the Control and the Experimental Group in Terms of EFL Self-Efficacy

	F	p
Time	3.83	.06
Group	.50	.49
Time*Group	.51	.48

$p < .05$

Neither the effect of time ($F(1,22) = 3.83, p = .06$) nor the effect of group ($F(1,22) = .50, p = .49$) was observed. Similarly, no interaction effect was detected ($F(1,22) = .51, p = .48$).

The experimental and the control groups' self-efficacy in reading ability in pre and post-tests was compared using a mixed ANOVA design. The descriptive results of the analysis are given in Table 14. The main results are presented in Table 15.

Table 14

Descriptive Results Regarding Pre-Test and Post-Test Results of the Control and the Experimental Group in Terms of Reading Self-Efficacy

	Group	Mean	SD
Reading SE Pre	Control	27.50	3.73
	Experimental	26.50	5.35
Reading SE Post	Control	30.33	4.38
	Experimental	28.33	5.40

Note. SD denotes the standard deviation

Table 15

Results of the Mixed ANOVA Comparing Pre-Test and Post-Test Results of the Control and the Experimental Group in Terms of Reading Self-Efficacy

	F	p
Time	9.00	.01
Group	.71	.41
Time*Group	.41	.53

$p < .05$

When Table 15 was taken into account, although there was not an overall group difference in self-efficacy ($F(1,22) = .71, p = .41$), there was a difference in self-efficacy across time ($F(1,22) = 9.00, p = .01$), wherein participants had higher reading self-efficacy in the post-test. Nevertheless, there was no interaction between the within and the between-subject variables ($F(1,22) = .41, p = .53$).

A 2x2 mixed ANOVA was performed to test whether the group scores differ in terms of EFL writing self-efficacy in time. The means and standard deviations of the analysis are given in Table 16. The main results are summarized in Table 17.

Table 16

Descriptive Results Regarding Pre-Test and Post-Test Results of the Control and the Experimental Group in Terms of Writing Self-Efficacy

	Group	Mean	SD
Writing SE Pre	Control	31.83	4.04
	Experimental	30.00	4.65
Writing SE Post	Control	33.83	4.75
	Experimental	31.00	5.92

Note. SD denotes the standard deviation

Table 17

Results of the Mixed ANOVA Comparing Pre-Test and Post-Test Results of the Control and the Experimental Group in Terms of Writing Self-Efficacy

	F	p
Time	2.54	.13
Group	1.76	.20
Time*Group	.28	.60

$p < .05$

As indicated in Table 17, neither the effect of time ($F(1,22) = 2.54, p = .13$) nor the effect of group ($F(1,22) = 1.76, p = .20$) was significant. Likewise, no interaction effect was found ($F(1,22) = .28, p = .60$), meaning that the two group scores did not change in different directions.

To test if EFL listening self-efficacy scores were different between groups and across time, a 2x2 mixed ANOVA was carried out. Descriptive results are illustrated in Table 18. F values and p values are presented in Table 19.

Table 18

Descriptive Results Regarding Pre-Test and Post-Test Results of the Control and the Experimental Group in Terms of Listening Self-Efficacy

	Group	Mean	SD
Listening SE Pre	Control	34.25	5.38
	Experimental	33.75	8.01
Listening SE Post	Control	35.33	7.88
	Experimental	33.25	8.49

Note. SD denotes the standard deviation

Table 19

Results of the Mixed ANOVA Comparing Pre-Test and Post-Test Results of the Control and the Experimental Group in Terms of Listening Self-Efficacy

	F	p
Time	.04	.84
Group	.22	.64
Time*Group	.32	.58

$p < .05$

As Table 19 points out, there was neither a significant effect of time ($F(1,22) = .04, p = .84$) nor the effect of group ($F(1,22) = .22, p = .64$) on listening self-efficacy. Furthermore, no interaction effect was found ($F(1,22) = .32, p = .58$), indicating that the writing self-efficacy scores of the experimental group did not change differently from the control group.

The experimental and the control groups' self-efficacy in speaking ability in pre and post-tests was compared utilizing a mixed ANOVA design. The descriptive part of the analysis is presented in Table 20, the inferential part is given in Table 21.

Table 20

Descriptive Results Regarding Pre-Test and Post-Test Results of the Control and the Experimental Group in Terms of Speaking Self-Efficacy

	Group	Mean	SD
Speaking SE Pre	Control	18.25	4.94
	Experimental	18.75	4.16
Speaking SE Post	Control	20.75	5.14
	Experimental	20.33	5.12

Note. SD denotes the standard deviation

Table 21

Results of the Mixed ANOVA Comparing Pre-Test and Post-Test Results of the Control and the Experimental Group in Terms of Speaking Self-Efficacy

	F	p
Time	5.53	.03
Group	.00	.98
Time*Group	.28	.60

$p < .05$

Even though there was no overall group difference in self-efficacy ($F(1,22) = .00, p = .98$), there was a difference in self-efficacy across time ($F(1,22) = 5.53, p = .03$), wherein students had higher speaking self-efficacy in the post-test. Nonetheless, there was no interaction between time and group variables ($F(1,22) = .28, p = .60$).

Chapter 5

Discussion and Conclusion

This chapter contains discussions of the findings from the data's statistical analysis. The findings were covered in relevant earlier research about the study variables. The first section is devoted to the discussion on the impact of digital escape room games on English preparatory school students' academic success, self-efficacy, academic motivation, and willingness to communicate. The second section contains recommendations for future research.

5.1 Discussion

Nowadays, gamification in education and integrating educational games into lessons have become quite common. In recent years, technology has been increasing in almost all fields including education. With digitalization, inevitably, gamification in education has also become digital. As stated earlier, most institutions of education had to be closed and switched to online education during the COVID-19 pandemic outbreak. Technologies such as the internet, big data, 5G, AI, and cloud-based platforms have all been used to improve education. On the other hand, infrastructure is not the result of a more flexible approach to education. Infrastructure, on the other hand, is merely the initial phase in the post-pandemic shift towards a new paradigm of education. This paradigm may indicate a move away from traditional, teacher-centered, lecture-based learning activities and toward more student-centered ones, such as group projects, debates, experiential learning opportunities, and a reduced usage of traditional lectures (Zhu & Liu, 2020). As digital natives, our pupils will keep changing and evolving so quickly that we won't be able to keep up with them (Prensky, 2005).

The objective of this research was to search and examine the effects of digital educational escape games in English lessons of preparatory school students. Pre-tests and post-tests of achievement test and scales of motivation, self-efficacy, and willingness to communicate were conducted to collect data and the study's results will be thoroughly described in this chapter. The current study intends to investigate the effects of online English courses in a private preparatory school in Istanbul over

the course of a seven-week module. In the following section, the study's results will be discussed, and its key findings will be provided.

5.1.1 Discussion on Research Question 1. The first research question focused on the impact of educational digital escape room games that included learning, and gaming on students' academic performance in distance education, which was required throughout the online module. The data analysis revealed that there was no significant difference between the experimental and control groups' achievement total mean scores. According to the analyzed data, there was no significant difference between experimental and control groups in terms of time and group interaction. This result is consistent with Kuo et al.'s (2022) research results which measure and analyze how the escape room intervention affects students' academic performance, motivation to study, and creative thinking, and it revealed that academic achievement did not significantly differ between the experimental and control groups and the data showed that kids can absorb science lessons well whether or not escape rooms are used. Similar to Kuo et al.'s (2022) findings, there was no difference between the pre-test and post-test results in this study, and students in both groups learned the outcomes of English courses at the preparatory school.

In this study, the achievement test pre-test and post-test scores of both groups did not significantly differ, in contrast to Shute and Ke's (2012) findings which revealed that they have a positive impact on students' cognitive abilities, including better memory retention and information recall. This is consistent with the notion that engaging learners through interactive and immersive experiences might improve their cognitive processes. Similar to Shute and Ke's (2012) results, Manzano-León et al.'s (2021) results revealed that statistically significant improvements in classroom flow were found when it was compared the effectiveness of escape rooms. Additionally, there were notable advancements in the ad hoc academic performance test. This suggests that using escape rooms to teach curricular information can enhance student learning.

5.1.2 Discussion on Research Question 2. Regarding the second research question's parameters, it was examined whether educational digital escape games have positive effects on the motivation level of the participants of the experimental

group. When the collected data was analyzed, the results showed that there was an interaction effect between time and group. This demonstrates how the groups' levels of motivation varied over time. However, there was no significant difference between both groups. On the contrary to the studies and finding of Keller (2008), Schrader and Bastiaens (2012), Woo (2014), Nebel et al. (2015), and Westera (2015), the data obtained showed that there was no statistically significant difference between the experimental and the control group despite the interaction effect. These results can be explained by the limitations which were mentioned in the third chapter. Because the devastating earthquake had occurred just before the module started, the psychological situation of the students must be taken into consideration. Therefore, considering the physical and mental state of the participants will enable us to analyze the findings from a wider perspective.

Vidergor (2021) conducted a study to examine the effects of digital escape room games in terms of collaboration and motivation and the results showed that elementary school students who participated in escape game activities demonstrated significant positive effects. As a culminating project, they could be challenged to design an escape room, either digital or physical, with a relevant theme, for the benefit of other students in their grade level, the school as a whole, or the community. To learn more about the ramifications, it could be helpful to look into signs of how the project affected their motivation, cooperation, and gaming experiences. Invariably, Dugnol-Menéndez et al.'s (2021) study results showed a statistically significant improvement after participating in educational escape rooms, suggesting that they may have a favorable effect on students' motivation and it showed that students' engagement and learning can be significantly enhanced by the proper use of educational escape rooms. Gamification tools were discovered to be preferred by students for use in their learning. They were more satisfied than they had anticipated. Similarly, Armie et al.'s (2021) research results showed that regarding the students' high degree of motivation in the English literature class, the outcomes are overwhelmingly positive. In addition to all these, a study conducted by Reed & Ferdig (2021) examined the use of a medical-surgical escape room game as a first-hand simulation experience for nursing students. The study specifically looked at the degree of anxiety among students and how the experience was viewed by professors and students and the results showed that students thoroughly enjoyed and

had a positive perception of a medical-surgical escape room game as an introduction simulation experience. Prior to and following their escape room experience, students' anxiety levels were high; nevertheless, they considerably decreased between the pretest and posttest. Contrary to all these, in this research, no significant difference was found between pretest and posttest results in terms of academic motivation. This study has several limitations as mentioned in previous chapters. When the experimental group students' and control group students' mental and physical state are taken into consideration, no motivation could inevitably be seen in any of the students of both groups because of the extreme, devastating, and worst days of all time.

5.1.3 Discussion on research question 3. Educational escape room games have become more and more well-liked as cutting-edge resources for improving educational experiences in recent years. The goals of these engaging and participatory exercises are to strengthen teamwork, critical thinking, and problem-solving abilities. This discussion examines how educational escape room games affect students' communication readiness while highlighting the potential advantages of these games for creating a supportive and interactive learning environment. Educational escape room games offer a distinctive setting for students to work together to solve problems; nevertheless, for the games to be successful, communication must be effective. Students are naturally inspired to share their ideas, thoughts, and tactics with their peers as they collaborate to solve puzzles, interpret clues, and complete assignments within the time. This cooperative setting fosters the growth of nonverbal communication abilities including gestures and teamwork in addition to spoken communication. Cooperative learning exercises, such as those seen in escape room games, have a favorable effect on students' communication abilities, according to Johnson, Johnson, and Smith (2014). The cooperative objective of getting out of the class encourages students to listen to one another and voice their thoughts, which in turn improves their willingness to communicate.

Regarding the third research question, which was evaluated as part another of the analysis, the students' communicative openness was assessed using a willingness to communicate scale. The preliminary main effect results revealed a substantial difference between the groups, with the experimental group being less communicative than the control. Additionally, there was a main effect of time, which

demonstrates that participants scored more willingly to communicate in the post-test. On the other hand, there was no interaction effect between time and group, indicating that the course of the scores did not alter over time. Contrary to Deterding et al. (2011), educational games usually have social elements that encourage interaction and teamwork among players and multiplayer video games foster social interaction, teamwork, and communication abilities, these results showed that there was no significant difference in terms of willingness to communicate. This situation does not mean that escape games are ineffective. However, it can be explained as the fact that it was a research study that was conducted during the devastating earthquake period, which is mentioned as a limitation, and that it may be due to the physical and mental states of the students in this period.

5.1.4 Discussion on Research Question 4. Using data from recent studies, this conversation attempts to investigate how these games affect students' self-efficacy in their ability to speak English. There seem to be several advantages to incorporating digital escape room games into language learning settings. Students' self-efficacy is increased in addition to their language proficiency when cognitive difficulties and linguistic immersion are combined. These results support Bandura's social cognitive theory by highlighting the role that mastery and vicarious experiences play in forming views about one's self-efficacy beliefs. (Bandura, 1977). Derer and Berkant (2020) analyzed the impact of a puzzle-based learning technique on the attitudes and self-efficacy beliefs of secondary school students during English classes and the study's findings showed that using a puzzle-based learning strategy improved students' perceptions of English lessons. Additionally, the Puzzle-based learning approach in English language class increased students' English self-efficacy beliefs within the group positively. Similarly, the results of Yıldırım and Demir's (2014) qualitative study showed that applications for gamification that engagingly boost student motivation have a good impact on students' interest in the course.

Nevertheless, in this research, the results showed that the students' self-efficacy beliefs were evaluated using a self-efficacy scale with regard to the fourth research topic, which was analyzed as part of the fourth analysis. However, there was a difference in self-efficacy over time, with individuals having stronger reading self-efficacy in the post-test, even though there was no overall group difference in self-

efficacy. Nevertheless, there was no interaction between the between-subject and within-subject variables. The limitations that were described in the third chapter can be used to explain these findings. The psychological state of the students must be taken into account because the tragic earthquake happened soon before the module began. Therefore, taking into account the participants' physical and mental health will allow us to assess the results from a wider perspective. Pistoia et al. (2018) indicated that 15% of people suffer from post-traumatic stress disorder (PTSD) following a natural disaster, such as an earthquake and the primary results of this study showed that earthquake victims generally experienced higher levels of anxiety and threat anticipation, along with a propensity for sleep issues. These results are consistent with the findings and they could be considered a realistic explanation for the finding of this research. As stated in earlier chapters, the study has several limitations including the post-disaster trauma of the participants. Assumably, the participants might have been in a post-disaster mental state and might have had several psychological problems while they were attending lessons in such a terrible environment which could explain their lack of attendance in lessons. All these traumatic situations negatively affected students' desire to communicate, self-efficacy beliefs, and motivation in this process, which explains why the results of this study are opposite to the existing literature.

5.2 Recommendations for Future Search

The following recommendations for application and further research are in accordance with the outcomes and conclusions of the study.

5.2.1 Recommendations for researchers. The Educational Digital Escape Room Games were employed as a gamification application in this study. The impact of the games on students' academic success, motivation, willingness to communicate, and self-efficacy beliefs were examined. Future research can focus on different variables.

This research was applied to B1-level English preparatory class students of a private university in Istanbul. The data collected was generalized to English preparatory school students. Future studies can be applied to preparatory class

students of different age groups and with different English levels. Moreover, due to the current conditions of the period, post-earthquake, and all universities immediately switching to online education, this study was implemented completely online and the students played the games completely online. In future research, the game can be designed more entertaining, interesting, memorable, and engaging by designing the game half digitally and half physically and using various places in the school as well as the classroom.

In this study, quantitative data from the control and experimental groups were collected and analyzed as pretests and post-tests. A quantitative method was used. Future research can also collect qualitative data by taking student opinions. In this way, the study can provide more comprehensive results. Furthermore, in future research, more efficient results can be achieved by taking into account the conditions of the period and the psychological and physical conditions of the students. This thesis was conducted with a total of 24 participants, 12 in the control group and 12 in the experimental group. In future research, more generalized results can be achieved with a higher number of participants.

In the field of educational escape games, a dynamic and immersive method of learning that has attracted a lot of interest lately, this advice offers a thorough road map for future research. This recommendation seeks to direct academics in performing significant studies to better comprehend the potential advantages, design considerations, and efficient implementation strategies of educational escape games. It does this by reviewing the existing literature and identifying significant knowledge gaps. The improvement of teaching and learning experiences across a variety of educational contexts will result from the synthesis of evidence-based insights from both educational and gaming perspectives. Designing engaging educational escape games that are in line with specific learning objectives and appropriate for a range of age groups and topic areas should be your major priority. The incorporation of escape games into curriculum and the creation of user-friendly design frameworks should both be the subject of further study (Arnab et al., 2015). To guarantee that educational escape games are beneficial to a wide range of learners, address any difficulties with accessibility, equity, and inclusivity (Schrier, 2014). In this study, the experimental group students played digital escape room games during fully online lessons and individually at their homes. Future studies could research if there

are any differences in the way that students participate, cooperate, and are motivated when they play these games in teams and in person during face-to-face lessons.

5.2.2 Recommendations for practitioners. The current study experientially used Educational Digital Escape Room Games to examine the impact of gamification on B1-level English preparatory school students' academic achievement, motivation, willingness to communicate and self-efficacy beliefs. Although there was no statistically significant difference in the results of the experimental and control groups, the experimental group students reached the course objectives equally with the control group. Educational Digital Escape Room Games were used to achieve these achievements. These results reveal that the experimental group, which studied with Educational Digital Escape Room Games, achieved the same lesson outcomes as the control group, which studied with the traditional method.

Moreover, these results reveal that educational digital escape room games contribute to the English preparatory class B1 level students' willingness to communicate, academic motivation, academic success and self-efficacy beliefs. Considering the situation of the students observed by the researcher in the course, it was observed that the Educational Digital Escape Room Games had positive effects on the students.

Integrating Educational Digital Escape Games into lessons, giving homework with games, conducting game-building exercises in teacher trainings, and asking students to design their own games can be examples of important studies to be done in the future. It will be easier to get effective and efficient results when carrying out all of these tasks if the circumstances, the constraints, the students' physical and mental health, the traits of the new generation, and the surrounding factors are taken into consideration.

5.3 Conclusion

Online education, which has become widespread all over the world with the pandemic process, can be quickly re-implemented under various conditions and situations. After the earthquake that occurred in Turkey on February 6, 2023, and affected the majority of the country's population in a very devastating way, the universities in Turkey quickly switched to online education. The results of this study, which was conducted completely online in the post-disaster period after the earthquake, showed that students in the experimental group met the course objectives as well as those in the control group and that they did so by engaging in instructive virtual Escape Room Games. After the earthquake, many students' physical limitations, such as being in the earthquake zone, and their psychological limitations and distress, such as losing their relatives, made it difficult for these participants to be in a normal mental state and physically healthy. The fact that the participants acquired the lesson outcomes as much as the control group even in this post-traumatic period can explain that Educational Digital Escape Room Games can be as effective as the traditional method and have positive effects on students.

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