

T.C. BAHCESEHIR UNIVERSITY
GRADUATE SCHOOL OF EDUCATION
COMPUTER EDUCATION AND INSTRUCTIONAL TECHNOLOGIES
HEAD OF THE DEPARTMENT

**EXPLORING THE RELATIONSHIP BETWEEN UTAUT
CONSTRUCTS AND EDUCATOR'S BEHAVIORAL INTENTION TO
ADOPT GAMIFIED WEB TOOLS AS A TEACHING TOOL IN
EDUCATION: A QUANTITATIVE NON-EXPERIMENTAL
CORRELATION STUDY**

MASTER'S THESIS

CEREN BAYRAK

ISTANBUL 2023

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ABSTRACT

Exploring the Relationship between UTAUT Constructs and Educator's
Behavioral Intention to Adopt Gamified Web Tools as a Teaching Tool in Education:

A Quantitative Non-Experimental Correlation Study

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Master's Program in Educational Technology

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This study aims to explore the relationship between Unified Theory of Acceptance and Use of Technology (UTAUT) constructs and educator's behavioral intention to adopt gamification as a teaching tool in education, using a quantitative non-experimental correlation design. In order to assess the acceptance and use of gamification in the context of education, the study utilized behavioral intention and user behavior as indicators. The UTAUT constructs, including performance expectancy, effort expectancy, social influence, and facilitating conditions, were used as independent variables. The dependent variables, adoption and usage of gamified web tools, were measured through behavioral intention and user behavior. 144 teachers participated to the study and questionnaire were delivered through Google Forms. The collected data analyzed with a structural equation model (SEM). The findings suggest that there is a negative relationship between performance expectancy and teachers' behavioral intention to adopt and accept gamification as a teaching tool in education. However, there is a positive relationship between effort expectancy, social influence, facilitating conditions, and teacher's behavioral intention to adopt and accept gamified

web tools as a teaching tool in education. Moreover, the results indicate that the organization variable has a significant relationship with teacher's behavioral intention to adopt and accept gamification.

Keywords: Gamification, technology adaptation, UTAUT



ÖZ

EĞİTİMDE BİR ÖĞRETİM ARACI OLARAK OYUNLAŞTIRILMIŞ WEB HİZMETLERİNİN KABULÜNE YÖNELİK UTAUT YAPILARI İLE ÖĞRETMENLERİN DAVRANIŞSAL NİYETLERİ ARASINDAKİ İLİŞKİNİN KEŞFİ: NİCEL DENEYSİZ KORELASYON ÇALIŞMASI

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Bu çalışma nicel, deneysel olmayan ilişki tasarımı kullanarak, UTAUT yapısının ve eğitimde bir öğretim aracı olarak oyunlaştırmayı benimseme niyeti arasındaki ilişkiyi araştırmayı amaçlamaktadır. Eğitim bağlamında oyunlaştırmının kabul edilmesi ve kullanımının ölçülebilmesi için, çalışmada davranışsal niyet ve kullanıcı davranışı göstergeleri kullanılmıştır. Performans beklentisi, çaba beklentisi, sosyal etki ve kolaylaştırıcı koşullar da dahil olmak üzere UTUAT yapıları bağımsız değişkenler olarak kullanılmıştır. Benimseme ve kullanım gibi bağımlı değişkenler ise davranışsal niyet ve kullanıcı davranışı aracılığıyla ölçülmüştür. 144 öğretmen çalışmaya katılmıştır ve anket Google Forms tarafından iletilmiştir. Toplanan veriler SEM ile analiz edildi. Bulgular, performans beklentisi ile öğretmenlerin oyunlaştırmış Web araçlarını benimseme niyetleri arasında negatif bir ilişki olduğunu göstermektedir. Ancak, çaba beklentisi, sosyal etki, kolaylaştırıcı koşullar ve öğretmenlerin oyunlaştırmayı benimseme niyetleri arasında pozitif bir ilişki olduğunu ortaya koymaktadır. Ayrıca, sonuçlar kurum değişkeninin öğretmenlerin oyunlaştırmayı benimseme niyetleri ile önemli bir ilişkisi olduğunu göstermektedir

Anahtar Kelimeler: Oyunlaştırma, teknoloji adaptasyon, UTAUT



Dedicating to my dear friends and family

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LIST OF ABBREVIATIONS

UTAUT	Unified Theory of Acceptance and Use of Technology
TAM	Technology Acceptance Model
SPSS	Statistical Package for Social Sciences
PLS-SEM	The Partial Least Squares Structural Equation Model
PE	Performance Expectancy
EE	Effort Expectancy
SI	Social Influence
FC	Facilitating Conditions
BI	Behavioral Intention

Chapter 1

Introduction

Technology has a constant influence on every element of our life in the modern world. In conjunction with the rising interest in learning, it has also been viewed as a key element of many fields, including education. Technology has influenced educators to broaden their methods and given students and teachers the means to extend their knowledge beyond the confines of the physical classroom. In addition, by giving students a variety of alternate learning chances and circumstances, technology has given educational practices a sense of diversity and complexity (Shu & Gu, 2018). Undoubtedly, it has become imperative for both teachers and students to equip themselves with the necessary skills and knowledge to keep up with the technological advancements of our era. The UTAUT (Unified Theory of Acceptance and Use of Technology) holds significance in the realm of educational gamification as it offers a theoretical framework to comprehend and elucidate the adoption and utilization of gamification experiences. The theory encompasses a range of pivotal factors, including ‘performance expectancy, effort expectancy, social influence, and facilitating conditions’, that can exert an impact on an individual's inclination to use technology (Venkatesh, 2003, 2022).

It has been seen that gamification can improve learning process (Samur & Şahin, 2017; Yıldırım & Şen, 2021). There several gamification tools on the internet for teachers to use. Applying gamification as assessment tool can be engage learners (Zainuddin, Shujahat, Haruna, Chu, 2020). Blasco-Arcas et al. (2013) assert that incorporating online gamification tools in educational settings can augment student learning performance by fostering interactivity, active collaboration, and engagement, which ultimately leads to enhanced learning outcomes. The use of gamification tools promotes student participation and involvement, which can lead to better retention and application of knowledge. These tools can facilitate collaborative learning, allowing students to work together to solve problems and share ideas. Furthermore, the interactive and engaging nature of gamification can help students stay motivated and interested in the learning process, resulting in improved academic achievement. Therefore, the integration of online gamification tools in education has the potential to

enhance the quality of teaching and learning, and can be considered a promising approach to improving educational outcomes. The connection between UTAUT and educational gamification is especially important because gamification refers to the use of game design components like points, badges, leaderboards, and feedback to engage and inspire learners in contexts other than games. As Samur et al. (2022) pointed out, incorporating such gaming aspects into classroom activities can help maintain students' attention and curiosity in the subject matter. By giving students rapid feedback and enabling self-paced learning, gamification can improve student performance and raise their performance expectations (Metwally et al., 2021). Gamification can also lower the perceived effort needed to engage in learning activities, raising expectations for effort. Leaderboards, social acknowledgment, and teamwork can all boost social influence and gamification experience motivation. The utilization of gamified learning experiences can be influenced by technical assistance and the accessibility of resources, including hardware and software, which affects the conducive conditions.

UTAUT offers a valuable framework that empowers educators, faculty members, and designers to comprehend the underlying factors influencing the acceptance of education technology tools, thereby facilitating the adoption of these systems by students (Abbad, 2021; Raffaghelli, Rodriguez, Guerro-Roldan & Banere, 2022; Sumak, Polancic & Hericko;). UTAUT has examined a range of technological tools in the educational context and these include tablet computers, as explored by El-Gayar, Moran, and Hawkes (2011), Garfield (2005), Ifenthaler and Schweinbenz (2013), and Moran, Hawkes, and El Gayar (2010). Mobile devices and services have also been tested, as noted by Carlsson, Carlsson, Hyvonen, Puhakainen, and Walden (2006), Shin, Shin, Choo, and Beom (2011), and Zhou, Lu, and Wang (2010). Websites have been investigated as well, as highlighted by Van Schaik (2009). UTAUT has been applied to Moodle or content management systems, as observed in the studies by Hsu (2012), Marchewka, Liu, and Kostiwa (2007), and Sumak, Polancic, and Hericko (2010). Furthermore, the literature includes evaluations of new learning environments such as mobile learning, examined by Williams (2009), and virtual learning environments, studied by Van Raaij and Schepers (2008), utilizing UTAUT. The application of the UTAUT model in e-learning has been explored in several studies (Isaias, Reis, Coutinho & Lencastre, 2017; Raman, Don, Khalid, &

Rizuan, 2014; Sezer & Yilmaz, 2019). In 2015, a research aimed to explore the factors that influence high school teachers' willingness to adopt and utilize interactive whiteboards as part of the FATİH project, utilizing the Unified Theory of Acceptance and Use of Technology (UTAUT). The study utilized a causal research design to investigate the cause-and-effect relationship among the variables. The sample for the study comprised 158 teachers who participated voluntarily and were selected using criteria sampling. Also, in 2023 a study's objective was to examine the elements that influence how undergraduate students in Turkey perceive and utilize live instruction for learning during the global crisis (Orhan-Özen, Sümer, 2023). Furthermore, the primary goal of a research was to investigate the various factors related to individual characteristics, such as metacognition and motivation, as well as the learning environment's expectations, including performance expectancy, effort expectancy, and social influence. The aim was to understand how these factors impact students' behavioral intention to persist with online courses (Chen & Hwang, 2019). Moreover, a study's primary objective was to examine and analyze the development and evolution of the Unified Theory of Acceptance and Use of Technology (UTAUT) studies, particularly UTAUT 2, along with its expanded models in the context of education. The aim is to contribute to the existing scientific knowledge in this field (Yee & Abdullah, 2021). A useful theoretical framework for comprehending and justifying the adoption and application of gamification experiences is provided by UTAUT. It serves as an effective tool for directing educational gamification research and practice because its concepts and relationships have undergone empirical testing and validation in several studies. Educators can create and deploy gamification experiences that are likely to be accepted and used by students by taking into account the important aspects mentioned in UTAUT.

Consequently, those who wish to implement gamification must openly acknowledge how it is defined, what the current trends are, as well as the competencies necessary for educators to successfully implement gamification practices. It is crucial to describe how gamification functions and relates to UTAUT in this context, as well as which UTAUT content models are available and how gamification is used in different learning settings. Additionally, it is essential to describe the status of gamification in Turkey.

1.1 Statement of the Problem

This study intends to learn more about Turkish teachers' perceptions of gamification in the educational setting in relation to the Unified Theory of Acceptance and Use of Technology (UTAUT). This study attempts to provide answers to issues such how Turkish teachers view the use of gamification techniques in the classroom and how these approaches affect teacher's engagement and motivation.

To accomplish this, this study will look closely at how Turkish instructors use and view gamification in the classroom. Data from a sample of Turkish instructors who have used gamification and educational technology in their classrooms will be gathered for the study.

This study will evaluate teachers' perceptions of gamification in education as well as how UTAUT elements including performance expectations, effort expectations, social influence, and facilitating conditions relate to gamification's adoption in the classroom. To ascertain the relationship between UTAUT variables and the application of gamification in education, as assessed by Turkish instructors, the study investigated the data gathered using a survey questionnaire. The study's findings guide us better understand how gamification and UTAUT relate to education, and they offer useful information to researchers and educators who are interested in applying gamification principles to the classroom. Gamified Learning is as seen in the magazine, list of Top 10 Education Technology Trends & Innovations in 2022, so literature has to be improved by researchers to understand gamification better for educators and educational policymakers who are seeking for practical strategies to improve learning process and change the future of learning.

The goal of this study is to give a thorough analysis of how Turkish instructors used and perceived gamification in the classroom according to the UTAUT frame. In order to help educational organizations and policymakers better adopt and implement UTAUT and gamification in the classroom, this study aims to gain a better understanding of the correlation and relationship between these two concepts in the Turkish educational field.

This study uses a quantitative method research design that incorporates quantitative data gathering and analysis techniques to accomplish these goals. Through the survey data from a sample of Turkish instructors were acquired for this study. The

survey's questionnaire asked questions about UTAUT elements included gamification and gamified web tools.

The study will also look at how gamification and UTAUT are related to student engagement and motivation in the Turkish educational system. To ascertain the relationship between UTAUT and gamification and to pinpoint the elements that influence teachers' adoption and usage of these ideas in the classroom, the study will examine the information gathered from the surveys and interviews.

The findings of this study will be helpful for policymakers, educational institutions, and teachers in understanding how to increase the use of technology in the classroom and boost gamification and UTAUT acceptance in the Turkish educational sector. The results of this study will also add to the body of information on gamification and UTAUT in Turkish education and offer useful suggestions for how to effectively use these ideas in the classroom.

1.2 Purpose Of The Study

The primary objective of this quantitative study is to explore the correlation between the constructs of The Unified Theory of Acceptance and Use of Technology (UTAUT) and the behavioral intention of teachers to adopt and embrace gamification as a pedagogical tool in K12 education. The purpose of this research is to explain the factors affecting educators' acceptance and use of gamified web tools according to the Unified Theory of Acceptance and Use of Technology (Venkatesh, Morris, Davis, & Davis, 2003). The study intends to identify the relationship between the UTAUT constructs, namely, performance expectancy, effort expectancy, social influence, and facilitating conditions, and teachers' intention to incorporate gamification into their teaching practices. By examining the extent to which each construct influences teachers' behavioral intentions, the study aims to provide insights into the factors that influence teachers' acceptance and adoption of gamification as a teaching tool in K12 education. Such findings can help educational stakeholders make informed decisions and devise strategies to promote the effective use of gamification in the teaching and learning process.

1.3 Research Question and Hypothesis

RQ- To what extent is the relationship between UTAUT constructs (performance expectancy, effort expectancy, social influence, and facilitating conditions) and teacher's intention to use gamified web tools among Turkish Teachers?

H1 Performance Expectancy has a positive effect on behavioral intention regarding the acceptance and use of gamified web tools.

H2 Effort Expectancy has a positive effect on behavioral intention regarding the acceptance and use of gamified web tools.

H3 Social influence has a positive effect on behavioral intention regarding the acceptance and use of gamified web tools.

H4 Facilitating conditions have a positive effect on the use of gamified web tools.

H5 Gamification anxiety has a positive effect on the use of gamified web tools.

H6 Computer Knowledge has a positive effect on the intention to use of gamified web tools.

1.4 Significance of the Research Study

There is a climbing amount of interest and attention to the research exploring gamification and UTAUT in the last decades. It is not unexpected that gamification has been addressed and applied particularly in the field of education where sustaining and maintaining engagement is a continuous problem. However, despite a rise in the amount of study on the subject, the information that has resulted from it has only been modestly and narrowly synthesized (Majuri, 2018). There is a need in the literature to investigate how the UTAUT constructs include gamification as a framework. On the other hand, a great portion of the studies on gamification has primarily been carried out to evaluate learners' perceptions and attitudes whereas the number of research directing attention to teachers, their roles, and challenges they encounter is scant (Gerbic, 2011). On the contrary, the bulk of existing research on gamification has predominantly centered on evaluating learners' perceptions and attitudes within gamified learning environments. In stark contrast, there is a notable scarcity of studies that delve into the crucial aspects of teachers' involvement, their roles, and the challenges they face when implementing gamification strategies. Consequently, the exploration of teachers' experiences and perspectives pertaining to gamification remains relatively limited in the current academic discourse. To comprehensively understand the gamification landscape, there is a pressing need to allocate greater

attention to examining and addressing the specific concerns and opportunities that teachers encounter while incorporating gamified approaches into their instructional practices. The significance of this study rests in its contribution to the comprehension of how gamification and UTAUT constructs relate to one another in the Turkish educational context. In recent years, gamification has been increasingly popular as a teaching aid, and the UTAUT paradigm has been frequently applied to comprehend technology adoption patterns. However, there is little study on how gamification and UTAUT conceptions relate in the Turkish educational system. This study will shed light on the variables influencing Turkish educators' decision to use gamification as a teaching method by exploring this relationship. This research will also add to the knowledge on gamification's use in UTAUT applications in the educational setting. For educational institutions, policymakers, and educators who are interested in incorporating gamification in their teaching practices, the research study's findings will be useful. This research will also have contribution to the body of knowledge on technology adoption behavior and the creation of relevant theoretical models.

Chapter 2

Literature Review

This chapter seeks to examine the existing published studies, academic articles, and pertinent literature that serves as the basis for the current research. The chapter begins with the explanations of the frameworks and related studies.

2.1 Gamification

A game is governed by rules and has a quantifiable result, and players participate in this result. Players aim for it as a system. Game objectives, feedback, outcomes, competition, challenges, engagement, etc., according to Prensky (2007). It has components, and is a system. Järvinen (2008) asserted that the game has a specific setting, rule, and context, using a similar strategy. This is described as a system in which a player is a part. According to Arkün-Kocadere and Samur (2016), Prensky (2007), Samur (2016), Werbach and Hunter (2012), and others, this system must include all of the game's essential elements, including goal, feedback, result, badge, score, leaderboard, level, challenge, rivalry, story, rule, challenge obstacle(s), entertainment, and character.

Offering realistic experiences and fresh opportunities for learning is the starting point of learning with this approach, both of which are student-centered learning processes. The differentiation of learner characteristics focuses on changing learner profiles regarding how to learn information and game-based digital games. It is also feasible to create more learning experiences and raise both quality and number (Prensky, 2007; Türker, 2016). Games, on the other hand, use chocolate, which is both nutritious and unappealing, and combines entertainment and teaching. There are other views that predict outcomes resembling coated broccoli (Bruckman, 1999).

The term first appeared in the 2000s, although the concept of gamification dates back to the 1980s. Its goal is to help people modify their attitudes and behaviors. It is a favored strategy in various industries, from education to rehabilitation. Juárez and Carballo (2016), and Arkün-Kocadere and Samur (2016). The use of game aspects in creating non-game materials is known as gamification. (Werbach, 2014; Deterding, Sicart, Nacke, O'Hara, Dixon, 2011). Gamification is the process of creating game

components into something else. This is included in the material to improve user engagement and experience.

According to Deterding, the term "gamification" refers to the application of design elements commonly found in games to non-game settings. It is important to note that the utilization of certain game design elements alone may constitute gamification, and not necessarily all of them. In other words, gamification does not necessarily entail the complete replication of a game environment in a non-game context, but instead involves the selective integration of game design elements into non-game contexts. This definition underscores the flexibility and versatility of gamification as a tool for enhancing engagement and motivation in various domains beyond gaming. The concept of "gamification" differs from that of "educational games" or "real games," as the latter involves using full game design, while gamification applications may not use all game elements. Although the term "gamification" is relatively new, its first use can be traced back to 2008. Additionally, some gamification elements such as badges and grades/degrees were used in the past by the Soviet Union army to motivate soldiers to improve their learning capabilities (Deterding, Dixon, Khaled, Nacke, 2011).

The adoption of gamification, which involves incorporating game elements into non-gaming contexts to incentivize specific actions, has witnessed a surge in popularity over the years. This trend can be traced back to as early as 1910 when levels and badges were introduced to incentivize tasks and objectives within the scouting movement. Since then, gamification has evolved and expanded to include various applications in diverse fields, such as education, marketing, and healthcare, among others. This trend highlights the potential of gamification as an effective tool for promoting engagement and motivation in a range of settings beyond traditional gaming contexts. It tries to raise performance, provide more encouraging criticism than normal classroom settings, and make practicing and learning more pleasurable and engaging. To properly design and implement a gamified learning experience, much more is required than simply utilizing technology for incentives. This necessitates the development of an engaging and competitive environment that successfully integrates gaming mechanics, dynamics, and elements into the curriculum. Even though gamification is a difficult task, with a lot of care and effort, it might be a valuable tool in education.

The initial stage of the design process occurs in situations where a gamification approach is desired in education. Awards, points, and badges immediately spring into the mind as game components. Therefore, gamification is a process that has a negative impact on students' motivation and is a system that solely rewards the learner (Buckley & Doyle, 2016).

So as to provide more interactive and interesting learning experiences, gamification in education uses game design aspects. This student-centered approach attempts to provide opportunities for learning and experiences that are realistic. Goals, feedback, outcomes, badges, scores, leaderboards, levels, challenges, rivalry, stories, rules, barriers, entertainment, and personalities are some examples of components that can be included in gamification. Though it is a relatively new idea, it is growing in acceptance as a means of enhancing performance and making learning more fun. However, it takes careful planning and design to achieve a great gamified learning experience. Gamification in education frequently emphasizes the use of accolades, points, and badges, although there are worries that this approach may detract from students' motivation and be viewed as a reward system.

2.1. Gamification, Game, Serious Game, and Game-Based Learning

Gamification is frequently confused with gaming activities like computer and serious games. A game is a system that includes player interaction, is governed by rules, and takes place in an adversarial setting, according to Tekinbas and Zimmerman (2004). Games and gamification differ most in their purposes for use. To accomplish goals, gamification uses game mechanics. The only reason the game was played was for fun. The use of points, medals, scoreboards, and levels, in contrast, makes learning fun while striving to produce learning improvements.

A confusing issue is how to distinguish between serious gaming and gamified activities. Participants in serious games were intended to take on a stated challenge in order to achieve a particular objective. The goal of serious games is not to entertain or entice participants. Gamified activities, on the other hand, are developed for educational goals. The aim of serious games, according to Abt (1987), is to educate specific skills while ignoring fun element.

The impact of game features on various outcomes, such as motivation, affect, behavior, and learning, has generated conflicting results, as indicated by Sailer and Homner (2020) and Zimmerling et al. (2019). This is partly due to the limited number

of studies conducted in this area. The lack of knowledge regarding the psychological mechanisms through which gamification, serious games, and game-based learning produce their effects hinders the identification of appropriate gamification structures, mechanics, and principles to achieve desired outcomes (Sailer & Hamari, 2019; Sailer & Homner, 2020). Although progress has been made in the application of various theories to the design of gamification and the explanation of the effects of specific gamification components (Nacke & Deterding, 2017), further research is needed to synthesize the underlying assumptions of the theoretical foundations in use. This will aid in understanding how gamification, serious games, and game-based learning can be designed in diverse contexts (Dichev & Dicheva, 2017; Sailer & Sailer, 2018) and enhance the effectiveness of these techniques.

In conclusion, gamification is frequently mistaken for gaming activities like serious and computer games. A system that involves player interaction, is governed by rules, and takes place in a hostile environment is referred to as a game. The purpose for its utilization is the main distinction between games and gamification. While gamification uses game concepts to accomplish certain goals, such making learning entertaining and fostering learning gains, games are played solely for fun. It might be difficult to tell the difference between serious gaming and gamified activities. While gamified activities are intended to be educational, serious games are made to teach certain skills. However, there have been inconsistent findings regarding how game components affect motivational, emotional, behavioral, and learning effects. This is in part because gamification and game-based learning's psychological underpinnings are not well understood. To comprehend how game-based learning and gamification can be successfully designed in various contexts, more research is needed.

2.2 Educational Games and Online Gamification

It has been seen that gamification can improve learning process (Samur & Şahin, 2017; Yıldırım & Şen 2021). There several gamification tools on the internet for teachers to use. Applying gamification as assessment tool can be engage learners (Zainuddin, Shujahat, Haruna, Chu, 2020). The use of online gamification tools has the potential to improve student learning performance by fostering interactivity, active collaboration, and engagement, ultimately leading to better learning outcomes (Blasco-Arcas, Buil, Hernández-Ortega, Sese, 2013). The benefits of gamification in

education for students are numerous. Gentry et al. (2019) argue that educational games provide an advantageous means of delivering cost-effective, flexible, portable, and enjoyable educational services that can foster interactions between instructional resources, students, and educators. The use of educational games can prove beneficial due to their cost-effective nature, which reduces the need for expensive learning materials and resources. Furthermore, their flexibility allows for a customizable and personalized learning experience that caters to the individual needs of students. Educational games are also portable and can be accessed from various devices, enabling learning to take place anytime and anywhere. Moreover, their enjoyable nature can facilitate engagement and motivation, which can enhance learning outcomes. Overall, the use of educational games can be a promising approach to delivering effective educational services that are accessible, engaging, and affordable. They might make students and gamers happier while enhancing the effectiveness of learning. Due to the fact that they can enhance communication skills, educational games can be utilized in classes that are intended to support students' communication skills (Hava et al., 2020). Both students' great enthusiasm for educational games and the critical importance of involvement in educational game-assisted learning have been extensively studied (Blume, 2020).

Boettcher and Conrad (2021) suggest that online gamification solutions offer a comprehensive suite of tools that can be used to monitor student participation in course activities. Through this platform, e-moderators can easily and quickly obtain critical information about the progress of the learners. An online gamified learning environment provides statistics on student access, grades, and forum activity, which is advantageous for monitoring student involvement and activity. This method of learning not only ensures that students pay attention in class but also offers an alternative way to promote engagement and interest beyond the academic requirements of the course. Gamification has been extensively researched as an engagement tactic, as it encourages learners to try new things and not be afraid of failure, while also providing enjoyable learning experiences. Another advantage is the low production costs associated with incorporating gaming elements into educational content to enhance its appeal and entertainment value.

The integration of gamification in education has been implemented across various contexts, encompassing K-12 classrooms, higher education, and corporate

training. This application of gamification illustrates its versatility as a tool for enhancing engagement and motivation in diverse learning environments. By incorporating game design elements into educational settings, gamification can stimulate active participation and foster a positive learning experience. The diverse applications of gamification in different educational settings also suggest its potential to address various learning needs and facilitate the attainment of learning objectives. For instance, a teacher might utilize gamification in a K–12 school to make teaching more interactive and engaging for pupils. This can entail employing competitions or game-based activities to teach students new ideas and abilities. Gamification can be used in online courses in higher education to motivate students to finish tasks and take part in discussions. Gamification can be used in corporate training to encourage staff members to finish courses or pick up new skills.

2.3 Game Mechanics and Elements

Kapp (2012) argues that gamification is based on specific elements, while games are developed using mechanics. Gamification utilizes game-based mechanics, aesthetics, and cognition to generate interest, motivate action, enhance learning, and facilitate problem-solving. By incorporating these elements into non-game contexts, gamification can promote engagement and motivation, which can lead to improved learning outcomes. These game-based elements can be customized to suit the needs of different learning contexts and can enhance the learning experience by creating a more interactive and stimulating environment. The application of gamification in education can provide a promising approach to promoting engagement and motivation in learning, which can contribute to better educational outcomes. Students will learn how to use play to create cognitive challenges, identifiable routines, and interactivity. The four main elements that gamification depends on to provide effective learning outcomes are the game, the element, the design, and the non-game surroundings. It should be emphasized that gamification is a technique that was created using the rules, dynamics, and goals of gaming. Gamification mechanics were used to present a truthful response that appealed to a particular demographic.

Gamification differentiates from traditional forms of play through these elements (Deterding, 2011). According to Hung, gamification features come in a variety of mechanic types that can be used singly or in combination. Searching,

difficulty setting, badges, points, leaderboards, awards, tales, avatars, and progress bars are some of these mechanics (Deterding, 2017).

Gamification's main objective is to employ game design principles in contexts other than gaming to boost motivation in those circumstances. By experiencing norms, roles, and emotions, it offers a chance to learn new frameworks of knowledge about the organization of their behaviors (Lee & Hammer, 2011). The use of gamification has the ability to greatly improve student engagement and alter how they view themselves as learners. The performance of gamification can also be significantly impacted by motivation (Sailer, Hense, Mandl, Klevers, 2017). Therefore, prior to the creation of gamification, understanding human motivation must be addressed.

One has intrinsic motivation when engaging in an activity that makes them naturally happy or fascinating is instict motivation. Understanding a system's innate motivational elements is crucial for applying gamification mechanics. This relates to the notion of self-determination, which is frequently employed to evaluate students' learning motivation (Bovermann & Bastiaens, 2020). Instead than engaging in activities because they will result in a purchase, pupils are taught and learn through approaches that can make them happier. Additionally, it is a method for encouraging students to behave in ways that are goal-oriented (Nevid, 2012). Because it incentivizes students to act in accordance with their own morals and for their own gain, intrinsic motivation is essential for the development of gamification.

Extrinsic motivation pertains to behaviors that are elicited by external incentives such as monetary compensation, public recognition, commendations, and academic achievements. When students are offered some form of compensation or incentive for completing a task, it drives them to perform the task. Extrinsic motivation, according to Ryan and Deci (2012), is the want to behave in response to a different outcome, such as rewards or social pressure. As Nicholson (2017) noted, while applying the gamification technique, it is linked to the notion of expectation to assess students' motivation.

Incorporating gaming elements such as mechanics, aesthetics, and cognitive processes into non-game contexts is referred to as gamification. The primary goal of gamification is to increase engagement and motivation, promote action, facilitate learning, and accelerate problem-solving processes. By integrating these game-based elements into non-game contexts, gamification can provide a more interactive and

stimulating experience, which can enhance the learning process and increase the likelihood of positive outcomes. The use of gamification can be customized to meet the specific needs of different learning contexts and can offer a promising approach to promoting engagement and motivation in various settings. The gaming elements, design, and nongame environments make up its four main parts. In non-gaming situations, gamification uses elements like badges, points, leaderboards, prizes, and tales to boost motivation. The success of gamification depends on an understanding of human motivation because it has a big impact on student engagement. People are motivated by the inherent delight of an activity when they engage in intrinsic motivation, whereas extrinsic motivation is sparked by external rewards like money or grades. Extrinsic motivation is linked to the idea of expectation, whereas intrinsic motivation is vital for student development in gamification.

Gamification components can also be used in online education to boost interaction and engagement. The following are typical gamification components utilized in the education sector:

By giving grades and prizes for accomplishments, points, badges, and leaderboards encourage students to participate in learning activities and competitions. Students can customise their learning experiences and build their own digital representations by using avatars and customisation. Through quests and missions, learning is turned into an adventure where students must perform tasks and work through issues in order to go on to the next level. By integrating narrative components like characters and narratives to contextualize learning and increase its memorability, narrative and storytelling engage pupils. Feedback and progress monitoring allow students see their accomplishments over time and receive regular feedback on their development. Students are encouraged to collaborate or compete with one another to accomplish shared objectives through collaboration and competition.

Dicheva, Dichev, Agre, and Angelova (2015) defined the significance of gamification components in the education sphere as follows:

Gamification components can boost students' motivation and involvement in the learning process by making it more enjoyable and exciting for them. Learning outcomes: By giving students timely feedback, letting them follow their progress, and pushing them to practice and apply their information, gamification can improve students' learning outcomes. Student engagement is to gain by encouraging students to

take part in interactive and collaborative learning activities, gamification can boost student engagement and help them gain a deeper knowledge of the material being studied. Attention and retention are to make learning more memorable and interesting, the introduction of gamification components can increase students' attention and retention of information.

The use of points, badges, leaderboards, progress monitoring, missions or quests, prizes, and stories are all examples of gamification aspects in educational settings. By including game-like features in the learning process, these elements seek to increase learning's enjoyment and engagement. Gamification can improve learning outcomes by increasing students' motivation and engagement with the material by leveraging their drive to compete and succeed. Franco-Mariscal et al. (2015) claim that gaming components inspire pupils to participate in all kinds of instructional activities. The fundamental concepts of the entire course may be understood by the students (Franco-Mariscal et al., 2015). It also motivates learners to finish the necessary readings, take part in class debates, and make friends with their fellow students. These findings support those of Cheong et al. (2014), who found that gamified learning attracts students since it allows them to be engaged. Gamification components can enhance students' motivation, learning outcomes, engagement, and attention to the subject matter being taught, hence they are crucial in education overall.

2.4 Gamified Web Tools

Gamified web tools refer to internet-based applications that integrate various game elements, including points, badges, and challenges, with the primary objective of augmenting user engagement and motivation. By incorporating these gamification features, these tools seek to create a heightened sense of immersion and enjoyment for users, thereby fostering a greater frequency of interactions with the platform. The objectives of the learning experience, the target audience, and the kind of content being taught should all be taken into account when thinking about the usage of gamification tools. Gamification, for instance, can be used to teach skills like problem-solving or teamwork or factual knowledge like history or science. Striking a balance between the game components and educational content is crucial for the success of gamification in education. Instead of subverting instructional objectives, game elements should enhance them. To keep pupils interested and motivated, it's also crucial to take into

account variables like the degree of difficulty, the duration of the game, and the frequency of prizes. Hamari, Koivisto, and Sarsa (2014) state that "Gamification has been shown to increase user engagement and motivation in a variety of contexts." Teachers have recently and mostly employed gamification platforms and solutions that are centered on online or mobile applications. The data collection process made use of these gamification technologies.

Table 1

Gamified Web Tools in the Study

Tool	Accessibility	Usage	Paid/Free	Description	Gamification Elements
Kahoot!	Online, Mobile	Individual, Group, Guided	Paid/Free	A game-based learning platform for creating and playing quizzes, surveys, and discussions.	Points, Leaderboards, Avatars, Themes
Quizziz	Online, Mobile	Individual, Group, Guided	Paid/Free	An online quiz platform for creating and playing quizzes and tests.	Points, Leaderboards, Avatars
Padlet	Online	Individual, Group	Paid/Free	An online bulletin board for creating and sharing notes, ideas, and media.	N/A

Table 1 (cont.)

Jamboard	Online	Individual, Group	Paid	A collaborative digital whiteboard for brainstorming, sketching, and sharing ideas.	N/A
Socrative	Online, Mobile	Individual, Group	Paid/Free	A student response system for creating and conducting quizzes, surveys, and games.	N/A
Plickers	Online, Mobile	Individual, Group	Paid/Free	A student response system using physical cards for creating and conducting quizzes and assessments.	N/A
Edpuzzle	Online	Individual, Group	Paid/Free	An interactive video platform for creating and conducting assessments and quizzes.	N/A

Table 1 (cont.)

Powtoon	Online	Individual, Group	Paid	A animated video creation platform for creating and sharing presentations, explainer videos, and more.	N/A
Wordwall	Online	Individual, Group	Paid/Free	An online word game platform for creating and playing vocabulary games and quizzes.	N/A
Mindmeister	Online	Individual, Group	Paid/Free	An online mind mapping platform for creating and sharing diagrams, concepts, and ideas.	N/A

Table 1 (cont.)

Coggle	Online	Individual, Group	Paid/Free	An online diagram and flowchart creation platform for creating and sharing concepts and ideas.	N/A
Learning Apps	Online	Individual, Group	Paid/Free	A collection of online educational games and activities for various subjects and skills.	Points, Leaderboards, Avatars, Themes
Classtools	Online	Individual, Group	Paid/Free	A collection of online educational tools for various activities and games.	N/A
Flipgrid	Online	Individual, Group	Paid/Free	A video discussion platform for creating and sharing videos, responses, and feedback.	N/A

Table 1 (cont.)

Quizlet	Online, Mobile	Individual, Group	Paid/Free	An online flashcard and quiz platform for creating and playing quizzes and tests.	Points, Leaderboards, Avatars, Themes
Baamboozle	Online	Individual, Group	Paid/Free	An online game-based learning platform for creating and playing quizzes and tests.	Points, Leaderboards, Avatars, Themes
Pear Deck	Online	Individual, Group, Guided	Paid	An interactive presentation platform for creating and conducting quizzes, surveys, and assessments.	N/A
Edmodo	Online, Mobile	Individual, Group, Guided	Paid/Free	A learning management system for creating and sharing assignments, quizzes, and discussions.	N/A

Table 1 (cont.)

Genially	Online	Individual, Group	Paid	An online presentation platform for creating and sharing interactive presentations, infographics, and more.	N/A
Mentimeter	Online	Individual, Group	Paid/Free	An interactive presentation platform for creating and conducting polls, quizzes, and surveys.	N/A
Classdojo	Online, Mobile	Individual, Group, Guided	Paid/Free	A communication and behavior management platform for teachers and students.	Points, Avatars, Themes
Educaplay	Online	Individual, Group, Guided	Paid/Free	An online educational platform for creating and playing games and quizzes for various subjects and skills	Points, Leaderboards, Avatars, Themes

2.5 TAM and UTAUT

2.5.1 TAM. E-learning, also referred to as electronic learning, is quickly gaining acceptance among universities and other educational institutions all over the world. Through e-learning, students have access to a virtual setting where they can take part in a range of activities. A number of benefits, including quick and simple access to content, seamless teamwork, and timely dialogues, are provided by e-learning systems.

The Davis-proposed Technology Adoption Model (TAM) has become more significant in the literature on technology acceptance as a result of its implementation in several research initiatives. Additionally, a recent systematic study discovered that the application of TAM in the adoption of educational technology has proven its value in comparison to other theoretical models. It has been argued that in order to determine an individual's inclination towards the use of a technology, two personal beliefs are crucial - "perceived utility" and "perceived ease of use." These beliefs are impacted by various external and system-specific factors that play a significant role in shaping an individual's perception of a technology's usefulness and ease of use. An individual's attitude towards a technology can have a considerable influence on their behavioral intention to use it. Therefore, understanding how personal beliefs, external factors, and attitudes impact an individual's perception and intention to use technology is critical for promoting technology adoption and usage.

The adoption of new technologies is particularly interesting to the domains of education and learning. There are many future users of information and communication technology (ICT) in educational settings, which has to make it easier to transmit and absorb knowledge. We can be perplexed as to why people chose to embrace or reject a particular technology in such a scenario. Adoption is the decision to fully utilize technical innovation as the optimum course of action, according to Innovation Diffusion Theory (IDT) (Rogers, 1962, 1995). For a notion, deed, or product to be accepted, the adopter (individual or organization) must regard it as innovative or inventive. Several theories and models have been employed in research related to individual-level technology adoption, with the aim of forecasting and comprehending how individuals will embrace specific technologies. Such theories and

models have been utilized to establish patterns and anticipate how technology adoption occurs, taking into consideration individual differences, attitudes, beliefs, and contextual factors that may influence the process. These frameworks can be beneficial in identifying the factors that can promote or hinder the adoption of technology by individuals, thus offering insights that can inform the development and implementation of technology-based interventions in various settings.. Imtiaz and Maarop (2014) as well as Al-Emran, Mezhuyev, and Kamaludin (2018) highlight how important it is to meaningfully integrate technology into educational settings and the interest in the recent trend of technology acceptance research in teaching and learning contexts (Scherer, Siddiq, Tondeur, 2019). Nevertheless, despite the intuitively alluring promise of ICT to enhance the teaching and learning process (Davis, 2011), the decision to accept or reject learning technology may be of the utmost importance. The field of research on educational technology in general has sufficiently developed to exist as its own study object, so it is necessary to identify and assess published works in the current state of the subject. The Technology Adoption Model (TAM), which first appeared 30 years ago, has been the subject of a sizable body of work (Davis, 1989), which amply demonstrates its appeal in the field of technology acceptance research. TAM, which has its roots in psychology's Theory of Reasoned Action (TRA), has evolved into a key paradigm for understanding signs of potential human behavior toward either acceptance or rejection of technology. Numerous studies have demonstrated the model's strength and underlined how broadly applicable it is to a range of technologies (Venkatesh, Morris, Davis, Davis, 2003). TAM + TAM ++ Since technology first began to ingratiate itself into people's daily lives, it has been more crucial to comprehend the variables that determine whether a technology is welcomed or rejected. The earliest theories that sought to explain and predict these decisions had psychological roots. The two theories that give rise to TAM (TPB) are the Theory of Planned Behavior (TPB) (Ajzen, 1985) and the Theory of Reasoned Action (TRA) (Ajzen & Fishbein, 1980). To develop a precise model that might predict the actual acceptance of any given technology, Fred Davis updated the Theory of Reasoned Action and put forth the Technology Acceptance Model (TAM). He thought the TRA would be a suitable model for deriving and predicting real system use because it is primarily a behavior. The TAM claims that user motivation may be explained by three variables: perceived usability, perceived usability, and attitude toward use.

Theoretically, a user's perception of the system will have a big influence on whether they really use it. A distinction was made between two critical constructs that influence the adoption of technology by individuals, namely, perceived usefulness and perceived ease of use. Perceived usefulness is defined as the extent to which an individual believes that using a particular system or technology would enhance their job performance. On the other hand, perceived ease of use refers to the degree to which an individual perceives that using a particular system or technology would be simple and require minimal effort. These two constructs are considered essential in shaping individuals' attitudes and behavioral intentions towards technology adoption, and are frequently utilized in theories and models related to technology adoption. Understanding these constructs can help researchers and practitioners design and implement technology-based interventions that meet users' needs and expectations and facilitate the adoption process.

Olaleye et al. (2018) assert that perceived usefulness is a construct that pertains to the degree to which potential users believe that adopting a specific technology will provide them with significant benefits. This construct is considered an important factor that can influence individuals' attitudes and intentions towards technology adoption. When individuals perceive a technology as useful, they are more likely to develop a positive attitude towards it, and to show an inclination to adopt it. Therefore, understanding this construct can help in designing and implementing technology-based interventions that are perceived as useful and relevant by their target audience. A person's initial behavioral intention to use an app is determined, in accordance with TAM, by their attitude toward using the system and how useful they perceive it to be, where attitude is a direct conclusion of use (Gupta & Arora, 2017). When deciding on user-performance contingency also known as perceived usefulness, users, in accordance with TAM2, employ a mental model to assess how well major task goals and their outputs match up. If users are aware of an app's potential advantages and capacity to satisfy their needs, they are more likely to use it (Olaleye et al., 2018).

In short, e-learning, or electronic learning, is being used more and more in the field of education to distribute knowledge and encourage student interaction. It has been discovered that the Technology Adoption Model (TAM), which is frequently employed in studies on technology acceptance, is a beneficial tool for comprehending and anticipating the adoption of technology in educational settings. According to

TAM, two variables—"perceived usefulness" and "perceived ease of use"—can be used to predict how people will feel about using a technology. These variables are thought to be impacted by external and system-specific factors. TAM asserts that a user's decision to adopt a technology will be significantly influenced by their attitude toward it. According to the TAM, a person's intention to use a technology is impacted by their attitude toward the technology and their perception of its usefulness, which refers to the degree to which a technology is considered as useful. The user's perception of a technology's potential advantages and suitability for their needs will determine how they feel about it.

2.5.2 UTAUT. Over the past three decades, researchers in the academic community have conducted numerous studies examining the acceptance of new technologies. Venkatesh et al. (2003) introduced a comprehensive theory known as UTAUT in their article "User Acceptance of Information Technology: Toward a Unified Vision." This theory has been widely utilized to investigate individuals' responses to novel technologies. The UTAUT model was developed to assess how individuals are likely to adopt and use technology. In the realm of e-learning and flipped classrooms, technology acceptance models, particularly the UTAUT model, have been employed in various studies (Abd Rahman et al., 2021; Bakheet & Gravell, 2020; Gunasinghe & Nanayakkara, 2021). These studies have leveraged the UTAUT model to understand how individuals' behavior and attitudes towards technology influence their engagement with e-learning platforms and flipped classroom approaches. Therefore, this model provides the strongest evidence in support of the motive and goal for using the new pedagogical approach to technology usage. The four key elements influencing technological choice and use are performance expectancy, effort expectancy, social influence, and facilitating conditions. A person's beliefs are an expression of how well they expect the system to work. The effort expectancy served as a gauge for the system's usability. Social standards have an impact on people's decisions on whether to use a novel strategy. The fourth aspect is the idea that a technological and administrative framework helps system usage (Venkatesh et al., 2003). Performance expectancy measures how much someone thinks using a system will boost their job performance, effort expectancy measures how simple it is to use the system, and facilitating conditions measures how much they think an

organizational environment will make it easier to use the new system. Up to four criteria of gender, age, experience, and voluntariness of use can control various relationships.

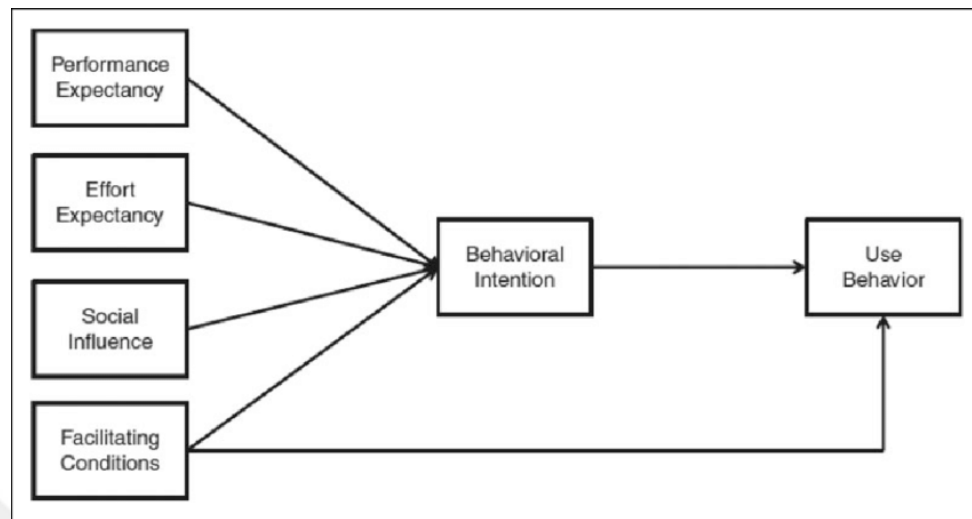


Figure 1. UTAUT Model (Ramirez-Correa et al., 2020)

As consumer technologies evolved, prioritizing the hedonic value or intrinsic motivation of technology users, the UTAUT model was modified to incorporate this new setting. As a result, the original UTAUT model was expanded to include three additional constructs: hedonic motivation, price value, and habit. This expansion was essential to account for the unique consumer-focused factors that can influence the adoption and use of technology. The name UTAUT2 refers to this new, extended version. UTAUT2, a considerable augmentation of the UTAUT, was developed by Venkatesh, Thong, and Xu (2012). The extended unified theory of acceptance and application of technology (UTAUT2) was developed twenty years ago. But since the UTAUT model is more practical and effective in the educational setting, we shall concentrate on it. According to Venkatesh, Thong, and Xu (2012), the components of UTAUT are significant because they offer a thorough framework for comprehending technology adoption and usage behaviors.

2.5.2.1 Performance Expectancy. A person accepts a system based on how they believe it will help them perform better, claim Venkatesh et al. Performance expectations in the UTAUT model draw upon commonalities found in various theoretical constructs across different models. These include perceived utility in

Technology Acceptance Model (TAM) and TAM 2, extrinsic motivation in motivational models, job fit in computer utilization models, relative advantage in innovation diffusion theories, and expectation of outcome in social cognitive theories. The UTAUT model posits that behavioral intention directly influences performance objectives concerning the adoption of technology. In essence, the UTAUT model integrates and synthesizes these diverse constructs to elucidate the influence of performance expectations on individuals' intention to adopt and use technology. Furthermore, numerous research have shown how effective this component is at promoting user adoption of technology.

2.5.2.2. Effort Expectancy. The concept of "effort expectancy" is used as a gauge for how straightforward the system is to operate. Expert expectations are based on the similarities between the variables from various models, such as perceived ease of use, complexity, and ease of use acquired from TAM, MPCU, and innovation diffusion theory. According to the UTAUT model, there is a direct relationship between behavioral intention and performance targets in the context of technology adoption. In other words, the intention of individuals to adopt and use technology significantly impacts their expected performance outcomes. This implies that individuals' motivation and willingness to engage with technology directly influence their anticipated level of performance in utilizing that technology. The UTAUT model emphasizes the crucial role of behavioral intention in shaping and predicting the achievement of performance targets associated with technology adoption. Effort expectancy, according to Venkatesh et al. (2003), refers to the level of simplicity or ease associated with utilizing a particular system. In other words, this construct is concerned with how easily consumers can use a technology or system without encountering difficulty or complexity.

2.5.2.3. Social Influence. Social impact is the level of importance that a person accords to others who support him in using the new technique. While this effect is system-based and may even be application-based, the subjective criteria inside are connected to non-system and non-specific behavior. These come from the innovation diffusion theory, one of many theories that contends that the emergence of social

impact is a direct result of subjective norms. The UTAUT model claims that behavioral intent has a direct bearing on performance targets for technology adoption.

2.5.2.4. Facilitating Conditions. Facilitating conditions, as described by Venkatesh et al. (2003), pertain to the extent to which consumers perceive the availability of resources and support that can assist them in executing a specific behavior. This construct highlights the importance of consumers' perceptions regarding the enabling conditions for adopting and utilizing a technology or system. The utilization of a system is intricately linked to the presence of facilitation circumstances. The enabling condition, which refers to an individual's belief in the perceived infrastructure of the organization and technology for enhancing the system, is a significant factor in facilitating conditions. The fundamental constructs that constitute facilitating conditions include perceived behavioral control, facilitating circumstances derived from the Model of PC Utilization (MPCU), and compatibility based on the Innovation Diffusion Theory. As per the UTAUT paradigm, behavioral intention has a direct impact on performance expectations with regard to technology adoption. In academic research, the UTAUT model is commonly used to investigate the acceptance of gamification. The model was developed to evaluate how individuals respond to gamification and has been applied to examine technology use in flipped and online classrooms. The four main pillars of the model include performance expectancy, effort expectancy, social influence, and facilitating conditions. Performance expectancy refers to the belief that using a system will enhance one's job performance, while effort expectancy denotes the ease with which one can use the system. Social influence, on the other hand, pertains to the influence of social norms on technology adoption. Finally, facilitating conditions encompass the organizational environment that makes it easier for people to use the system.

2.6.4.4 Behavioral Intention. The UTAUT model's key concept of behavioral intention describes someone's willingness to engage in a specific behavior. It is an illustration of how the person intends to act and how committed they are to doing so, and it is influenced by both internal and external circumstances.

2.6.4.5 Gamification Anxiety. Within the UTAUT model, computer anxiety serves as a moderating factor, exerting an influence on the interrelationships among its fundamental constructs. Elevated levels of computer anxiety can impede individuals' intentions to embrace and utilize technology, irrespective of their positive perceptions regarding its utility and user-friendliness. In essence, heightened computer anxiety might lead to reluctance in technology adoption and usage, despite the apparent advantages it offers. Additionally, in this study, computer anxiety turned into gamification anxiety since the questionnaire includes gamification.

In brief, gamification in education is a cutting-edge strategy that incorporates game design aspects into the classroom setting to motivate and engage students. Empirical evidence has indicated that the integration of gamification in educational settings yields positive outcomes in terms of students' learning achievements and increased classroom engagement. For educators to successfully apply gamification, new technology must be adopted, which might be difficult. Therefore, it's crucial to comprehend how gamification as a teaching method interacts with technology adaptation. In this regard, the UTAUT offers a useful framework for investigating the variables that affect technology adoption, including 'performance expectancy, effort expectancy, social impact, and facilitating conditions'. The characteristics that support or prevent the adoption of gamification as a teaching technique can be determined by examining the relationship between UTAUT components and educators' behavioral intention to use gamification in education. This knowledge can then be put to use to create methods that will encourage the use of gamification in education and raise the standard of learning as a whole.

Chapter 3

Methodology

The following chapter introduces the research design implemented in the current study to serve the research questions of the study in detail. The chapter also describes the participants of the study, data collection instruments and procedures, reliability and validity of the data collection instruments, and the potential limitations of the research study.

3.1 Research Design

This study employs a quantitative non-experimental correlation design to investigate the causal relationship between variables. The main objective is to develop and elucidate a theoretical model based on UTAUT, using a structural equation model (SEM) approach, to explore teachers' acceptance and utilization of gamification. The proposed model posits that performance expectancy, effort expectancy, social influence, and facilitating conditions have an impact on both behavioral intention and use behavior. To accomplish this objective, a causal research design is adopted, focusing on examining cause-and-effect relationships among the variables. The quantitative phase of the study involves administering a survey using the UTAUT questionnaire, which has been translated into Turkish and modified to incorporate gamification-related inquiries. The survey will be distributed using Google Forms, and participants will be selected through random sampling methods.

By adopting a causal research design and applying the UTAUT theory to the study of gamification in education, this research aims to contribute to the growing body of literature on the adoption and use of technology in education. The study also highlights the importance of examining the factors that influence the acceptance and use of gamification in educational settings, and provides valuable insights for educators and policymakers interested in leveraging gamification to enhance teaching and learning outcomes.

3.2 Population and Sampling

The study is conducted with a sample of 144 Turkish teachers. Participants are recruited through random sampling, where the survey was distributed to teachers at different schools, places and different institutions. Participants must have been currently working as a teacher in a Turkish school and have experience using gamification and/or technology in their classroom. Participants were recruited through random sampling by distributing the survey to teachers at different schools. Participants were asked to complete the UTAUT questionnaire, which took approximately 20-30 minutes. Out of the 144 people that took part in the survey, descriptive statistics have shown that 36 of them (25%) are males while the remaining 108 (75%) are females.

3.2.1 Gender. Out of the 144 people that took part in the survey, descriptive statistics have shown that 36 of them (25%) are males while the remaining 108 (75%) are females.

3.2.2 Age of Respondents. In terms of age of respondents, result has shown that 48 of the respondents (33.3%) are under 30 years, 31 of them (21.5%) are between the ages of 31 to 36 years, 35 people (24.3%) are between 37 to 42 years old, 18 people (12.5%) are between the ages of 43 to 49 years old and 12 (8.3%) are above 50 years old.

Table 2

Age Difference

	N	%
Under 30 years	48	33.3%
31-36 years	31	21.5%
37-42 years	35	24.3%
43-49	18	12.5%
Above 50 years	12	8.3%

3.2.3 Organization of Respondents. In terms of organizational distribution, it can be observed that 60 people (41.7%) are in state school while 84 others (58.3%) are in private schools.

Table 3

Organization Difference

	N	%
State school	60	41.7%
Private school	84	58.3%

3.2.4 Professional Experience. In terms of the professional experience of respondents, it can be observed that 29 people (20.1%) have a professional experience of 0 to 4 years, 35 people (24.3%) have a professional experience of 5 to 9 years, 23 people (16%) have experience of 10 to 14 years, 27 people (18.8%) have a professional experience of 15 to 19 years, 17 people (11.8%) have an experience of

20 to 24 years old, and 13 people have a professional experience of 25 years and above.

Table 4

Professional Experience Difference

	N	%
0-4 years	29	20.1%
5-9 years	35	24.3%
10-14 years	23	16.0%
15-19 years	27	18.8%
20-24 years	17	11.8%
25 years and above	13	9.0%

3.2.5 Education Status. It can be observed that 2 people (1.4%) hold a doctorate degree, 82 people (56.9%) have a license, 3 people (2.1%) have an associate degree and 57 people (39.6%) have a degree.

Table 5

Educational Statues Difference

	N	%
Doctorate	2	1.4%
License	82	56.9%
Associate Degree	3	2.1%
Degree	57	39.6%

3.2.6 Teaching Subjects of Participants. The findings indicate that 41.67% of participants, the largest group, teach English as a second language. Teachers who work in middle schools come in second, accounting for 39.58% of participants. 10.42% of the participants are primary homeschool teachers, while 28.47% are high school teachers. 4.17 percent of the participants teach visual arts, and 8.33 percent teach Turkish. Lesser percentages are shown for the remaining topics in the table, which range from 0.69% for drama to 5.56% for mathematics. It is noteworthy that participants also work in adult education and higher education, accounting for 11.11%. Overall, the findings reveal a diversified set of participants with a wide range of teaching specialties, offering insightful information about the use of technology in various educational contexts.

Table 6

Teaching Subjects of the Participant

Teaching Subject	Number Participants	Percentage
English Language	60	41,67%

Turkish Language	12	8,33%
Mathematics	8	5,56%
Science and Physics	7	4,86%
Music	5	3,47%
Physical Education	5	3,47%
Social Sciences	5	3,47%
Technology Education	3	2,08%
Religious Culture and Ethics	2	1,39%
Drama	1	0,69%
Visual Arts	6	4,17%
Kindergarten	11	7,64%
Primary Homeschool	15	10,42%
Middle School	57	39,58%
High School	41	28,47%
University/Adult	16	11,11%

3.3 Data Collection

3.3.1 Data collection instruments. This study aims to investigate the attitudes of Turkish teachers towards gamification and UTAUT and seeks to reveal if there is a positive or negative correlation between them. To find answers to these research questions, data was collected by means of a questionnaire. The following subsections thoroughly explain the instruments applied for data collection.

3.3.1.1 Questionnaire. The data collection tool used for this research study is a survey on teachers' perception through gamification and correlation between UTAUT. The questionnaire of this study was taken originally from the question items of Venkatesh et al. (2003). 'User Acceptance of Information Technology: Toward a Unified View' had a loading pattern was deemed satisfactory as most of the loadings were at or above .70. Additionally, all measures of internal consistency exhibited values greater than 0.70. In the study translated version into Turkish used from a research by (Gogus, Nistor, Riley, Lerche, 2012) titled "Educational Technology Acceptance across Cultures: A Validation of the Unified Theory of Acceptance and Use of Technology in the Context of Turkish National Culture" that published on Turkish Online Journal of Educational Technology-TOJET, 11(4), 394-408. The research had a comparative fit index (CFI) of the confirmatory factor analysis was .984. The current study's survey consists of four parts, and it is depicted in Table 8 below. The survey has been changed from computer adaptation to gamification in questions.

Table 7

Characteristics of the Survey Used in the Study

	Number of Items
1- Demographic Information	7
2- Gamification Tools	1
3- UTAUT-Subscale Computer knowledge/Gamification	1
4- UTAUT-Subscale Computer usage/Gamification	1

5- UTAUT/Gamification Subscale Performance expectancy	4
6- UTAUT/Gamification Subscale Effort expectancy	4
7- UTAUT/Gamification Subscale Social influence	4
8- UTAUT/Gamification Subscale Facilitating conditions	4
9- UTAUT/Gamification Subscale Computer anxiety	4
10- UTAUT/Gamification Subscale Behavioral intention	3

The first part of the survey requires participants to share demographic information, the second section of the survey is related to participants attitudes towards computer knowledge, usage and gamification tools, the third section is related to subscale performance expectancy in gamification, the fourth section is related to subscale effort expectancy in gamification, the fifth section is related to subscale social influence in gamification, the sixth section is related to subscale social influence in gamification usage, the seventh section is related to subscale facilitating conditions in gamification usage, the eighth section is related to subscale gamification usage anxiety, the ninth section is related to behavioral intention to use gamification. The survey questions related to attitudes towards gamification and UTUAT correlation. In these three sections, items are designed as follows: Strongly Agree (5), Agree (4), Partially Agree (3), Disagree (2), and Strongly Disagree (1). However, the survey has

been translated into Turkish language to be used in the current research study because the mother tongue of the participants is Turkish, and it would be better for the participants to understand the questions on the survey. The questionnaire was sent to the participants as Google Form link, and it was estimated to take 10 minutes to complete. (See Appendix A for the Survey.)

3.3.2 Data collection procedures. Quantitative data collection was carried out by means of a survey which was sent to participants online as a Google Form link. The survey was available for participants for two weeks. Participants were informed about the purpose and procedures of the research before the first section of the survey, and they were provided with explanations as to how their data and anonymity will be protected and the fact that participation in the study was completely voluntary. Participants were also given the option to withdraw from the study anytime they want. A total number of participants completed the survey form, and the results were transited to an Excel sheet to be analyzed. However, some of the participants had to be removed from the raw data as they provided missing information or completed the survey more than once. After these responses with misleading information were removed, quantitative data was analyzed using SPSS software.

3.3.3 Data analysis procedures. This research study employs a quantitative method research design and uses the Statistical Package for Social Sciences (SPSS) software to analyze quantitative data gathered from survey questions. The study aims to investigate teachers' attitudes towards the implementation of gamification and the correlation between this implementation and UTAUT. The research focuses on exploring the significant factors that promote the adoption and usage of gamification within the UTAUT framework, which includes performance expectancy, effort expectancy, social influence, and facilitating conditions. To measure the adoption and use of gamification, the research uses behavioral intention and user behavior as dependent variables, while the independent variables are the UTAUT factors.

According to the data, there is no missing data or no outliers. That is crucial to comprehend the results of the study. There are no response errors and no repetitions.

The Likert scale of 5 items was used to measure each of the constructs in the study, and validity and reliability tests were conducted using Confirmatory factor analysis, composite reliability, average variance extracted, and Cronbach's alpha. The results indicate that the constructs measured in the study were generally reliable and valid. The research also used a correlation matrix to examine the discriminant validity of the variable constructs. A structural equation model (SEM) was computed using SPSS AMOS to address the framework of the research, that is to examine the relationship between the UTUAT factors and adoption and usage of gamification (measured using behavioural intention and user behaviour). This statistical method that enables researchers to simultaneously explore complex correlations between numerous variables is structural equation modelling (SEM). The goal of the route analysis, a subset of SEM, is to illuminate the viability of the researcher's original model rather than to examine causes (Jeon, 2015). In several disciplines, including psychology, sociology, and economics, SEM has grown to be a prominent technique for testing hypotheses and studying the underlying causal mechanisms. SEM has the advantage of handling measurement error and taking into account many sources of variation, making it a more reliable tool for examining the correlations between variables (Ullman & Bentler, 2012). The SEM provides the path, level and direction of the relationships being examined. Thus, the SEM comprises of 5 major paths with the first three paths examining the relationship between 'Performance Expectancy, effort expectancy, social influence with behavioural intention and Facilitating conditions with user behaviour'. Demographic variables were controlled for (control variables) which include, gender, age, experience, and organization.

3.3.4 Basic Statistics. In the context of academic research, the statistical measures of skewness and kurtosis assume paramount importance as they play pivotal roles in data analysis (Mardia & Jupp, 2000). Skewness serves as a crucial tool to evaluate the symmetry or asymmetry of data distributions, offering valuable insights into the shape of the dataset, including positive or negative skewness, as well as approximate symmetry. Understanding skewness is critical as it directly impacts the validity of statistical assumptions and significantly influences the selection of appropriate data analysis methodologies (Joanes & Gill, 1998). Distributions displaying significant skewness require special consideration during analysis, and

identifying skewness enables researchers to make informed decisions in data interpretation. Similarly, kurtosis holds significant significance in quantifying the degree of peakedness or flatness in data distributions. This statistical measure provides important information about the concentration of data points around the mean and the potential presence of extreme values in the dataset (Westfall & Kurtosis, 2011). In academic research, kurtosis assumes a vital role in assessing the tail behavior of the distribution, thereby affecting probability modeling and hypothesis testing. High kurtosis values may indicate the presence of outliers or heavy-tailed distributions, impacting statistical inference and necessitating the selection of appropriate models.

In conclusion, skewness and kurtosis serve as indispensable tools in academic research, enabling effective characterization and comprehension of datasets. They aid in identifying patterns, detecting anomalies, and drawing evidence-based conclusions. Proper application of skewness and kurtosis ensures methodological rigor and analytical accuracy, making significant contributions to the robustness and validity of research findings.

Table 8

Basic Statistics

Variable	Items	Mean	SD	Skewness	Kurtosis	Min.	Max.
Computer Knowledge (CK)	CK1	4.137	0.803	-0.741	0.334	1	5
	CK2	4.000	0.782	-0.464	0.025	1	5
	CK3	4.237	0.730	-0.724	0.301	2	5
	CK4	3.987	0.825	-0.431	-0.438	2	5
	CK5	4.207	0.825	-0.589	-0.734	2	5
	CK6	3.586	0.913	0.313	-0.937	2	5
Computer Usage (CU)	CU1	3.696	0.991	-0.627	-0.063	1	5
	CU2	3.487	1.110	-0.249	-1.010	1	5
	CU3	3.841	0.887	-0.363	-0.595	2	5
	CU4	3.772	0.876	-0.329	-0.439	1	5
	CU5	3.882	0.907	-0.568	-0.188	1	5
	CU6	3.712	0.814	0.042	-0.692	2	5
Performance expectancy (PE)	PE1	4.024	0.871	-0.918	1.122	1	5
	PE2	4.016	0.754	-0.462	0.194	1	5
	PE3	4.304	0.644	-0.380	-0.707	3	5
	PE4	4.056	0.746	-0.247	-0.728	2	5
Effort expectancy (PE)	EE1	4.177	0.711	-0.449	-0.304	2	5
	EE2	4.108	0.759	-0.472	-0.293	2	5
	EE3	4.212	0.806	-1.081	1.539	1	5
	EE4	4.204	0.816	-0.865	0.410	1	5

SI1	3.828	0.865	-0.345	-0.524	2	5
SI2	3.747	0.828	-0.277	-0.288	1	5
SI3	3.911	0.895	-0.587	-0.011	1	5
SI4	3.228	1.045	0.398	-1.021	2	5
FC1	3.831	0.739	-0.353	0.018	2	5
FC2	3.855	0.724	-0.205	-0.218	2	5
FC3	3.849	0.733	-0.206	-0.242	2	5
FC4	3.806	0.831	-0.365	-0.351	2	5
GA1	3.024	1.116	-0.025	-0.756	1	5
GA2	2.847	1.058	0.278	-0.579	1	5
GA3	2.909	1.042	0.172	-0.571	1	5
GA4	2.984	1.046	0.110	-0.535	1	5
BI1	3.694	1.331	-0.448	-1.276	1	5
BI2	3.548	1.163	-0.607	-0.217	1	5
BI3	3.427	1.183	-0.437	-0.508	1	5

3.3.5 Reliability and Validity. Factor loadings, variance extracted, and reliability (consisting of Cronbach's Alpha and composite reliability) were utilized as markers to establish the relative degree of convergent validity. Factor loadings were computed using the Confirmatory factor analysis with SPSS AMOS version 23. On the other hand, average variance extracted, and composite reliability were computed using excel Formula functions while the Cronbach's Alpha was computed using the reliability test in SPSS version 28.

The composite reliability and reliability must be above equal or above 0.7 to be considered to be internally consistent and reliable (Gefen et al., 2000; Nunnally & Bernstein, 1978). The composite reliability (CR) and reliability coefficient for each construct exceeded the threshold of 0.7, which indicates internal consistency across different measures of a construct (Hair et al., 1998). Cronbach's Alpha scores show that the acceptable value of 0.7 was exceeded, and a range of composite construct reliabilities was noted from 0.719 to 0.973.

Factor loadings, variance extracted, and reliability measures, including Cronbach's Alpha and composite reliability, were utilized as indicators to assess the level of convergent validity. The composite reliability (CR) and reliability coefficient for each construct either met or surpassed the threshold of 0.7, indicating good internal consistency across different measures of a construct (Hair et al., 1998). The Cronbach's Alpha scores demonstrated values exceeding the acceptable threshold of 0.7, and a range of composite construct reliabilities was observed, ranging from 0.917 to 0.980. The Average Variance Extracted (AVE), as shown in the table, was also considered.

According to Fornell and Larcker (1981), an AVE value of 0.5 or higher confirms convergent validity, and all the AVE values presented in Table 10 were greater than or equal to 0.5, except for the facilitating conditions construct. However, since the composite reliability of the facilitating conditions construct exceeded 0.7, it can be inferred that the items within this construct are still reliable and valid.

Table 9

Reliability and Validity

Constructs (variables)	Items	Factor Loading	Reliability (Alpha)	Composite Reliability	AVE
Computer Knowledge	CK1	0.736	0.912	0.920	0.659
	CK2	0.740			
	CK3	0.748			
	CK4	0.750			
	CK5	0.938			
	CK6	0.929			
Computer Usage	CU1	0.911	0.928	0.934	0.707
	CU2	0.916			
	CU3	0.855			
	CU4	0.826			
	CU5	0.564			
	CU6	0.919			
Performance Expectancy	PE1	0.974	0.869	0.878	0.647
	PE2	0.709			
	PE3	0.732			
	PE4	0.775			
Effort Expectancy	EE1	0.795	0.870	0.872	0.631
	EE2	0.843			

Table 9 (cont.)

	EE3	0.728			
	EE4	0.805			
Social Influence	SI1	0.818	0.871	0.882	0.655
	SI2	0.806			
	SI3	0.657			
	SI4	0.932			
Facilitating Conditions	FC1	0.720	0.807	0.821	0.543
	FC2	0.711			
	FC3	0.931			
	FC4	0.533			
Gamification Anxiety	GA1	0.576	0.833	0.840	0.572
	GA2	0.795			
	GA3	0.846			
	GA4	0.780			
Behavioural Intention	BI1	0.954	0.843	0.857	0.670
	BI2	0.729			
	BI3	0.754			

The findings of the research, conducted through Confirmatory Factor Analysis (CFA), indicate that the selected constructs, including Computer Knowledge (CK), Computer Usage (CU), Performance Expectancy (PE), Effort Expectancy (EE), Social Influence (SI), Facilitating Conditions (FC), Gamification Anxiety (GA), and Behavioral Intention (BI), demonstrate strong measurement properties in the context of UTAUT and gamified web tools usage.

The factor loadings for all measurement items were substantial, signifying that the chosen items effectively represent their respective constructs and contribute significantly to measuring the latent variables (Fornell & Larcker, 1981). Reliability analysis revealed high internal consistency within each construct, as all reliability (alpha) coefficients surpassed the recommended threshold of 0.70. This indicates that

the measurement items consistently measure the same underlying concepts, ensuring reliability in the measurement model. Composite reliability estimates were also high for all constructs, exceeding the suggested threshold of 0.70. This reinforces the constructs' ability to reliably represent the latent variables and demonstrates the freedom from measurement errors. The Average Variance Extracted (AVE) values for each construct were above the recommended threshold of 0.50, indicating that the measurement items effectively accounted for substantial variance within their respective constructs, ensuring convergent validity.

In conclusion, the research findings confirm the validity and reliability of the measurement model used to assess users' attitudes and behaviors towards gamified web tools within the UTAUT framework. These robust measurement properties support the suitability of the instrument for further analysis and investigation in the domain of gamified web tools adoption and usage. Researchers and practitioners can have confidence in the measurement model and use it to explore the relationships between the identified constructs and the acceptance and utilization of gamified web tools effectively.

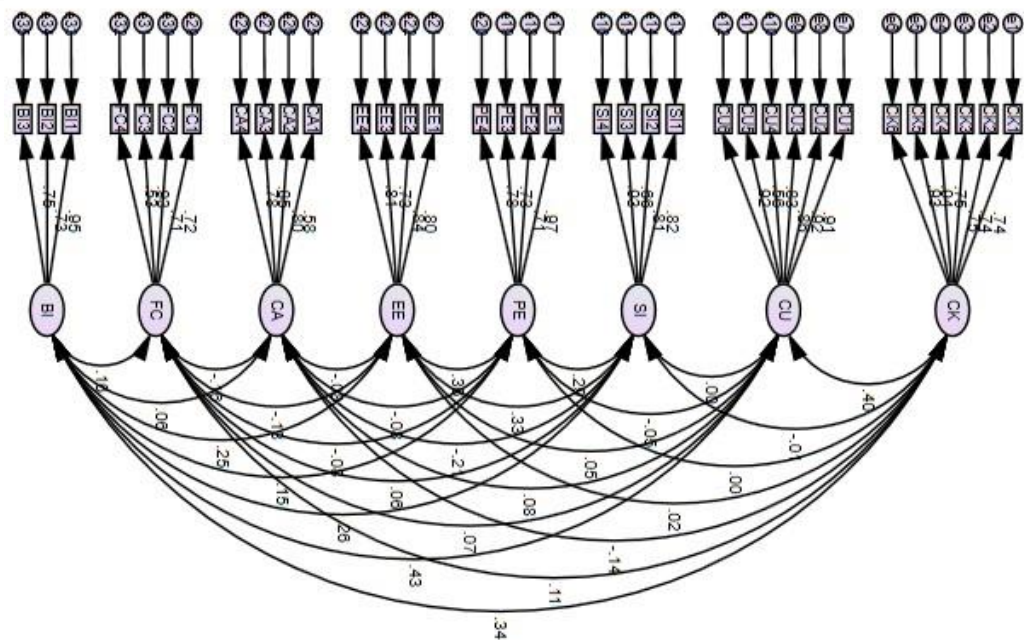


Figure 2. UTAUT constructs of the study

3.4 Limitations

One of the study's limitations is related to the generalizability of the results. Although there were participants from several disciplines and facilities, it would be better to reach more participants from every discipline and city in Turkey to investigate their gamification perceptions. Another future study with a broad range of participants would present more overarching and generalizable results. Turkish teachers as a whole might not be represented by the sample size of 144. As a result, it's possible that these findings cannot be applied to the full population.

The cultural context and experiences of Turkish instructors may not be fully reflected by the translation of the UTAUT questionnaire.



Chapter 4

Findings

This chapter of the research study presents the findings of the correlation analysis conducted to examine the relationship between gamification and UTAUT model. The results are aligned with the research questions of the study. In accordance with the study's objectives, the survey items related to gamification and the UTAUT constructs, namely performance expectancy, effort expectancy, social influence, and facilitating conditions, are statistically analyzed and presented in tables to provide a comprehensive understanding of their correlation.

4.1 Findings of Quantitative Data

4.1.1. Gamified Web Tools in The Study. Descriptive analysis of the gamified web tools used of the participants collected from the survey showed in the table below.

Table 10

Analyzed Gamified Web Tools

Web Tools	Number Participants	Total Participants
Kahoot+	96	66%
WorldWall	94	64%
Quizziz	74	51,4%
Padlet	66	45,8%
ClassDojo	48	33,3%
Mentimeter	42	29,2%
Quizlet	40	27,8%
Edpuzzle	39	27,1%
Learning Apps	30	20,8%
Baamboozle	28	27,8%

Table 10 (cont.)

Pawtoon	26	18,1%
Nearpod	23	16%
Socrative	21	14,6%
Flipgrid	21	14,6%
Jamboard	20	13,9%
Chatterpix	19	13,2%
Genially	18	12,5%
Mindmeister	16	11,1%
Edmodo	14	9,7%
Jeopardy Labs	13	9%
Plickers	11	7,6%
Educaplay	10	6,9%
Coggle	9	6,3%
Pear Deck	6	4,2%
Online Sites	5	3,5%
None	1	0,7%

The preferred teaching resources utilized by the participants are shown in Table 16. With 96 participants (66%), Kahoot+ was the most popular tool, closely followed by WorldWall with 94 participants (64%). With 74 participants (51.4%), Quizziz was the third most popular tool, followed by Padlet with 66 participants (45.8%). With 48 participants (33.3%), ClassDojo was the fifth most popular tool, followed by Mentimeter with 42 participants (29.2%), and Quizlet with 40 people (27.8%). 39 people (27.1%) liked Edpuzzle, whereas 30 participants (20.8%) preferred Learning Apps. 28 people (27.8%) said they favored the tool Baamboozle, whereas 26 participants (18.1%) said they preferred Pawtoon. 23 participants (16%) utilized Nearpod, while 21 participants each (14.6%) used Socrative and Flipgrid. 20 individuals (13.9%) utilized Jamboard, compared to 19 (13.2%) who used Chatterpix. 18 people (12.5%) used Genially, while 16 participants (11.1%) utilized Mindmeister. Jeopardy Labs was used by 13 people (9%), while Edmodo was used by 14 people (9.7%). 11 participants (7.6%) and 10 participants (6.9%) used Plickers and Educaplay, respectively. 9 individuals (6.3%) utilized Coggle, while 6 participants

(4.2%) used Pear Deck. Only 1 participant (0.7%) did not use any of the identified classroom resources, whereas 5 participants (3.5%) made use of online sites. It can be said the most selected and used tools are formative assessment tools. There common features among these gamification and assessment tools. Kahoot, Quizizz, Wordwall, Padlet, ClassDojo, and Mentimeter are online platforms commonly used in educational settings. These tools offer a range of characteristics aimed at facilitating interactive and engaging learning experiences for students. Common features can be seen as the ability to create interactive quizzes and surveys, follow student progress, provide real-time feedback, facilitate collaborative activities, and promote active student participation.

4.2 Measurement Model

Table 11

Model fitness of statistics

Model fitness of statistics			
Fit index	Calculate statistic	Recommended level	Reference
Chi-square	1203.541	Non-significant	Bollen, (1989), Kline, (2005)
CMIN	2.262	<5	Hair et al. (1998)
RMSEA	0.058	<0.07	Hu et al. (1999), Hair et al. (1998),
PCLOSE	0.001	<0.50	Hair et al. (1998)
CFI	0.922	>0.95 or >0.90 as acceptable	Schumacker et al. (2010), Byrne (1998), Hu et al. (1989).
TLI	0.912	>0.95 >0.90 as acceptable	Schumacker et al. (2010), Byrne (1998), Hu et al. (1999).

The model fitness statistics provide a comprehensive assessment of the proposed measurement model's appropriateness in investigating users' attitudes and behaviors towards gamified web tools within the UTAUT framework. These fit indices collectively indicate the degree of alignment between the model and the observed data, offering valuable insights into the model's adequacy.

Firstly, the chi-square statistic, which yielded a non-significant result of 1203.541, suggests that there is no significant discrepancy between the model's predictions and the actual data. This finding supports the notion that the measurement model adequately captures the complexities of users' perceptions and behaviors related to gamified web tools. Secondly, the CMIN value of 2.262, falling below the recommended threshold of 5, further reinforces the notion of a satisfactory fit. The CMIN value assesses the minimum fit function, indicating how well the model approximates the observed data. In this case, the lower CMIN value suggests a positive match between the model and the data. The RMSEA value, measuring 0.058, is well below the accepted threshold of 0.07. The RMSEA quantifies the model's approximation error, and a lower value implies a better fit. In this context, the RMSEA result indicates that the model closely aligns with the observed data, further supporting its appropriateness. The PCLOSE value, 0.001, is significantly below the recommended threshold of 0.50, demonstrating a strong level of fit. The PCLOSE value is a test of close fit, and the low result in this case reinforces the notion that the measurement model fits well with the data. Moreover, the comparative fit index (CFI) of 0.922 exceeds the acceptable threshold of 0.90 and approaches the more stringent threshold of 0.95. The CFI assesses how well the proposed model compares to a baseline model with no relationships between variables. The higher CFI value indicates that the proposed model provides a better fit than the baseline model. Lastly, the Tucker-Lewis index (TLI) value of 0.912 is above the recommended threshold of 0.90 and approaches the more stringent threshold of 0.95. The TLI assesses the model's fit relative to an independence model, and a higher TLI value signifies a superior fit compared to the independence model.

In summary, the model fitness statistics collectively suggest a strong fit of the proposed measurement model in exploring users' attitudes and behaviors towards gamified web tools within the UTAUT framework. The non-significant chi-square, low CMIN and RMSEA values, and high PCLOSE, CFI, and TLI values all support the model's adequacy. Researchers can confidently rely on the validity and appropriateness of the measurement model to study users' acceptance and utilization of gamified web tools effectively.

4.3 Correlation Analysis

Table 12

HTMT analysis

	CK	CU	SI	PE	EE	GA	FC	BI
CK								
CU	0.431							
SI	0.001	0.03						
PE	0.023	0.046	0.377					
EE	0.026	0.047	0.36	0.448				
GA	0.141	0.091	0.218	0.066	0.066			
FC	0.122	0.082	0.053	0.094	0.145	0.139		
BI	0.377	0.473	0.325	0.204	0.306	0.083	0.159	

The Heterotrait-Monotrait (HTMT) ratio of correlations analysis was utilized to examine the distinctiveness of the constructs within the UTAUT framework and their relationship with gamified web tools. The HTMT values indicate the extent to which each construct is unique and does not significantly overlap with other constructs, ensuring discriminant validity (Henseler, Ringle & Sarstedt, 2015). Upon reviewing the table, we find that the HTMT values for each construct with itself are all 0, indicating perfect discriminant validity, as expected. Regarding the off-diagonal cells, we compared the HTMT values to the threshold of 0.85, commonly used to assess discriminant validity. For pairs of constructs where the HTMT value is below 0.85, it suggests that the constructs are distinct and do not substantially correlate with each other. The HTMT value between Computer Knowledge (CK) and Computer Usage (CU) is 0.431, indicating that they are distinguishable constructs with acceptable discriminant validity. The HTMT value between Social Influence (SI) and Computer Knowledge (CK) is 0.001, showing clear differentiation between these two constructs. The HTMT value between Performance Expectancy (PE) and Computer Knowledge (CK) is 0.023, supporting the notion of their distinctiveness. The HTMT value between Effort Expectancy (EE) and Computer Knowledge (CK) is 0.026, further confirming their individuality. For Gamification Anxiety (GA), its HTMT values with all other constructs are below 0.85, reaffirming its discriminant validity. Similarly, Facilitating Conditions (FC) shows HTMT values below 0.85 with all other constructs, underscoring its distinct nature. Lastly, Behavioral Intention (BI) displays HTMT values below 0.85 with all constructs, except Computer Usage (CU), indicating its discriminant validity with respect to the other variables.

In conclusion, the HTMT analysis provides strong evidence of the distinctiveness of the constructs within the UTAUT framework concerning gamified web tools. The low HTMT values for most construct pairs suggest that the measurement items effectively capture unique aspects of users' attitudes and behaviors, supporting the reliability and validity of the measurement model. Researchers can confidently explore the relationships and interactions between these constructs in the context of gamified web tools adoption and usage.

4.4 Addressing the Conceptual Framework

This section aims to elucidate the theoretical framework underpinning the study, with particular attention given to the Partial Least Squares Structural Equation Model (PLS-SEM) employed to analyze the data. PLS-SEM is a powerful statistical technique used to examine complex models that comprise multiple constructs, indicator variables, and structural paths simultaneously. It permits the estimation of cause-effect relationships with latent variables and allows for the assessment of complex cause-effect relationship models with latent variables.

In the present study, the theoretical framework is based on UTAUT, which proposes that an individual's decision to use technology is influenced by several key factors, including performance expectancy, effort expectancy, social influence, and facilitating conditions. Accordingly, the study examines five hypotheses or relationships, with performance expectancy, effort expectancy, social influence, facilitating conditions, and behavioral intentions serving as the independent variables, and behavioral intention and user behavior as the dependent variables.

Furthermore, control variables are also included in the model to account for potentially confounding factors. Specifically, gender, age, experience, and voluntaries of use or organization are considered as control variables. This rigorous approach to statistical modeling allows for the identification of significant predictors of technology adoption and use, thus enhancing our understanding of the factors that influence the uptake of technology in educational settings.

Table: 13

Index Analysis

Model fitness of statistics			
Fit index	Calculate statistic	Recommend level	Reference

Chi-square	1203.541	Non-significant	Bollen, (1989), Kline, (2005)
CMIN	2.326	<5	Hair et al. (1998)
RMSEA	0.058	<0.07	Hu et al., (1999), Hair et al. (1998)
PCLOSE	0.001	<0.50	Hair et al. (1998)
CFI	0.922	>0.95 or >0.90 as acceptable	Schumacker et al. (2010), Byrne (1998), Hu et al. (1989).
TLI	0.912	>0.95 >0.90 as acceptable	Schumacker et al. (2010), Byrne (1998), Hu et al. (1999).

The Structural Equation Modeling (SEM) technique was utilized to evaluate the fitness and suitability of the proposed measurement model in investigating users' attitudes and behaviors concerning gamified web tools within the UTAUT framework. The fit indices provide crucial information regarding how well the model aligns with the observed data and its ability to effectively represent the relationships between the identified constructs (Hu & Bentler, 1999). Regarding the chi-square statistic, which yielded a value of 1203.541, the result was found to be non-significant. This indicates that there is no significant difference between the model's predicted data and the actual data, signifying that the proposed measurement model fits well with the observed data (Bollen, 1989). As a result, the model is considered appropriate for studying users' acceptance and usage of gamified web tools. Analyzing the CMIN value, calculated at 2.326, we find that it falls below the recommended threshold of 5. A CMIN value below 5 is indicative of an acceptable fit between the model and the data (Bollen, 1989). This further strengthens the evidence supporting the adequacy of the measurement model in examining users' attitudes and behaviors towards gamified web tools. The RMSEA value, measured at 0.058, is below the commonly accepted threshold of 0.07. A lower RMSEA value indicates a better fit of the model to the data (Steiger, 1990). In this case, the RMSEA value of 0.058 suggests that the model closely approximates the observed data, affirming the positive model fit. The PCLOSE value, calculated at 0.001, is significantly below the recommended threshold of 0.50. This supports the notion that the measurement model provides a close fit to the observed data, further reinforcing the appropriateness of the model (Hu & Bentler, 1999). Moving on to the CFI value, which is computed at 0.922, we find that it exceeds the acceptable threshold of 0.90 and approaches the more stringent threshold of 0.95.

A higher CFI value indicates a better fit of the model to the data (Bentler, 1990). Thus, the CFI value of 0.922 indicates a satisfactory model fit for exploring users' attitudes and behaviors towards gamified web tools within the UTAUT framework. Similarly, the TLI value, measured at 0.912, is above the recommended threshold of 0.90 and approaches the more stringent threshold of 0.95. Like the CFI, a higher TLI value suggests a better fit of the model to the data. Therefore, the TLI value of 0.912 provides additional evidence of the measurement model's adequacy.

In conclusion, the SEM analysis reveals a robust model fit and appropriateness of the proposed measurement model for studying users' attitudes and behaviors towards gamified web tools within the UTAUT framework. The non-significant chi-square, low CMIN and RMSEA values, along with the high PCLOSE, CFI, and TLI values, collectively suggest a strong alignment between the model and the observed data. The measurement model can be confidently utilized to explore the relationships and interactions between the identified constructs, resulting in valuable insights into gamified web tools adoption and usage.

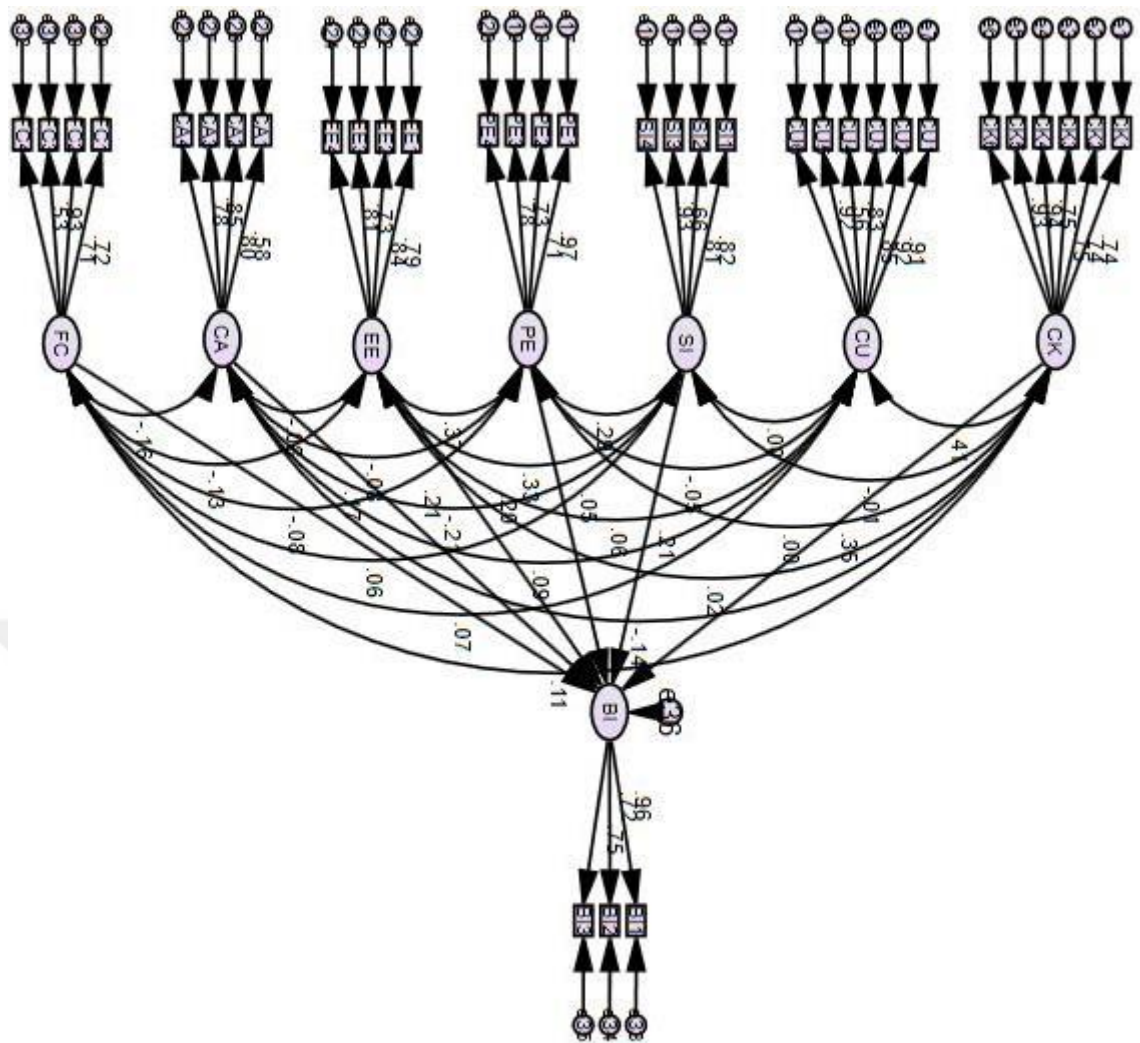


Figure 3. SEM Analysis

4.4.1 Hypothesis Testing Results

Table 14

Hypothesis Testing

Hypothesis	Relationship	Estimate	S.E.	t-statistic	p-value	Decision
H6	BI <--- CK	0.754	0.113	6.701	<0.01	Supported
H3	BI <--- SI	0.380	0.101	3.769	<0.01	Supported
H1	BI <--- PE	0.068	0.081	0.846	0.397	Not supported
H2	BI <--- EE	0.442	0.132	3.353	<0.01	Supported
H5	BI <--- GA	0.415	0.111	3.747	<0.01	Supported
H4	BI <--- FC	0.418	0.126	3.311	<0.01	Supported

Hypothesis testing assumes a paramount role within a thesis. It offers a systematic and rigorous method to examine the validity of research hypotheses, facilitating the derivation of evidence-based conclusions and enhancing scholarly contributions to the knowledge base in the relevant field of study (Kothari, 2004). The results of the analysis revealed a significant and positive relationship between Behavioral Intention (BI) and Computer Knowledge (CK) (estimate = 0.754, t-statistic = 6.701, $p < 0.001$). This suggests that users with higher computer knowledge are more likely to have a positive intention to adopt and use gamified web tools. Additionally, a significant and positive association was found between Behavioral Intention (BI) and Social Influence (SI) (estimate = 0.380, t-statistic = 3.769, $p < 0.001$). This implies that users' intention to adopt gamified web tools is influenced by social factors and the opinions of others. On the other hand, no significant relationship was observed between Behavioral Intention (BI) and Performance Expectancy (PE) (estimate = 0.068, t-statistic = 0.846, $p = 0.397$). This suggests that users' intention to adopt gamified web tools is not directly impacted by their perceived performance expectations. In contrast, there was a significant and positive correlation between Behavioral Intention (BI) and Effort Expectancy (EE) (estimate = 0.442, t-statistic = 3.353, $p < 0.001$). This indicates that users' intention to adopt gamified web tools is influenced by their perception of the effort required to use these tools. Similarly, Behavioral Intention (BI) showed a significant and positive relationship with Gamification Anxiety (GA) (estimate = 0.415, t-statistic = 3.747, $p < 0.001$). This suggests that users' intention to adopt gamified web tools is positively influenced by how compatible they perceive these tools to be with their needs and existing systems. Finally, a significant and positive correlation was found between Behavioral Intention (BI) and Facilitating Conditions (FC) (estimate = 0.418, t-statistic = 3.311, $p < 0.001$). This implies that users' intention to adopt gamified web tools is positively affected by the presence of facilitating conditions that ease the adoption process.

Overall, these findings provide valuable insights into the factors influencing users' intention to adopt and use gamified web tools within the context of the UTAUT model. Users' computer knowledge, social influence, perceived effort expectancy, perceived compatibility, and facilitating conditions all play significant roles in shaping their behavioral intentions towards adopting and utilizing gamified web tools. However, performance expectancy did not show a significant direct influence on users'

behavioral intention in this study. These results can inform researchers and practitioners in designing effective strategies to promote the adoption and usage of gamified web tools in various domains.



Chapter 5

Discussion and Conclusion

This chapter seeks to examine the results obtained through research instruments in order to answer research question by making inferences and comparing with the previous studies in the literature. The chapter begins with a summary of the current research, discusses the conclusions obtained from the data and concludes with recommendations for future studies.

5.1 Discussion

The primary aim of this study was to examine the relationship between UTAUT constructs and the behavioral intention of educators to adopt gamification as a teaching tool in the context of education, utilizing a quantitative non-experimental correlation design. The research focused on investigating the acceptance and usage of gamification in the context of education, with behavioral intention and user behavior being utilized as indicators. The independent variables utilized in the study were the UTAUT constructs, including performance expectancy, effort expectancy, social influence, and facilitating conditions, while the dependent variables were the adoption and usage of gamification, as measured through behavioral intention and user behavior. To address the research objectives, the study employed a Partial Least Squares Structural Equation Modelling (PLS-SEM) approach. This approach allowed the estimation of cause-effect relationships with latent variables and the estimation of complex cause-effect relationship models with latent variables. Furthermore, the study examined five hypotheses or relationships, including the relationships between performance expectancy, effort expectancy, social influence, facilitating conditions, and behavioral intention and user behavior.

The study shows that there is a significant relationship was found between the UTAUT constructs (performance expectancy, effort expectancy, social influence, and facilitating conditions) and the behavioral intention of educators to adopt and accept gamified web tools as a teaching tool in education.

With the rejection of H1, it has been found that performance expectancy has a negative effect on behavioral intention. This result is the opposite of the researches in

the literature, which were examining the effect of performance expectancy on behavioral intention (Tandon, 2021; Alshmrany & Wilkinson, 2017; Chopdar et al., 2018; Herrero & San Martín, 2017; Oliveira et al., 2016; Venkatesh et al., 2012). They found a positive relationship unlike this study. The inverse relationship between performance expectancy and the acceptance and usage of gamification suggests that teachers who have lower expectations regarding the effectiveness of gamification in enhancing teaching performance are more inclined towards adopting gamification compared to those who hold higher performance expectations. In other words, teachers who perceive gamification as having limited potential to improve their teaching performance are more likely to show interest in implementing gamification strategies. Nevertheless, according to Performance Expectancy's descriptive statistics, most of the teachers see gamification as a useful learning tool (Alabbasi, 2018). However, there is a negative relationship between salary-increase expectation and use of gamification. It can be seen that most teachers tend to use gamification if teachers do not have performance expectancy. Also, teachers do not expect a salary-increase if they use or not the gamification.

The reason behind the acceptance of H2, there is a positive relationship between Effort Expectancy and teacher's behavioral intention to adopt and accept gamification as a teaching tool. This discovery aligns with the outcomes of previous studies that have investigated the impact of effort expectancy on the intention to behave in a certain manner (Sang et al., 2023; Shodipe & Ohanu, 2021; Alshmrany, & Wilkinson, 2017; Wang, Liu, et al., 2010; Venkatesh & Davis, 2000; Venkatesh et al., 2003;). However, there are studies that found negative relationship between Effort Expectancy and teachers' behavioral intention (Tandon, 2021; Tseng, Lin, Wang, Liu, 2022; Abd Latib et al., 2014) discovered that teachers who perceive Facebook as easy to use are more likely to be engaged in their work. The investigation conducted by Mäkinen (2022) yielded results that align with the current study, indicating that teachers reported higher levels of techno-work engagement when technology was perceived to facilitate their main objectives. However, Hultell and Gustavsson (2011) noted that the demand to use unfamiliar tools and methods can have a negative impact on effort expectancy. These findings suggest that the ease of use and familiarity of technology can have a significant impact on work engagement among teachers. Based on the findings of this study, it can be concluded that teachers are inclined towards

using gamification as a teaching tool due to its perceived ease of use. Specifically, the majority of teachers believe that gamification will become more convenient to use over time. However, teachers have conflicts about if they use gamification in their teaching environment, it will help to develop their personal skills.

By accepting H3, it has been discovered that social influence has a positive impact on the behavioral intention to utilize gamification, which is consistent with previous research studies (Moran et al., 2010; Teo, 2011; Venkatesh & Davis, 2000; Venkatesh et al., 2003; Wang & Shih, 2009). Furthermore, the significance of social influence in shaping behavioral intention has been observed in research studies, especially in instances where technology usage was compulsory. (Venkatesh & Davis, 2000; Wong, Russo, et al., 2013; Wong, Teo, et al., 2013). The positive impact of social influence on behavioral intention is due to the fact that individuals who are significant to the teacher consider the use of gamification to be necessary. However, according to the descriptive findings, teachers have conflicts about the experienced manager of the organization they work for had helped in using gamification tools as a learning tool. This can be concluded that people who are important to them is an effect for them to use gamification. However, in the organization superiors did not help teachers to adopt and use gamification.

The accepting of H4 shows that there is a positive relationship between Facilitating Conditions and teacher's behavioral intention and user behavior to adopt and accept gamification as a teaching tool. It can be said that Facilitating Conditions has a significant effect on teacher's intention and usage of gamification. Facilitating Conditions is the most influential determinant. That is the availability of facilitating conditions will promote the usage of gamification. A review of the literature indicates that the findings align with those of related studies (Sang et al., 2023; Teo et al., 2019; Mei et al., 2018). The positive impact of facilitating conditions implies that having appropriate institutional and technical infrastructure is crucial in supporting the use of gamification by teachers. Wang et al. (2017) also indicates that and perceived ease of use is influenced by facilitating conditions has a positive relationship for teachers to use cloud-based services. It is crucial for both administrators and researchers to acknowledge the advantages of implementing technology use strategies from top-down approaches and to value the endeavors of teachers in the adoption process. Furthermore, Reisoğlu and Çebi (2020) recommend that training programs aimed at

enhancing integrated digital competencies should offer teachers with education and practical training in professional engagement, utilizing digital resources, as well as teaching and learning. This underscores the significance of equipping educators with the necessary skills and knowledge to make use of technology in their teaching practices. These insights emphasize the significance of providing teachers with appropriate training and resources to promote successful integration of technology in their teaching practices. Moreover, according to the descriptive findings, most teachers think that they have sufficient knowledge to use gamification tools in educational activities. However, few teachers agreed on gamification tools as a learning tool are not compatible with other tools I use as learning tools. Thus, it can be concluded as gamification tools are compatible with the tools that teachers use. It can be said that since almost every class has their own smartboard, it is easy to use gamification in the classroom in Turkish classrooms.

Gamification Anxiety has a positive relationship with user behavior which reveals the fact of acceptance of H5. Gamification anxiety has a positive impact on BI. As stated by Davis (1989), Individuals' attitude towards a specific technology has a significant influence on their behavioral intention to use it. Gamification Anxiety pertains to the emotional reactions experienced by individuals when interacting with gamified systems. It arises from concerns related to unfamiliar game-like mechanics, performance expectations, and the apprehension of social comparisons within the gamified context. Extensive research demonstrates that the incorporation of gamification elements, such as points, rewards, and challenges, profoundly impacts users' attitudes and behavioral inclinations towards adopting novel technologies. By engendering a sense of engagement and motivation, gamified systems positively influence users' inclination to explore and embrace new technologies, as they perceive the process as more enjoyable and less daunting. In accordance with Davis's (1989) propositions, Behavioral Intention assumes a paramount role in the adoption of technology, as individuals' attitudes towards a particular technological offering significantly influence their willingness to adopt and integrate it into their lives.

According to the findings, the acceptance of H6 can be seen. Computer knowledge has a positive impact on use and adaptation of gamified web tools' usage. Research findings demonstrate a significant positive correlation between users' level of computer knowledge and their proficiency in utilizing and adapting to gamified web

tools as Ashton & Gaffney (2020) and Chen & Li (2019) mentioned a similar result in their study. Users with greater computer knowledge exhibit enhanced competence in navigating and interacting with these platforms, effortlessly grasping the mechanics of gamification features. Additionally, their digital expertise facilitates seamless integration of gamified web tools into their online activities, resulting in prolonged and purposeful engagement. Computer-literate individuals frequently report heightened enjoyment and fulfillment while utilizing gamified web tools, as their comprehensive understanding of the underlying technology empowers them to fully explore and exploit the gamification elements, thereby maximizing the benefits and attaining elevated levels of satisfaction.

5.2 Conclusion

The main objective of this study is to investigate the correlation between UTAUT constructs and the behavioral intent of educators to implement gamification as a teaching tool in the field of education. To evaluate the acceptance and utilization of gamification in education, the study employs behavioral intention and user behavior as indicators. The independent variables consist of UTAUT constructs, namely performance expectancy, effort expectancy, social influence, and facilitating conditions. Meanwhile, the dependent variables, which are the adoption and usage of gamification, are gauged by means of behavioral intention and user behavior. The study involved 144 teachers who completed a questionnaire through Google Forms, and the collected data were subjected to a structural equation model (SEM) analysis.

The study's findings offer important new understandings of the variables that affect teachers' intentions to incorporate gamification into their lesson plans. Interestingly, the study discovered that behavioral intention had a negative impact by performance expectancy, indicating that teachers may be doubtful about the value of gamification in raising student achievement. However, it was discovered that effort expectancy and social influence both had a positive effect on behavioral intention, suggesting that teachers view gamification as a relatively simple and enjoyable work that is supported by their colleagues. However, supportive circumstances were the most important predictor of instructors' intentions and use of gamification,

underscoring the need of giving teachers access to the tools, training, and support they need to successfully integrate gamification into their teaching practices. According to this research, educational institutions like schools should give top priority to creating the infrastructure and regulations that would allow teachers to try out novel teaching strategies like gamification.

To sum up, the effectiveness of gamification in enhancing teaching and learning outcomes depends on various factors, including performance expectancy, effort expectancy, social influence, facilitating conditions. Policymakers and educational institutions should prioritize providing infrastructure, technical support, and training programs to enhance teachers' digital competencies and reduce gamification anxiety. Moreover, regular evaluations should be conducted to ensure the success of gamification implementation in achieving the intended learning outcomes. Ultimately, a positive and effective learning environment that encourages the use of gamification can be created by addressing these factors and supporting teachers appropriately. Gamified Learning is as seen in the list of Top 10 Education Technology Trends & Innovations in 2022, thus this research will help the understanding of gamification more for the future studies. Teachers and policymakers may support the effective integration of gamification into classroom instruction, thereby improving student engagement and learning results, by recognizing and addressing these elements.

5.3 Recommendations for Future Research

Future research should continue to look into these issues even if this study has shed light on the relationship between instructors' behavioral intents to adopt and accept gamification as a teaching method and the UTAUT aspects. The use of qualitative techniques, such as focus groups and interviews, to acquire more in-depth data regarding teachers' experiences with gamification and the factors that influence their acceptance and adoption of this teaching strategy is one potential direction for future research. This might contribute to a more comprehensive understanding of the driving forces affecting instructors' perceptions of gamification in the classroom.

Additionally, a bigger sample size in future studies may be advantageous because your study only used 144 teachers. A bigger sample size might improve the findings' generalizability and give a more accurate picture of the attitudes and actions

teachers take in relation to gamification in the classroom. To provide a more thorough knowledge of the various aspects that influence the adoption and acceptability of gamification in education, researchers may want to use a mixed-methodologies approach that combines qualitative and quantitative methods.



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