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Article abstract

Recent research specifies that game-based learning effectively engages students in classroom activities. Although there has been a prominent upsurge in game-based teaching and learning, this area has not received significant attention within the context of Gulf nations. This study investigates the perceptions, motivations, and benefits of game-based teaching-learning among school teachers, aiming to enhance the interactive learning environment. This study used a quantitative method and survey data from 505 school teachers who were actively teaching around the United Arab Emirates to reach its objectives. The majority of teachers believed that using games as a teaching tool in the classroom was a good idea. The study revealed the potential for game-based learning in the classroom and identified challenges, such as the need for rigorous game-based instructional design. We examined game-based teaching and learning's role in contributing to interactive learning environments and its apparent benefits of improving teamwork and lowering stress among teachers.

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# Exploring United Arab Emirates School Teachers' Perceptions, Motivation and Benefits of Game-Based Teaching and Learning Environments

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*Recent research specifies that game-based learning effectively engages students in classroom activities. Although there has been a prominent upsurge in game-based teaching and learning, this area has not received significant attention within the context of Gulf nations. This study investigates the perceptions, motivations, and benefits of game-based teaching-learning among school teachers, aiming to enhance the interactive learning environment. This study used a quantitative method and survey data from 505 school teachers who were actively teaching around the United Arab Emirates to reach its objectives. The majority of teachers believed that using games as a teaching tool in the classroom was a good idea. The study revealed the potential for game-based learning in the classroom and identified challenges, such as the need for rigorous game-based instructional design. We examined game-based teaching and learning's role in contributing to interactive learning environments and its apparent benefits of improving teamwork and lowering stress among teachers.*

*Des recherches récentes précisent que l'apprentissage par le jeu permet d'impliquer efficacement les étudiants dans les activités de la classe. Bien que l'enseignement et l'apprentissage par le jeu aient connu un essor important, ce domaine n'a pas reçu une attention particulière dans le contexte des pays du Golfe. Cette étude examine les perceptions, les motivations et les avantages de l'enseignement et de l'apprentissage par le jeu chez les enseignants, dans le but d'améliorer l'environnement d'apprentissage interactif. Pour atteindre ses objectifs, cette étude a utilisé une méthode quantitative et des données d'enquête provenant de 505 enseignants dans les écoles de la région des Émirats arabes unis. La majorité des enseignants ont estimé que l'utilisation des jeux comme outil d'enseignement en classe était une bonne idée. L'étude a révélé le potentiel de l'apprentissage par le jeu en classe et a identifié des défis, tels que la nécessité d'une conception pédagogique rigoureuse basée sur le jeu. Nous avons examiné le rôle de l'enseignement et de l'apprentissage par le jeu dans la création d'environnements d'apprentissage interactifs, ainsi que ses avantages apparents en termes d'amélioration du travail d'équipe et de réduction du stress chez les enseignants.*

Recent studies suggest that game-based teaching and learning is an effective method for engaging students in classroom activities (Hartt et al., 2020; Molin, 2017; Rohman & Fauziati, 2022; Sofiadin & Azuddin, 2021; Yu et al., 2023). With the development of EdTech pedagogies, game-based teaching and learning has become an accepted teaching-learning approach due to its ability to motivate and engage students in complex learning activities, such as problem-solving, decision-making, and metacognitive thinking (Aprea & Ifenthaler, 2021; Cabellos et al., 2023; Sulistyanto et al., 2023). Other studies indicated that game-based learning improves students' involvement in classroom activities (Al Breiki & Yahaya, 2021; Alhammad & Moreno, 2018; Ambawani et al., 2024; Rivera & Garden, 2021). Furthermore, Garone and Nesteriuk (2019) revealed that the rise of game-based learning is an initiative to improve teachers' teaching experiences by engaging students in problem-solving activities.

Previous studies on game-based learning primarily focused on video game-based learning; thus, there has been little research on the aspects of online game-based learning environments that motivate teachers to engage students in classroom teaching (Al Breiki & Yahaya, 2021; Hoque et al., 2023; Mocanu et al., 2023; Saputri et al., 2020). Other studies also revolved about the explanation and experimentation of the game-based learning concept, focusing mostly on its function in engaging learners in classroom teaching activities (Bourgonjon et al. 2013; Foster & Shah, 2020; Kim et al., 2018; Pitarch, 2018; Yu et al., 2023). Research recommends that one of the significant factors limiting teachers' creative performance in online learning environments is the lack of motivation for classroom activities (Meşe & Sevilen, 2022; Hoque et al., 2023). Further studies have shown that student learning can be affected by teachers' lack of motivation to engage students in classroom learning (Ertan & Kocadere, 2022; Islam et al., 2023).

Therefore, further research is needed to investigate to what extent United Arab Emirates [UAE] school teachers evaluate the online game-based teaching-learning of educational settings as an active learning practice, what kind of teacher-student interactions occur in game-based classes, to what extent teachers perceive their role in motivating students, to what extent teachers take a position in their choice to participate in game-based classes, and to what extent teachers perceive the benefits of a game-based teaching and learning environment. As a result, this study investigates school teachers' engagement in game-based classes and explores to what extent they perceive their experiences in game-based learning environments in UAE school education. The following issues are the primary focus of this study:

1. To what extent do school teachers in the UAE perceive game-based learning experiences in terms of their needs and choices to motivate students in their classes?
2. To what extent can the implementation of game-based learning foster interactive teaching and learning environments?
3. What are the benefits of game-based learning in UAE school teaching-learning environments?

UAE school teachers' perceptions and experiences of game-based learning concerning motivational factors, students' engagement to boost interactive teaching-learning environments, and the benefits of using game-based teaching-learning in school education have been explored while investigating the research questions.

## Literature Review

This literature reviews game-based learning in UAE school education, examining its effects on

student motivation, advantages and disadvantages, and its current situation. It emphasizes game-based learning's potential to create an engaging and empowering learning environment.

## Research in Game-Based Learning

Researchers are now working to define and better understand the idea of game-based teaching and learning environments, as well as how game-based teaching and learning engages students in educational activities. This effort has resulted in a substantial amount of research that has been supported by academics (e.g., Bourgonjon et al., 2013; Foster & Shah, 2020; Kim et al., 2018; Pitarch, 2018; Shah & Foster, 2015; Spires et al., 2011). According to Kim et al. (2018), in order to fully comprehend the idea of game-based learning, one must first examine the nature of games, as this sets the groundwork for understanding the idea of game-based teaching-learning. Games require active engagement from at least one player because they are complex systems made up of interrelated sets of mechanics and actors by their very nature (Al Fatta et al., 2018; Huotari & Hamari, 2016). Similarly, in another study, Kim et al. (2018) stated that games evolve in response to advancing technology, expanding beyond traditional platform-based formats to encompass a diverse range of interests, including alternate reality games. Notable markers of this evolution include the incorporation of leader boards, badges, and point systems (Zahedi et al., 2021). Given the multifaceted dynamics between players and the game structure, game-based learning has been defined variously across different domains, including education, marketing, advertising, and training.

Game-based learning needs game mechanics to boost the players' dedication, commitment, and enjoyment in specific settings. These processes have a direct impact on reward distribution. Depending on the level of difficulty, they frequently offer incentives to players who take action at a specific moment. Thus, game-based learning is an effective tactic that can inspire and influence large groups and has numerous applications in education, learning, and personal development. Huotari & Hamari (2016) defined game-based learning as the process of improving services with affordances that enhance the gaming experience and help customers generate more overall value. According to Kim et al. (2018), game-based learning is a combination of methods used to solve issues. They also posit that game-based learning is a set of techniques and activities in the form of games used to address issues related to learning and instruction.

In brief, game-based learning is a rapidly evolving field with diverse contributions from academicians. Its multifaceted nature, including game elements, requires clear definitions. Game-based learning enhances motivation, offering new applications in education and self-driving learning process.

## Teachers' Motivation in Game-Based Learning

Maintaining students' motivation in classroom activities is one of the most problematic tasks for teachers. Teachers use different methods to get students interested in the lesson content. A game-based learning strategy to gauge student involvement in lessons has been proven to motivate student engagement (Measles & Abu-Dawood, 2015; Rincon-Flores & Santos-Guevara, 2021). Several studies have examined the link between motivation and game-based learning. For instance, Díaz-Ramírez (2020) noted that the success of game-based learning relies on motivating students to induce the desired actions. Games have the ability to motivate students (Dicheva et al., 2015), and in school education, it is vital that students should be motivated both intrinsically

and externally by their studies, both of which can be affected by game-based learning (van Roy & Zaman, 2018). Motivated students are generally keen to complete their studies and, therefore, gain the most from their education. If teachers and materials designers can find a way to design appropriate games for motivating students to learn, there will be many benefits for both institutions and learners.

Hu (2020) highlighted several theories central to the development of game-based teaching and learning environments. These are the motivation theory, self-determination theory, achievement goal theory, social learning theory, situated learning theory, and feedback theory. Motivation and motivational theories are a major driving force behind the game-based learning, and teachers hope that students become more motivated by game-based learning. Huang & Hew (2018) identified several motivational theories that support the gamification of education. These are self-determination theory, flow theory, goal-setting theory, oral comparison theory, and behavior reinforcement theory. Thereafter, they used these five models as the basis for gamification design in a flipped class for students studying basic statistics and SPSS. They found that gamification encouraged students to undertake extra learning tasks and produce work of higher quality than the control group. The study used badges as well as positive feedback as a motivation for students to complete tasks early. Gamification also allows learners to take on increasingly different challenges, thereby adding intrinsic motivating factors. This has a tremendous impact on teachers and instructors, who are constantly seeking ways to motivate students to take more control over their own learning. Huang & Hew (2018) suggested that gamification is an effective way to motivate those who wish to motivate themselves intrinsically.

Reward systems of various types are prevalent in the gaming world to motivate players (Nicholson, 2015). To motivate students through game-based learning, content designers use various strategies to encourage learners to perform various tasks and foster a sense of competition. For example, Nicholson (2015) noted that designers aim to increase intrinsic motivation through rewards, points, and badges. van Roy & Zaman (2018) examined the impact of the game-based learning on motivation among 40 university students in Belgium over a 15-week course using Google+. They found that attributes such as badges, competition, and challenges were a significant part of the gamification process. Although game-based learning can be a motivating factor, van Roy & Zaman (2018) called for the instructor to know their audience and be aware of their needs to adapt to the gaming system appropriately. Personal characteristics cannot be underestimated as mediating factors between gamification and motivation (van Roy & Zaman, 2018).

Thus, game-based learning can use both intrinsic and extrinsic gaming features to motivate students to take an active role in their classroom activities. In addition, a wide range of motivating theories have supported the creation of game-based teaching and learning environments.

## Benefits and Drawbacks of Game-Based Learning

Similar to other EdTech pedagogies, game-based learning has several advantages. It has first and foremost become an effective instrument for teachers to improve students' motivation in classroom activities. For instance, Kotini & Tzelepi (2015) asserted that the introduction of game-based learning can increase student engagement in classroom activities that are typically regarded as uninteresting by students. Consequently, game-based learning can transform these uninteresting tasks into a more engaging and interactive experience. In 2015, Dicheva et al. (2015) conducted a mapping study of game-based learning. They noted that the most frequently

mentioned principles were visible status, social engagement, and freedom of choice. Badges, points, and leaderboards were also frequently mentioned in studies examining game-based learning.

Similarly, Díaz-Ramírez (2020) found that, for engineering students, game-based learning improved the pass rate of those who actively participated in the game compared to non-active players. Students also expressed that the activities fostered a sense of belonging and improved their overall learning. Díaz-Ramírez (2020) found that extrinsic motivating factors were the most popular form of motivation for this group. When considering the concept of game-based learning, the first thing that comes to mind for both educators and parents is younger learners. Younger learners (children and teenagers), who are involved in gaming on a regular basis in their leisure and social time, are an obvious choice when it comes to the game-based learning in school education. Similarly, Ge (2018) conducted a study in Beijing and found that using reward patterns in game-based learning activities contributed to improving students' learning and increasing their motivation in classroom lessons. Specifically, Ge (2018) found that when learning grammar, both giving "prizes" and using a combined "forfeit-or-prize" reward pattern were effective in enhancing learning and motivation. Thus, game-based learning with reward systems tailored to the target audience has the greatest impact on learning. Furthermore, game-based learning can assist school students with special needs. For example, Gooch et al. (2015) conducted a study with students who had dyslexia and found that customization of symbols was an important factor that motivated students with dyslexia. Teachers could personalize rewards for students who overcame personal challenges. In Gooch's study, students were given the agency to identify their areas of weakness, and their ability to create their own badges was seen as a beneficial process.

Nonetheless, there are drawbacks to using games for teaching and learning purposes. For instance, Wood and Reiners (2015) warned that well-thought-out ideas and time must be put into designing such games for them to be learner-friendly. Furthermore, it is acknowledged that game-based learning may not appeal every student, particularly in school students, as many of them love to read textbooks and do not like to participate in group or teamwork. Some of them do not enjoy the gaming experience. Therefore, it is important to design student-friendly game-based lessons so that they can promote teamwork and collaboration (Vegt et al., 2015). Heinzen et al. (2015) concluded that the ideal game-based learning can make even failing informative and motivating. In another study, Kim et al. (2018) suggested the necessity of simple structure when designing game-based learning materials for school students and highlighted the crucial role of teachers in implementing these materials in the classroom. Teachers first become familiar with game by playing it themselves. Kim et al. (2018) noted that teachers must identify appropriate motivational strategies for their students and incorporate them into gamified instructions. Craven (2015) stated that the future of game-based learning in delivering real benefits to the learner rests with the integration of the learning process into game elements. Thus, game-based learning offers the advantages of increased engagement, motivation, and personalized learning experiences. However, challenges include the need for thoughtful design and the recognition that game-based learning may not appeal to all students. The future of education may lie in integrating game elements to enhance learning rather than solely relying on game-based teaching and learning environments.

## Game-Based Learning in UAE School Education

The UAE is striving to move forward in both technology and education. Technology and learning

can be interconnected within the school setting at any level from elementary to higher education. Game-based learning is one of the best approaches to achieve this. Recently, it has gained popularity in Arab nations particularly in UAE education (Dicheva et al., 2015). The United Arab Emirates Vision for 2021 aims to integrate technologies with school teaching-learning environments. The National Agenda aims to equip all schools, universities, and students with smart systems and devices as the basis for teaching methods, projects, and research. Thus, the national demand for EdTech skills has accelerated the growth of game-based learning and resulted in new policies and measures for school curricula.

With regard to the educational environments in UAE schools, game-based learning has the ability to change static teaching methods into ones that are dynamic and interesting. The necessity for creative techniques is becoming more and more obvious as various forms of virtual learning have grown in prominence (Islam et al., 2023). The UAE's dedication to integrating technology into education and the adoption of EdTech pedagogies globally highlight the need to utilize flexible teaching strategies. The incorporation of game-based learning emerges as a strategic bridge between technology and education, recognizing the needs of modern students in a digital world. Game-based learning becomes a potent tool to engage students in online teaching in a technology-based society where students are accustomed to computers, video games, laptops, tablets, and other smart gadgets. Al Breiki & Yahaya (2021) showed that teachers in the UAE could establish interactive educational environments that would motivate their students to engage in active learning by incorporating gaming components into instructional content. Also, game-based learning in school education can encourage healthy competition, teamwork, and problem-solving abilities that are crucial in the workforce of the twenty-first century and assist the UAE in realizing its national vision of "Smart Services" (United Arab Emirates Ministry of Economy, 2021).

In addition, smart technology and EdTech pedagogies have been integrated into many areas of life within the context of the UAE. Thus, students need not shy away from capitalizing on their technological skills within the classroom for desired educational purposes. This is where game-based learning has a significant role to play. It is a powerful tool by which educators can teach, persuade, and motivate students. Accordingly, it is a new way to engage 21stcentury students and equip them with ICT skills that will enable them to progress and contribute to society. Game-based learning in education requires the combination of many components to develop an effective strategy that directs students towards achieving learning outcomes. Thus, for a forward-thinking nation such as the UAE, which desires to incorporate EdTech strategies into every aspect of life including the education system, game-based learning is one way of encouraging students and teachers to use computers in a fun manner to motivate all types of learners and break down barriers in the classroom.

## Research Methods

This study adopted a quantitative research design using questionnaire survey in collecting the data to address the research questions (Kurzhals, 2021; Nardi, 2018). The data for the current study are drawn from a survey questionnaire which is the main tool for collecting data in a larger project on game-based teaching-learning in UAE. The survey was distributed to 685 school teachers and 505 teachers responded. The questionnaire included four components: (1) demographic data, (2) Teachers experience and motivations of game-based learning in school education, (3) Interactive Learning Environment and (4) Benefits of game-based learning environment. Regarding the investigation's goals, the two basic elements were the independent

variables while the third and fourth items were the reliant items.

Items related to the teachers' experience and motivation about game-based learning included what increases students' intrinsic and extrinsic motivation, aids in the cognitive development of learners, solves complex problems, increases teachers' engagement, helps teachers save learning time, and provides immediate feedback in which teachers become motivated to apply game-based learning in their classroom practices. For example, five skill levels were provided as alternatives for the item about competency, but time adverbs were used when inquiring about how frequently their teacher used game-based learning. Each of these items contained response options that were appropriate to the nature of the question being posed.

Next part of the survey was teachers' perspective on regarding game-based learning and interactive learning environment. Items related to this part included what creates attractive learning environment, gives learners the opportunity to see the real-world applications, helps teaches to solve complex problems and provides teachers with immediate feedback in which teachers could play the role that contribute to interactive learning environment. A set of Likert-scale items was designed to understand participants' perspectives of game-based learning in the context of interactive learning environments.

The survey's final section aimed to understand teachers' perceptions of the benefits of game-based learning through six statements. Items were related to advantage of game-based leaning included what helps teachers to observe teaching-learning performance, enhances teachers' collaboration work with students, encourage in teaching for competitive environments, learning is fun, aids in accessibility in the classroom and reduce teaching stress. Participants were asked to respond to set of Likert-scale items evaluating the advantages of game-based learning.

## Participants

Although the study sample was not fully representative of the general population in the UAE, the participants were diverse in terms of programs, schools, academic qualifications, gender, and teaching levels. Table 1 details the demographic information of the participants, which we further describe in the subsequent paragraphs. This diversity provided a broad perspective on the topic under investigation. For instance, according to the demographic results of the study, there were more female (320) than male respondents (185).

Teachers were selected according to the grade they were teaching. According to the data, the majority of teachers were teaching grade ten to twelve, with 202 teachers falling into this category. Teachers catering to students in grades three to six, and ten to twelve are comparatively less dominant, with 169 and 134 teachers respectively.

Participants had a broad range of academic backgrounds for teachers in schools, including those in business, education, humanities, social sciences, religions, science, and psychology. With a total of 70 teachers having a focus in this area, it is evident that the majority of school teachers were in the subject of psychology. Subsequently, education recorded highest count with 67 teachers, followed by humanities and social sciences with 63 and 61 and science with a count of 53. Relatively fewer teachers taught business (47), Mathematics (45), religion (49) and other subjects (50).

Participants also included distribution based on disciplines taught, including Arabic, English, math, science, social studies/history, religion, and other school subjects. The data indicates that 80% of the teachers taught Arabic in school. English and mathematics were two popular courses with 45 and 25 teachers, respectively. Fewer teachers were present in science, social

studies/history, and religion; there were only 18, 19, and 10 teachers, respectively. Furthermore, 21 teachers were teaching other subjects.

## Procedure

After completing of the survey items, Google Form was used to create an online version of the survey. The Likert-scale items were provided with drop-down options for response options. Participants were directed to the survey homepage, where they could begin the survey. The survey was completed in an average of 45 minutes. The survey was conducted anonymously and completely voluntary, with participants informed of its purpose and asked to consent to data collection for research purposes. The participants were granted the liberty to halt the survey at any time and request that their data not be utilized. The data collection and analysis adhered to the ethical guidelines established by United Arab Emirates University. Prior to commencement, the research proposal received approval from the university's Ethics Review Board, ensuring that all procedures met the institution's standards for ethical research involving human subjects. The survey was completed by all 505 participants, and none of them chose not to participate or requested their data not to be used.

Table 1.

*Demographic Information About the Survey Respondents*

| Category | Number of Teachers Surveyed |
|---|---|
| Gender | |
| Female | 320 |
| Male | 185 |
| Teaching Grade Level | |
| Grade 3 to 6 | 169 |
| Grade 7 to 9 | 134 |
| Grade 10 to 12 | 202 |
| Focus of Academic Qualifications | |
| Business | 47 |
| Education | 67 |
| Humanities | 63 |
| Mathematics | 45 |
| Psychology | 70 |
| Religion | 49 |
| Social Sciences | 61 |
| Science | 53 |
| Other subjects | 50 |
| Subjects Taught | |
| Arabic | 404 |
| English | 45 |
| Mathematics | 25 |
| Religion | 18 |
| Science | 19 |
| Social Studies/History | 10 |
| Other Subjects | 21 |

## Analysis

After getting an initial impression, the data analysis was conducted with assistance of SPSS version 22, the statistical software package used for analyzing data. To begin quantitative analyses, each survey answer was first transformed into numerical data. Following that, descriptive statistics for the dependent and independent variables were extracted (teachers' perception and experience and motivation on game-based learning, problem solving-activity). The original numbers were used in those situations since each variable on the survey was represented by a single item (Fisher et al., 2016). The data were downloaded to a Microsoft Excel spreadsheet from Google Drive, where the spreadsheet was kept. Likert scales were coded from 1 to 5 (*strongly disagree—strongly agree*). Inferential analysis (t-test) was employed to determine differences, whereas descriptive statistics contained percentages and frequency. The analysis found that the distribution of grade levels by school teachers varied statistically significantly (T = 0.04).

# Results

## Teachers' Perceptions and Motivations of Game-Based Learning

In Table 2, we report teachers' perceptions to their motivations for using game-based learning in school education in the UAE. Results show that game-based learning has a positive impact on students' intrinsic and extrinsic motivations, cognitive development, and teacher engagement, posing questions, and learning time. Specifically, around half of the teachers (49.7%) agreed that gamification increases students' intrinsic motivations, with only a small percentage (0.8%) disagreeing with the statement. Additionally, 57% of teachers agreed that gamification increases students' extrinsic motivations, with a similar percentage (13.7%) remaining undecided.

Like intrinsic and extrinsic motivation, 49.5% of teachers agreed that game-based learning aids in cognitive development for young learners. However, a relatively higher percentage (38.8%) strongly corroborated the claim. This implies that although game-based learning may offer advantages for cognitive development, not all teachers share this perspective. The majority of teachers (50.3%) concurred that game-based learning enhances teacher engagement, with only a small percentage (0.6%) strongly opposing the notion. This indicates that game-based learning can serve as an effective strategy for boosting teacher engagement within the classroom. About 49.5% of teachers agreed that game-based learning cultivates an environment that encourages questioning, with only a small faction (1%) strongly opposing the statement. Almost half of the teachers (49.1%) agreed that gamification helps them save time studying. However, a relatively higher percentage (18%) are still undecided about this statement. This implies that the employment of game-based learning can serve as an efficient approach to promote active and engaged learning settings within the educational setting. This determination discloses that whereas game-based learning might economize time for certain instructors, it might not inevitably be the case for all. These findings imply that game-based learning holds promise for benefiting both students and teachers. Although not all teachers may agree on its benefits, it can be an effective strategy to enhance intrinsic and extrinsic motivations, cognitive development, and teacher engagement, questioning, and learning time.

Table 2

*Impact of Game-Based Learning on Teachers' Motivation*

| Item | Agree | | Disagree | | Strongly Agree | | Strongly Disagree | | Undecided | | SD | Mean |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Freq | % | Freq | % | Freq | % | Freq | % | Freq | % | Score | Score |
| Game-based learning increases students' intrinsic motivation | 251 | 49.7 | 4 | 0.8 | 2 | 0.4 | 1.9 | 38.8 | 54 | 10.7 | 0.0070 | 0.410 |
| Game-based learning increases students' extrinsic motivation | 288 | 57.0 | 7 | 1.4 | 140 | 27.7 | 1 | 0.2 | 69 | 13.7 | 0.0081 | 0.421 |
| Game-based learning aids in cognitive development of learners | 250 | 49.5 | 13 | 2.6 | 149 | 29.5 | 9 | 1.8 | 84 | 16.6 | 0.0029 | 0.361 |
| Game-based learning increases teachers' engagement | 254 | 50.3 | 17 | 3.4 | 154 | 30.5 | 3 | .6 | 77 | 15.2 | 0.006 | 0.371 |
| Game-based learning encourages teachers to pose questions | 250 | 49.5 | 15 | 3.0 | 151 | 29.9 | 5 | 1.0 | 84 | 16.6 | 0.006 | 0.363 |
| Game-based learning helps teachers save learning time | 248 | 49.1 | 19 | 3.8 | 140 | 27.7 | 7 | 1.4 | 91 | 18.0 | 0.008 | 0.355 |

**Game-Based Learning as an Interactive Learning Environment**

The survey results revealed teachers' opinions on the effectiveness of game-based learning as an interactive learning environment, as shown in Table 3. The online survey had four questions, each with five response possibilities (*strongly agree* to *strongly disagree*, with an additional option).

The highest agreement percentage was for "Game-based learning provides teachers with immediate feedback" (54.1%), followed by "Game-based learning gives learners the opportunity to see real-world applications" (51.9%), "Game-based learning helps teachers to solve complex problems" (50.1%), and "Game-based learning creates attractive learning environment" (48.3%). For each item, the percentages of disagreement, which vary from 1.0% to 3.6%, are incredibly low. The highest disagreement percentage was for "Game-based learning gives learners the opportunity to see real-world applications" (3.6%), followed by "Game-based learning provides teachers with immediate feedback" (3.0%), "Game-based learning creates attractive learning environment" (1.4%), and "Game-based learning helps teachers to solve complex problems" (2.4%). According to the survey, game-based learning in an interactive learning environment is largely accepted by teachers. They think it fosters an engaging learning environment, offers students the chance to experience real-world applications, aids teachers in resolving challenging issues, and gives teachers prompt feedback. It is important to note that a significant number of teachers (ranging from 13.5% to 18.4%) are uncertain about each question. This shows that some teachers may not have enough knowledge of game-based learning to form firm opinions or may still be unclear about its advantages in an interactive learning environment. The evidence points to the possibility of game-based learning as a useful educational technique in an interactive learning environment. When it comes to fostering an interactive learning environment, raising

student engagement, and giving teachers rapid feedback, gamification can be a successful strategy.

**Benefits of Game-Based Learning Environment**

In Table 4, we present the results of a survey on the benefits of game-based teaching and learning using gamification in education. Participants' responses to the survey were gathered on a five-

Table 3

*Interactive Learning Environment*

| Item | Agree | | Disagree | | Strongly Agree | | Strongly Disagree | | Undecided | | Sd | Mean |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Freq | % | Freq | % | Freq | % | Freq | % | Freq | % | Score | Score |
| Game-based learning creates attractive learning environment. | 244 | 48.3 | 7 | 1.4 | 171 | 33.9 | 1 | 0.2 | 82 | 16.2 | 0.0065 | 0.3749 |
| Game-based learning gives learners the opportunity to see real world applications. | 262 | 51.9 | 18 | 3.6 | 144 | 28.5 | 6 | 1.2 | 75 | 14.9 | 0.0075 | 0.3759 |
| Game-based learning helps teachers to solve complex problems | 253 | 50.1 | 12 | 2.4 | 139 | 27.5 | 8 | 1.6 | 93 | 18.4 | 0.0070 | 0.3614 |
| Game-based learning provides teachers with immediate feedback. | 273 | 54.1 | 15 | 3.0 | 144 | 28.5 | 5 | 1.0 | 68 | 13.5 | 0.0074 | 0.3936 |

Table 4

*Benefits of Game-Based Teaching-Learning*

| Item | Agree | | Disagree | | Strongly Agree | | Strongly Disagree | | Undecided | | Sd | Mean |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Freq | % | Freq | % | Freq | % | Freq | % | Freq | % | Score | Score |
| Game-based learning helps teachers to observe teaching learning performance. | 267 | 52.9 | 9 | 1.8 | 146 | 28.9 | 1 | 0.2 | 82 | 16.2 | 0.007 | 0.393 |
| Game-based learning enhances teacher's collaboration work with students | 245 | 48.5 | 16 | 3.2 | 173 | 34.3 | 7 | 1.4 | 64 | 12.7 | 0.007 | 0.371 |
| Game-based learning encourages students learning for competitive environments | 255 | 50.5 | 16 | 3.2 | 164 | 32.5 | 4 | 0.8 | 66 | 13.1 | 0.007 | 0.379 |
| Game-based learning is fun | 237 | 46.9 | 24 | 4.8 | 147 | 29.1 | 5 | 1.0 | 92 | 18.2 | 0.007 | 0.343 |
| Game-based learning aids in accessibility in the classroom. | 257 | 50.9 | 19 | 3.8 | 153 | 30.3 | 8 | 1.6 | 68 | 13.5 | 0.007 | 0.371 |

point Likert scale (*strongly agree*, *agree*, *undecided*, *disagree*, and *strongly disagree*), and each response was then examined.

"Game-based learning helps educators to observe teaching learning performance" received an overall agreement rate of 52.9%, with 28.9% of respondents choosing *strongly agree*. This demonstrates that the implementation of gamification as a means of monitoring and evaluating the educational advancement of students is a beneficial resource for teachers. Merely 1.8% of participants dissented from this declaration, while the residual 16.2% expressed uncertainty. "Game-based learning enhances teacher's collaboration work with students" received an overall agreement rate of 48.5%, with 34.3% of respondents choosing *strongly agree*, 16.2% of respondents were undecided, and 3.2% disagreed with the claim. This implies that gamification can foster teacher collaboration and teamwork, which can lead to more effective and efficient teaching methods. "Game-based learning encourages students for learning in competitive environments" received an overall agreement rate of 50.5%, with 32.5% of respondents choosing "agree". This suggests that game-based learning can inspire students to participate in healthy competition, which can boost motivation and improve learning results. The majority of respondents (13.1%) were undecided, while only 0.8% strongly disagreed with this statement. "Game-based learning is fun" received an overall agreement rate of 46.9%, with 29.1% of respondents choosing *agree*. This implies that gamification can increase learners' enjoyment and engagement in the learning process. On the other hand, a sizable portion of respondents (18.2%) were unsure, and 4.8% disagreed with the assertion. "Game-based learning aids in accessibility in the classroom" received an overall agreement rate of 50.9%, with 30.3% of respondents choosing *agree*, 3.8% of respondents disagreed with the statement, while a sizable minority of respondents (13.5%) were unsure. The learning experience may be made more inclusive and accessible for all students, even those with special needs, thanks to game-based learning, it seems. "Game-based learning can reduce teaching stress" received an overall agreement rate of 47.3%, with 33.1% of respondents choosing *agree*. The analysis indicates that the integration of gamification can help to alleviate the damaging effects of stress and burnout experienced by educators, which could ultimately enhance teaching efficacy. Nonetheless, it is vital to highlight that a substantial subset of the participants (16.6%) was unsure, whereas a tiny fraction (2.2%) firmly objected to the claim that game-based learning can reduce teaching stress. The outcome of the survey suggests that gamification can impart diverse advantages within the educational realm, such as heightened collaboration, enhanced accessibility, and increased motivation, as well as decreased stress levels among educators.

## Discussion

After COVID-19, the teaching-learning environment across the globe changed, and game-based learning has become a popular EdTech pedagogy, especially in technology-based high-income countries like the United Arab Emirates. Therefore, the majority of the teachers in this study believed that game-based learning was beneficial for involving students in classroom teaching. The conclusion drawn from this study, which is consistent with Al Breiki & Yahaya (2021), reveals that teacher interest in game-based learning and teaching practices has shown it to be an emerging teaching tool and enhances the potential of gamification as an EdTech pedagogical strategy in school education.

Overall, the findings demonstrated that teachers were motivated to apply game-based teaching because gamification assisted them in increasing students' engagement in classroom

activities. They perceived that the overall experience of game-based learning was significantly positive in response to teacher-student interactions. These findings confirm those of an earlier study by Khaldi et al., (2023), who concluded that the use of games in the classroom boosts student participation and enhances the teaching-learning process. The results also support those of Kim et al., (2018), who concluded that gamification strategies in education can increase teachers' desire to encourage collaborative and active learning. Though the pandemic had compelled teachers to adopt game-based learning, as their experiences with it show, they soon realized its importance. This has inspired them to continue teaching with EdTech pedagogical methods.

Although the findings endorse that teachers have a positive impact to motivate and engage students in game-based learning classifying its contribution to creating an interactive learning environment. This aligns with other previous studies that highlight the crucial role of teachers in forming interactive learning experiences for school students who are fond of using modern technology (Al Fatta et al., 2018; Aprea & Ifenthaler, 2021; Cabellos et al., 2023). Therefore, teachers' experiences with game-based learning suggest that although not all students may be ready to participate, game-based learning is emerging as a new teaching approach in school education. Furthermore, teachers' roles in game-based learning is pivotal. If teachers do not make appropriate games for an appropriate lesson, the lesson becomes less interactive, which calls into question the effectiveness of gamification in school education.

In terms of the benefits of the gamification of education, teachers consider the value of the teacher-student relationship above the statistics that show the benefits of the gamification of education. Most participants concurred that the role of teachers is vital in game-based learning environments. This confirms the findings of prior research that stressed the importance of teachers in learning gamification (Gooch et al., 2015). One of the key factors limiting instructors' creative performance in online learning is students' lack of interest in classroom activities (Mauliya et al., 2020; Meşe & Sevlien, 2021). Additionally, studies suggest that teachers' inability to engage students in classroom learning may affect their learning (Ertan & Kocadere, 2022; Islam et al., 2023).

In the global education market, the UAE continues to deliver high-quality education. Thus, it is crucial that new technology be put into use to give children in the UAE the best education in the post-COVID teaching-learning environment. Several teachers have found that game-based teaching allows for creativity and offers flexible learning environments. This helps students feel more engaged and improve their achievement. Learning communities are necessary in gamification settings to allow students to engage and learn from one another. Teachers and developers of game-based teaching materials must be mindful of students' motivation to participate in classroom activities to build a game-based learning environment and avoid any negative effects such as students' lack of interest in classroom learning.

## Implementation and Conclusion

Game-based learning in school education is marked by a nonstop pursuit among scholars to explain and comprehend its full-fledged nature, especially its role in motivating students within classroom activities. The study's major findings contribute to the way school teachers encourage and engage their students in game-based learning strategies. The implementation of game-based learning in the school curriculum emphasizes the necessity for clear and precise definitions in this field. Game-based learning in education enhances students' motivation and embraces

considerable potential for involving large groups of students in classroom activities and personal development that eventually bridges the gap between intrinsic and extrinsic motivation (Kotini & Tzelepi, 2015; Huotari & Hamari, 2016; Kim et al., 2018).

The paper acknowledges that game-based learning may not appeal to every student, particularly in school students who prefer traditional methods like reading textbooks and may not enjoy the gaming experience. Thoughtful design is necessary to make game-based lessons more student-friendly and promote teamwork and collaboration. The study focuses on the experiences and motivations of UAE school teachers, which may limit the generalizability of the findings to other contexts or regions. The paper highlights the challenges of game-based learning in school education, such as the need for careful design and the recognition that it does not appeal to all students. The limitations of game-based learning in terms of learner-friendliness and the time and effort required for designing effective games are also acknowledged. The paper does not provide an in-depth exploration of the potential drawbacks or limitations of using game-based learning in the UAE context specifically.

Further research can explore the specific design elements and strategies that can enhance the effectiveness of game-based learning in UAE school education. This can include investigating the impact of different game mechanics, feedback systems, and assessment methods on student engagement and learning outcomes. Additional research can investigate the role of teachers in game-based learning environments and explore ways to enhance their engagement and effectiveness in facilitating student learning. This can include providing professional development opportunities for teachers to develop their skills in integrating game-based learning into their teaching practices. Future studies can also examine the long-term effects of game-based learning on student motivation, cognitive development, and academic achievement. This can involve longitudinal studies that track students' progress and outcomes over an extended period of time.

In conclusion, the study explores the importance of implementing game-based learning in the classroom to enhance student engagement and collaborative learning environments. The paper emphasizes the need for teachers to understand game-based learning techniques, identify appropriate game-based teaching-learning materials, and select suitable educational platforms. Challenges include developing immediate feedback, encouraging fun and interactive activities, and creating online learning communities.

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