



## Pros and Cons of Tomorrow's Learning: A Review of Literature of Gamification in Education Context

Bitā Mirzaie Feiz Abadi<sup>1</sup>, Neda Khalili Samani<sup>2</sup>, Alireza Akhlaghi<sup>3</sup>, Sara Najibi<sup>4</sup>, \*Molood Bolourian<sup>5</sup>

<sup>1</sup>MD, Fellowship of Psychosomatic Medicine, Mashhad University of Medical Sciences, Mashhad, Iran.

<sup>2</sup>School of Nursing and Midwifery, Isfahan University of Medical Sciences, Isfahan, Iran, & Social Security Organization, Isfahan, Iran.

<sup>3</sup>MSc Student of Health Education and Promotion, Yasuj University of Medical Sciences, Yasuj, Iran.

<sup>4</sup>Shoushtari Mother and Child Hospital, Shiraz University of Medical Sciences, Shiraz, Iran.

<sup>5</sup>MD, Pediatrician, Department of Pediatric, Faculty of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran.

### Abstract

Gamification in learning alleviates some current educational difficulties, including decreased student engagement, motivation and a lack of cooperation among students. As a result, gamification can enhance students' engagement, increase their motivation toward learning, promote collaboration among peers, aid with knowledge retention, provide instant feedback, and establish a positive, personalized learning environment. On the other hand, some challenges in applying gamification in education include being expensive to develop, diminish in value over time, assessment challenges, retaining information, cheating, and regulatory and legal issues. Therefore, training through games can simultaneously accommodate different types of training methods, each of which will have advantages and disadvantages according to the characteristics that should be considered when using the game method. Games in the workplace are a great tool if used properly. Instructional designers must consider the pros and cons before jumping into game development. Ensuring it fits with the learning outcomes will lead to a successful game.

**Key Words:** Cons, Education, Gamification, Tomorrow's Learning, Pros.

\*Please cite this article as: Mirzaie Feiz Abadi B, Khalili Samani N, Akhlaghi A, Najibi S, Bolourian M. Pros and Cons of Tomorrow's Learning: A Review of Literature of Gamification in Education Context. Med Edu Bull 2022; 3(4): 543-54. DOI: [10.22034/meb.2022.350941.1063](https://doi.org/10.22034/meb.2022.350941.1063)

### \*Corresponding Author:

Molood Bolourian, MD, Department of Pediatric, Faculty of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran.

Email: [az.mansourzadeh@gmail.com](mailto:az.mansourzadeh@gmail.com)

Received date: Jun. 28, 2022; Accepted date: Oct.22, 2022

## 1- INTRODUCTION

In the last few decades, the spread of gamification in various fields and its effectiveness has led to the use of gamification in educational environments and to teach various subjects. The simplest reason for using gamification in education is that gamified learning is fun, enhancing learning; in this case, learners spend more time learning. Although game-based education is not a new concept, the recent popularity of video games and the widespread use of personal computer technologies have accelerated the investigation and application of these games for educational purposes. In fact, one of the learner-centered methods to make learning and teaching attractive is gamification (1, 2). Gamification, broadly defined, is the process of defining the elements that comprise games, making those games fun, and motivating players to continue playing, and then using those same elements in a non-game context to influence behaviour (3, 4).

There are two forms of gamification: structural, which means no changes to the subject matter, and the altered content method that adds subject matter (1). Gamification is the strategic attempt to enhance systems, services, organizations, and activities by creating similar experiences to those experienced playing games to motivate and engage users. This is generally accomplished by applying game-design elements and game principles (dynamics and mechanics) in non-game contexts (5, 6). Games applied in learning can be considered serious games or games where the learning experience is centred on serious stories (7). Game design elements are the basic building blocks of gamification applications. These typical game design elements are points, badges, leaderboards, performance graphs, meaningful stories, avatars, and teammates (3, 8). According to the supporters of using games for learning, education provided

through games leads to acquiring knowledge and includes other aspects of life such as skills, beliefs and habits (9). The gamification of the game is due to the presentation and combination of elements such as goal, competition, cooperation, freedom of action to experience failure, as well as game mechanics such as avatar, medal, point system, stage, etc., which motivates the learner to do the activity (10). Despite the many advantages that have been counted for the game, it is important to pay attention to the fact that in the matter of educational planning and game design, along with the positive points of the games, the weaknesses and limitations should also be considered. Various studies show that if the game is not coordinated with the learning goals, it loses its importance and value and cannot be used in learning and teaching.

Considering the expansion of the use of gamification elements in education in developed and developing countries, since one of the first requirements for enthusiasts and researchers to enter any scientific field is to have a correct understanding of its field, therefore, reviewing the articles of each field of science, more than anything else, seems necessary for researchers and organizations to ensure the usefulness of the material and intellectual investment in a subject area and its practicality. So, this study aimed to review the pros and cons of gamification in the education context.

## 2- MATERIALS AND METHODS

We carried out a review of the literature on gamification in educational and learning contexts. Various design elements for gamification of education are discussed in these papers, along with their impact on the learners, which we refer to as learner outcomes. In this review, all papers evaluating the pros and cons of applying gamification in educational and learning contexts were searched on the

electronic databases of Scopus, EMBASE, Cochrane, Web of Science, ERIC, Wiley Online Library, and Medline (via PubMed) with no language or time restrictions (up to Jun 15, 2022). Two independent researchers performed the search process, and a supervisor resolved any discrepancies in this regard. The two reviewers initially reviewed the abstracts of searched articles, downloaded their full texts to review carefully, and selected the relevant studies independently.

Finally, the articles that met the inclusion criteria were enrolled in the review, and relevant references were reviewed to find further studies. The third reviewer resolved possible discrepancies. The criteria used in conducting a literature review were to choose a review theme, determine the appropriate article, conduct an analysis and synthesis of the literature, and review writing organization (11).

### **3- RESULTS**

Gamification was introduced in the last decade and has focused on many different fields, including education (12). A game can be defined as a voluntary activity with rules and actors trying to achieve a goal within the framework of these rules. Game is accompanied by joy and pleasure, and this element distinguishes it from work. Learning through games can bring about the development of characteristics, advantages and disadvantages at the same time, some of which are briefly mentioned as following:

#### **3-1. The Pros of Gamification**

##### **3-1-1. Background Theories**

According to Kapp (2012), gamification is "using game-based mechanics, aesthetics and game thinking to engage people, motivate action, promote learning, and solve problems" (1). Gamification in learning alleviates some current

educational difficulties, including decreased student engagement, motivation and a lack of cooperation among students. The benefits of gamification lie in its congruence with two psychological theories; the Theory of Flow (13), and the Self-determination theory. Self-determination theory suggests that people are motivated to grow and change by three innate and universal psychological needs. This theory suggests that people can become self-determined when their needs for competence, connection, and autonomy are fulfilled (14, 15). Flow as a state of optimal experience characterized by being fully focused and engaged in an activity – has been regarded as one of the most important psychological outcomes of gamification and games. Designers of games and experiences have utilized the flow theory to understand users' activity better. The theory says that when a person is dealing with something challenging that he or she can handle, he or she enters a state of mind, a certain flow, where he or she is captivated, happy and eager, all at once (13). Moreover, game elements, such as scoreboards, rewards, quests, teams and leadership roles, all foster essential psychological needs. As a result, gamification can enhance students' engagement, increase their motivation toward learning, promote collaboration among peers, aid with knowledge retention and establish a positive, personalized learning environment (16).

##### **3-1-2. Educational Capabilities of Gamification**

Many researchers have investigated gamification's effect on learning and found a positive relationship between gamification and learning (17-25). When teachers use gamification, one of their considerations is whether gamification enhances students' learning achievements or not. Many researchers (19, 20, 26-28) have shown that gamification of learning can improve learning success. A large

systematic review of the literature regarding the application of gamification in Higher Education benefits was identified, such as positive effects on student engagement, attitude, performance and enjoyment, although these are mediated by the context and design (29).

### **3-1-3. Boosts Learner Engagement**

Gamification makes learning fun and engaging, which means better employee training participation. By making learning fun, trainees can participate wholeheartedly. Games encourage friendly competition among colleagues. They make learners feel proud, completing a course after a series of gamified challenges and tasks. When learners feel emotionally connected to the content, their retention increases. Gamification makes learners want to achieve the learning objectives of a course. They want to know what comes next (30-32).

### **3-1-4. Increases Motivation**

Motivation is the driving force that makes learners want to get to the end of the game and complete the learning. Badges are used as rewards at checkpoints throughout the game. They can be as simple as a sticker or fancier, like a Starbucks gift card for the first 100 students to complete the game successfully. Badges can be displayed within the game or on the company's website. They are a great technique because they make the user feel important and skilled. Badges give learners a sense of accomplishment (33-35).

### **3-1-5. Challenges**

The gamification strategy challenges the participants to perform to the best of their abilities. Participants can be challenged to do better in different areas of interest. Thus, ensuring maximized potential (36, 37).

### **3-1-6. Immediate Feedback**

Gamification of learning ensures instant feedback in all scenarios. This makes learning easier by giving them the right solution if they cannot find it themselves, and with the help of instant feedback, it becomes easier to find the domains that need more work. Leaderboards are another way of offering additional feedback. It lets learners see how they are doing compared to their colleagues (38-42).

### **3-1-7. Learning at an Individual Pace**

Every individual has a different learning speed. Online training that includes gaming strategies allows learning at a pace suitable for the learner. By this, trainees can grasp the available knowledge according to their comfort level (43-45).

### **3-1-8. Social Interaction**

While playing the intended games, the trainees interact with the trainer and other trainees, increasing social interaction (46-49).

### **3-1-9. Problem-solving**

Solving complex problems is important for human development, but the problems are increasingly complex; gamification using game elements turns problem solving into a game and makes it more enjoyable and easier to solve (1).

### **3-1-10. Improve Hand-eye Coordination**

Research supports the conclusion that video games enhance hand-eye coordination. Several studies show that the reaction time of gamers is faster than non-gamers, and playing even for less than fifteen minutes can improve hand-eye coordination. Research has shown that video game players are faster at searching and identifying stimuli presented in visual environments than those who do not play video games (50).

## **3-2. The Cons of Gamification**

Considering all the advantages mentioned, the use of games in education is also accompanied by limitations that the educational designer should consider if she/he wants to use this method. This research reinforces the idea that knowing the challenges and barriers will help implementers of gamification to strategize for overcoming the obstacles that may come their way.

### **3-2-1. Expensive To Develop**

A common opinion is that this type of technology is expensive to use. Games take longer to develop than traditional Instructional Design. If not well-designed, students' attitudes may be adversely affected. Time is money. It does not take much to go over budget because of the extra demand on time. Not to mention the cost of additional resources used to enhance the gameplay. Animations, graphics, stock photos and videos, music, and sound effects all cost money. The gamification of learning includes incurrence of additional cost, as it is not cheap to gamify learning scenarios. This includes buying the game and ensuring the system specification suits the game in question for it to run (51-53).

### **3-2-2. Diminished Value Over Time**

Not only are games costly to develop, but they are also costly to maintain. It does not take long for cool games launched a few years ago to look dated. An outdated game may also lead employees to question if the content is outdated. Another disadvantage is the reference value of a game. Games are one-and-done, meaning that once a learner has completed the game, they do not want to repeat it if they need to reference some content. Depending on the content, a quick reference may also need to be created in addition to the game. This, of course, increases the project's cost (54-57).

### **3-2-3. Games That Are Only Poorly Masked Quizzes**

Games are meant to be fun. Who enjoys taking quizzes and tests? Creating interactive, fun games that do not feel like quizzes pretending to be games takes time and creativity. Assessments in games need to link back to the learning objectives, just like any other eLearning course. Collecting points or stars may not be enough to motivate adult learners. Tokens, badges, or in-game prizes must be meaningful for the learner. However, successfully navigating a series of workplace challenges presented in an eLearning course could be so. Real-life scenarios, situations, and challenges related to the job are more effective than traditional quizzes and tests (58-60).

### **3-2-4. Pointsification**

Some studies suggested that badges, competitions, Leaderboards, and points are the game design elements most often reported as causing negative effects. The most cited negative effects were lack of effect, lack of understanding, irrelevance, motivational issues, and worsened performance. The ethical issues of gaming the system and cheating were also often reported (61, 62).

### **3-2-5. Competition**

The introduction of gaming in training scenarios propagates competitiveness. While competition is good for gaming scenarios, the organization requires its employees to cooperate (63-66).

### **3-2-6. Assessment Challenges**

There is a gap between the course material and the games available on the market. It becomes the trainer's responsibility first to find the right game and then to find a way to translate the results of game progress to fulfilling objectives (67-72).

### **3-2-7. Retaining Information**

While supporters may argue that students are more engaged and interested in learning when gamification is used, some see gaming as a way of bribing students. They learn the goals to unlock achievements; therefore, they are only learning for the sake of achieving a checkpoint of reaching a milestone. Students may not be retaining information but rather learning just enough to complete the challenge, then disposing of the information immediately after (68, 73).

### **3-2-8. Cheating**

Another criticism is the potential for cheating within games, especially in education. There is little to stop a student from searching the internet or looking up an answer. If the games are the sole evaluation method, it becomes near impossible to determine which information a student actually knows and which information has been looked up. Although this is an issue across education due to the changing classroom landscape, gaming and especially the urge to win may increasingly drive students to cheat (72-76).

### **3-2-9. Frustration**

Experts say that using gamification techniques in learning decreases learners' attention span. In addition, when they do not get instant gratification in real life, it can lead to frustration (77-79).

### **3-2-10. Regulatory and Legal Issues**

Another criticism of gamification in the classroom involves the regulatory and legal issues and, ultimately, the ethics of introducing these concepts to students. Whenever students come into play, privacy should always be a concern of educators. Specifically, the amount of personal information students must share with the gaming program to access the material. Often, account creation involves a first and

last name, e-mail address, and other personal information. Holding the gaming site accountable for failing to protect student's personal information may be difficult. A second legal concern is the introduction of advertising and paid endorsements into the educational setting. While it is possible to find gaming systems that do not rely on outside funding, it is rare. This may lead to biased or advertiser-influenced content, which may or may not provide the most accurate setting for learning. Educators may have difficulty ensuring that all content is unbiased and without advertiser influence (80-86).

### **3-2-11. Effect Assessment**

Some researchers claim that its recent development has not been sufficiently tested, as there has not been enough time to evaluate the long-term effects of this type of intervention (86, 87).

## **4- CONCLUSION**

Due to the increasing progress of technology and information and communication technology, teaching methods have faced fundamental changes. Gamification is an example of these recently used changes in education. The use of this method has had significant effects on the amount of learning, participation and engagement and overall motivation. Due to the creation of dynamic interactions and the provision of various reinforcements, gamification can attract attention and teach new behaviour and skills to students. Applying gamification elements in education can add an attractive and playful aspect to learning. Because it is fun, gamification can be a good solution to solve learners' problems in the education context. A collection of research on gamification shows that most studies on gamification find it has positive effects on individuals. However, individual and contextual differences exist.

On the other hand, some challenges in applying gamification in education are: expensive to develop, diminish in value over time, require encouragement to complete, assessment challenges, retaining information, cheating, and regulatory and legal issues. Instructional designers must consider the pros and cons before jumping into game development. Ensuring it fits with the learning outcomes will lead to a successful game. Further evidence-based research needs to be carried out to objectively measure the effectiveness of gamification of learning across varying factors.

## 5- AUTHORS' CONTRIBUTIONS

Study conception or design: BM, and MB; Data analyzing and draft manuscript preparation: NK, AA, and SN; Critical revision of the paper: BM, and NK; Supervision of the research: MB and BM; Final approval of the version to be published: BM, NK, AA, SN, and MB.

**6- CONFLICT OF INTEREST:** None.

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