# Gamification in Primary Education: What It Is, Benefits and How to Use It

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**Abstract:** *In the field of education in recent years, two topics stand out as dominant: online teaching and gamification. Gamification is increasingly detected as an important element in the development of learning methods, e-learning and digitalization. Game-based learning is an innovative form of education that incorporates educational computer games. Various forms of computer games are widely used in education.Gamification also includes software for educational games, learning aids, teaching improvement and student assessment.However, most teachers are very cautious and distrustful of exploring this concept of learning and its application in teaching. The paper focuses on the basic questions of this topic - what exactly is gamification in education, why is it such a growing trend, and how to apply it all in regular teaching, online and school classes. This article discussesthe effects and implications of gamification in primary education with the aim of providing a critical point of view on its use. Positive and negative effects are discussed, as well as various factors that influence the effectiveness of gamified learning. In addition, gamification is also scrutinized from a modern perspective, including points of consideration such as the current state of technological development.*

**Keywords:** *Gamification; Online Learning; e-Learning; Education*

## 1. INTRODUCTION

Play is a fundamental human activity that fosters curiosity and facilitates skill acquisition and behavior change. Numerous fundamental researches in the field of psychology, as well as affective neuro-science, have revealed that play is not only entertainment and useless waste of time for the purpose of entertainment, but also a developmental need, which is characteristic of all mammals [1]. Researches showed that handling emotions is learned through play, in addition to the fact that play significantly affects the development of both physical and social skills of an individual [2]. It can be argued that play is an evolutionary product. Games can be defined as rule-based systems of meaningful choices towards desirable goals. Games such as sports and board games have been the staple of ancient human civilizations [2].

When you look at the importance of games, as a part of development, but also of other human activities, it becomes meaningful and clear that a functional way must be found to include games as a part of business and educational systems [3]. The idea of using games, as a form of functioning in non-game conditions, is not new. However, a systematic approach to the problem of applying that idea is more recent. Thus, the concept of gamification appeared for the first time in the early 2000s. The term gamification has gained great interest and popularity only since 2010, and the very concept of gamification was introduced in 2002 by the British developer Nick Pelling [4]. Gamification stems grammatically from the verb gamify, which was presumably first used by Richard Bartle in his work on the first Multi-User Dungeon (MUD), one of the first computer-generated gameful and social virtual worlds [5].

## 2. GAMIFICATION: CONCEPT, IMPORTANCE AND IMPACT

A number of definitions of gamification can be found on Internet and in literature. In short, gamification would be the application of principles from games to new non-gaming environments. The two most important goals to be achieved through gamification are: motivation for a specific activity and achieving a goal (achievement) from the game [6].

Although gamification started to appear as a topic only fifteen years ago, in less than a decade it found wide application in literally any aspect of life, i.e. everything can be gamified. The integration of gamification techniques into various sectors of the economy and society has been a notable trend in recent years. The systematic review revealed that the domain of education and training is emerging as the primary area where gemification is being implemented and intensively researched [7].

Within the educational environment, gamification's potential for transformative impact extends beyond simply making learning "fun". Research suggests that well-designed gamified learning environments can foster a range of cognitive and emotional benefits, such as improved problem-solving abilities, collaborative skills, and resilience [8]. Gaming is above all potent in fostering self-motivation, thereby contributing to long-term engagement and learning gains through play [9], [10]. Gamification is one of the most current issues in the field of education, certainly because it is increasingly being detected as an important element in the development of learning methods, e-learning and digitization.

Education experts define gamification as the application of typical elements and principles of games in a teaching context to encourage participation, increase commitment and effort, and improve results. Although it seems to teachers that games first found application in the classroom, the truth is that they have been used for some time in various other segments of life, from business (marketing games) and travel (earning points for discounts), to surgeon training (AI trainings), to motivating cashiers in supermarkets (who gets items through the cash register faster). Already this spectrum of examples of successful application in different fields is enough to convince the teaching staff to give gamification a chance in the classroom.

However, most educators are very cautious and distrustful of exploring this concept of learning and its application in teaching. Plantak Vukovac and associates (2018) published their research on gamification in elementary schools. The research included a survey of teachers about the practical application of gamification in their teaching practice. In addition, the general attitudes of teachers towards gamification, as a form of teaching environment and teaching practice, were examined. The results showed that only one third of the surveyed teachers were even familiar with the concept of gamification. The other teachers were not familiar with the concept of gamification, in terms of what it entails, how it is implemented and which methods of work, lesson planning, instruction organization are most suitable for gamified teaching. Also, most of the teachers involved in the research, have never participated in professional development on gamification. With this kind of research, the authors pointed out a big gap in the educational system, where teachers reported a lack of knowledge when it comes to gamification, a lack of time to create such an educational environment, but also a lack of interest in improving teaching methods [11].

Perhaps educators' reticence towards gamification in education can be justified by a relatively demanding teaching approach, extensive preparation and thorough planning of teaching in such an environment. As an instructional approach, it extends to different disciplines (science, technology, engineering, mathematics, arts), with each employing distinctive mechanics and reward systems adapted to the learning outcomes of the discipline [12]. Indicative examples include point-based grading systems [13]; leaderboards for academic achievements [14]; and even more intricate constructs, such as game-based learning platforms that simulate real-world scenarios [15]. Gamification has also infiltrated e-learning and professional training environments, where interactive online courses often use game elements to improve student engagement. Namely, for an even more practical presentation of gamification in an educational environment, it is best to say that it is a system that can include elements such as points, badges, levels, challenges, a table with positions, etc. In addition, there is the dynamic of games, which implies competition, speed, patience, rewards, pride, building status, satisfaction with achievements. If education is viewed as preparing and equipping young people for life after school, aren't these competencies exactly what they will encounter or strive for in real life?

Gamification certainly makes the teaching process more fun and, if it used with purpose and understanding, can bring many benefits. Namely, it should be kept in mind that gamification is a tool, not a solution for reaching the goal (which is the development of knowledge and skills among students). It should be complementary to traditional learning, to facilitate and supplement it, motivating students to come to knowledge independently or give it a useful value, through discovery. It is a big misconception that it is enough to give a student a tablet or a computer and find an educational game. Gamification can motivate and direct the learner, but that direction can also be towards the wrong goal. Student motivation can be superficial and external, and will not produce deeper results, so it is crucial for the teacher to connect the elements of the game with substantive knowledge or skills. In addition, students can be focused only on winning the game as a goal, thus neglecting the goal that should be in focus, which is learning and mastering a subject. That is why it is important for the teacher to be a game-master, to be able to manage the process and time, directing the students towards the right outcome [16]. It can be concluded that gamification can and will give results only if the teacher knows well the subject he is teaching and its use value, the laws and benefits of games and prizes, then if he has motivation and wants as many students as possible to like and discover his subject and has enough support, resources and freedom to implement own ideas.

Gamification in education is important because it can overpass the great gap between the two extremes - students are generally unmotivated to learn, and they easily access playing various computer and mobile games. Gamification was conceived as an instrument that can replace this state of affairs, and therefore represents one of the greatest innovations in education.

## 3. GAMIFICATION TEACHING MODE IN PRIMARY SCHOOL

The elementary school stage is a critical period for fostering students' basic literacy. For most subjects in primary school, the connotation of basic literacy is multifaceted and should include the following main contents:

– Awareness of the subject topics covered – elementary school students should understand and master some basic subject matter theoretical knowledge, develop a holistic understanding of the topics, actively think and study the subject issues and gradually improve competences and knowledge in that area;

– They should develop logic and thinking – primary school students should think actively during the entire learning process. Through systematic learning, with continuous mastery of knowledge and skills, they need to learn from each other and learn by analogy when solving problems, in order to continuously improve ability to think logically;

– Communication – primary school students need to expand own understanding and understanding of subject areas, to communicate and apply relevant knowledge, such as using expert language and correct terms;

– Practical applications – after the theoretical learning of knowledge and facts in the classroom, attention should also be paid to extracurricular practical applications. The combination of theory and practice should be emphasized in order to encourage students to flexibly apply the acquired knowledge to solve practical tasks and problem situations, which helps to improve the comprehensive development of students' abilities [17, 18].

Primary school children have a strong curiosity and are interested only in relatively new things, which is a reference for designing teaching activities for teachers. Primary school teachers should pay attention to understanding students' psychological characteristics and they should attract and encourage students to learn actively in training activities. Only when students develop an interest in learning, the basic conditions for promotion basic competencies can be provided

[17]. In the process of creating a gamified teaching model, teachers should take into account and include the psychological characteristics of students, by introducing game activities to stimulate students' interest in knowledge [19]. Driven by curiosity, students will show motivation to explore unknown fields in the game. This can stimulate students' interest in learning and develop their intelligence by introducing elements of play into the lesson. It can also go a long way in cultivating good logical thinking skills [20]. In traditional instruction, teachers should actively explore and implement teaching reform and design game activities based on students' psychological needs, so as to encourage students to show strong interest in learning and fully reflect the great value of gamified teaching.

The important thing related to the gamification process is that it isn't only reserved for an online teaching, but the teacher can always create own scenario for a live educational game in the classroom. But the prerequisites needed for successful gamification are the same for both live games and online content.

### 3.1. Key Components of Gamification

Effective gamification assumes four basic components: goal setting, feedback and reinforcement, progress tracking, and social interaction. Only when all these four elements are unified together, they provide the structure for a gamified experience [5, 21].

*Goal setting* – Goal setting is an important part of gamification, as it gives students a clear objective to work towards. Goals should be defined so that they are achievable. As well as that resources are available to students to achieve such set goals. Practice shows that it is more effective to set several smaller goals, which are more accessible, than one global one, the achievement of which requires more effort and more long-term work [22]. By setting achievable goals, students are motivated to work hard and stay engaged in the learning process. For example, one of the goals can be that the student submits his homework on time. The second goal is to have that task done properly and correctly

*Feedback and reinforcement* – Feedback and reinforcement are also crucial components of gamification. During work, everyone likes to be updated and informed about whether they are working in the right way, correctly and whether they are progressing in the right direction. Knowing about the correctness of the work is an additional motivation to continue with the work. Also, knowing about a possible error during work, provides a chance to change the approach to the problem and to make the necessary corrections. By providing students with regular feedback on

their progress, teachers can help them stay motivated and engaged [22].

Reinforcements, such as rewards and recognition, can also help encourage students to keep working toward their goals [5]. In the example of assigned homework, the feedback is whether or not students receive credit and points for turning homework in on time. Or how many points they get for doing their homework correctly.

*Progress tracking* – By tracking their progress toward their aims, students can see how far they've come and stay motivated to keep going [22]. Monitoring progress also allows the identification of areas where students may be struggling. This made it possible to provide additional support to students as needed. Using the homework assignment example, progress tracking occurs when students can see on the scoreboard how many points they have and how close they are to receiving the next award.

*Social interaction* – Social interaction is the final key component of gamification. Pedagogy and educational sciences have long recognized social interaction and social inclusion as an extremely important factor in education. The purposefulness of learning and the importance of acquired knowledge, as well as the possibility of their application in the social environment, are crucial factors of motivation to learn [5]. By including social elements like collaboration and competition, it can be created a more engaging and interactive learning experience. Social interaction can also help students develop important social and communication skills, which are essential for success in the classroom and beyond. In homework example, the social interaction is when students can show their rewards to other students and everyone can see who is closest to the next prize on the leaderboard.

What is each game based on? What keeps students glued to their computer or smartphone when they play a game are actually the three fundamentals of any gameplay: challenges, rewards, and progress [5, 23].

Challenges – represent expectations that the student should achieve. Sometimes it's learning a new lesson, reviewing material, or taking a test. Almost all popular games have these aspects: sometimes your task in playing is to solve a puzzle on the current level, sometimes it is a transition to the next (more demanding) level of play, sometimes it is the fulfillment of a daily, weekly or monthly task. All these components are irresistibly reminiscent of homework at school, and yet students prefer to play games rather than schoolwork.

*Rewards* – follow the challenges. In the world of games, these are usually virtual coins, upgrades or items that make the game easier. In the world of education, these can be instruments in teaching

that will facilitate, speed up, or be necessary in the work.

*Advancement* – is the main driver of motivation. In games, every attempt is scored. Of course, more successful attempts than unsuccessful ones. Progressing through the game is usually characterized by passing the level or solving all the provided tasks [23].

From the above, it can be seen that the process of learning through gamification is essentially the same as in classical teaching - there is a goal that needs to be achieved, progress is monitored and finally information is obtained about what has been achieved. The difference is in the methods and approach to the problem - the goals are partially fragmented; progress monitoring is online and more effective; the feedback and reward system is more transparent for all participants and is adapted to the more modern requirements of students who are digital natives.

## 3.2. Gamification Techniques in Classroom

Gamified learning is designed to have a positive impact on students by incorporating game elements into training strategies. Of course, there are various steps in implementing gamification in the learning process that can be implemented in the classroom, including integrating educational video games into the curriculum, encouraging independent learning in the gamification of homework, gamification in scoring, implementing a wider class reward system, ensuring that lessons be interesting from the beginning, making gamification part of the evaluation, choosing gamification in the form of multiple choice, giving rewards like badges, etc. However, the application of gamification requires that the system or platform be successful [24]. There are several techniques and approaches to gamification of teaching and learning, and some of them, which are the most common in primary schools, are briefly presented here [25].

*Game-Based Learning* [25] – is a gamification technique that incorporates game design elements into everyday educational activities. By creating games that reinforce skills and concepts, educators make learning more engaging and fun for students. Game-based learning is particularly effective for younger students, as it provides a structured and immersive learning experience. A good example is the use of interactive quizzes while processing material with students; thus, students would be given instant feedback and at the same time learning becomes a fun activity.

*Points, badges, and leaderboards* [25] – are popular gamification elements that encourage active learning among students. These elements influence the competitive spirit of students, encouraging them to strive for better results. When designed effectively, these tools help

students develop a growth mindset, where they see mistakes as opportunities to learn. For example, a system where students who complete assignments on time are awarded a special badge that rewards their engagement can encourage other students to complete their assignments on time so that they too can receive a badge the next day.

*Collaborative and Competitive Elements* [25] – Gamification can also include elements of collaboration and competition, which can take advantage of the social nature of learners to achieve learning outcomes. Collaborative activities include cooperative learning, group projects, and group challenges. These activities not only make learning more fun but also help students develop important teamwork and communication skills. Competitive elements include head-to-head competitions and team challenges. These gamification elements not only make learning more fun, but also help students develop important social and emotional skills, such as competitive spirit and teamwork.

*Actually Using Educational Games* [25] – Gamification is essentially about taking the best elements of (video) games and using them to help students learn better. But if there are games already made that use these elements to help students learn, they can also make great additions to the classroom!

For example, Kodable is an educational app that helps primary students (in USA) learn the basics of computer science in a fun and engaging way [26]. Kodable levels offer helpful-hints, when students need them, and provide immediate feedback to help reinforce learning and build resilience. After completing levels students also receive positive support by leveling-up, collecting rewards, and gaining points they can use to upgrade their playable character. Together these elements motivate students to continue playing and learning.

Overall, gamification techniques can be an effective way to engage students in the learning process. By incorporating game design elements into educational classroom activities, learning can be made more fun and engaging while helping students develop important skills that will serve them well throughout their academic and professional careers.

In all presented gamification techniques, a common factor can be observed, which is that gamification turns lessons and lectures into fun and, in this way, releases greater potential for students to acquire new knowledge, skills and abilities [25].

Prerequisites for successful gamification are: fairness, clear and defined rules, interestingness, transparency, competitive spirit, specific tasks, sustainability and elements of advancement.

## 4. BENEFITS OF GAMIFICATION IN EDUCATION

If the advantages and benefits brought by gamification in education are considered, perhaps the most important thing is to point out the items that, viewed from the pedagogical aspect, are the most important in an educational process.

Thus observing, it must be pointed out at:

*Increased student engagement* - Gamification can help students engage more in learning, leading to better results. A Yee study from 2006 [27] found that achievement, students who want to excel, social factors, and immersion, students who want to discover new aspects of the game, are the three motivating factors that lead students to play games again and again. These same motivational factors, when used in the classroom, can increase student engagement by encouraging them to continue engaging with your materials and activities.

*Improved learning outcomes* - All of the previously discussed sources show that when games target students' critical thinking and problem-solving skills, they can improve students' information processing and retention skills. Therefore, introducing game elements into the classroom, and especially into educational material, can help students not only process that material better, but also remember it better [28].

*Improved critical thinking and problem solving skills* - Gamification can help students develop critical thinking and problem-solving skills by providing opportunities to apply knowledge in real-world scenarios. Experience shows that skills acquired from video games can be transferred to other fields. This means that using gamification in the classroom can better prepare students to apply the acquired knowledge outside the classroom or in other contexts [28].

*Personalized learning experiences* - Gamification also enables personalized/adaptive learning, where students can learn at their own pace and at their own level. By providing feedback and tools to monitor progress, gamified experiences help students stay on track and focus on achieving their learning goals [28].

## 5. CONCLUSION

Gamification is a powerful tool that can help students learn better, more efficiently and in a more interesting way. By using game elements, it is possible to create a more interesting and effective learning experience for students. With the many digital learning tools available today, gamification is becoming more accessible to schools of all sizes and levels. By understanding the key components of gamification and applying effective gamification techniques, it is possible to

create a more engaging and rewarding learning experience for students.

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