

Innovative educational techniques: exploring the potential of edutainment and gamification

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Abstract. In an era where digital distractions dominate the attention of younger generations, the educational sector faces significant challenges in maintaining student engagement and improving learning outcomes. This article explores the integration of edutainment and gamification as transformative approaches that merge entertainment with education, presenting new possibilities for both educators and learners. Edutainment leverages multimedia and interactive platforms to make learning enjoyable and accessible, while gamification uses game-based elements to enhance knowledge retention, critical thinking, and problem-solving skills. The benefits of these methods are manifold, offering personalized learning environments, fostering collaboration, and promoting creativity. However, the challenges of digital literacy, infrastructure limitations, and the need for balanced game design pose significant hurdles. An educator's struggle starts with a facility of digital laboratories, grant acceptance for the generated idea, checking feasibility and applicability, digital literacy, designing a gamified curriculum, and sharing educational asset platforms. This paper also addresses future prospects, emphasizing the growing importance of these techniques in shaping the educational landscape of tomorrow.

1 Introduction

The educational sector is one of the oldest and most important sectors, providing the necessary knowledge for human development and progress in general. This sector is well-established and carefully structured in terms of materials and its impact on the overall system. Various governments spend a lot of time trying to implement new ideas and technologies, but these often fail to endure for long. The necessity of remoulding the traditional teaching methods into new technologies and practices is dictated by modern realities and challenges [1]. When implemented correctly, technological advancements could transform the sector drastically in a positive way.

Various techniques can be utilized in the educational sector. New tools can provide a more personalized learning environment suited to each individual. Another factor is that the new generation requires completely different approaches. Many distractions offer platforms for entertaining activities, which are often prioritized over more important and developmental

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pursuits. Technological improvement moves in two directions: one that can directly improve learning methods and practices, and another that enhances and engages. Many sectors have integrated technologies as their advancement tool such as the use of Augmented Technology in E-commerce [2], library game website software [3], learning of foreign language with games [4], suicide prevention & outreach programs [5], E-mental health website, physical training by gamification [6].

This work investigates new approaches currently available. The educational sector can be drastically transformed by these new methods and technologies. Therefore, the main focus of this work is to demonstrate that new technologies and approaches can lead to better educational outcomes. Gamification, a modern approach that combines contemporary realities with traditional practices, will be examined in detail. The gamified applications have different game elements where analyzing the necessity and feasibility of the game is an important factor [7].

2 Edutainment and gamification

There is a shred of clear evidence that the education sector must incorporate more novel approaches to enhance the learning abilities of students. In this fast-changing world, it is difficult to compete with the distractions that occupy most of the time of the new generation. The excessive playing of games by the youth causes visual impairments, sensitivity, aggression, and frustration despite having some positive signs like enhances focusing, strategic planning, fine motor skill development, visual attention, and spatial navigation. Therefore, to incorporate theories of video games as a mental exercise in education can make lecture more enjoyable and motivational.

Hence, it is essential to integrate new methods and ideas to challenge these distractions and increase awareness of modern learning techniques. These distractions, in the form of gaming applications, software, and multimedia materials like reels, shorts, and stories, can be used as multimedia-based education models by incorporating them in the lecture sessions and gives significant results in managing anger issues and mental health.

This idea has led to the emergence of a new term: edutainment. Edutainment was created to transform how educational content is delivered to students. Lectures and educational materials can be presented in various formats. Due to the increasing number of distractions, students' attention spans have generally shortened. As a result, students tend to lose interest quickly, so the delivery of educational material must be concise and followed by the entertaining approaches previously mentioned. The incorporation of online lectures and principles based on multimedia improves educational potential of the students [8]. For instance, some materials are presented in the form of entertaining videos, blending both educational and entertaining elements. The use of games is another form of edutainment. This concept is known as gamification, which will be defined in the next paragraph.

Gamification is closely related to edutainment and can either stand alone or be viewed as a branch of it. As the name suggests, this method involves using gamified applications as a platform for new-world learning. Various games can be designed in a way that teaches specific topics, either knowingly or unknowingly. Learning materials can be integrated into games specifically created for educational purposes or into general games available online (freely available or paid). This approach offers significant potential for the education sector, both in terms of learning outcomes and the development of supplementary tool that enhances the mental skills. Both of these approaches aim to keep up with the rapidly changing world and prevent falling behind due to the influence of distractions.

3 Benefits of edutainment and gamification

The efficacy of both methods has been proven to be beneficial for both students and teachers [9]. It is essential to include teaching personnel in the equation, as they also lack tools that could be useful for education. It will be harder to motivate students when the staff is not interested in applying new approaches. Therefore, one of the key elements in edutainment and gamification should be a focus on both students and teachers. Nevertheless, the focus of this work will be on students and how these methods influence their learning abilities.

The first thing these methods introduce is engagement. With traditional methods, it is difficult to attract students and make them eager to learn. As mentioned earlier, modern life presents more distractions than in the past. It is challenging to focus in a world full of endless distractions. Therefore, the main goal of this approach is to use these distractions as a primary tool and integrate them with learning material. For instance, analyzing attention-grabbing distractions such as games, videos, apps, and devices, and then embedding the necessary learning material within them. This makes learning more interactive, engaging, and, most importantly, diverse. Various methods and ideas keep students engaged without losing interest by integrating game-based models via e-learning. These approaches motivate students to learn and encourage them to return to studying, as they capture interest through different approaches.

These methods are also known for enhancing knowledge retention. As mentioned earlier, edutainment and gamification encompass a wide range of methods that make retention easier. The human brain tends to remember information better when it is presented in different ways. It is also true that a one-dimensional delivery of material leads to poor retention. For example, material presented in a series of interesting videos will be remembered better than a large chunk of written text. The use of games is an excellent approach to delivering math problems, geometry solutions, chemical bonding concepts, communication techniques, and other learning materials. The seamless flow of information (learning material) within a game is one of the best ways to retain knowledge without forcing it to be memorized.

Edutainment and gamification are also known for fostering the development of critical thinking and problem-solving skills [10]. Games are entertaining because they contain levels and stages that need to be passed in order to complete them. Therefore, students are required to use various and unconventional approaches to solve problems that arise in the game.

These approaches also allow students to enhance their creativity and collaboration with peers. They develop skills necessary for modern times. For instance, by interacting with these materials, students can observe patterns of creativity, enabling them to expand their knowledge with the tools that edutainment provides. The development of artificial intelligence has opened many doors for creative solutions [11]. Additionally, the outbreak of COVID-19 prompted many schools to adopt new technologies and platforms that have drastically transformed the education sector [12]. Personalized learning has emerged thanks to algorithmic improvements. Nowadays, learning is easier with tools powered by artificial intelligence, which can be used for both entertainment and learning. These tools also require creativity to achieve better outcomes. Students can bring their ideas to life using these tools, which positively influences their creativity.

These approaches are well-suited for improving students' collaboration skills. Students can be placed in situations where they need to collaborate to solve problems. For instance, games can be used for team play, where groups of students work together to engage with the game and with each other to solve challenges [13].

Lastly, but not least, these approaches promote a more positive learning environment. The learning process does not feel forced. Students exposed to these methods experience less stress and greater mental stability. With these approaches, everyone can find something that suits their individual needs.

4 Challenges of edutainment and gamification

The addition of gamification tools and other ICT tools to education is frequently increasing to showcase different levels of edutainment. However, some challenges are also seen in the indulgence of this new technology in education. Active participation of the learner is a challenge for the educator due to the lack of physical contact, poor or no internet connectivity in the rural belts, and learners with poor economic backgrounds who don't have facilities of hardware (phones, computers, laptops, desktops). The interruption in internet connectivity and hardware negatively influences a user's interest and motivation to learn something new.

The ability of a learner to cope with the gamification techniques and tools differs from student to student as each of them has a varied sensory pattern, and the ability to gain from virtual classes, some require repetition, and some are bored due to the repetition of activities during the online class. Each learner has varied capabilities to overcome difficulties in passing the levels of the games. Other factors are nervousness, anxiety, frustration, and depression when they do not act fast during the online event leading to the dissemination of a negative flow of energy in the minds of slow learners. The user must have at least basic knowledge of technologies or digital literacy to use all the elements of a game that make their learning effective, maximize their engagement, and gain positive learning outcomes.

The period between the emergency mandate to adopt the online mode of teaching and the current scenario of a hybrid mode of teaching was crucial to both the learners and educators who struggled with the new era technologies and their applications. The lack of physical appearance of an instructor and abandonment of students such as switching off their camera or silent mode of their audio concluded that the e-learning processes are less engaging. Therefore, another struggle for an educator is to create an online platform that is more engaging and justifies the study techniques needed. The complexity and lack of time are the obstacles in perceiving and using the gamified teaching activities.

Throughout the creativity of game design in the sector of edutainment, some more things need to be carefully focused such as the feasibility, adaptability, resource availability, application of the principles, and projection of the correct information of the proposed game with the learners. The conditional constraints, solutions to the technical glitches, feedback from the learners, progress indicators, minimum gap between the goals and output, etc. are the other parameters that should also be kept in mind for the better implementation of the game [14]. The reward points, tokens, badges, levels, and leaderboards are some of the criteria that grab the student's attention and review the progression and achievements of a learner. If the game elements are superficial and do not correlate properly with the game design negatively affects the learning outcomes. Hence, game designers and educators should incorporate a perfect correlation between the rewards and the context of the subject. Also, the essential learning skills of the student should be justified by the meaningful, relevant, and effective tools the instructor designs [15]. The budget to plan and create any gaming application or website is another challenge to the educator or inventor. The process to procure funds from government or non-government bodies or start-ups is also too complicated and the sanction process is very prolonged. The idea and enthusiasm that has clicked the mind of an inventor soon vanishes if, at a certain time, he does not receive any funds. There are also some hidden complexities including the technical complexities, charges of the web designers, cost of the consultancy, and evaluation from the subject experts also need to be kept in mind [16].

The creator shall be a techno-friendly skilled person who can meet the challenge and is competent to reach a goal. Training of facilitators and educators to blend with the latest model of the game is also a big footstep that needs consideration. The implication of less familiarity with the game-based theories and their vision in the education system to promote learning via ICT tools, sharing of educational assets, design of new curriculum including

gamification, and lack of in-house resources, creation of multi-centric platforms are the additive problems that need solutions [17].

5 Examples of edutainment and gamification in action

There are many applications and websites provided on various search engines online where some are freely available online and some may charge a minimum amount. Some of the examples are listed below in Table 1.

Table 1. Examples of edutainment and gamification in action.

Game	Subject	About	Output and links
Humanim	Medical & Health	Instead of practicing unusual, complicated, or high-risk case operations in person, the game allows medical professionals to do so electronically.	Professionals learn how to treat patients more effectively. https://www.healthysimulation.com/
Food Detectives Fight BAC!	food safety	Learning Games Lab and virtual studio, and an exploratory environment for playing and evaluating games and educational tools.	Varies with games, videos, apps, and interactive tools, university-based research to create effective and meaningful transformational media https://mediaproductions.nmsu.edu/products/foodsafety.html
Foldit	Human diseases	Anyone who want to assist can do so by downloading and playing Foldit, a puzzle-solving game offered by game.	Recognize every factor in their quest for treatments for illnesses including Alzheimer's, HIV/AIDS, and cancer. https://fold.it/science
Brilliant	math, science, computer science, and engineering	Through an immersive learning environment, users can investigate ideas and solve challenging tasks.	Problem-solving and critical thinking skills https://brilliant.org/
Coursera	All streams	enabling communication and collaboration between instructors and students during a course.	A platform for online education that gives everyone access to the greatest education available from leading universities https://www.coursera.org/
Mimo	learning to code	offers quizzes, coding challenges, and interactive lectures.	Users learn how to code in a variety of programming languages. https://mimo.org/
Innovativezoology	Zoology	Classification of invertebrates and vertebrates	student recognizes animals, their characteristics, and their systematic position in the animal kingdom https://innovativezoology.uniraj.edu.in/
BitDegree	teaching technology-related skills	provides gamified versions of courses in data science, programming, web	Degrees in these programmes https://www.bitdegree.org/

		development, and digital marketing.	
Memrise	Learning language through locals	teaches a new language using a variety of gamified methods.	Learn English, French, Spanish, German, Japanese, Korean, and many more languages. https://www.memrise.com/
Yousician	Music	To offer you instant feedback on how you're doing, the app will play background music, show the song tutorial, and listen to you play.	An instructional gamified app for learning to play an instrument https://yousician.com/

6 The future of edutainment and gamification

The potential of gamified applications and their ultimate use in the form of edutainment can revolutionize higher education. The gamified app offers to bridge two parts (games & education) and directs the educator to ideate gamification technologies and findings of new opportunities for upcoming research and innovations. A study in which 102 teachers of physical education were trained via the gamified application supported the view that the students' intrinsic level, motivational level, psychological strength, and cooperative learning behavior would increase [17]. The development of edutainment using digital technologies is required to compete and grow in the current educational society of higher education. It not only enhances mental efficiency but brings revolution in information technology and gives a chance to explore new kinds of thinking in a learner. There is a need to review edutainment processes and incorporate digital literacy as a tool in modern society.

The gamified applications can be a means to solve many unsolved cases, overcome educational problems, demonstration trials in medical sciences.

7 Conclusion

To conclude, this work aimed to illustrate the various methods available for enhancing the educational sector, particularly in terms of learning. It explored two relatively recent approaches that have emerged in the education field. While the specific reasons for the development of these methods were not covered in this work, their benefits and applications in the sector were discussed in detail. The paper began with an introduction and a brief description of these two approaches, highlighting their advantages in education, as well as their drawbacks. Examples were provided to clearly explain the concepts. Lastly, the future potential of edutainment and gamification was addressed.

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