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# FROM THEORY TO PRACTICE: GAMIFICATION AND SIMULATION-BASED LEARNING IN MODERN EDUCATION

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**RESEARCH ARTICLE**

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**Abstract**

In today's rapidly evolving digital environment, educators are seeking innovative strategies to enhance student engagement and learning outcomes. Gamification and simulation-based learning have emerged as effective approaches that bridge theory and practice in modern education. This paper explores the integration of gamified elements with simulation-based learning to create interactive and learner-centered classroom environments. Gamification incorporates game mechanics into teaching–learning processes, while simulations provide experiential and skill-based learning opportunities. Their combined application enhances learner motivation, engagement, and retention. The study highlights how this integrated approach moves beyond traditional "drill and test" methods, fostering active participation and deeper understanding among students. The findings indicate that gamified simulation-based learning supports the development of critical thinking, problem-solving, and collaborative skills. It also demonstrates significant positive impacts across various subjects and educational levels, from primary to higher education. The paper concludes that adopting these innovative strategies is essential for educators aiming to improve teaching effectiveness and remain relevant in a competitive educational landscape.

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**Keywords:** *Critical Thinking; Digital Education; Educational Technology; Gamification; Innovative Pedagogy; Simulation Based Learning; Student Engagement; Teaching-Learning Process; Teaching–Learning Process*

## Introduction

The wide range of educational approaches currently includes in research, discussion, academic instruction, hands-on training, and multimedia-based learning. The impact of technology on education has never been greater, given that they were born in the digital age and use technology virtually constantly in their daily lives. Today's K–12 learners are often referred to as "digital natives," although the term remains debated. With the extensive use of smartphones, tablets, computers, and internet technologies, not only students but also adults and professionals are increasingly adapting to and relying on digital tools in their everyday lives. Gamification in the classroom has the potential to increase engagement and motivation. Students' motivation to play these games even inside a classroom is greatly increased by game features like instant feedback and badges awarded for successfully completing the challenges.

Furthermore, gamified learning's social component in which students gamify in groups, has numerous positive effects on brain function. Social and intellectual engagement reduces inflammation and the harmful effects of oxidative stress on the brain while also promoting neurotransmission, brain plasticity, and rewiring.

Gamification improves learning by altering the reward and pleasure centers of the brain. It is commonly known that games that include winning or receiving positive feedback can trigger the release of the neurotransmitter dopamine, which in turn activates the brain's pleasure circuits. It is hypothesized that educational games, which involve obstacles and goal-achieving, will have a similar impact. A lasting affinity for the academic subject for resolving challenging difficulties is the result of this enjoyment during gamified education.

A type of gamification known as "gamified simulation training" involves incorporating game concepts into virtual settings. The two aspects are employed as follows: Challenges, contests, and incentives to advance through levels, earn points, and acquire badges are all components of gaming. They are used to enhance the inter activeness and enjoyment of the teaching-learning

process. By simulating real-world circumstances, simulations help students get ready to use the abilities they may gain in the classroom in real-world settings.

Gamified simulations span a wide range of modules, topics, and techniques, and their interactive nature speeds up the learning curve. Because it encourages active engagement, scenario-based learning is a powerful experiential learning method. Higher retention and quicker understanding of difficult ideas and concepts are made possible by this dynamic learning environment. This successfully enables students to understand more quantities that can be replicated and used in practical situations. By adding excitement and competitiveness to the learning process, gamification makes learning inherently fun. These features of gamified simulations capture and hold students' attention. This results in an increase in engagement and motivation; student motivation levels reach high, fostering a favourable outlook on the educational experience.

In traditional classroom education, exposure to real-world scenarios was mostly limited by geographic constraints. Every student globally has access to gamified simulation instruction with simple internet connectivity. Students' learning experiences are revolutionized by gamified simulation training, which eliminates reference-based learning possibilities and levels the playing field for them by giving them access to an interactive platform where they may practice and apply their important skills for a variety of scenarios.

## Review of related literature

Gamification, according to Deterding (2011), is the application of game aspects outside of games. It is student-centered and promotes active engagement. Through the use of game features like experience points, prizes, badges, and numerous other defined game elements, it encourages people to conduct voluntary behaviours in a predictable manner (Sulong et al., 2021).

According to studies, incorporating gaming elements into online learning environments improves academic accomplishment, motivation, and interest as well as cooperation performance. Gamification fosters social connectedness and encouragement (Sailer & Sailer, 2021).

Students who use technology as a learning aid discover that time and space are not limitations. ICT 101 integration in schools, particularly in the classroom, is essential because, according to Ghavifekr & Rosdy (2015), pupils would learn better in a technology-based environment as they are accustomed to it. Teachers are another group that benefits from the use of technology in the classroom, according to Santos and Castro (2021). However, Mujtaba et al. (2021) recommended that teachers receive training to improve their digital literacy so they can introduce the digital tools, implement them, and select the most appropriate and specialized tool for their students.

Using group-based games called Cross Question, Durrani et al. (2022) examined how students' grades and enthusiasm to study were affected by gamified-flipped classroom delivery online during COVID-19. When gamification is used in flipped classes, motivation and interests are positively impacted. According to Gündüz & Akkoyunlu (2020), flipped learning should be gamified in an online setting. One of the main goals of educational games, according to Abrantes & Gouveia (2014), is to inspire students to use their personal experiences to facilitate learning. According to Simoes (2015), gamification, a recent trend, seems to be beneficial because it increases motivation and engagement and encourages behaviour change. Students' active engagement, demonstrated by their pre-class preparation, indicates that gamification-enabled flipped classrooms increased motivation (Akkoyunlu, 2020; Ozer, 2018).

## Objectives

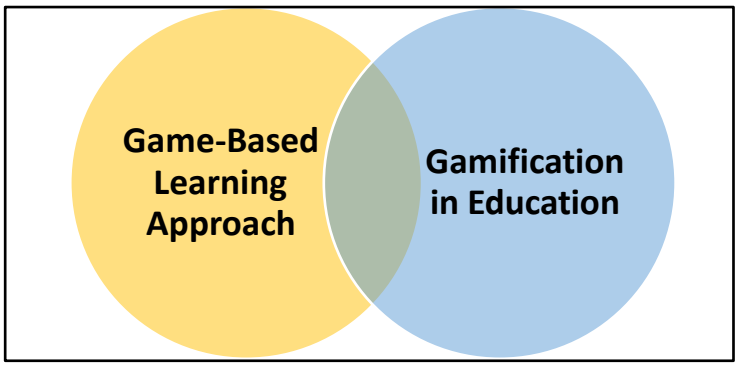
- To find out the two approaches of Gamification;
- To find out the best Gamification technique for learning;
- To highlight the principles of Gamified Simulation;
- To analyze the new teaching-learning process through Gamified Simulation-Based learning;
- To discuss about the combining Technology with Gamified Simulation-Based Training;
- To describe briefly the past, present and future scenarios of Gamification and Simulation-Based Learning;

**Methodology:** The majority of this article is descriptive. It's information and statistics come solely from secondary sources. All of the information was obtained from a variety of sources, including journals, e-books, reports from different organizations' websites, and stories in local, national, and international newspapers. A quick overview of the current state of gamification and simulation-based teaching-learning will be provided in this paper.

## Gamification of learning: Two approaches

The primary goal of the gamification idea is to assist students in developing foundational abilities through enjoyment and amusement. Teachers mostly take two approaches to make that happen:
1. Game-Based Learning Approach: Including games and activities that are solely intended for amusement but that, by meeting specific learning goals, have educational value. This strategy is commonly referred to as the "game-based learning approach."
2. Gamification in Education: Incorporating aspects, features, and mechanics of well-known game designs into instructional settings to add interest and interaction to dry teachings. This method is mostly known as "gamification in education."

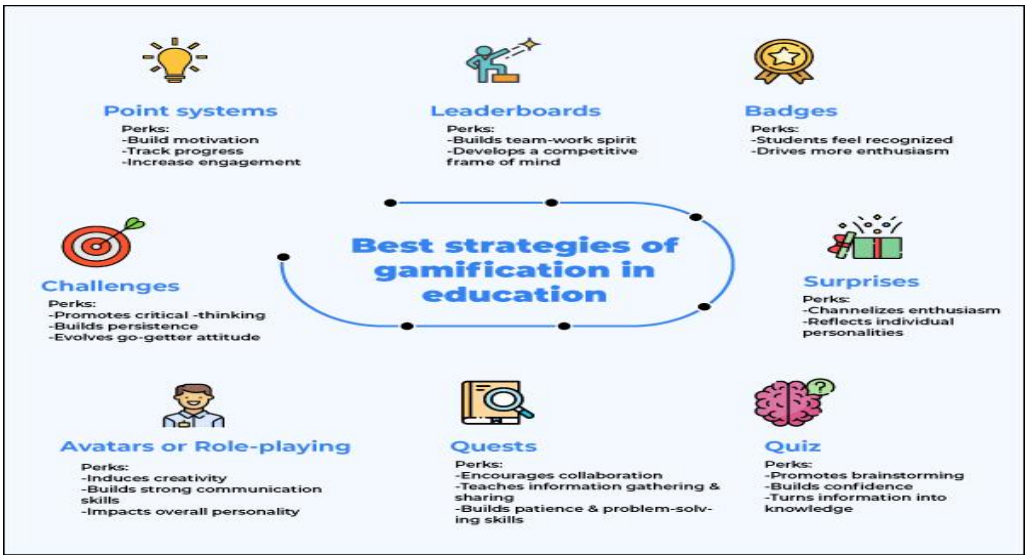
Diagram1: Two Approaches of Gamification




## The Best Gamification Techniques for Teaching

Learning various subjects and concepts is made simple and enjoyable with the new learning-focused edition of the well-liked game. A type of gamification known as "gamified simulation training" involves incorporating game concepts into virtual settings. Gaming involves challenges, contests, and incentives to advance through levels, earn points, and acquire badges. They are used to enhance the inter activeness and enjoyment of the learning process. By simulating real-world circumstances, simulations help students get ready to use the abilities they may gain in the classroom in real-world settings. This creative approach produces a dynamic and efficient platform for knowledge transmission and skill acquisition. Time flies when you're having fun, and gamified studying brilliantly translates that sentiment into educational experiences. Gamification offers numerous benefits and changes and improves learning experiences across a range of industries.

Picture 1: Different Strategies of Gamification in Education




Source: https://www.pickcel.com/blog/gamification-in-education-complete-guide/

## Four Principal of Gamified Simulations

Time flies when you're having fun, and gamified studying brilliantly translates that sentiment into educational experiences. Gamification offers numerous benefits and changes and improves learning experiences across a range of industries. The following are the main advantages of gamifying learning solutions:

1. Platform Access

The accessibility of gamified simulation training is one of its primary advantages. In traditional classroom education, exposure to real-world scenarios was mostly limited by geographic constraints. Every student globally has access to gamified simulation instruction with simple internet connectivity. Students' learning experiences are revolutionized by gamified simulation training, which levels the playing field for them by giving them access to an interactive platform to see how to apply their critical thinking.

2. Availability of Progress and Feedback

Feedback in learning solutions has a significant impact on students' comprehension of their learning journey and is essential for evaluating how future tests and challenges will be delivered. Access to feedback is significantly improved with gamified simulation training. It also makes it possible to track a student's progress more effectively. A live progress meter, for instance,

might be incorporated into the simulation to demonstrate progress as each task and step is finished. More detailed information, including the amount of time needed for each task, the type and level of difficulty of the tasks, and the average performance of all students for each task, can also be recorded using gamified simulation training. Within each simulation, learners can receive real-time assessments with this type of data and progress tracking. This makes it possible to analyze strengths and areas for improvement more quickly.

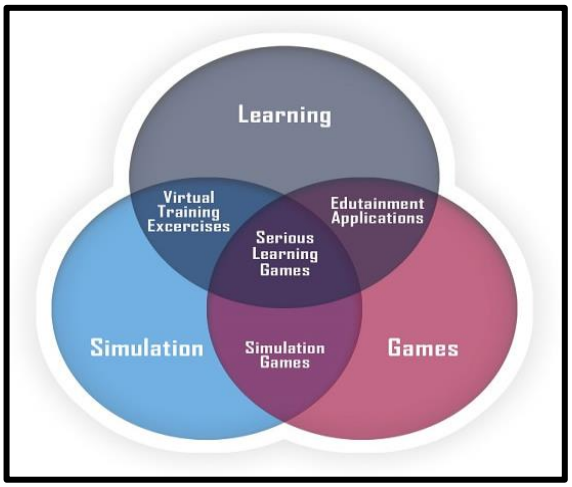
3. Enhances the Learning Curve

Gamified simulations span a wide range of modules, topics, and techniques, and their interactive nature speeds up the learning curve. Because it encourages active engagement, scenario-based learning is a powerful experiential learning method. Higher retention and quicker understanding of difficult ideas and concepts are made possible by this dynamic learning environment. This successfully enables students to understand more quantities that can be replicated and used in practical situations.

4. Interest Is Powered by Excitement

By adding excitement and competitiveness to the learning process, gamification makes learning inherently fun. These features of gamified simulations capture and hold students' attention. This results in an increase in engagement and motivation; student motivation levels reach nearly 48%, fostering a favourable outlook on the educational experience.

Picture 2: Gamification, Simulation, Learning Trio




Source: https://www.outlife.in/game-based-experiential-learning.html

## Teaching-learning process through Gamified Simulation-Based learning

In the classroom, gamification can be applied in a variety of ways. Video games, apps, and online games are always improving their features to further engage pupils. Here is a list of the best games that help students become proficient and meet gamification goals.

1. **Gamified Simulation through Video Game**:

- *Minecraft:* Learning various subjects and concepts is made simple and enjoyable with the new learning-focused edition of the well-liked game. The game provides STEM education, project-based tasks, historical location exploration games, and more. It offers pupils a fully immersive digital experience that fosters their ability to be creative and solve problems.
- *Math Blaster:* It teaches pupils algebra, geometry, counting, basic computations, and more through mathematical adventures. Learners can earn rewards by playing multi-level games including Juice Store, Puck's Pet Shop, and Lost & Found.
- *Treasure Mountain:* The adventure game is tailored to help pupils improve their problem-solving abilities. Games like High Swing, Waterfall Chase, Camping, and Biking encourage creativity and ideation of learners.

2. **App-Based Gamified Simulation:**

- *Google's read-along:* It benefits children who have just begun learning to read, write, and spell. When children struggle with reading or pronouncing words incorrectly, the AI helper "Diya" can identify it. Diya uses audio-visual aids to correct the child right away.
- *Kahoot:* Instructors can use websites to construct multiple-choice questions and create links that can be shared. Students would swiftly address the problem after receiving the link on their smart devices. Kahoot is quite popular because of its real-time in-class query-solving capability.
- *Duolingo:* The app makes learning a language more fun. The software allows users to study over thirty-seven languages. Kids may learn languages more quickly and easily with the use of games, flashcards, quizzes, and other resources. It is the most downloaded app for gamifying education because of its key features, which include progress bars, experience points, leaderboards, and streaks.

- *Educandy:* With its lively, appealing figures, animated characters, and captivating sound effects, it proves to be irresistible. The primary focus of this interactive vocabulary learning app is on exercises and easy games.

**3. Online Perform-Based Gamified Simulation:**

- **Blooket:** This gamified learning platform has engaging quiz games and an intuitive user interface. Players are excited by the many game modes and levels, which also speed up their learning.
- **Boat Coordinates:** This boating game from Mathnook makes concepts like quadrants and grids simple. The game's main objective is to race along the X and Y axes to reach the finish line.
- **Learn with Socrates:** It's a fantastic advancement in classroom gamification. With entertaining games, quizzes, points, and ticket incentives, the tool builds a customized learning path for every student. It is a dynamic platform for learning through games.
- **National Geographic Kids:** Exploring ancient Greece and Rome and closely observing the mythological aspects are made possible by the daring path with Captain John Smith. Students can learn more about science and history through the game's treasure hunts, quizzes, and other entertaining activities.
- **ABCya:** Here, children assist hero Kit Foxtail in opening safes at different locations so that the city's residents can get their money back. Every time a math problem is solved to unlock the safes, the countdown begins. It's an entertaining and engaging method of learning how to finish challenging arithmetic problems in a set amount of time.

**4. Physical-Based Gamified Simulation:**

Learning and skill development are made relatively simple by the abundance of physical activities and competitions, such as Box Drop, Roll-N-Do, Entrance Routine, ESL games, group discussions, debates, and extempore. Online and digital gamification coexist alongside traditional or physical classroom games to give students the best of both worlds.

Picture 3: Reason to use Different Gamification in Simulation-Based Learning


Source: https://playxlpro.com/reasons-to-use-simulations-in-e-learning/

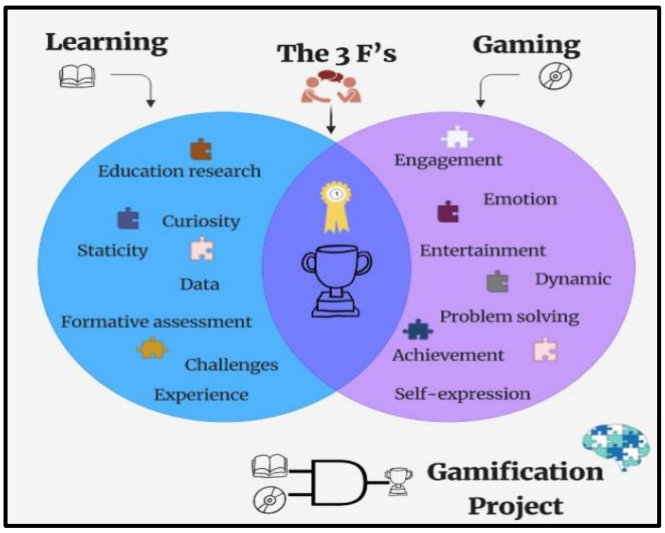
## Combining Technology with Gamified Simulation-Based Training

Gamification is a readily scalable invention since it is fundamentally a digital solution. Modern technologies can be effortlessly integrated with it to improve and revolutionize student education. To provide a combination of improved engagement, learning, and upskilling gamified simulation training can be combined with these two powerful technologies.

- AI-powered gamification: Artificial intelligence (AI) goes hand in hand like bread and butter in the classroom. They are a powerful combo that uses AI algorithms to dynamically modify scenarios according to each learner's success. It adjusts tasks in real-time based on student skill levels and optimizes the simulations. AI makes it possible to create intelligent feedback systems that offer subtle direction and help people comprehend difficult ideas more deeply. Gamification with AI creates the synergy required to change the educational landscape. It accommodates a variety of learning styles with adaptable content. By adding AI, the simulation experience is improved and the learning module becomes more dynamic, responsive, and tailored to the needs of each learner.
- Using virtual reality: In gamified simulation training, virtual reality (VR) produces lifelike virtual worlds that engross students. Through real-world experiences, learning modules can present realistic scenarios that improve decision-making and practical abilities. VR is a subset of immersive learning, which promotes a closer relationship between theory and practice. Learning becomes significantly more profound and memorable when these two are combined. The experience of

using immersive technologies is intrinsically transforming. Students can apply theoretical knowledge in risk-free environments by immersing themselves in simulated worlds through VR-based gamified simulation training.

Picture 4: 3F's (Fun, Facilitate & Feedback) of Gamified Simulation-Based Learning




Source: https://janesthanalgcritcare.biomedcentral.com/articles/10.1186/s44158-023-00118-2

## Educational Implication of the study

- Using Gamification in user acquisition has led to a remarkable increase in new apps.
- Today's students prefer those learning methods, that incorporate gaming elements.
- Today's teachers find that Gamification boosts student motivation and creativity.
- Students' participation in gamified activities typically improves day by day.
- Gamification-based simulation significantly enhances student outcomes, that better than standard records.
- Learners believe that their performance would improve in a Gamified environment.
- Homework completion rates increase with gamification, compared to non-gamified settings.
- Gamification is ranked as a top 10 feature for Learning Management Systems (LMS).

## Conclusion

The world is continuously searching for ways to provide students with something that will stick in their thoughts and maintain their enthusiasm for learning. With its accessibility, motivation-boosting potential, and adaptive feedback, the gamified future of education is the way of the future. AI and VR-powered gamified simulation training allows learning modules to break down geographical boundaries, increase retention, and guarantee equal opportunity and enthusiasm. Even if the future of education is rapidly approaching, it can be difficult to create the ideal gamified learning environment with the right support. AI developments and cutting-edge tools like Lingio will play a major role in the revolutionary growth of gamification in education in the future. Gamified learning experiences will become even more individualized, flexible, and successful as educational technology advances. By analyzing learning habits and customizing content, artificial intelligence (AI) may provide students with a highly personalized educational experience that improves engagement and results. With its use of interactive tests, character-driven plots, and point systems, Lingio is a prime example of gamification through AI. Its features, such as in-app translations in more than 100 languages, also cater to the various needs of students, ensuring that education is inclusive and accessible. Additionally, Lingio's mobile-based platform breaks down conventional barriers to education by facilitating learning at any time and from any location.

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## References

1. Abrantes, S. L. & Gouveia, L. B. (2014). Using Games for Primary School: Assessing its Use with Flow Experience. https://www.igi-global.com/chapter/using-games-for-primary-school/88189

2. Adrian (2018, July 30). 10 Top Tips Using for Gamification techniques to engage Your Learner. accelerole. https://accelerole.com/10-tips-gamification-techniques/?keyword=gamified%20learning%20techniques&creative=481846085909&gad_source=1&gclid=Cj0KCQjwvpy5BhDTARIsAHSilyn1of51ePDaqMmTzZZqqeQP0Zp8Tui-0ABQACRtgdFam7AWFaHjYp0aAudjEALw_wcB
3. Banerjee, P.(2022, August 31). Gamification in Education: Definition, Stratigies & Examples. Pickcel. : https://www.pickcel.com/blog/gamification-in-education-complete-guide/
4. Deterding, S. (2011). From game design elements to gamefulness. Proceedings of the 15th International Academic MindTrek Conference on Envisioning Future Media Environments. https://www.academia.edu/33801833/From_game_design_elements_to_gamefulness?em ail_work_card=view-paper
5. Durrani, U., Hujran, O., & Al-Adwan, A. S. (2022). CrossQuestion Game: A Group-Based 128 Assessment for Gamified Flipped Classroom Experience Using the ARCS Model. Contemporary Educational Technology, 14(2), ep355. https://doi.org/10.30935/cedtech/11568
6. Ghavifekr, S. & Rosdy, W.A.W. (2015). Teaching and learning with technology: Effectiveness of ICT integration in schools. International Journal of Research in Education and Science (IJRES), 1(2), 175-191. https://files.eric.ed.gov/fulltext/EJ1105224.pdf
7. Gündüz, A. Y., & Akkoyunlu, B. (2020). Effectiveness of Gamification in Flipped Learning. SAGE Open. https://doi.org/10.1177/2158244020979837
8. Mujtaba, I., Prapantja, Y., Khatuni, A., & Hadi, M. (2021). Online English Education: A Paradigm Shift in the Education System and Its Challenges. English Language in Focus (ELIF), 3(2), 119–126. https://jurnal.umj.ac.id/index.php/ELIF
9. Neendoor, N. (2024, January 28). How Gamified Simulation Transforms the Learning Experience?. Hurixdigital. https://www.hurix.com/how-gamified-simulation-transforms-the-learning-experience/
10. Özer, H., H.; Kanbul, S. & Ozdamli, F. (2018). Effects of the Gamification Supported Flipped Classroom Model on the Attitudes and Opinions Regarding Game-Coding Education. Near East University, Nicosia, North Cyprus. https://doi.org/10.3991/ijet.v13i01.7634
11. Sailer, M. & Sailer, M. (2021). Gamification of in-class activities in flipped classroom 137 lectures. British Journal of Educational Technology 52(1):75-90. DOI:10.1111/bjet.12948. https://www.researchgate.net/publication/341119842_Gamification_of_in-class_activities_in_flipped_classroom_lectures
12. Santos, J. & Castro, R. (2021). Technological Pedagogical content knowledge (TPACK) in action: Application of learning in the classroom by pre-service teachers (PST). https://doi.org/10.1016/j.ssaho.2021.100110
13. Sim˜oes, P. (2015). Using Gamification to Improve Participation in Social Learning Environments. University of Vigo. https://www.academia.edu/21464221/Using_Gamification_to_Improve_Participation_in_Social_Learning_Environments?email_work_card=thumbnai
14. Sulong, A., Ibrahim, A. B., Abas, A., & Abu Bakar, A. Z. (2021). Incorporating gamification in a flipped classroom approach: A review of literature. Jurnal Pendidikan Bitara UPSI, 14, 22-32. https://doi.org/10.37134/bitara.vol14.sp.3.2021