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GAME BASED LEARNING TO IMPROVE MATHEMATICS CONCEPTUAL UNDERSTANDING

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ABSTRACT

In many respects, computer games have infiltrated everyday life. Many studies and designed systems include features in the structure of the game that draw attention and fun, consequently enhancing student motivation in the field of educational learning. We shall provide many theoretical reasons supporting the benefits of using games in education and learning in this study. We will also distinguish between methodologies such as Game Based Learning (GBL), educational games, and Gamification in education. A clear definition of this new term will be offered, along with an explanation of the potential impacts on teaching and learning. Games can make learning concepts more enjoyable and provide a platform for students to improve their creative thinking. Games are frequently used as a learning trigger, stimulating conversation about the concept of learning among students after they have completed a game. Some new teaching methods, such as Games Based Learning and Gamification, can be used to boost the learning spirit of students of all ages. The purpose of this study is to identify research methods and the fields that the chosen articles on game-based learning cover. The fundamentals and characteristics of game-based learning, an overview of game-based learning from prior studies, the application of game-based education for students and teachers, conclusions, and suggestions for further study are also included in this article.

Keyword: Games Based Learning, Gamification, motivation, learning concept, enjoyable.

Introduction

Educational games are games that are designed and used to teach and learn. We can combine elements of fun and education concepts in educational games to increase student motivation and encourage them to be directly involved in this educational game. The usage of gaming in the classroom is the activity that encourages student-driven exploration. Increased motivation and student engagement are benefits of serious games, which are games designed with educational goals in mind (Young et al., 2012). Game-Based Learning (GBL) is thought to be more effective than traditional lecture teaching in terms of creating a better learning effect and increasing learning motivation. It is also possible to encourage students' problem-solving abilities and generate quality learner outcomes.

The traditional teaching method is no longer beneficial to students for a variety of reasons, including the inability of students to think outside the box. In the old teaching mechanism, students entirely focused on the exam rather than attempting to understand the concepts underlying those things. As a result, there is a need to allow students to learn in their own way rather than focusing on the exam without understanding the subject matter. Researchers have been persuaded to create a virtual learning environment to allow students to learn through experience (Jayasinghe & Dharmaratne,2013). In

addition, research made by Shaikh et al. (2020) proved the impact of game-based learning in enhancing the motivation and attraction of school students to learn. Furthermore, Shaikh et al. (2020) demonstrated the effectiveness of game-based learning in increasing the motivation and interest of school pupils to learn.

Game-Based Learning (GBL) is actively utilised to encourage students to participate in learning while playing and to make the learning process more fascinating by including fun into the learning process. It is beneficial to cognitive development. GBL is an undeniable pedagogical attraction in the classroom. Its objective is to demonstrate additional intellectual gains from studying. In the mid-1800s, Friedrich Fröbel expressed the concept of learning through play and given rise to kindergarten (Wasmuth, 2018). One of the most defining characteristics of game-based learning environments is their ability to provide an effective and engaging learning experience (Andrew et al., 2020).

Kebritchi et al. (2010) looked at the results of implementing severe GBL in the pre-algebra math classroom in one study. The classroom teachers in this study believed that the use of serious gaming was successful because the games were experiential in nature, provided a fresh perspective on how to present and experience learning, provided the students with context and inspiration to work on the current mathematical concepts, and made math enjoyable. Additionally, studies show that game-based learning increases students' comfort levels in the classroom and enables them to interact with professors in ways they otherwise wouldn't be able to (Sprague, 2016). According to research (Muhridza et al., 2018; Partovi, 2019), game-based learning helps students acquire and adapt complicated abilities. Game-based learning environments have the potential to aid in the transmission of knowledge outside of the classroom. As a result, student participation in the classroom has increased. Students can learn cooperatively with their peers through game-based learning, which increases their engagement in the classroom (Zakaria et al., 2021).

Effects of game-based learning in mathematics

When faced with the direct delivery of mathematics teachings, the condition of students will become something abstract when accepted by students, resulting in many students whose scores do not meet the aim. There must be a suitable remedy for this situation to not be continued. The teacher's responsibility as a motivator is to find new ways to improve pupils' learning motivation. The guide note taking learning approach is one strategy that can be applied. The application of ICT technology to teaching processes, such as game-based learning (GBL), is viewed as one of the learning mediums that can engage students in mastering Mathematics. This technique can also help to build on a more understandable idea of learning (Steinmaurer et al., 2020). Hussin (2018) discovered that game-based learning improves student motivation. Liu et al. (2020) discovered in a game-based learning study that

educational institutions should use game-based learning to favour important personality traits such as conscientiousness in students.

The use of GBL in mathematics learning has numerous benefits that serve to improve the quality of the teaching and learning process. In comparison to the use of traditional gadgets, the use of innovative interactive units allows for more efficient learning (Kalogiannakis et al., 2021). Meanwhile, explicit learning objectives aligned with curricular standards, as well as student-centered implementation, make GBL more effective (Farber, 2015; Tan, 2018). Students will study mathematics effectively if they can independently build the concept of mathematics in a constructivist way. As a result, using GBL in mathematics teaching and learning assists students in developing self-awareness (Giannakas et al., 2018). GBL also offers an interactive technology-based learning process that allows students to play as they learn. As a result, GBL develops a positive desire and sense of self-efficacy towards mathematics. It also aids in the development of critical and creative thinking in students (Tokac et al., 2019). The GBL application encourages students to engage in problem-solving and self-learning to increase their competences and self-efficacy (Eseryel et al., 2014; Wu et al., 2014). Finally, this application will aid in the improvement of students' mathematical achievement.

Conclusion

GBL encourages students to learn a mathematical topic instinctively and to develop solid basic mathematical skills (Tokac et al., 2019). In this approach, students could learn basic mathematics ideas and skills while playing the game and completing the tasks, in addition to other key skills such as reading and problem-solving abilities. Such interactions will facilitate learning and skill acquisition (Byun & Joung, 2018). This shows that GBL can assist students improve their math skills. These are skills that go beyond traditional reading, writing, and arithmetic. It is not only what students must learn, such as shifting, but also how and when they must study. Students have grown up with laptops, tablets, cell phones, and video calls and expect to use them in their daily interactions.

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