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Integrating Gamified Learning Environments Into Regular Classrooms For Deeper Understanding Of Concepts Of Science

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Abstract: Gamification in education has drawn attention for its possibility to boost student engagement and learning outcomes. This research investigates the integration of gamified platforms like Kahoot, Blooket, and quizzes into regular middle school science classrooms to promote deeper understanding of science concepts. The purpose of the study is to investigate the effectiveness of gamification in improving student comprehension, involvement, and retention of science concepts. Methodologically, it fuses a mixed-methods approach, combining qualitative observations and quantitative tests to examine how well the gamified lessons on the academic achievement of student and attitudes towards science. Findings indicate that gamification positively improves student learning experiences, providing active participation and increases motivation. The study summarizes with educational implications and recommendations for further research.

Keywords: Gamification, Gamified platforms, student engagement

Introduction:

Gamification has gained popularity as a potential strategy to enhance student engagement and expand on learning in educational settings in recent years. Particularly in science education, where abstract concepts and complicated theories can sometimes be difficult for middle school students to grasp, gamified learning environments contributes a dynamic approach to advance understanding. By utlilizing game design elements such as points, levels, challenges, and rewards, gamification tries to convert traditional classrooms into interactive environments where students actively engage in learning activities. Science can be taught in an engaging and dynamic way using gamified learning platforms like Gimkit, Blooket, quizzes, and Kahoot, which enhance student participation and retention of concepts. It also facilitate interactive classroom experiences and cooperative learning. Blooket uses variety of game elements like power-ups, upgrades and challenges to develop quizzes and review aciviites thus promote a dynamic learning environment. Kahoot enables educators to create or choose multiplayer quiz games that students can access through their device . Teachers provide a code or link to students so that they can join the game. All the questions are timed which ensures participation and competition. Quizzes is a more traditional tool , also uses game elements such as points, leaderboards and rewards to make sure active participation and engagement in teaching- learning process. With quizzes, students return to a level if their response is wrong rather than losing point which helps students to increase the retention rate. Gimkit uses a modifiable game environment as compared to other platforms where learners can achieve game currency to boost their learning and challenge their peers. These learning platforms makes learning enjoyable and interactive and increases the performance by giving immediate feedback. This research explores how integrating gamified learning environments into regular middle school science classrooms helps to a deeper understanding of scientific concepts. By introducing platforms like Kahoot, Blooket, and quizzes, this study tries to understand how gamified learning lessons can improve student learning experiences and develop deeper understanding of the topics in science. By exploring the impact of gamified approaches, this study attempts to provide the consequences and benefits in improving science education.

Theory and Review of Literature

Many studies have proven that Kahoot is a good tool to enhance the learning outcome of students. According to Licorish et al (2020), Kahoot promotes active participation and hence the academic performance. Wang and Tahir (2018) gave the importance of immediate feedback provided by Kahoot in understanding the mistakes. Many gamified learning platforms are readily available for educators to use in classrooms. Some of the gamified platforms used in present study is given below:

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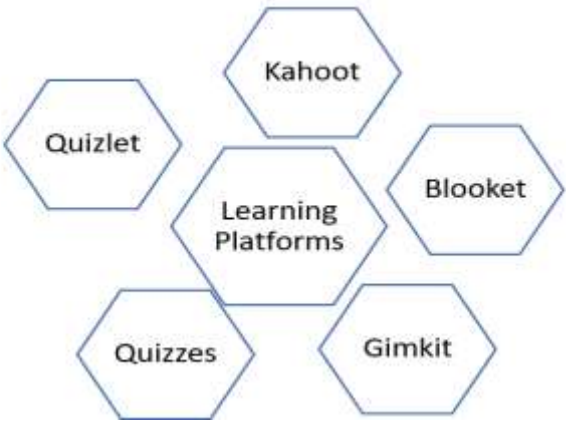

Figure 1.1 Gamified Learning Platforms

Objectives of the study

- To explore the impact of gamified learning lessons on student engagement in learning science.
- To assess the influence of gamified lessons on students' comprehension and retention of scientific concepts.
- To investigate learning outcome of students in gamified science classrooms.

Hypothesis of the study

- There is a positive impact on gamification and learning outcomes of students in gamified science classroom
- There is a significant difference in comprehension and retention of scientific concepts in students with the gamified lessons.
- gamification tools provide positive perceptions and attitudes towards gamified learning among students.

Methodology

The study utilized both qualitative and quantitative method to collect data. The sample of the study is 100 middle school science students selected from different parts of India to ensure diverse cultural and academic backgrounds. Quantitative data is collected by pre-test and post-test whereas qualitative data is collected by surveys, interviews, and observations.

Tools Used

- Pre- and post-tests on the topics learnt
- Surveys to evaluate student perceptions and engagement levels
- Classroom observations
- Interviews with students and teachers to gather qualitative data

Findings of the Study and Analysis:

1.Analysis of pre-test and post-test scores of students

The t value is 2.96 at 95% confidence interval states a significant difference between the pretest and post test scores of students. The P value is calculated is 0.0048 which is less than 1, indicates a considerable effect of gamification on the learning outcome of students. Figure 1.1 shows the comparison of mean pre-test and post-test scores of students.

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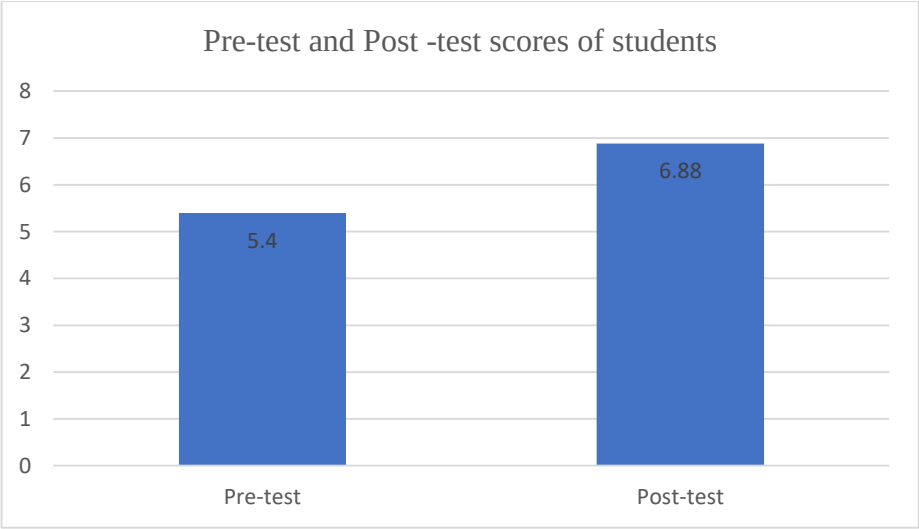

Figure1.1: Comparison of mean pre-test and post-test scores of students.

A survey was conducted to assess the effect of gamified lessons on understanding and retention of scientific concepts in students. The results shows that there is a positive correlation between the lessons with gamified elements and the comprehension and retention of the topics learnt. Figure 1.2 shows the effect of gamified instruction on the student's retention rate. The pie chart given below shows the responses of how gamified lesson helps students to understand and remember the concepts. 58% of responses are of the view that gamified lessons improve the comprehension and retention rate of students

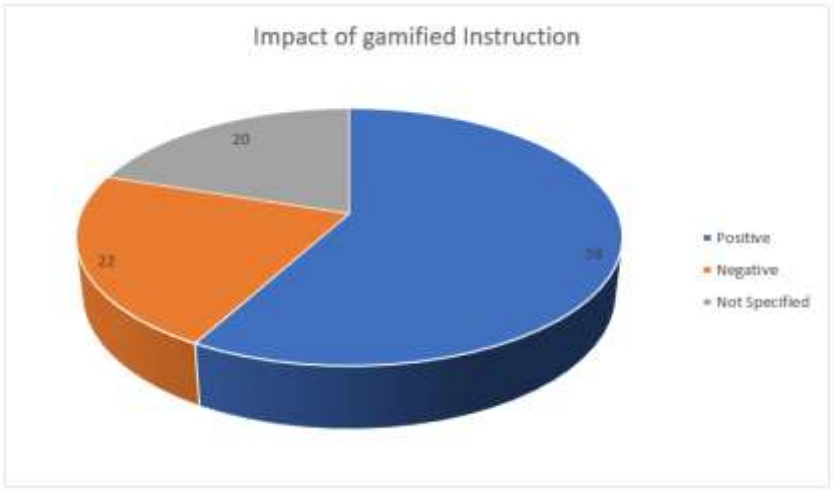

Figure 1.2: effect of gamified instruction on the retention rate.

The results also indicate that assimilating gamified learning environments into regular science classrooms positively impacted student engagement and motivation. Students expressed higher levels of engagement and satisfaction with gamified lessons as opposed to traditional instructional methods. The interview with the students concluded that most of the students enjoy the gamified lessons. Students love to play team games in gamified lessons and thus facilitates cooperative learning environment. The leaderboards and rewards help to improve the motivation and engagement and thus learning.

Qualitative data provided deeper insights into the mechanisms through which gamification enhances learning experiences. Themes such as increased motivation, active participation, and a sense of accomplishment emerged consistently from student interviews and observations. Students expressed a preference for interactive and challenging tasks characteristic of gamified learning, which they perceived as more relevant and enjoyable than traditional lectures.

Conclusion

It was concluded that the current study on the gamified lesson had better understanding regarding the scientific concepts when compared to students in classes with lessons that did not have gamification elements. In addition, elements such as

rewards and leaderboards allow for competition among peers while students participate in the learning process. It therefore follows that this study contributes to the body of knowledge on the potential of gamified learning environments in fostering deeper understandings of science subject concepts among middle-grade learners. By engaging students through game-like features, educators are better placed in creating dynamic participative and motivational learning experiences. The main thrust brought out by the study, therefore, is that indeed innovative pedagogical approaches ought to be integrated to ensure enhanced science education; it thus suggests very useful practical implications for educators seeking to put into practice strategies for gamification.

Scope of the Study

Classroom-based gamified lessons challenge studies can be conducted. Similarly, studies can be conducted for the integration of game elements into different subjects. Gamification is one such promising approach for turning traditional classrooms into interactive learning classrooms to address the diversity of middle school students' needs and preferences in learning

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