

DOES GAMIFICATION IN MEDICAL EDUCATION ENHANCE STUDENTS' ENGAGEMENT AND THEIR LEARNING EXPERIENCE?

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ABSTRACT

Background: In traditional teaching methods, student engagement and participation are often limited. Generation Z demonstrates a preference for mobile devices and gaming activities. This raises the question: Could gamification in educational activities enhance student engagement and learning outcomes? The research seeks to determine the overall effect of gamification on student learning activities. **Materials and Methods:** Following comprehensive instruction about the study and obtaining informed consent, 139 first-year MBBS students were included in the study. A quiz was conducted after a session on "Properties of Cardiac Muscle". The quiz provided real-time feedback, displayed scores, and incorporated a leaderboard to encourage competitiveness. Post-quiz, students were administered a feedback form assessing various aspects of gamification: motivation, subject comprehension, effectiveness of immediate feedback, enjoyment and an opportunity to share open comments. **Results:** The study revealed that 89% of students reported a significant increase in motivation to engage in learning activities due to the incorporation of game elements. 91% of respondents indicated that gamified quizzes substantially enhanced their understanding of the subject matter. 90% felt that the presence of a leaderboard enhanced their competitive spirit. Immediate feedback was highly valued by 89% of students, who perceived it as beneficial in identifying areas for improvement. Notably, 95% of participants found gamified sessions more enjoyable compared to traditional teaching methods. Many students preferred and encouraged this approach over traditional methods. **Conclusion:** This study emphasizes the potential of gamification to revolutionize medical education, enhancing student learning outcomes and engagement. The findings provide a strong justification to integrate gamified elements into medical curriculum.

INTRODUCTION

Integration of advanced technology is accelerated in medical education in recent years, reshaping traditional methods of teaching. Among the technology advancements, Gamification plays a rising role in medical education, which shifts towards learner centered approach.^[1] Gamification is the application of game based designs such as badges, points, leaderboards into non game based context.^[2] Lecture based learning have limited student engagement and participation. Passive learning reduces motivation.^[3] Generation z learners are grownup with ubiquitous technology and social media, which shaped their learning preferences and expectations. They exhibit diminished face to face and verbal skills, requiring educators to adapt teaching methods with engagement.^[4] They have strong preference for mobile devices & gaming.

Interactive & competitive elements boost focus. However, mobile phones use in the classroom causes serious interruption in teaching and learning environment and students misconduct.^[5] This raises the question, can gamification enhance student engagement & learning outcomes? Hence, our study aimed to evaluate the impact of gamified learning on students' motivation and engagement.

MATERIALS AND METHODS

Study Design and setting: This Cross-sectional observational study was conducted at Government Medical College, The Nilgiris, Tamil Nadu, India.

Study population: Phase 1 First-year MBBS students

Inclusion and Exclusion Criteria: All students who were present on the day of data collection and willing to participate were included in the study

Ethical consideration: The study was approved by the Institutional Ethical Committee (IRBGMC0075)

Procedure: Following comprehensive instruction about the study, informed consent was obtained from the students. A teaching session was conducted on the topic “Properties of Cardiac Muscle”. Students scan the QR Code displayed on screen using their mobile to access quiz using Slido website. Once they access, students names will be displayed on the screen. After each question, scores were displayed on their mobile. Real-time feedback was provided after each question. Leaderboard was incorporated after each question and at the end of the session. After the quiz, a Google form-based Likert – scale questionnaire was administered to participants to assess various domains of gamification, which evaluated motivation, subject comprehension, effectiveness of immediate feedback, leaderboard competitiveness and enjoyment. The form also included an open comments section to collect more in-depth information about students’ experience in gamification. The collected data was analyzed using both quantitative and qualitative techniques. The survey data from the questionnaire was analyzed using descriptive statistics to determine the influence of gamification on student perception.

RESULTS

Figures 1 – 5 presents survey responses to the questionnaire regarding Gamification, whether enhances student engagement and learning experience.

Statement 1 Engagement and motivation - “How did the incorporation of game elements (e.g., points) influence your motivation to participate in the learning activities?” 64 % participants responded as Extremely motivating and 25 % as very motivating, which shows that gamification enhanced student motivation. For the Statement 2 Learning Experience – “To what extent did the gamified quizzes enhance your understanding of the subject matter?” The responses were 46 % Extremely and 45 % very much enhanced the understanding. Statement 3 Competitiveness – “Did seeing your rank on the leaderboard make you feel more or less competitive during the learning activities?” 57 % students responded as significantly increased & 33 % as slightly increased. Hence, displaying leaderboards increased competitiveness and participation. Statement 4 Feedback and improvement – “How effective was the immediate feedback provided after each quiz in helping you identify areas for improvement?” 47 % of students responded as extremely effective and 42 % as very effective, which shows that immediate feedback is beneficial for identifying learning gaps. Statement 5 Enjoyment – “How enjoyable did you find the gamified learning sessions compared to traditional teaching methods?” The responses of 68% are much more enjoyable and 27% more enjoyable. The participants enjoyed gamified learning.

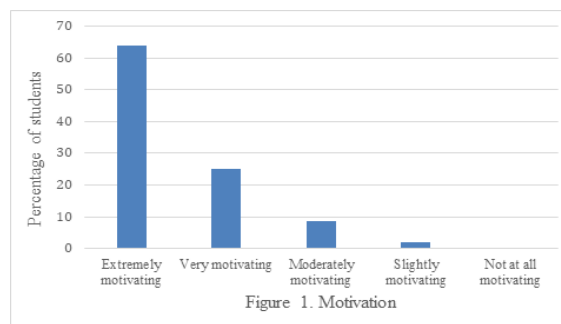


Figure 1: Motivation

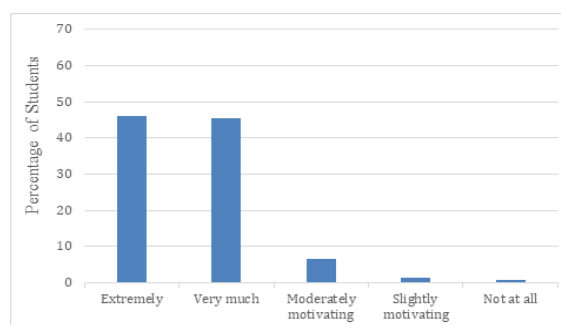


Figure 2: Learning Experience

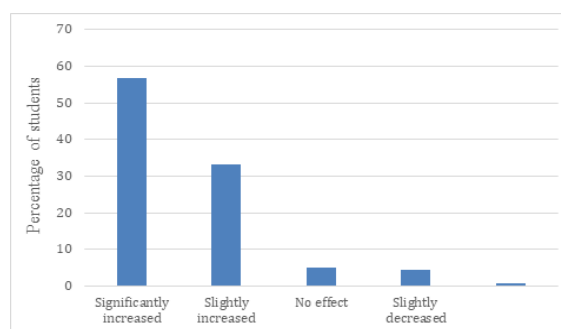


Figure 3: Competitiveness

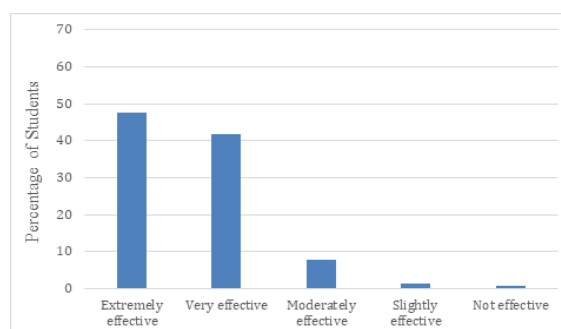


Figure 4: Immediate Feedback and Improvement

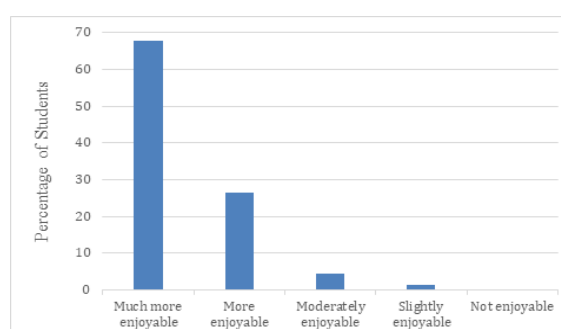


Figure 5: Enjoyment

Enjoyed this session by answering... excellent...
It is nice and continue as it is like this
Was useful and engaging. Motivates to listen all the classes. Hope all the classes has this type of quizzes at the end so that it is very useful for grasping the concepts very easily.
Very interactive, enjoyable, excited to attend each question and more motivating
A kind of fun with learning.
Quick explanations after each question will help improve the productivity of the session and the quality of learning.
It's a reliable session. I got better engaged with the subject
Developed the involvement in class and crystal clear the concept in an enjoyable means
Good, really made us enthusiastic during class
Good session
If this method is followed in every class, it helps us to recall the concepts taught in the class. This is like a fun form of revision rather than summarizing the whole class in words.
Good idea for interactive session between teacher and student
Very interesting
Can provide more quizzes like these in the upcoming classes
It improves the interest and attention during class time
It is enjoyable and more competitive during the learning activity
Really enjoyed well... curious to answer the question in quicker manner
It is very useful to learn and understand the concept more
Well, this activity was good but I can't concentrate well on that yet it is interesting
It's very interesting idea to be done and it motivates students, it also stimulates students not only to be fast but also to be correct. <i>DF</i>
This increases healthy competition between us which helps in group learning
The class was greatly enjoyable and learnt many things
It was a great idea

Figure 6: Open comments

Figure 6 presents the open comments feedback from the students, using gamification in teaching methods has been well received. Students generally found it useful, fun and engaging. For instance, one student commented, “A kind of fun with learning”. Another noted that it is “Very interactive, enjoyable, excited to attend each question and more motivating”. In addition, many students appreciated this method of learning.

DISCUSSION

The present study indicates that Gamification can significantly enhance student engagement, motivation and comprehension in medical education. High proportion of students reporting increased motivation indicates that gamified learning creates a more stimulating learning environment. Improved subject comprehension among participants further highlights the value of immediate feedback and interactive learning formats, consistent with previous study.^[6,7]

Real time feedback, served a dual purpose: It reinforced learning for students while simultaneously enabling the teacher to identify misconceptions and provide timely clarification.

The leaderboard component motivated the students, suggesting that the competitive element can positively influence participation when used appropriately.

These findings align with the previous researches which shows that Gamified Learning through mobile further enables an accessible learning environment. These technologies allow students to engage with the content interactively, fostering the continuous involvement compared to the traditional settings.^[8] Medical Educators also show positive perception towards gamification.^[9]

As Generation Z students are highly accustomed to mobile-based, interactive platforms, gamified learning appear to meet their learning preferences more effectively than traditional teaching methods.^[10,11]

However, most of the faculties show negative attitudes about mobile phones use in college classrooms during lectures.^[5] In the present study, by

monitoring the number of active participants displayed on quiz platform, ensured students were engaged. Additionally, incorporating leaderboards and real-time feedback kept them actively involved. This gamified learning activity required only 10 minutes, to complete within the lecture session, making it feasible and easily implementable method that can be incorporated into regular classroom teaching.

Hence, Gamification in Medical Education bridges the gap between traditional teaching & modern learning needs. It engages students through real-time feedback, competition & interactivity and encourages active participation.

CONCLUSION

Gamification has the potential to revolutionize medical education by enhancing student engagement, motivation, and learning outcomes. Integrating game-based elements into the medical education is highly recommended to improve interactive learning.

Limitation

Minor technical issues faced by a small percentage of students (0.7%) underscore the need for stable internet connectivity and proper device management.

Future Scope

More research needed to assess long-term effects & curriculum integration.

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