

Perceptions of MBBS Phase II Students on Gamification

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ABSTRACT

Introduction: Traditional didactic lectures make classes monotonous and lead to reduced student engagement and interaction. Gamification can be used to break the monotony. Use of game elements in a non-gaming context is gamification. Simple digital tools can be used for gamification. We conducted this study to evaluate the student perceptions on gamification in medical education. **Methodology:** This study was carried out in the department of Pathology. MBBS phase II students who attended all the gamification sessions were included in the study. Gamification was done for sub-topics on Neoplasia, using digital tools like Slido, Socrative, google forms and crossword. Student perceptions were taken on validated questionnaire on a 5-point Likert scale. One open-ended question was given. Statistical analysis was done using frequency, percentage, mean and standard deviation. **Results:** A total of 72 students responded to the questionnaire. Students liked google forms the most followed by Slido. The findings of the study showed that students felt that gamification increases knowledge retention, understanding, improves engagement and satisfaction, enhances motivation, and improves overall learning experience. Students felt that gamification increases opportunities for interaction with faculty. For the questions on perceptions, the highest mean score was 4.33 and the lowest score was 3.97. Students recommended more quizzes with images and gamification for other subjects and classes too. **Conclusion:** Gamification was well-received by the students. Students perceive that gamification improves their learning and retention. Gamification can be used in teaching to make classes more interesting and to increase student motivation.

KEY WORDS: Gamification, Medical Education, Teaching, Learning, Perceptions, MBBS.

Introduction

Medical education is changing at a rapid pace. Teaching learning methods are changing and evolving. The traditional methods like didactic lectures may reduce the attention of students due to monotony. This is especially of concern when teaching important topics to students. There is a need to increase students' engagement and interaction by modifying or changing our teaching methods. Improvements in technology and digital tools help the teachers in increasing student interest. Also, the present generation of students are tech savvy.

We are living in a world which has numerous, attractive, user-friendly, creative, and useful technological resources which can be utilized in various aspects including education^[1]. New interactive teaching-learning methods are emerging with the introduction of gamification methods and smartphones^[2]. Gamification refers to the use of game design elements (like points, leader boards, prizes, etc.) in a non-gaming context, for instance in education, with an intention to encourage students' participation and enrich the process of teaching-learning and problem solving, that increases student motivation. Gamification thus promotes interactive learning and group work^[3]. Few recent studies have shown that gamification based on educational technology increases student engagement in learning^[4,5]. The attention of students in the didactic lectures decreases around the eighteenth minute. So, there is a need to break the monotony by some creative or playful content which can increase student interest and motivate them^[6]. A very crucial element for teaching-learning is motivation, which is

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directly linked with positive stimulation of students enabling their active participation in the classes^[7]. Gamification is considered as a form of motivation which can be used to make classes more attractive and engaging to students^[8]. Hence, we conducted this study to evaluate the perceptions of students on gamification.

Methodology

This was a prospective, interventional, single-center research study designed to study the perceptions of students on gamification. This was done in a large group in pathology lecture class. The institution ethical clearance was obtained (FMM-CIEC/CCM/606/2022). The study included MBBS phase II students who attended all the four classes in which gamification was done. The topic chosen was "Neoplasia" which included four classes of gamification with four different tools for the sub-topics as follows:

1. Socrative for nomenclature
2. Slido for carcinogenesis
3. Crossword for molecular aspects of neoplasia
4. Google form for hallmarks of cancer

The tools were chosen based on the content of the sub-topics. Socrative was used in the form of quiz where students had to answer ten multiple choice questions. The questions were prepared by subject experts. Students had to answer the quiz in teams, each team containing three members. The teams which got the highest scores were rewarded. Socrative is an app to assess and engage students while visualizing learning progress in real-time with instant results. This can be accessed at Socrative.com. Socrative teacher login was created and then the MCQs were incorporated in the Socrative quiz. The MCQs were administered using the instant feedback method. Groups were made based on the seating arrangement of students. The MCQs were of different difficulty levels. The didactic lecture was for forty minutes and was followed by gamification for the last twenty minutes.

Slido was chosen for carcinogenesis because the sequence consisting of initiator and promoter carcinogens which can lead to carcinogenesis is important. Five sequences with various combinations of initiator and promoter carcinogens were created by subject experts. Slido is an interactive tool which

can be used to create surveys, wordclouds, quizzes, questions and answers, live polls and analytics about audience. This can be accessed at slido.com. Slido login was created and was incorporated into the powerpoint presentation. These sequences were given in the form of surveys using Slido and students had to respond whether that sequence gives rise to cancer or not.

Crossword was created using bookwidgets.com by subject experts. Students were divided into groups, each consisting of ten members. The groups were made based on their seating arrangement. The prints of the crossword were given to student groups and the team that solved the crossword fastest with the most accurate answers were given prizes.

Google forms were created with multiple choice questions prepared by subject experts. Images were also incorporated in a few questions. The link was shared with students and students were asked to answer this in the form of a quiz. The top scorers were applauded, and prizes were given to the top four students.

These activities were conducted following the didactic lecture and a quick summary of the class was done following the discussion of the activity. In the fourth class, students were told that these activities were introduced to gamify, and the students were then asked to fill out a google form containing questions on students' perceptions of gamification. Students were told that it is purely voluntary and that their responses will be anonymized, and the data obtained will be used for publication and research.

The questions on perceptions were prepared and validated by medical education experts. They were as follows:

1. I liked all the digital tools used
2. Gamification made me remember the lecture content better
3. Gamification with activities will make me remember the lecture content for longer time than that following lecture without gamification.
4. Gamification kept me active throughout the class
5. Gamification helped me in better understanding of the key concepts
6. Gamification motivates me to prepare and read more
7. Gamification improved the overall learning experience for me

8. Gamification gave me more opportunities for interaction with faculty.
9. I would recommend use of gamification for other classes
10. Overall, I am satisfied with gamification
11. Which digital tool you liked the best?
12. Any other suggestions?

Questions 1 to 10 were on a Likert scale of 1 to 5.

Question 11 was a closed ended question with the options: Slido, google form, Socrative and crossword.

Question 12 was an open-ended question.

The reliability analysis was done using Cronbach's alpha. Students were given this questionnaire through a google form and were asked to fill it out. Students were asked to mark these on a 5-point Likert scale (strongly agree – 5, agree – 4, neutral – 3, disagree – 2, strongly disagree – 1). The students who had not attended all the four classes and those who were not willing to fill out the google form on students' perceptions, were excluded from the study.

Statistical analysis

Data were analysed using frequency, percentage, mean and standard deviation (SD).

Results

A total of 72 students out of 116 had attended all the four classes involving gamification and responded to the perception questionnaire. Students who were absent for any of the four classes involving gamification were excluded from the study.

Of the four different digital tools used, the majority i.e., 45.8% liked Google forms the most, followed by 30.6% liked Slido the most, 12.5% liked Crossword and 11.1% liked Socrative the most.

The mean and standard deviation for questions on student perceptions on gamification are as shown in Table 1. A mean score of greater than 4 was seen for all the questions on perceptions. Only one questions had a mean score of 3.97 which was on opportunities for interaction with faculty. The highest mean score was 4.33 and the lowest mean score was 3.97. The Cronbach's alpha for responses was 0.928. A positive response was seen for all the questions on student perceptions.

Some of the key responses to the open-ended question were as follows:

- Please do more Maam. It was really helpful and make me study more Thank you.
- More quizzes to keep us engaged.
- More of image-based questions in pathology. Need this for pharmacology and microbiology.
- It would benefit us a lot if more images and MCQs were displayed and discussed in detail. Our knowledge would increase a lot and help with exams.

Overall, the responses suggest that gamification can have number of positive effects on learning including:

1. Increased engagement and motivation
2. Greater challenge and reward
3. Enhances learning

Discussion

In this prospective, interventional study, we determined that the phase II MBBS students perceive gamification as a better method as compared to traditional, non-gamified, lectures. The students responded with overwhelming positive agreement to statements regarding gamification in their learning experiences. The reliability analysis showed excellent consistency. However, our study was not designed to detect any significant differences in the effect of gamification on learning in terms of post-intervention scores or improvement in student performance of students who experienced gamification.

The need for change in our approach to adult learning is not recent. It had been recognized by educational researchers long ago that the traditional pedagogical approaches fall short. Coupled with this, the present generation of students are adult learners who have grown up in the technological era, well equipped with good knowledge and expertise in using computers, smart phones, and the internet. Medical schoolteachers are constantly trying out innovative strategies like gamification, to improve adult learning experience for this new generation^[9].

Studies on gamification have reported diverse outcomes. These outcomes are context-dependent and hence difficult to generalize. A study by Landers

Table 1: Mean and standard deviation (SD) for perception questions

Sl no	Question/ statement	Mean	SD
1	I liked all the digital tools used.	4.03	0.85
2	Gamification made me remember the lecture content better	4.22	0.86
3	Gamification with activities will make me remember the lecture content for longer time than that following lecture without gamification.	4.25	0.87
4	Gamification kept me active throughout the class.	4.15	0.82
5	Gamification helped me in better understanding of the key concepts.	4.13	0.80
6	Gamification motivates me to prepare and read more.	4.07	0.88
7	Gamification improved the overall learning experience for me.	4.28	0.79
8	Gamification gave me more opportunities for interaction with faculty.	3.97	0.99
9	I would recommend use of gamification for other classes.	4.33	0.86
10	Overall, I am satisfied with gamification.	4.26	0.86

emphasized that gamification influences attitude and behavior, influencing learning outcomes^[10].

In a study^[11] that evaluated students' learning experiences on gamification, a thematic analysis based on focus group discussions was conducted. Five major themes emerged, as mentioned below:

1. Motivation and engagement are encouraged by gamification
2. Participants and experts are interested in the concept of gamified learning
3. Simplicity of the gamification method used in their study
4. Usability issues of the game design used and
5. Limitations in the gamification method used

Motivation, engagement, and interest in turn lead to enhanced teacher-student interaction and learning. Dominguez A, Saenz-de-Navarrete J, de-Marcos L, et al., in their study showed that game elements that increase motivation in students encourage them to seek more information independently, thus making them better self-directed learners and encourage them to participate in learning activities such as research^[12].

Surendeleg G, Murwa V, Yun HK, et al., explained that gamification enhances understanding of students by increased learner engagement and by providing suitable learning atmosphere^[13].

In a systematic review by Krishnamurthy K, Selvaraj N, and Gupta P, et al.,^[14] the authors describe a

few strategies that make gamification work better. Some of these are using reward system, making learning fun, using suitable narratives, using experiential learning, using feedback, using technology, using competition, ensuring diversity, bringing in collaboration, ensuring sustainability, and ensuring diversity. In our study, we have used some of these strategies. We have used digital tools, created fun and lively atmosphere, incorporated diversity with different activities, ensured collaboration through group activities, used competition and reward systems by giving prizes to the winners, and used repetition through discussions after the activities.

Our study results support the idea that gamification increases learner engagement, motivation, interaction, understanding and retention. However, our study was not designed to detect a significant difference in learning in the form of better scores and performance in exams. Further prospective, theory-based research is needed to determine whether gamification can lead to improvements in examination scores and pass rates as well as patient outcomes.

Limitations

In general, medical education research suffers many methodological limitations^[15]. This study was conducted at a single medical college. The number of gamification sessions were limited to a few sub-topics and few sessions. The main limitation was that this study did not determine the effect of gamification on learning in terms of improvement in examination scores or outcomes. However, despite these limitations, our study can be used as a basis for designing future studies to assess the effectiveness of gamification in medical education.

Conclusion

We performed a study to explore the perceptions of MBBS phase II students on gamification. Our results support that gamification was well accepted by students and it increases motivation, engagement, and interaction, compared to traditional didactic lectures. The study did not investigate the effects of gamification on learning. However, further research studies must be conducted to investigate the impact of gamification on specific learning outcomes in students.

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