ORIGINAL ARTICLE

Impact of Gamification on Education Prime Time

KAINAT JAVED, SAIMA RAFIQUE, TAYYABA AZHAR
Department of Medical Education, University of Lahore
Correspondence to Dr Kainat Javed, Email: drkainatjaved@hotmail.com

ABSTRACT

Aim: To assess the effectiveness of Gamification approach for teaching anatomy to first year medical students by comparing the students' performance in traditional teaching with gamification approach.

Method: A Comparative Analytical study was conducted in undergraduate students having Taught anatomy in a private medical college of Lahore (mention Name), from 16th July -31st August 2019. A total 155 students of 1st year MBBS were enrolled and divided randomly into two groups Group 1(Traditional n=77) and Group 2 (Gamification n=78). Shapiro-wilk and Kolmogorov-smirnov test were applied to check the normal distribution of pre-test and post-test scores. Comparison of pre and post test scores by paired sample t-test resulted in significant decrease in the control group while a significant positive change in learning of experimental group.

Results: Findings of the study showed that students studied in Group 2(i.e. Gamification) achieved the highest scores in post-test, compared with the other group. Mean difference of Group 2 is (MD=-6.100) compared to Group 1(Traditional) which is MD=-1.040 and paired sample t-test shows p-value=.000 of both groups, thus evident from the statistics that students of group 2(Gamification) achieved high scores as compared to traditional group.

Conclusion: This study concluded that planned gamification frameworks can be generally welcomed by students. It is recommended that this approach in small group discussion is worth pursuing in future, this teaching approach can be implemented for teaching medical students where the role of teacher is more of facilitator.

Keywords: Gamification, Effectiveness, Education

INTRODUCTION

Traditional teaching is observed as insufficient and tiring by many students. In spite of the fact that teachers consistently look for novel instructional methodologies, to a great extent, schools face serious issues around student's commitment and motivation[1]. The use of instructive games as instruction tools is very hopeful technique because of the ability to educate and strengthen knowledge as well as significant aptitudes, for example: problem solving, cooperation, and consistency. Gamification, characterized as the application of game like components in non-game settings, is truly a new and quickly emerging field in educational setups. The concept of gamification is unique in relation to that of an instructive or genuine game[2].

Games have surprising motivation force; they use numerous instruments to impulse individuals to attract them, and often with no prize, only for the joy of playing and chances to win but making an attractive instructional game is time consuming as well as costly[3]. Moreover, classroom requires certain specialized framework, rather than utilizing detailed games requiring a lot of plan, the "gamification" approach recommends utilizing game reasoning and plan components to improve students' commitment and inspiration[4].

The objective of the study was to assess the effectiveness of Gamification approach for teaching anatomy to first year medical students by comparing the students' performance in traditional teaching with gamification approach.

METHODS

This study was done in University College of Medicine and Dentistry (UCMD), University of Lahore in Department of Anatomy from 16th July to 31st August 2019 and was approved by the ERB (Ethical Review Board) of the University of Lahore.

This was a Comparative Analytical study conducted in undergraduate students having been taught Anatomy in private medical college of Lahore, Pakistan. Intervention in this study was gamification technique (scrabble); and students were assessed on pre and post test scores. The sample size was calculated by G power calculator. All the students of 1st year MBBS enrolled in UCMD were approached for this study, total 155 students of 1st year were divided through randomized control sampling into two groups Group 1 n=77(Traditional teaching method and Group 2

n=78 (Gamification Approach) according to computer generated roll numbers. Three themes from Musculoskeletal module were selected from the musculoskeletal module of First year MBBS, only knowledge content was assessed and the tool used for the assessment of students was MCQ's test, which were aligned with the learning objectives. All the data of Pre and Post-test (MCQ's) and scrabbles was validated by two anatomists. and scores of pre and post-test were analyzed.

RESULTS

In this study 155 students of first year MBBS took part and randomly divided in two groups. Scores of 5 students were not included due to incomplete test. Three sets of pre-post tests were finalized as per themes which were included in Musculoskeletal module. Most of the items fall in moderate range i.e. p-value=0.40-0.80, with respect to difficulty of mcqs and all questions showed positive item discriminations (Ds), which indicate that students choose more right answers in post-test as compared to pre- test. Total numbers of MCQs in all selected themes were 15 and reliability was 0.801. In this study the quantitative data was analyzed by SPSS 20 by paired t-test on both scores of pre and post-test of both batches distribution. P vale for this study is p<0.05

The probability and normal distribution of scores of both groups are in the first part of analysis of both groups, similarly the distribution of pre and posttest of both the groups are given in second part, and thirdly, table shows the correlations of both groups. The common tests Shapiro-wilk test and Kolmogorov-smirnov test are applied to check the normal distribution of pre-test and post-test scores (Table 1).

Table 2 showing results of Paired sample statistics, which shows significant mean difference in pre-test and post-test results of all the three groups. Table 3 indicates the mean difference between pre-test and post-test scores

Thus it is evident from the scores that Gamification teaching approach has more positive impact on students' performance. Paired sample t- test shows p value=.000 of both groups, which is also significant. Gamification is a true student centered blended learning technique in which students actively took part in different activities, discussions and helping the students in retaining the information in long term memory.

Table 1: Tests of Normality

Groups	Test	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Group 1 (Traditional)	Pretest	.186	50	.210	.932	50	.517
	Post-test	.201	50	.217	.901	50	.501
Group 2 (Gamification)	Pre-test	.194	50	.214	.933	50	.599
	Post-test	.151	50	.200	.947	50	.637

Table 2: Paired samples statistics group wise pre-test and post-test results

Pair	Group	Test	M	N	SD
Group 1	Traditional teaching method	Pretest	3.20	50	1.212
		Posttest	4.24	50	.938
Group 2	Gamification approach	Pretest	3.28	50	1.67
		Posttest	9.38	50	1.398

Table 3: Paired samples test group wise results

Pair	Group	Test	Paired Difference		t	df	Sig. (2-tailed)
			MD	SD			
Group 1	Traditional teaching method	Pretest - Posttest	-1.040	.925	-7.951	49	.000*
Group 2	Gamification approach	Pretest - Posttest	-6.100	1.898	-22.727	49	.000*

*p<0.05

DISCUSSION

Thus on basis of strong evidence of results it is proved that students who joined gamification lectures had significant effect in their post test scores.

Anatomy is a vast subject and many new methodologies are introduced in recent years to support the teaching of this subject[5]. In 2018 a study was conducted by hew[6], which also indicates that traditional teaching method should be replaced with other new teaching strategies in Pakistani setup so that our students can perform better[5].

It has been observed that game based study has a positive impact on our students[7]. Gamification is the key for better engagement and higher levels of motivation. The results of Group 2, which was taught with Gamification approach shows that retention was improved and students took more interest in the subject. Study based games helps to motivate the participants[8]. It has been proved through various researches also that gamified classroom with well-planned study based games is better than simple traditional teaching technique[9]. It is suggested that in future MOODLE can also be used for online games[10].

Limitations: Sample size was small in this study; and can be increased to see the more generalized results. Due to time limit only one game i.e.; SCRABBLE was introduced as Gamification technique.

CONCLUSION

Gamification is as yet ascending in fame, this approach in educational settings seems to be still climbing up to the top[11] while Medical education is expanding day by day, students are between those who asks for the better end result from their medical college or university, so for them involving gamification in small group discussion is worth pursuing in future[12].

Findings and conclusion of this study suggests that gamification must be employed as a teaching strategy in the curriculum of MBBS as well as BDS for teaching anatomy and other subjects also to the medical students[13].

Conflict of Interest: None.

Funding Sources: None.

REFERENCES

1. Lo CK, Hew KF. A critical review of flipped classroom challenges in K-12 education: Possible solutions and recommendations for future research. Research and practice in technology enhanced learning. 2017;12(1):1-22.
2. Capdarest-Arest N, Opuda E, Stark RK. "Game on!" Teaching gamification principles for library instruction to health sciences information professionals using interactive, low-tech activities and design-thinking modalities. Journal of the Medical Library Association: JMLA. 2019;107(4):566.
3. Ang ET, Chan JM, Gopal V, Li Shia N. Gamifying anatomy education. Clinical Anatomy. 2018;31(7):997-1005.
4. Gómez-García G, Marín-Marín JA, Romero-Rodríguez J-M, Ramos Navas-Parejo M, Rodríguez Jiménez C. Effect of the Flipped Classroom and Gamification Methods in the Development of a Didactic Unit on Healthy Habits and Diet in Primary Education. Nutrients. 2020;12(8):2210.
5. Betihavas V, Bridgman H, Kornhaber R, Cross M. The evidence for 'flipping out': a systematic review of the flipped classroom in nursing education. Nurse education today. 2016; 38:15-21.
6. Hew KF, Lo CK. Flipped classroom improves student learning in health professions education: a meta-analysis. BMC medical education. 2018;18(1):1-12.
7. Ali MF, Nadeem N, Khalid F, Anwar NM, Nabie G, Docherty C. Sonogames: Sounds of the Right Kind; Introducing Gamification into Radiology Training. 2021.
8. Cheng X, Ka Ho Lee K, Chang EY, Yang X. The "flipped classroom" approach: Stimulating positive learning attitudes and improving mastery of histology among medical students. Anatomical sciences education. 2017;10(4):317-27.
9. Ahmad A, Zeshan F, Khan MS, Marriam R, Ali A, Samreen A. The impact of gamification on learning outcomes of computer science majors. ACM Transactions on Computing Education (TOCE). 2020;20(2):1-25.
10. Xu P, Chen Y, Nie W, Wang Y, Song T, Li H, et al. The effectiveness of a flipped classroom on the development of Chinese nursing students' skill competence: A systematic review and meta-analysis. Nurse education today. 2019; 80:67-77.
11. Gentry SV, Gauthier A, Ehrstrom BLE, Wortley D, Lilienthal A, Car LT, et al. Serious gaming and gamification education in health professions: systematic review. Journal of medical Internet research. 2019;21(3): e12994.
12. Morton DA, Colbert-Getz JM. Measuring the impact of the flipped anatomy classroom: The importance of categorizing an assessment by Bloom's taxonomy. Anatomical sciences education. 2017;10(2):170-5.
13. Minuti A, Sorensen K, Schwartz R, King WS, Glassman NR, Habousha RG. Librarians flip for students: teaching searching skills to medical students using a flipped classroom approach. Medical reference services quarterly. 2018;37(2):119-31.