

Using Kahoot! as an assessment tool to enhance learning in a traditional lecture-based classroom

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Abstract

Purpose: Game based learning when introduced into traditional classroom environments makes learning fun. Kahoot! is a game based app which can be used to assess students' knowledge, and is a promising tool for formative assessment. The purpose of the study was to measure the extent to which the popular game based online platform of "Kahoot!" is effective as a tool of assessment for learning.

Methodology: The crossover study was conducted at a medical college in India. Sixty students participated with 30 in the Kahoot! Group and 30 in the Control group. Four topics were taught; assessments were done immediately after a topic was taught and 15 days afterwards to assess knowledge retention.

Results: Analysis showed statistically significant improvement from initial test to retention test in both the Kahoot! and Control groups in all four sessions. Out of 120 respondents from each group who attended the four sessions, 75% (90/120) of respondents in the experimental group (Kahoot!) scored 17.7% more than the Control group in the test held immediately after the lecture and 76.6% (92/120) respondents in the experimental group scored better than the Control in the test held after 15 days. Students found that Kahoot! sessions were motivating, engaging and made learning fun.

Conclusion: Kahoot! is a promising formative assessment tool that can be introduced in a traditional classroom to enhance learning.

Keywords: Kahoot! , Game based learning, formative assessment

Introduction

Use of Internet based technologies has become an important component of today's teaching-learning process in higher education to enhance knowledge and performance of students. One advancement in learning technology is game-based learning. Games have been used to engage students in a fun way as a means to enhance learning (Lee *et al.*, 2018). Studies have

shown that games sustain and motivate students' interest in learning (Bawa, 2018; Plump & LaRosa, 2017). There is sufficient evidence that assessments drives learning and when conducted formatively, may even create a better teaching and learning environment (Ismail & Mohammad, 2017).

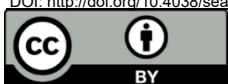
Kahoot! is a game-based learning platform used to review students' knowledge, for formative assessment or as a break from traditional classroom activities. Its availability as a free online tool is an advantage and allows the implementation of quick quizzes to assess students' knowledge in real time. The purpose of the research was to measure the extent to which the popular game based online platform of

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“Kahoot!” is effective as a tool of assessment for learning.

Methodology

This educational research study was conducted at the Department of Pharmacology, Terna Medical College, India following Institutional Ethics Committee approval and with prior voluntary consent of students. Sixty students, with 30 students each in experimental group and Control group participated in this crossover study from July 2019 to Feb 2020. The experimental group of learners used the online digital Kahoot! Platform. The control group took the same test on paper. There were four topics taught –Beta lactam antibiotics, Contraception, Antitubercular drugs and Corticosteroids.

Kahoot! App: All participants downloaded the Kahoot! App on their smart phone or on their laptop (<http://getkahoot.com>). Students entered a game PIN displayed on a common screen into their personal mobile devices and selected from multiple choice answers as the class played the game together. As each item was presented, the program provided stimulating music and colorful animated shapes to keep participants engaged in the activity. A timer for each question created a competition during the game. At the end of each question answered, a bar graph displayed how many participants chose each of the possible answers and thus provided immediate feedback for class discussion and faculty instruction.

Steps in the Study

1. All students were asked to read up the topic before attending the class.
2. A didactic lecture topic was taught to the two groups by the same teacher.
3. A MCQ quiz consisting of 30 questions was administered after the didactic lecture to each group to test immediate recall of knowledge (Day 1). The MCQs were pre-validated by discussion with fellow faculty members. Experimental group took the quiz on Kahoot!

App while the Control group took the same quiz on paper.

4. At the end of the quiz, feedback was given by the teacher who got a clear and immediate picture of each one of the students' answers on his screen and therefore, was able to focus on the understanding of each learner in the Kahoot! group. The teacher discussed the concepts that had not been understood by the learners to both groups. MCQs attempted by control group were also assessed after the discussion.
5. Two weeks later (Day 15), the MCQ quiz was taken 'in previously applied format' to detect any changes in their initial responses regarding the topic taught. This was done to assess long term retention of knowledge.
6. Four such sessions were administered to students to identify whether assessment done after a class using Kahoot! enhances learning of the students.
7. Student feedback about Kahoot! was taken at end of study using a survey and open ended questionnaire.

Data Analysis

One tail Independent t-test was used to compare the means of the performance scores of the two groups. Paired t-test was used to compare means of performance scores from the same group at different times. Effect size was found out using Cohen's d. Student feedback about Kahoot! app was taken using a 5 point Likert scale. Feedback obtained from open ended questions were evaluated thematically.

Results

Quantitative data Analysis Differences Within groups:

Differences within the groups at initial test and retention test were analyzed using a paired t test and is depicted in Table 1. Analysis showed statistically significant improvement from initial test to retention test in both the Experimental and Control groups in all the four sessions.

Table1: Comparison of assessment of initial test (Day 1) and retention tests (Day 15) with in groups

Session	Groups n=30 (each group)	Day	Mean scores	SD	P value	Effect size (Cohens d)
Beta lactam antibiotics	Experimental	Day 1	17.5	5.67	.00002*	.802 (high)
		Day 15	21.8	4.95		
	Control	Day 1	18.6	5.57	.01792*	.242
		Day 15	20.03	6.25		
Contraception	Experimental	Day 1	16.66	4.81	.00001*	.717
		Day 15	20.26	5.23		
	Control	Day 1	16	5.91	.00004*	.558
		Day 15	19.83	7.70		
Anti-tubercular drugs	Experimental	Day 1	20.53	4.14	.00001*	.706
		Day 15	23.55	4.41		
	Control	Day 1	20.7	5.90	.00001*	.496
		Day 15	22.5	6.14		
Corticosteroids	Experimental	Day 1	19.73	4.13	.00001*	.901 (high)
		Day 15	23.26	3.69		
	Control	Day 1	15.1	17.53	.00189*	.409
		Day 15	6.22	5.66		

*P value statistically significant at $P < .05$, Cohen's $d = .2$ small effect, $.5$ medium effect, $\geq .8$ high effect

Analysis of Pooled data of 120 respondents from the four sessions

Out of the 120 respondents from each group who attended the four sessions, 75% (90/120) of respondents in the experimental group (Kahoot!) scored 17.7% more than the control group in the test held immediately after the lecture. 76.6% (92/120) respondents in the experimental group scored better than the control in the test held after 15 days.

Qualitative data Analysis Student Feedback

Student feedback was taken at end of study on a 5 point Likert scale. Eighty-four percent students felt Kahoot! helps improve attention in

class while 80% felt it helps to retain knowledge. Eighty-five percent agreed Kahoot! motivated them to learn more. Eighty-two percent mentioned learning was fun.

Qualitative responses obtained through open ended questions were analyzed with mixed method analysis using percentages and themes. Seventy-five percent students recommended Kahoot! for classroom learning. Eighty-five percent of students were motivated to read further on the topic. Students referred books outside of the prescribed standard textbooks while preparing for the quiz. Students expressed that Kahoot! sessions were motivating, competitive, instant results useful, interactive and fun like a game.

Discussion

The key finding revealed by the study was that Kahoot! improved the performance scores compared to the control. It enriched the quality of student learning in the classroom, with the highest influence reported on motivation, instant feedback, competition and improved learning experience. Using Kahoot! in the classroom benefits both teacher and student. Student engagement with this game is high as the game is fast paced, visual, and energetic. Teachers can track student performance of the game, made adjustment in teaching or re-teaching when necessary.

One of the limitations of Kahoot! is it was difficult to administer problem based questions as there is a constraint on word limit and time limit.

Conclusion

Kahoot! can be introduced for formative assessment in a traditional classroom in Pharmacology to enhance learning.

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