ORIGINAL ARTICLE

Comparison of Technology Enhanced-Learning and Traditional-Based Learning on Academic Performance among Undergraduate Physiotherapy Students

Hari Hara Sudan S[1], Pavithra V[1], Manoj Abraham M[1], Esther P[1]

[1] KG College of Physiotherapy, Affiliated to The Tamil Nadu Dr MGR Medical University, KG Hospital & PG Medical Institute, Coimbatore. Tamil Nadu, India.

ABSTRACT

Background: Learning is the act of acquiring knowledge or skills through instruction, attention and repeated experiences. Educators must arrange an appropriate learning environment to elicit the correct response. In physiotherapy education, there is a need for a continuous development that forces the educators to plan and implement new kinds of strategies in order to help the students to prepare for their future and to gain optimal learning. **Objective:** This study compared the technology-enhanced learning versus traditional-based learning on academic performance among undergraduate physiotherapy students. **Methods:** Quasi experimental study design was used. 30 students were selected by convenient sampling and were randomly divided into experimental group (A) and control group (B). They underwent a class on role of physiotherapy in congenital heart diseases for four hours in a week for about four weeks. The student's academic performance was evaluated by asking few questions regarding the class which was conducted in Kahoot! for Group A and multiple-choice questionnaires (MCQs) for group B. **Results:** The comparison of post-test mean score between Group A and Group B showed the calculated t value = 9.63 with the p value < 0.00001. The result was significant at $p<0.05$. **Conclusion:** Technology enhanced-learning is more effective than traditional method of learning among undergraduate physiotherapy students which indicates that students are actively participating in technology-enhanced learning which increases the academic performance of students.

Keywords: Traditional learning, technology-enhanced learning, physiotherapy students, MCQs, Kahoot!

Corresponding Author:
Hari Hara Sudan S
Email: harisudan.90@gmail.com
Tel: 9600540572

INTRODUCTION

In this modern technological era, students have the mind set of swiping and pinching the smart aids than flipping the pages in the books. It is hard to make the learners to be engaged in learning through a passive traditional method (Weeks & Horan 2013). In traditional learning, a teacher's basic instructional tools are chalkboards, multipurpose boards, pegboards, bulletin boards and flip charts. Recently the use of electronic presentations has become common and Microsoft PowerPoint (PPT) is the most popular instructional aid now. A traditional classroom is replaced by digital ones and teachers ensure individual attention to augment the learning capabilities of the child (Raunak 2017). Various studies have been conducted to assess the effectiveness of lectures using. PPT or other such media in comparison to lectures using chalkboard. When technology-enhanced learning is used instead of traditional method of learning, it can enhance learner's cognition and interest in a broader perspective. Several studies reported that educational computer games could enhance student's learning interest and motivation. Active game-based or technology enhanced learning have great potential for improving the learning achievements of students.

Combining games with educational objectives could not only trigger students' learning motivation, but also provide them with interactive learning opportunities. It is well known that playing games is one of the most natural forms of learning.

One of the emerging game-based learning platforms used in education institutions is Kahoot! which is freely available (Plump & LaRosa 2017). It allows teachers to create game-based quizzes, surveys, etc. in which the participants compete against each other. Top responders for each question are revealed and the overall winner(s) will be displayed at the end of the Kahoot! session (Johns 2015). The scoreboard at the end of the game will display the winners. The good thing about Kahoot! is, the results including their descriptive analysis data can be exported and saved by the teachers for future reference.

Multiple choice questions (MCQs) are a well-established, reliable method of assessing knowledge and are used widely among medical students. Well-constructed MCQs

have a greater ability to test knowledge and factual recall but they are less powerful in assessing the problem-solving skills of the students. Generally, MCQs stimulate students to make a superficial and exam-oriented study.

In this study, we used Kahoot! and MCQs to assess for the technology-enhanced learning over the traditional-based learning on academic performance among the undergraduate physiotherapy students.

METHODS

KG Institutional ethical committee approval and individual consent was obtained as per ethical guidelines. A quasi experimental design that use a control group but no pre-test, post-test only design was adopted for this study. By convenient sampling technique, 30 undergraduate third year physiotherapy students from KG College of Physiotherapy were selected and randomly divided into experimental group (A) and control group (B). The 'role of physiotherapy in congenital heart diseases' as a topic was designed for both the groups. The classes were scheduled four hours per week for four weeks, for both groups. The classes for Group A (technology-enhanced learning group) were taken through power point and video presentations. For Group B (traditional-based learning group) the classes were delivered sing chalkboard and charts.

The groups were evaluated by Kahoot! and MCQs respectively. 30 questions were created as questions in Kahoot! game-based tool, and the same questions were asked in paper-and-pencil test as MCQs. In Kahoot!, students answered the questions by choosing one of the different shapes within particular time using their mobile phones with the given code; in MCQs test, students marked the correct answers on paper. Duration of the test session was 30 minutes. Each question carries 1 mark, with the total 30 marks. After the Kahoot! session each student's score was displayed on their screen immediately after answering; in MCQs, the researcher evaluated the answers and the score was given back to the students.

RESULTS

Table I and II describes demographic variables and the mean scores of Group A (technology-enhanced learning) and Group B (traditional-based learning), which were analysed by student independent t –test respectively. The mean score of Group A (25.80) was higher than the Group B (20.27). This result indicated that Kahoot! was a fun and effective method to give feedback thus better than the MCQs test. There was a significant difference on academic performance between Group A and Group B ($p<0.05$).

Table I: Demographic variables

S.N.	Characteristics	Numbers	Total
	Age		
1	20	14	30
	21	16	
	Gender		
2	Male	9	30
	Female	21	

Table II: Comparison of technology-enhanced learning and traditional-based learning on academic performance among undergraduate physiotherapy students

Group	Variable	Posttest Mean	Independent T-Test	*p-value*
Experimental Group (A)	Kahoot	25.80	9.63*	0.00001*
Control Group (B)	MCQ	20.27		

*significant at $p \leq 0.05$

DISCUSSION

The present study revealed that there was a significant difference on academic performance between technology-enhanced learning and traditional-based learning among physiotherapy students. The comparison of mean score between Group A and Group B showed that the calculated t-value = 9.63 with the p-value < 0.00001. The result was significant at $p < 0.05$. This result is consistent with the study conducted by Douglas et al. (2017), which stated that contemporary instruction group performed significantly better on the posttest questionnaire and scored 8.94 ($p = 0.001$) when compared to traditional instruction post mean score of 7.30. The contemporary instruction format improved the students' learning of the topic as assessed by test scores (Flavio et al. 2018).

The rise of technology-enhanced learning has occurred primarily due to the ease of internet access enabling the retrieval and sharing of information in an instant. The better scores could be due the engagement of students that improve the experiential nature of active, intentional learning. Educational games and game-based student response systems both increase student motivation and engagement, especially in circumstances where conventional lecture style or 'chalk-and-talk' teaching is resented by students and induce boredom (Cugelman 2013; Douglas et al. 2017; Leaning 2015; Barrio, Muñoz-Organero & Soriano 2016).

In Malone's theory of intrinsic motivation, by challenging students with difficult problem-solving tasks in an audio-visually stimulating environment, the fantasy 'game-show' environment further increases their absorption during problem-solving. Kahoot! has a greater impact on interpersonal interactions than other tool (e.g., Socrative), by allowing competition and discussion to occur between an entire class rather than in small groups (Wang & Lieberoth 2016; Graham 2015; Roehl, Reddy & Shannon 2013). Kahoot! also improves classroom dynamics as the system provides students with real- time feedback of their performance, and to some extent adapt teaching activities based on students' responses to quizzes (Méndez & Slisko 2013; Plump & LaRosa 2017).

CONCLUSION

Education is not just about memorizing facts and vocabulary words; it is about solving complex problems

and being able to collaborate with others in the workforce. Subjects that students deem challenging or boring can become more interesting with technology. Kahoot! is an innovative formative assessment tool which reflect on what the students have learned. The present study concluded that technology-enhanced learning is more effective than the traditional-based learning among undergraduate physiotherapy students.

ACKNOWLEDGEMENTS

The authors sincerely thank Dr. G. Bakthavathsalam, Chairman, Mrs. Vasanthi Ragu, Vice Chairman, Mrs. Vaijeyanthi M Das, CEO, Mr. Prabhu Kumar, CEO, Prof V. Mohan Gandhi, CEO, KG Hospital, Coimbatore. India, and Dr. Manoj Abraham M, Professor & Principal, KG College of Physiotherapy, Coimbatore, India, for their support and logistical help to conduct this research.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

FUNDING

No funding was received for conducting this study.

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