



## Introduction

In the UK, TEF has been introduced to look at a range of metrics to assess teaching quality. Knowledge acquisition, retention, and student engagement are some of the most important metrics used in TEF. Due to the diversity of our students' background and differences of students' competency, there are increasing concerns of teacher-student interaction and student engagement in classrooms, and knowledge acquisition and retention in the teaching and learning process in our large cohort teaching. This intervention addresses the concerns by introducing game-based learning quiz into traditional classrooms, with the objectives of:

- increasing the awareness and interest in the topic.
- improving student participation and concentration on knowledge acquisition.
- enhancing teacher-student interaction, and student engagement in classroom.

It brings together active learning methods involving mobile learning, gamification learning, and quiz learning in large cohort teaching in classroom.

## Literature Review

New methods like mobile learning, game-based learning, problem-based learning, and quiz-based learning are being introduced into teaching and learning process based on the concept of active learning (Devi, 2014).

Mobile learning has the potential to improve teaching quality with the power and flexibility to transform practice (Motiwalla, 2007). It also facilitates social and collaborative learning (Sung *et al.*, 2016) with widely used quiz-based learning (Pechenkina, *et al.*, 2017). Mobile learning in classroom can be used to enhance student-centred learning, teamwork and collaboration skills through communication applications, interactive displays, and video features (Murray and Olcese, 2011). One way of using quiz learning is through gamification.

Gamification in education refers to the use of game elements in non-game contexts (Dominguez *et al.*, 2013) with purpose of increasing student engagement and motivation. Due to the popularity of interactive media, students may find gamification in classroom appealing and motivating (Landers, 2014). Gamification can also be considered as the process of using features and elements borrowed from games to increase intrinsic and extrinsic motivation of students (Buckley and Doyle, 2016). 'Kahoot!' represents a new generation of educational technology apt for increasing the learning motivation and engagement, and for assessing students' understanding of a lesson through gamification (Wang, *et al.*, 2016). Furthermore, gamification can develop students' metacognitive abilities, promote empathy, and build teamwork skills.

Meanwhile, the quiz method can facilitate students' performance and participation (Devi, 2014).

## Context

This intervention took place at University of West London in academic year 2018-19. It involved in two classes with 168 level-4 undergraduate students enrolled on the module of Computer Architecture from 4 courses: BSc Computer Science, BSc Creative Computing, BSc Cyber Security, and BSc Computer Games Technology, respectively. The students were randomly pre-allocated to two classes: Class A had 90 students; Class B had 78 students.

## Methodology

In Class A, each game quiz was conducted at the end of the lecture to let students complete it interactively. The gameplay was an interactive multiple-choice quiz with approximately 10 to 15 questions based solely on the lecture contents. All students then used a generated PIN on their various smart devices to answer the questions created in advanced by the lecturer. Finally the lecturer and students reflected on the session together. Each quiz game lasted no more than 15 minutes to prevent the possibility of a wear-out effect. At the end of the semester, the students completed the questionnaire after being exposed to the use of game quiz in their weekly lectures for the entire semester. The comprehensive questionnaire consists of open and closed-ended questions (five-point Likert scale). Both objective data (*i.e.*, mean marks of the class, and weekly student attendance rates) and qualitative opinions (*i.e.*, questionnaires) have been gathered and analysed.

In Class B, neither game quizzes nor questionnaires were conducted.

## Conclusions

The results showed that the use of game-based quiz has a positive effect on student engagement and knowledge creation. The students' comments demonstrated that their interests, motivation, and concentration have been enhanced, and more formative quiz games are expected in the classrooms. However, the results cannot be generalised to all tertiary students in the UK, partly due to not only the fact that the reasons for this success are largely unknown but also because of the diverse nature of different tertiary courses. Future interventions are suggested to employ samples from other academic courses and also from other universities.

## References

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## Evaluation and Results

The module was assessed by coursework. The mean marks and weekly student attendance rates of the two classes are compared in Figure 1. The data shows that the mean marks of the Class A is higher than that of Class B, implying that the intervention could increase the knowledge acquisition and retention. The data also shows that the weekly student attendance rate of the Class A is higher than Class B, implying that the intervention could enhance the behavioural engagement.

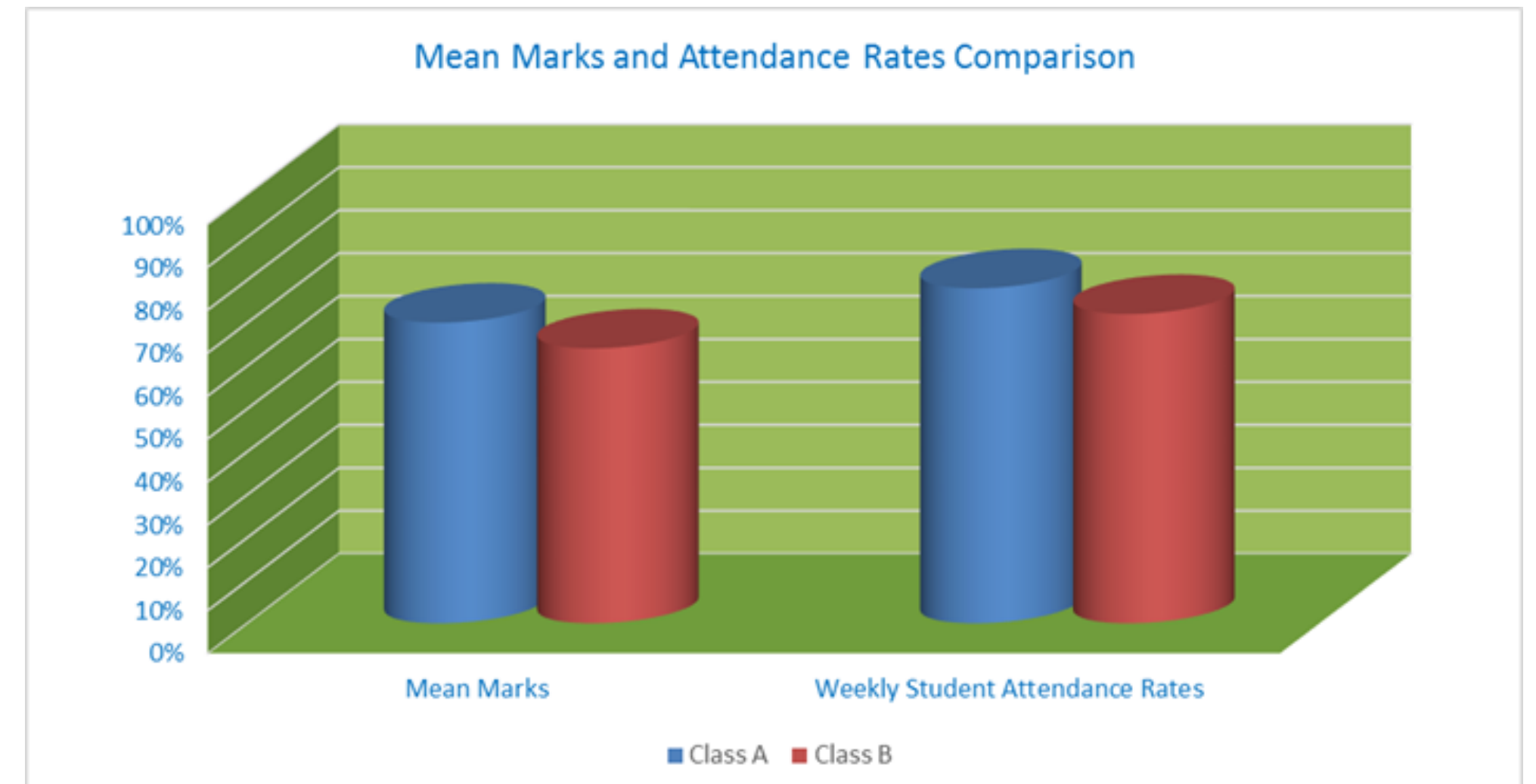


Figure 1 Comparison of the Two Classes' Mean Marks and Weekly Student Attendance Rates

In Class A, the results from the close-ended questionnaires about students' attitude to use game quiz in classroom are compared and shown in Figure 2. It is noteworthy that 100% of the students expressed their positive regard for the effectiveness of the game quiz in the academic context. A small proportion of 2% strongly disagreed to 6 out of 10 statements listed in Table 2. An interesting trend of 98% of similar responses was recorded for all statements which supplies evidence with regard to the popularity of game quiz among the students finding it interesting (statement 1), fun (statement 2), and enjoyable (statement 4); responding quickly to and focusing on each statements or question eagerly (statements 5-6); being fond of the competition in each game quiz (statement 8); recognising the value of using game quiz for teaching and learning purposes, and in higher education (statements 9-10). About 96% of the respondents also perceived the game quiz as exciting and were thus motivated to make the effort to answer every statement or question in each game quiz session (statements 3 and 7).

No.	Statements	Strongly Disagree	Disagree	Slightly Agree	Agree	Strongly Agree
1	I find game quiz interesting	2%	0%	2.6%	10.8%	84.6%
2	I find game quiz fun	2%	0%	2.8%	12.8%	82.4%
3	I feel excited when playing game quiz	2%	2%	3.6%	30.6%	61.8%
4	I enjoy playing game quiz	0%	2%	3.8%	28.5%	65.7%
5	I focus on the statements or questions in each game quiz session	2%	0%	3.2%	35.6%	59.2%
6	I respond as quickly as possible to each statement or question in each game quiz session	0%	2%	3%	32.2%	62.8%
7	I respond to each item or question in each game quiz session	2%	2%	3.2%	29.8%	63.0%
8	I like the competitiveness in our game quiz sessions	0%	2%	8.8%	32.4%	56.8%
9	There is value in using game quiz for teaching and learning purposes	0%	2%	5.8%	24.5%	67.7%
10	Game quiz should be used in higher education	0%	5.8%	6.8%	20.6%	66.8%

Table 2 Close-ended Questionnaires about Students' Attitude to Use Game Quiz in Classroom

In the answers to open-ended questionnaire, which was "Please provide a comment about your experience with game quiz in this course." The students reiterated that they found game quizzes to be intrinsically motivating (*e.g.*, "very nice and engaging experience"; "enhances interest in the course"; "quite enjoyable") and can induce extrinsic motivation (*e.g.*, "enjoy the competition"; "feel more motivated and focused"; "really expect more game quizzes"). They also highlighted that the use of game quiz during lectures help foster and reinforce learning (*e.g.*, "enjoy the learning process by playing quiz game on 'Kahoot!' as it gives me the chance to recall and to retain what I've learned during lectures"; "very interesting approach to revising after the lecture"). From my observation, the students' engagement in the class, participation and concentration on knowledge acquisition, and interaction with teacher were enhanced obviously in the intervention. Therefore, this method will be adopted in my future teaching.