Incorpating Gamification in A Flipped Classroom Approach: A Review of Literature

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Abstract

This study aimed towards designing and developing an instructional learning module, where it combines flipped classroom approach and gamification. Information obtained through 20 articles reported on the gamified flipped classroom, where the study was conducted from 2015 - 2020. The content analysis method was used to identify the online platform or tools, the impact of gamified flipped classroom on student's learning and gamification element in a gamified flipped classroom. The results showed that some web platform or tools were employed for gamified flipped classroom practice and year by year, a variety of online platform or tools have been used. The result also showed, the use of gamified flipped classroom yielded positive impact on three (3) aspects; (i)student's motivation, (ii)engagement; and (iii)achievement. While, point, badges and leaderboard were reported as the most basic elements used in gamifying activity. This paper also proposes the future research on focusing in detailing the gamification for out-class and in-class activities. The findings of this review potentially provide insights for further studies in a gamified flipped classroom approach.

Keywords: Flipped classroom, Gamification element, Online Platform, Gamified

INTRODUCTION

The flipped classroom is a learning approach that requires students to prepare themselves with prior knowledge before class and actively engaging students during class (Boevé et al., 2017). The term "flipped classroom" was made popular by Sams and Bergmann (2012) The flipped or inverted classroom is a type of blended learning where the students study a leaning material outside the classroom and do an interactive and participatory activities in the classrooms with educator (Kaviza, 2020; Strayer, 2012). The flipped classroom puts the learning responsibility on the students. A student will undergo self-study activities at home. These includes watching a video, read books or reading materials provided by the teacher. Subsequently, the student has to practice it in the class. A study on the impact of flipped classroom to the student have been reported that the flipped classroom shown a positive impact toward students' performance, engagement, motivation and interaction, respectively (Martínez-Jiménez & Ruiz-Jiménez, 2020; Trpkovska, Bexheti, & Cico, 2017; Tugun, Uzunboylu, & Ozdamli, 2017). Through the flipped classroom, the environment of the class conductively turned to be active, dynamic and authentic. This is in line with the previous study where according to Holland & Holland (2014) and Hwang & Lai (2017), teacher guides and facilitates the students on how to engage and apply the concepts in the topic.

PROBLEM STATEMENTS

In order for a flipped classroom to be effective, the students should not skip out-of-class activities. The previous study found that the limitation of flipped classroom approach was, students' disengagement in the out-class activity (Chen, 2016; Lo & Hew, 2017). This created difficulty for the teacher to ensure that their students are really made themselves prepared with out-of-class material (Chao, Chen & Chuang, 2015). For that reason, integrating gamification in a flipped classroom are strongly suggested by some researchers. Gamification is a mechanism that helps in improving the efficiency of a flipped classroom (Yildirim, 2017). The integration of gamification in a flipped classroom approach will both, encourage collaboration, and also as the best way to exploit the student motivation and engagement (Butt, 2017). Zicherman and Cunningham (2011) stated that gamification as a process of game elements by engaging the user, while Deterding, Dixon, Khaled and Nacke (2011) represented the gamification as the use of game elements in the non-game contexts setting. It will drive people to take voluntary actions predictably through the use of games elements such as experience points, rewards, badges and many others of identified game elements. It also increases the student engagement in doing learning activity (Lee & Hammer, 2011; Kapp, 2014). According to Armstrong (2013), effective implementation of gamification will motivate students to build knowledge from a learning activity.

Recently, research has highlighted a great potential of the flipped classroom approach and gamification in education field. In Malaysia, the teachers and students still not familiar with gamified flipped classroom approach. This paper aims to provide a better understanding about gamification element and the flipped classroom approach. This paper is part of an on-going process to design an instructional learning module which combines flipped classroom approach and gamification.

OBJECTIVE

The analysis will answer the following research questions:

i. What gamification element have been used in a gamified flipped classroom?
ii. What online platform or tools have been used for conducting a gamified flipped classroom study?
iii. What are the effects of using the gamified flipped classroom towards student's learning?

METHODOLOGY

Content analysis by McMillan (2000) applied to this study because it is enabled in evaluating the publishing piles, analyzing process, interpretating article and calculating frequency. There are three (3) steps involved in this study.

Step1- General database search: a variety of databases were explored to make sure that relevant studies were found and a total of 20 articles were selected. Previous studies on gamified flipped classroom acquired through journal article from electronic databases such as WebOfScience, JSTOR, Springer, SAGE Journals, JSTOR, IEEE, Wiley and ProQuest. Journals articles that have been searched were from year 2015 to 2020. The keywords explored in the electronic databases included "flipped classroom" OR "flipped learning" OR "blended learning" OR "inverted learning" AND "gamification" OR "gamified" OR "gamify". Step 2 – Focused searches: the article was retrieved using the following rationales; A specific focus on the gamified flipped classroom, a current publication in the year 2015 to 2020, containing a various field research and an article accesses and founded through an electronic database. An article that only contains a flipped classroom without gamification were removed. Step 3 – Analysis: all the data were analyzed and categorized based on the provided framework on gamification and a flipped classroom approach.

RESULTS

i. Online platforms or tools used in the gamified flipped classroom

Online platforms or tools have been used in conducting the gamified flipped classroom studies, specifically in supporting the out-of-class activity. Therefore, by using various technology media or online platforms, students able to study virtually, watch learning materials and communicate with students and teachers outside of the classroom. The second research question; *"What Online Platforms or tools have been used in a gamified flipped classroom?"* will be answered in this part. This finding will help future research in the selection of appropriate platforms, or tools to support a gamified flipped classroom approach. Online platforms or tools have been used by students to access the video and other learning materials during out-class and in-class activities. These platforms or tools also allowed sharing and collaborating activities among the student and teacher (Zainuddin & Halili, 2016).

Table 1 summarizes the online platforms or tools that have been used in gamified flipped classroom study. Butt (2017) used the Code Academy platform as a web module which utilized for out of class instruction. Huang, Hew and Low (2018); Tan and Hew (2016) and Aşıksoy (2017) used a Moodle platform for their research in uploading course video, quiz; and conducting a discussion session.

Table 1 Online Platform or Tools in Gamified Flipped Classroom Research

Studies	Online Platform or tools used
Butt (2017)	Code Academy
Lo and Hew (2018)	Moodle LMS
Matsumoto (2016)	Super Rapid Accumulation of Lasting Abilities (Surala)
Aşıksoy (2017)	Moodle LMS
Hung (2018)	TED-ed Web Platform, QR Code
Huang, Hew, and Lo (2018)	Moodle LMS
Tan & Hew (2016)	Moodle LMS
Latulipe, Long, and Seminario (2015)	Moodle LMS
Özer, Kanbul, and Ozdamli (2018)	Moodle LMS and YouTube
Jo, Jun, and Lim (2018)	YouTube, Minimum Learning Judgement System
Hung (2016)	Clicker application (Kahoot!)
(Zainuddin, 2018)	iSpring LMS, YouTube
Turan and Goktas (2018)	Kahoot!, Facebook, YouTube, GoogleDocs
Ho (2020)	Sketchpad

Sailer and Sailer (2020)	Video link, Quizalize
Durrani (2020)	Kahoot!, Socrative, Moodle LMS
Mese and Dursun, (2019)	Moodle LMS
Sánchez et al. (2020)	PeerWise
Zamora-Polo et al. (2019)	Youtube, Kahoot!, Socrative, Quizziz, Taboo, Time's up!, Canva, Plickers
Zainuddin et al. (2019)	Youtube, iSpring LMS

Figure 1 shows that the most online platform or tools used in the gamified flipped classroom studies was Moodle LMS (24%), followed by YouTube (18%), Kahoot! (12%) and others (3%).

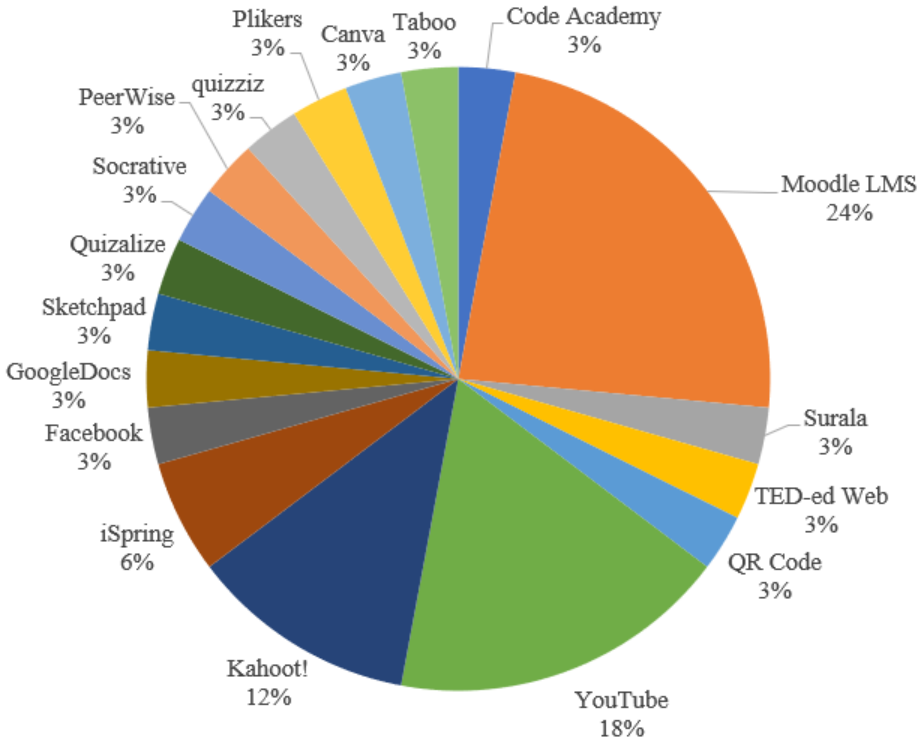

Figure 1 Popular online platform or tools in a gamified flipped classroom

ii. Gamification element used in studies

These game elements correspond with human feeling such as the self-expression, desire to get reward, achievement, rivalry, status and altruism. Game elements that are used to create gamification scenario involve badges, levels, challenges, experience points, avatars, and leader boards. Table 2 summarizes the gamification elements that have been used in previous gamified flipped classroom study. Badges, levels, leader boards, points, and progress bars are the five (5) elements, identified as subset in majority of gamification studies.

Table 2 Gamification element used in studies

Studies	Gamification element
● Latulipe, Long, and Seminario (2015)	● stamps, leaderboard, tokens
● Tan & Hew (2016)	● Points, badges, and leaderboard
● Matsumoto (2016)	● Level (Task), feedback
● Hung (2016)	● Points and leaderboard
● Aşıksoy (2017)	● Points, badges, and leaderboard
● Butt (2017)	● Group, badges, profiles, performance charts, points and progression bars.
● Lo & Hew (2018)	● Points, badges, leaderboard, level, progress bar
● Hung (2018)	● Token, points, leaderboard
● Huang, Hew, and Lo (2018)	● Badges, level, leaderboard, progress tracker/ progressbar
● Özer, Kanbul, and Ozdamli (2018)	● Badges
● Jo, Jun, nd Lim (2018)	● Score(points), leaderboard (ranking system)
● Zainuddin, (2018)	● Points, badges and leaderboard
● Turan and Goktas (2018)	● Leaderboard
● Zamora-Polo et al. (2019)	● Narrative
● Zainuddin et al. (2019)	● Point, badges, leaderboard
● Mese and Dursun, (2019)	● Leaderboard, level, point, badges
● Ho (2020)	● Narrative
● Sailer and Sailer (2020)	● Point, leaderboard
● Durrani (2020)	● Point
● Sánchez et al. (2020)	● Level, points, badges, leaderboard

Figure 2 shows that the top three (3) gamification elements used in the gamified flipped classroom studies were leaderboard, badges and points.

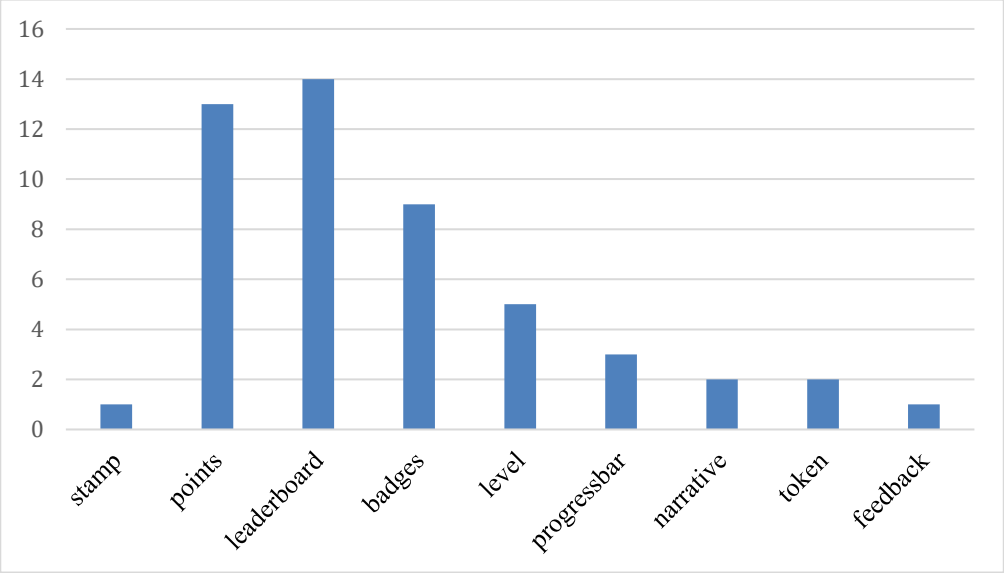

Figure 2 Popular gamification elements in a gamified flipped classroom

In designing gamification environment, it is important to identify relevant gamification element that could be positively affect the learning process and the expected learning objectives.

iii. Effect of using Gamified Flipped Classroom Approach on Student's Learning

Many studies found that the gamified flipped classroom had good effects towards teaching and learning. Hence, this part will answer the third research question*; "What are the effect of using the gamified flipped classroom on student's learning?".* Attitude, motivation, performance and engagement were identified as a learning impact that many researchers focus on when conducting gamified flipped classroom study. Table 3 shows list of researchers and impact on student's learning that they choose to study.

Table 3 Effect of gamified flipped classroom approach on students' learning

Studies	Impact on students' learning			
	Attitude	Performance/ achievement	Motivation	Engagement
Butt (2017)	•			
Lo and Hew (2018)		•		•
Matsumoto (2016)			•	
Aşıksoy (2017)		•	•	
Hung (2018)			•	

Huang, Hew, and Lo (2018)				●
Tan and Hew (2016)				●
Latulipe, Long, and Seminario(2015)				●
Özer, Kanbul, and Ozdamli (2018)	●			
Jo, Jun, and Lim (2018)	●	●		
Hung (2016)		●		
Zainuddin (2018)		●	●	
Turan and Goktas (2018)			●	
Ho (2020)		●	●	●
Sailer and Sailer (2020)		●	●	
Durrani (2020)	●	●		●
Mese and Dursun (2019)		●	●	
Sánchez et al. (2020)			●	●
Zamora-Polo et al. (2019)		●	●	●
Zainuddin et al. (2019)		●	●	●

Table 4 summarizes the researchers' finding related to the impact learning in a gamified flipped classroom study.

Table 4 Previous studies and researcher Finding

Studies	A Gamified flipped classroom impact
Butt (2017)	● Promotes preparation for class, engage with discussion activity and helped them think critically through an activity.
Lo and Hew (2018)	● A gamified flipped classroom boost student's cognitive engagement effectively compared to the traditional learning and online independent study.

Matsumoto (2016)	● Benefited in enhance student's motivation and their understanding level.
Aşıksoy (2017)	● Enhance motivation and learning achievements
Hung (2018)	● Enhance student's confident and increase their motivation to take part in classroom activities.
Huang, Hew, and Lo (2018)	● A gamified flipped classroom affects student's behavioural and cognitive engagement
Tan & Hew (2016)	● Gamification that used badges system significantly increase forum participation.
Latulipe, Long, and Seminario (2015)	● Gamification elements able to increase engagement.
Jo, Jun, and Lim (2018)	● Positively affect students' attitude and improves student achievement.
Hung (2016)	● The used of gamification had positive effect on student learning, concerning their performance, perceptions, and preferences.
Zainuddin (2018)	● Gamified flipped classroom provides better motivation and achievement.
Özer, Kanbul and Ozdamli (2018)	● Gamified flipped classroom gave a positive impact on the teacher candidates' attitudes
Turan and Goktas (2018)	● Gamification activities increase the students' motivation
Ho (2020)	● A gamified flipped classroom enhances the students' motivation and engagement in term of aspects behavioural and cognitive.
Sailer and Sailer (2020)	● The finding shows that a gamified flipped classroom effects the students' motivation, performance and satisfaction of social but not significant on satisfaction of competence.
Durrani (2020)	● A gamified flipped classroom positively affects students' attitude and engagement but the traditional classroom is better than a gamified flipped classroom in learning outcome achievement.

Mese and Dursun (2019)	● The gamification had negative and positive influence on motivation. The gamification elements: badges and points increase a students' motivation but another three main headings: restrictions and activity completion decrease their motivation. the restriction when an activity was not completed or the level was not reached.
Sánchez et al. (2020)	● A gamified flipped classroom improves the students' motivation and enhances student-teacher interaction and student-student interaction.
Zamora-Polo et al. (2019)	● The students' motivation and perception improved through the use of gamified flipped classroom but they still find the subject was difficult.
Zainuddin et al. (2019)	● Integrating a gamification into flipped classroom enhances students' motivation, performance and interaction.

DISCUSSION

At present, the trends of a gamified flipped classroom research from 2015 to 2020 year by year show a variety of online platform or tools that have been used. The researcher not only use a single platform but they combine several platform or tools in their research. The new tool used by researcher in latest studies such as Socrative, Plickers, Quizalize and PeerWise.

There are many gamification elements used in many fields purposely to attract the user. From this study, it found that leaderboard, badges and points are the most popular used in gamified flipped classroom approach in education field.

For this study, the scholar found several good effects by using the gamified flipped classroom practice: students' achievement or performance, students' engagement, students' attitude and students' motivation. Motivation is classified into two (2) main categories which are intrinsic and extrinsic motivation (Abeysekera & Dawson, 2015). Intrinsic motivation refers to those activities that people participate in as they are characteristically intriguing, fun, energizing, and pleasant. Extrinsic motivation refers to individuals taking part in activities because they want to get reward or to keep away from punishment (Deci & Ryan, 2002; Ryan & Deci, 2000). Students' engagement refers to the students' wish to actively involved in a learning action such as listening to the topic, working on what the teacher requests them to do, completing homework and affectively going to the class (Yang & Cheng, 2014). According to Zepke, Leach and Butler (2009), motivation and engagement are two related things: students' motivation will influence the students' engagement.

IMPLICATION OF FINDINDS

The findings and discussion in this study could potentially become a basis for future research of the gamified flipped classroom approach and development, specifically focusing on the learning material. It is hoped that the findings and discussion from this study will significantly contribute to the body of the knowledge, importantly and specifically for the future research in the gamified flipped classroom field. Additionally, its hopefully will aspire teachers in getting deeper and broader understanding on the gamified flipped approach that may be useful in making decision about planning and teaching strategy.

CONCLUSION

Incorporation of the gamification in a flipped classroom approach become popular as a teaching and learning strategy. This study intends to analyse the trends and contents of gamified flipped classroom studies which based on 20 reported articles on gamified flipped classroom approach from 2015 to 2020. It was found that research into the gamified flipped classroom most frequently employed gamification elements, online platforms or tools and impactful on students' learning. From the review, the Moodle platform is the most frequently used in a gamified flipped classroom environment while frequently used of gamification element are points, badges and leaderboards. The gamified flipped classroom improved students academically and motivationally where the students can learn according to their ability and paces, and also boost confident in their learning activities in the classroom.

As a recommendation, future gamified flipped classroom research could be focusing in detailing the gamification for out-class and in-class activities. It also could be used in a different online platform or mobile application by applying the future gamified flipped classroom approach. The future research also suggested that the focus could be on the different game element.

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