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The Influence of Gamification in Flipped Learning: A systematic Review

By

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Abstract

As part of the effort to adopt the learner-centred approach to learning, flipped learning is one of the most popular and active strategies in education, but it has drawbacks. Gamification can provide suitable solutions to these drawbacks. A systematic review was adopted to critically review previously published studies from 2020 to 2021 on the influence of gamification in flipped learning. The databases searched include SCOPUS, Web of Science, Science Direct, Wiley Online Library, and Education Resources Information Center (ERIC). Six studies were selected and data extracted by two evaluators. In the selected articles the Gamification environment were Moodle, Kahoot, online quizzes, video quizzes, and google drive forms. The Game elements were points, level, progress, and rewards, leader board, badges, and instant feedback. The variables studied were achievement, social relationship, and motivation, innovation, self-efficacy, attitude, and critical thinking. The results demonstrated that gamification in flipped learning is effective in improving the performance of students in learning as it leads to increased motivation, engagement, and achievement. The results can be adopted in the institution of learning to improve the learning performance of students.

Keywords: Flipped learning, gamification, gamified, learning, game elements, environment.

Introduction

Currently, the education paradigm is shifting from the traditional approach which was teacher-centred to the innovative approach that is learner-centred. As part of the effort to adopt the learner-centred approach to learning, flipped learning has gained popularity in the most learning institution (Nuhoğlu et al., 2020). Besides, since the Covid-19 pandemic, there has been a drastic change from physical face to face teaching and learning to a representative model such as flipped learning (Nerantzi, 2020). In a situation of crisis such as the covid-19 situation, flipped learning is one of the approaches associated with educational effectiveness while at the same time the safety of the learners is considered (Jia et al., 2020). In flipped learning, efficiency is maximised through tasks that can be performed online or face to face, thus, enhancing mastery of content and student engagement in learning. The main challenge with flipped learning is that it is difficult for the learners to voluntarily participate since the learning and teaching activities are not fun or interesting (Nerantzi, 2020). To address the aforementioned challenge, gamification is integrated with flipped learning. Gamification is the introduction of game techniques in the context of teaching and learning to promote the active engagement of the learners in the scheduled learning activities (Kalogiannakis et al., 2021). Gamification positively correlates with increased learning behaviour as well as the motivation of learners, and it has therefore been adopted by many teachers in the flipped classroom (Huang et al., 2020). This study aims at providing a detailed overview of the influence of gamification in flipped learning based on the review of previously published literature.

Background

Flipped Learning

Flipped learning is one of the modern pedagogical approaches that involve a shift of learning instruction from group to individual learning leading to a dynamic and interactive environment where the teacher guides the learner to not only apply concepts but also engage them in the subject creatively (Nuhoğlu et al., 2020). The learning hours is mostly used for open and interactive activities. Flipped learning is associated with a positive influence on communication skills, learners' motivation, and a change in attitude, leading to improved academic performance (Nerantzi, 2020). Through flipped learning, learners are motivated to study independently (Jia et al., 2020). Learners with different styles of learning as well as the speed of learning are easily accommodated in the flipped learning and especially through e-learning environment. Through flipped learning, the teacher can easily identify the learning needs and give the learners opportunities to develop critical as well as problem-solving skills (Chen & Hwang, 2020). In flipped learning, learners take the active role of strengthening their skills through activities such as teamwork (Jia et al., 2020). It is also reported that once the teaching material is shared before the flipped learning, the perception of learners that the subject is difficult to reduce (Nerantzi, 2020). Therefore, flipped learning has attracted the attention of most educational institutions.

Gamification

Gamification is the use of game experience to promote active participation of the learners in the classroom (Huang et al., 2020). In gamification, the game is used in a digital environment, thus enhancing the learner's problem-solving skills and involvement in learning. Online

games increase the productivity of the learners as well as motivation in the learning activities since the learning activities are interesting (Kalogiannakis et al., 2021). The categories of gamification relevant to education include quest, reward, avoidance, and status (Díaz-Ramírez, 2020). Elements of quest include unlocking, scaffolding, and discovery. Reward elements are points, badges, and professions from one level to the other. Avoidance elements include disincentives and leaky buckets. Finally, elements of status are avatar and social graph. The playful experience in gamification is influenced by challenges, competition, exploration, as well as completion. Elements such as badges are extrinsic motivation to learners while elements such as unlocking as well as social graph contributes to intrinsic motivation and the learner are always interested in the learning activities (Huang et al., 2020). However, gamification is not suitable for all learners, especially those who are not interested in games. According to Kalogiannakis et al. (2021), a competition that leads to either victory or defeat after a game is associated with a detrimental effect on some of the learners. The learners who are always defeated may easily lose interest in the learning activities. Díaz-Ramírez (2020) adds that games that have a high level of entertainment can distract the learner from the learning objectives. Besides, some learners may be interested in the games and the associated elements such as rewards, and as a result, gamification will not have the needed positive effect in learning. The teacher should always mentor learners for gamification to have a positive influence on learning.

Limitations of Flipped Learning

The common limitation of flipped learning is the time as well as expert level needed to prepare for the online teaching and learning environment (Nuhoğlu et al., 2020). Developing a video in line with the learning content and editing to ensure that the learning outcomes are

achieved require expertise and time. However, Nerantzi (2020) reports that the difficulties in developing the teaching and learning resources in the flipped classroom is usually an initial encounter and with time the teacher competence increase and it is easy to develop interactive online content. The greatest challenge, therefore, remains financial resources and time for lesson preparations. The second limitation of flipped learning is the incorporation of technology in the teaching and learning environment such as the computer, smartphones, and the internet (Rahman et al., 2020). Some of the students may not have a smartphone and at times the internet may not be stable, therefore, a limitation to teaching and learning. Finally, the policy of the learning institution can be rigid, therefore teachers are not allowed to implement flipped learning (Nuhoğlu et al., 2020). For instance, a learning institution that does not value the need of the students accessing the institution network can be a hindrance to the implementation of flipped learning.

Gamification for Flipped Learning

To attain the positive influence of flipped learning, there is a need for incorporating gamification. One of the positive effects of gamification in flipped learning is the promotion of learners' achievement as well as engagement (Choi & Choi, 2021). Gamification elements such as badges enhance learners' engagement in learning. Besides, the use of quizzes using the board and Moodle system motivate students to participate in learning activities, therefore, improved achievement (Gündüz & Akkoyunlu, 2020). When gamification in flipped learning is compared with the traditional method of teaching and learning, the use of gamification is associated with autonomy, team building, and motivation to learn (Zhao et al., 2021). The effectiveness of gamification for flipped learning is enhanced by considering the needs of the learners in the

design of teaching and learning activities (Choi & Choi, 2021). This means that the teacher should keep on changing the elements of gamification depending on the identified needs of the learners.

Justification and Purpose

It is reasonable to note that flipped learning has advantages as well as limitations. The introduction of gamification in flipped learning seems addresses most of the drawbacks of filliped learning. Incorporating gamification into flipped learning can be defined as bringing the best of both worlds together to improve learning (Gündüz & Akkoyunlu, 2020). In addition, for practical reasons, these two strategies can be easily combined because learning management systems (LMSs) and digital Platforms have been used in both flipped learning and gamification (Zhao et al. 2021). Therefore, this study focuses on analyzing research on the use of gamification in flipped learning environments to reveal the effect of gamification in flipped learning.

Methodology

A systematic review was adopted to critically review previously published studies from 2020 to 2021 on the influence of gamification in flipped learning. The systematic review was the most appropriate design because it helps the researcher address the issue under investigation within the shortest period, thus, providing an immediate answer to the research question (Kalogiannakis et al., 2021). Besides, a systematic review is associated with valid and reliable results because the retrieved articles are critically appraised and those with the highest quality and methodological rigour based on inclusion and exclusion criteria are selected. The two key stages of the methodology were planning and conducting and thereafter the results of the review were reported (figure 1).

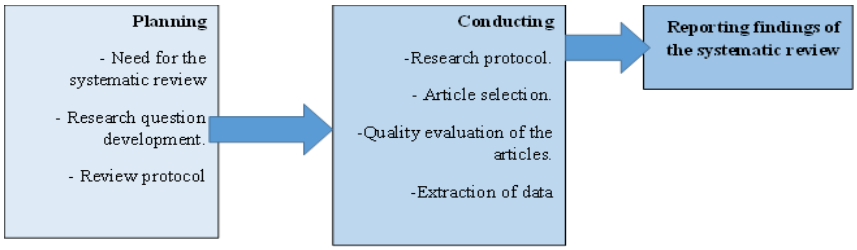

Figure 1: Stages of systematic review

Planning

The need for the Systematic Review

The available evidence on the influence of gamification in flipped learning are few, thus the need for thy systematic review. An intensive search of the literature was conducted to identify studies that support the use of gamification in a flipped classroom.

Research Questions Development

The research questions helped to maintain the search within the scope of the review. **Four research questions were developed that include:**

1. What key methodological aspects were adopted in studies on gamification in flipped learning?
2. What tools or environment did the researchers use in studies on gamification in flipped learning?
3. What elements of gamification did the researchers use in studies on gamification in flipped learning?
4. What variables did the researchers investigate in studies on gamification in flipped learning and the influence of those variables on learning?

Review Protocol

This study reviewed empirical evidence in articles that examined gamification in flipped learning. The databases searched include SCOPUS, Web of Science, Science Direct, Wiley Online Library, and Education Resources Information Center (ERIC). These databases were selected because they contain relevant articles in the field of education that are easy to access and retrieve. The year of publication was set from 2020 to 2021 so that articles with relevant information can be retrieved. The language of publication was set as original publication in English so that any translated articles is not identified in the databases. Articles translated from another language to English are likely to have biased information since the meaning of the study can be lost during the translation process (table 1 is on inclusion criteria). Exclusion criteria were articles that did not demonstrate a direct relationship between gamification and flipped learning because these articles will not help address the purpose of the study. Review articles and theories were also excluded as they do not contain authentic first-hand information.

Table 1: Inclusion Criteria

Databases	SCOPUS, Web of Science, Science Direct, Wiley Online Library, and ERIC
Search strategy	For SCOPUS (abstract, title, and keywords), Web of Science (topic), Science Direct (all fields), Wiley Online Library (all fields), and ERIC (all fields).
Search range	2020 -2021
Document type	Articles
Language	English

Conducting

Research Protocol

The keywords used were obtained from the title of the study and the developed research questions. To enhance the search, synonyms of the keywords were also included. The keywords included gamification, use of games, a game like, gamified, flipped learning, learning, flipped classroom, and flipped learning environment (table 2).

Table 2: Keywords

Gamification	gamification, use of games, game-like, gamified
Flipped learning	learning, flipped classroom, and flipped learning environment

The keywords were joined using Boolean operators AND and OR. AND was used to join keywords with different meanings such as gamification and flipped learning. OR was used to join keywords that are synonyms such as gamification OR use of games. To further facilitate the search, a quotation mark was used to identify records of articles with the exact phrase. For example, the use of quotations in the phrases "flipped learning" was used to identify articles with the words flipped learning following each other. Finally, truncation involved the use of the * sign at the end of a word to enhance retrieving articles with a variant of the keyword. For example, gamifi* to identify articles with the word gamification and gamified. The keywords, Boolean operators, quotations, and truncation, were used to develop a search phrase in the selected **databases (table 3)**

Table 3: Search Phrase

Keywords linked to form a search phrase
gamifi* OR "game-like" AND “flip* learning” OR “flipped classroom”

Articles Selection

After the search phrase was run through the selected databases, the records of the articles identified were reviewed for relevance to the issue under investigation. Some of the records of articles were unrelated to the issue of combined gamification and flipped learning therefore, removed. For instance, most articles were dealing with gamification only and others were dealing with flipped learning only, and therefore removed. Review, as well as theory papers, were also excluded. The review of the remaining articles using the N9 software led to the removal of duplicates (figure 2). The remaining articles were subjected to quality evaluation.

Identification	Databases of the University Library that were searched	
	SCOPUS	21
	Web of Science,	30
	Science Direct,	12
	Wiley Online Library	31
	ERIC	21
	Total records of articles identified (105)	
	Analysis of abstracts	50
	Articles excluded	20
	Articles that remained for the review (30)	
Screening	Duplicates removed (16)	
	Articles that remained for quality evaluation (14)	
Eligibility	Articles with low qualities removed (8)	
	Articles included in the systematic review (6)	

Figure 2: PRISMA flow chart used for a search protocol

Quality evaluation of the articles

The quality evaluation was by use of a checklist to help in identification the articles that will be used to answer the developed research questions. The answer to the items on the checklist was either yes, partial, or No with a score of 2, 1, and 0 respectively (Table 4). The yes answer means that the selected article met the criteria completely. Partial means that the selected article met some of the criteria. No means the selected articles did not meet the criteria. The quality of evaluation led to exclusion of eight articles.

Table 4: Checklist for the evaluation of the articles

Question	Yes (2)	Partial (1)	No (0)
Is the study purpose clearly stated			
Is the study methodology congruent with the purpose of the study?			
Is documentation of the research process adequate?			
Did the researchers adequately answer all the developed research questions?			
Are the results of the study articulated clearly with previously published literature?			
Are the elements of the game indicated in the study?			
Is the use of a gamification platform in the study clearly indicated?			

Extraction of Data

The extraction of data was done by two evaluators. When data is extracted by two or more people, the results are compared and the findings synthesised leading to the extraction of quality data (Brunton, Oliver, & Thomas, 2020). The results extracted by the two evaluators were not only compared but also adjusted, leading to a 95% interrater agreement, therefore, the findings of this systematic review are reliable.

Findings

Characteristic of Research (Research Question 1)

The six articles used for this systematic review were published in three different journals. Four articles were published in educational journals (Hwang & Chang, 2020; Sailer & Sailer, 2021; Sprint & Fox, 2020; Zainuddin et al., 2021) and two articles were published in discipline-specific journals namely engineering for Ahmed and Asiksoy (2021), and laboratory sciences for Asiksoy and Canbolat (2021). The selected articles were published between 2021 and 2021. Two articles were published in 2020 (Hwang & Chang, 2020; Sprint & Fox, 2020) and four in 2021 (Ahmed & Asiksoy, 2021; Asiksoy & Canbolat, 2021; Sailer & Sailer, 2021; Zainuddin et al., 2021) (Figure 3). The studies were conducted in five different areas namely Germany University (Sailer & Sailer, 2021), Near East University in Turkey (Ahmed & Asiksoy, 2021; Asiksoy & Canbolat, 2021), Nursing School in Nothern Taiwan (Hwang & Chang, 2020), Indonesia College (Zainuddin et al., 2021), and Gonzaga University USA (Sprint & Fox, 2020). Two studies (33%) were conducted in colleges while four (67%) were in the universities.

Five studies (83%) adopted experimental design (Ahmed & Asiksoy, 2021; Asiksoy & Canbolat, 2021; Hwang & Chang, 2020; Sailer & Sailer, 2021; Sprint & Fox, 2020) while one study (17%) (Zainuddin et al., 2021) adopted a mixed-method approach. In all the studies, the durations are not clearly highlighted but range from a one-point data collection using a survey, to collecting data the whole semester. All the five studies that adopted the experimental design had a control group for comparing the effects of the interventions. In the selected studies, the smallest sample size was 56 participants (Sailer & Sailer, 2021) and the largest was 205 (Hwang & Chang, 2020).

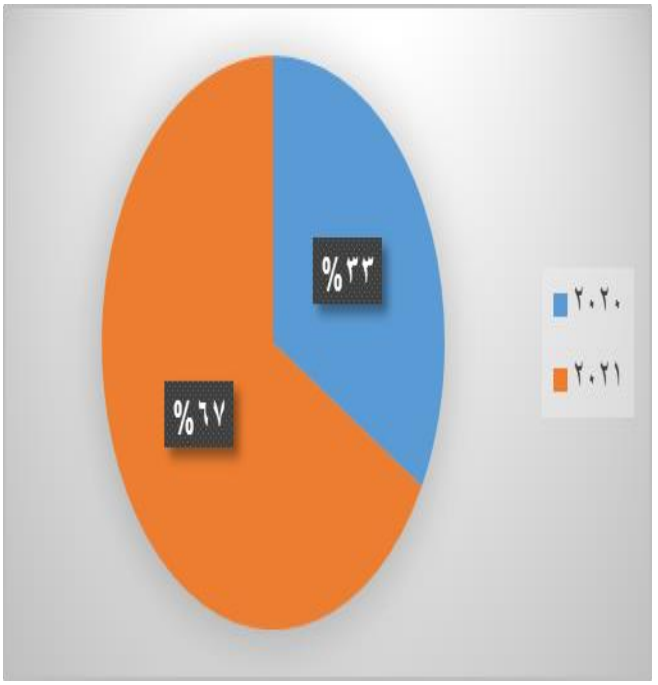

Figure 3: Distribution of the selected articles according to years

Gamification environment (Research Question 2)

The learning environment varied in the selected studies. The learning environment by Sailer and Sailer (2021) was the online quizzes. Ahmed and Asiksoy (2021), Hwang and Chang (2020), and Asiksoy and Canbolat (2021) utilised the Moodle learning management structure. Zainuddin et al. (2021) used Moodle and Kahoot quizzes. Sprint and Fox (2020) utilised Moodle quizzes, video quizzes, and google drive forms (table 5 and Figure 4).

Table 5: Gamification Environment

Environment Articles

Environment	Articles
Moodle learning management structure	Ahmed and Asiksoy (2021), Hwang and Chang (2020), Asiksoy and Canbolat (2021), Zainuddin et al. (2021), Sprint and Fox (2020).
Kahoot	Zainuddin et al. (2021)
Online quizzes	Sailer and Sailer (2021)
Video quizzes	Sprint and Fox (2020)
Google drive forms	Sprint and Fox (2020)

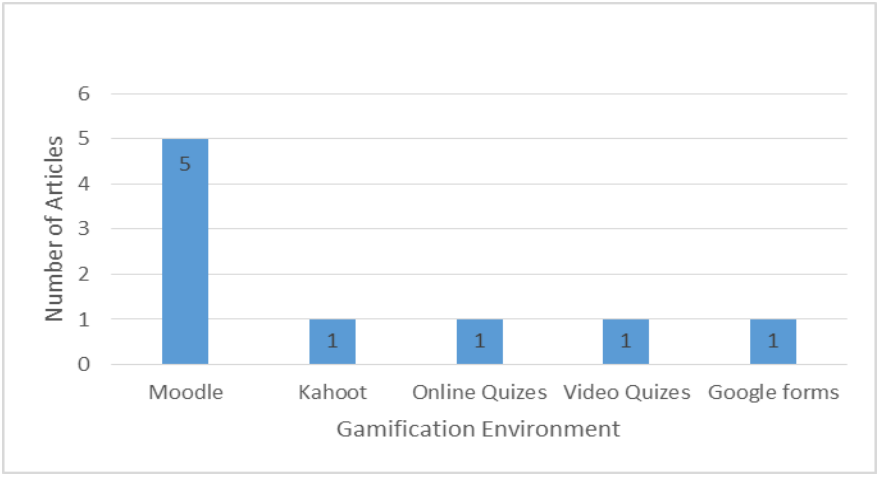

Figure 4: Gamification Environment

Game elements (Research Question 3)

Game elements by Sailer and Sailer (2021) included points, level, progress, and rewards. Ahmed and Asiksoy (2021), and Asiksoy and Canbolat (2021), applied levels, points, leader board, badges, and instant feedback. Hwang and Chang (2020) utilised levels and rewards. Sprint and Fox (2020), and Zainuddin et al. (2021) utilised points and leader board (table 6 and Figure 5).

Table 6: Game elements used in gamification in flipped learning

Elements	Articles
Points	Sailer and Sailer (2021), Ahmed and Asiksoy (2021), Asiksoy and Canbolat (2021), Sprint and Fox (2020), and Zainuddin et al. (2021).
Levels	Sailer and Sailer (2021), Ahmed and Asiksoy (2021), Asiksoy and Canbolat (2021), and Hwang and Chang (2020)
Progress	Sailer and Sailer (2021)
Rewards	Sailer and Sailer (2021), and Hwang and Chang (2020)
Leader boards	Ahmed and Asiksoy (2021), Asiksoy and Canbolat (2021), Sprint and Fox (2020), and Zainuddin et al. (2021).
Badges	Ahmed and Asiksoy (2021), and Asiksoy and Canbolat (2021).
Instant feedback	Ahmed and Asiksoy (2021), and Asiksoy and Canbolat (2021)

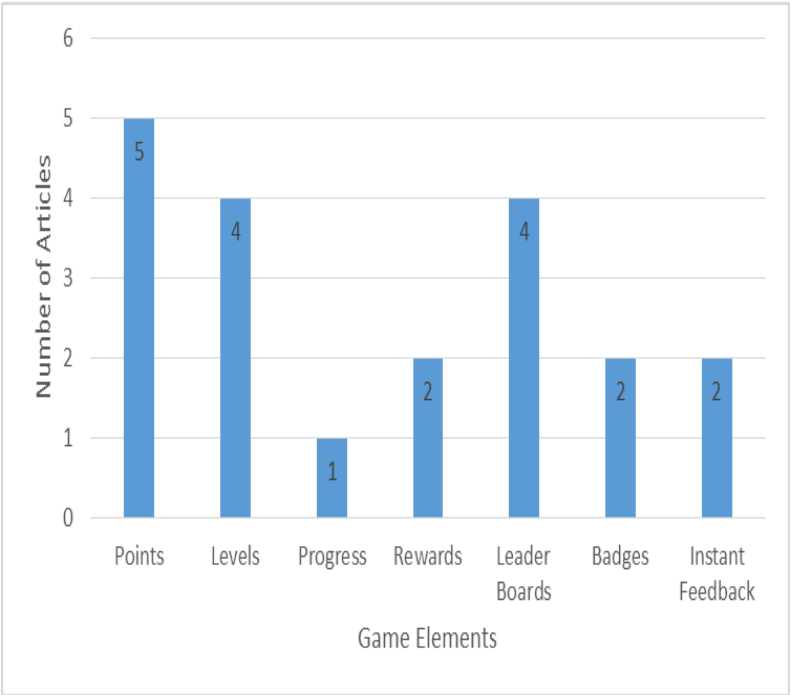

Figure 5: Game elements used in gamification in flipped learning

Variables and influence of gamification in flipped learning (Research Question 4)

The selected articles on gamification in flipped learning addressed a variety of variables. The variables addressed by Sailer and Sailer (2021) include achievement, social relationships, and motivation. Ahmed and Asiksoy (2021) study innovation, self-efficacy, and social relationships. Hwang and Chang (2020) addressed the issue of achievement, motivation, attitude, and critical thinking. Sprint and Fox (2020) investigated achievement and motivation. Finally, Asiksoy and Canbolat (2021) studied social relationships, achievement, and motivation (Table 7 and Figure 6).

Table seven: Variables Studies in Gamification in Flipped Learning

Variables	Articles
Achievement	Sailer and Sailer (2021), Hwang and Chang (2020), Asiksoy and Canbolat (2021),
Social relationships	Sailer and Sailer (2021), Ahmed and Asiksoy (2021), Asiksoy and Canbolat (2021), Zainuddin et al. (2021).
Motivation	Sailer and Sailer (2021), Hwang and Chang (2020), Sprint and Fox (2020), Asiksoy and Canbolat (2021)
Innovation	Ahmed and Asiksoy (2021), Zainuddin et al. (2021).
Self-efficacy	Ahmed and Asiksoy (2021)
Attitude	Hwang and Chang (2020), Ahmed and Asiksoy (2021)
Critical thinking	Hwang and Chang (2020), Zainuddin et al. (2021).

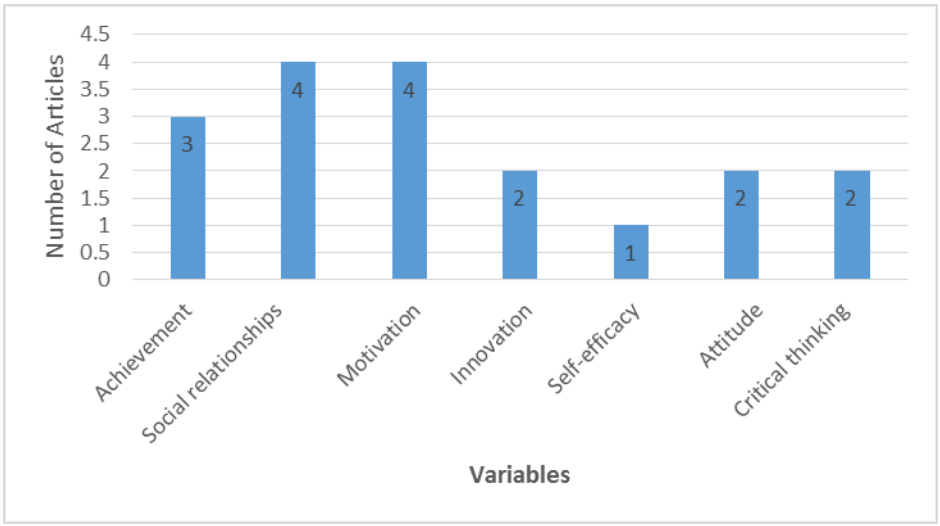

Figure 6: Variables Studies in Gamification in Flipped Learning

Results Reported in Different Articles

The focus of the results reported in the six selected articles includes motivation, engagement, and achievement.

Motivation: Sailer and Sailer (2021) found that students in the gamified group had a higher level of intrinsic motivation compared with the non-

gamified group with a mean of 5.2 and 4.2 respectively. Sprint and Fox (2020) did not specify the type of motivation but reported that the gamified group were more motivated to learn than the non-gamified and would always submit assignments earlier. Ahmed and Asiksoy (2021) found that students in the gamified group had a positive attitude towards learning activities and were willing to engage in learning tasks in future compared with the non-gamified groups. Hwang and Chang (2020) reported that the post-test results revealed that the gamified group had a higher level of extrinsic motivation ($t = 12.56$, $p < 0.001$) and intrinsic motivation ($t = 10.72$, $p < 0.001$) to learning compared with the non-gamified group. Hwang and Chang (2020) also found that the experimental group had a more positive attitude than the control group and could easily perform the scheduled learning tasks. According to Zainuddin et al. (2021), students in the gamified group were more motivated to learn than the non-gamified group as learning was perceived as fun, enjoyable, and interesting.

Engagement: Sailer and Sailer (2021) found that students in the gamified group felt that they could easily relate socially compared with the non-gamified group. Ahmed and Asiksoy (2021) found that students in the gamification group improved their innovation skills compared with the non-gamified group with significant results with p values less than 0.05. Although Hwang and Chang (2020) found that the critical thinking ability of those in the gamified group was higher than the non-gamified group, the results were not statistically significant. Zainuddin et al. (2021) found that the involvement of students in the experimental group was higher than the control and that most of the students in the experimental group were more emotionally, behaviorally, and psychologically engaged in the learning activities. Finally, Asiksoy and Canbolat (2021) found that the level of engagement of students in the gamified group was higher than the non-gamified group and that the students spent most of the time online performing different online tasks with a mean of 8858 and 4305 respectively.

Achievement: Sailer and Sailer (2021) students in the gamified group were more competent in the different classroom activities than those in the non-gamified group. Ahmed and Asiksoy (2021) also found that the performance in quizzes of the group on gamification was higher than the non-gamified group with means of 7.4 and 5.3 respectively. Hwang and Chang (2020) reported that in the post-test, the gamified group had a higher score than the non-gamified group at $t = 5.19$, $p < 0.001$. Besides, Asiksoy and Canbolat (2021) also found that the gamified test score was higher than the non-gamified group test score with a mean of 60.7 and 49.5 respectively. Zainuddin et al. (2021) found that the higher achievement in the experimental group than the control group was because the gamified learning was associated with increased problem-solving skills, construction of knowledge, persistence, and active participation in the learning activities.

Discussion and Conclusion

The results of this literature review demonstrate that gamification in flipped learning is effective in improving the performance of students in learning as it leads to increased motivation, engagement, and achievement. Gamification is associated with improved motivation (Sprint & Fox, 2020; Sailer and Sailer, 2021). The most common type of motivation that initially increases in gamification is extrinsic (Hwang & Chang, 2020) because the students are attracted to the rewards and the levels associated with the accomplishment of the learning activities. With time, extrinsic motivation is no longer exciting since the learner has mastered the learning concepts, and therefore, intrinsic motivation develops (Sailer and Sailer, 2021). The motivation of a learner is also

sustained by the attitude towards the learning activities. It is indeed evident that gamified learning is associated with a positive attitude towards learning (Hwang & Chang, 2020), therefore, students are highly motivated to learn. With a positive attitude, learning is always fun and enjoyable (Zainuddin et al., 2021) as a result, the students are always willing to learn and always ready to be engaged in the learning activities.

Gamified in flipped learning is associated with engagement in learning activities which is mostly social, psychological, behavioural, and emotional. Social engagement depends on the interaction of the learners with each other and the learning tasks. Social engagement is evident in the study by Sailer and Sailer (2021). Social engagement is imperative because learners may sometimes need to work as a team to effectively accomplish the learning task and get high scores. The need for understanding each other and developing an effective team is one of the core aspects of gamified learning. Closer to the social engagement is the behavioural engagement that is evident in the study by Zainuddin et al. (2021) and Asiksoy and Canbolat (2021) where the students adopted the behaviour of spending most of their time attempting the learning tasks such as quizzes. Most students in the gamified group spend time online performing different tasks and consulting the teacher in areas of difficulty. Besides, the different learning environments, are made in such a way that learners get feedback and therefore use the feedback to improve performance. Psychological engagement is about critical thinking and innovations, aspects that are developed in gamified flipped learning (Ahmed & Asiksoy, 2021; Hwang & Chang, 2020; Zainuddin et al., 2021). For a student to move from one level of the quiz to the other,

critical thinking is needful because of the complexity of the task increase as the level increase. Besides, the rewards are also associated with the complexity of the learning task. Therefore, a student will need to be innovative and think critically to solve the presented learning problem to get the associated task. The final engagement is emotional (Zainuddin et al., 2021) and this is greatly linked with the feelings associated with accomplishing the assigned quiz. A feeling of happiness is positively correlated with the rewards and recognition and sadness is linked to failure to pass the quizzes. To attain happiness, the student in the gamified flipped learning has to work harder compared with the non-gamified learning because, in gamified learning, there are rewards that lead to improved emotions. As the student works harder, there is academic achievement, further promoting emotional engagement.

Gamification in flipped learning leads to a higher score in academic performance (Sailer & Sailer, 2021; Ahmed & Asiksoy., 2021; Asiksoy & Canbolat, 2021; Zainuddin et al., 2021). Good performance is associated with engagement in the learning activities and motivation to learn. As the learner strive to think critically and solve the presented problem because of the associated rewards, there is an automatic improvement in performance. Besides, students who are motivated to learn are mostly confident and irrespective of the outcome, the student will strive to be the best, therefore, improve academic performance.

In conclusion, the reviewed studies provide evidence that gamification in flipped learning improves the performance of the learners at the college and university level. The results demonstrate that the

performance improves irrespective of the courses that the student is undertaking and the university or college that the student is attending. Although the six studies that were reviewed are very few, the articles were of high methodological rigour based on the findings of the evaluation for quality, therefore, provide a high level of evidence for the systematic review. Besides, the six articles used inferential statistics, thus improving the generalisation of the findings to the target population. The results of this systematic review can be adopted in the institution of learning to improve the performance of students.

Limitations and Future Research

One limitation is that most of the studies found in the selected databases focused on the issue of gamification and flipped learning as two different components leading to very few studies that addressed gamification in flipped learning as a combined issue. Adding studies that address the issue of gamified learning may improve the findings of this systematic review since the focus of the review is on integrating gamification into the flipped learning environment. Besides, the concept of gamified flipped learning has not been explored by many researchers, therefore limited data. There is a need for future researchers to take interest in the issue of gamification in flipped learning so that adequate data is available to be used for evidence-based practice in the field of education. Finally, all the selected studies were conducted in colleges and universities increasing the likelihood of biased results since studies in secondary could have yielded different results. There is a need for a future systematic review with a focus on secondary education since it will help increase the utilisation of the research findings in diverse educational settings.

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