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Key Challenges and Barriers in Gamification: A Systematic Review

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Abstract

This paper aimed to synthesize the key challenges and barriers in implementing gamification at the tertiary level. Using PRISMA 2020, a systematic review was conducted with searches in databases such as ProQuest, ResearchGate, Scopus, and a manual search in Google Scholar from June to July 2021. The selected studies were analyzed following Braun and Clarke's (2006) six-phase thematic analysis framework. The result revealed four themes such as 1) not all students are fully-engaged; 2) tasks were not completed; 3) performance was compromised, and 4) problems in attitude arose. These themes underscored the key challenges and barriers in gamification. This review concluded that no matter how the design and implementation are well planned, obstacles and drawbacks will be present. This systematic review reinforces the idea that knowing the challenges and barriers will help implementors of gamification to strategize in overcoming these obstacles that may come in their way.

Keywords: barriers in gamification, challenges in gamification, tertiary level

Introduction

Technology in education has progressed throughout the years, with educators integrating strategies that encourage students to better their learning. Gamification is one of these strategies. Gamification is described as the use of game-based mechanics, aesthetics, and game thinking to engage people, stimulate action, promote learning, and solve issues using game-based mechanics and game thinking (Kapp, 2012). Game design and mechanics enhance non-game environments by promoting involvement, engagement, loyalty, and competition. In both research and education, the use of gamification has gotten a lot of attention (Buckley & Doyle, 2016). This highlights the value of gamification in fostering a fun and productive learning environment.

Gamification has been found to bring positive effects to learning. In fact, existing studies and systematic reviews showed that gamification increased students' motivation and enhanced learning outcomes (Wichadee & Pattanapichet, 2018). However, some studies also discussed contradicting findings. A significant number of studies on gamification have noted key challenges and barriers in its implementation, including the perspectives of tertiary students. For example, Alabbasi (2017) noted that in students' perception, game features impede their socialization, generate anxiety, lead to poor learning habits, and impede their course completion. In addition, according to Shipherd & Burt (2018), students were initially concerned about the number of group work and group assessments. Although gamification enhanced learning, there were a number of significant challenges and barriers that educators had to overcome. As far as gamification is concerned, the benefits of gamification in education were clearly established. However, there is a limited synthesis of key challenges and barriers. It is essential also to explore this dimension of gamification to ensure that the learning outcomes will ultimately be achieved. Hence, the goal of the study is to undertake a systematic review to synthesize the major challenges and barriers of gamification in the learning process.

In this way, educators can strategize to break the barriers and overcome the challenges to optimize the benefits of gamification in the learning process as the study's main contribution.

Objectives of the Study

The purpose of the study was to provide a systematic review of the major challenges and barriers to gamification in the learning experience. The following objectives guided the research throughout the study: 1) to identify the integration of gamification integrated into the learning experience in terms of duration and gamification elements; and 2) to synthesize the key challenges and barriers in integrating gamification into students' learning experience.

Methodology

This systematic review was conducted using the Pre-Established Reporting Elements for Systematic Reviews and Meta-Analyses 2020 (PRISMA) as a comprehensive guide and framework in the selection of the studies. During June and July 2021, the researchers did a systematic literature review to generate a list of relevant studies. The systematic review's goal was to gather all available information to answer the study questions based on previously stated eligibility criteria. To accomplish this, a systematic method was used, which produces more trustworthy results for drawing conclusions and, as a result, decision-making (Moher et al., 2015).

The studies were gathered using an online search method across different databases in ProQuest, ResearchGate, Scopus, and a manual search in Google Scholar. Searching in databases was used by exploring a web-based engine and hand searching using keywords of "gamification," "education," "tertiary level, "Game-based learning," "learning," "gamified learning." To synthesize and interpret the results, the researchers used Braun & Clarke's (2006) six-phase framework to interpret the results of the qualified studies. The six steps involved becoming familiar with the data, generating initial codes, searching for themes, reviewing themes, defining themes, and presenting the results. In order to conduct the present study, the researchers established a set of defined criteria to help them filter through the various studies, choose and include those that were appropriate to their research topic, and discard those that did not fulfill specified criteria.

Data Extraction through PRISMA 2020. The figure below shows the selection of the studies included in the systematic review adopted from the PRISMA 2020. It helped the researchers map out the number of records identified, included, and excluded and the reasons for exclusions. The figure showed the gathering and selection process using PRISMA 2020. There was a total of 128 studies from different databases. After the researchers finalized the records, 20 studies were removed because they duplicated the other studies. Then, researchers excluded the other 21 records because the studies were not enough to be used as references based on the inclusion criteria. Thus, studies were down to 87 reports to be assessed for eligibility. As researchers critically analyzed the remaining studies, some studies needed to be excluded, such as 37 studies about gamification in primary and secondary education. Twelve studies about not specified elements of gamification were used, nine studies that were not specified the tool used in gamification, four studies that were beyond the ten years of maximum validity time frame of the studies published, and eight studies that were secondary data. Hence, 17 out of 128 studies qualified based on the inclusion criteria. These studies were carefully analyzed and interpreted. Suri (2020) outlined six phases of systematic reviews, and those principles were applied in the study to enhance ethical decision-making in systematic reviews. The systematic reviewers analyzed the findings using a post-positivist perspective. The study aimed to gather related studies that could impact the study's findings. Throughout the review process, the researchers were reflective about how the review findings influence their subjective positioning influences. Critical decisions in the review process were guided by purposefully informed selective inclusion and exclusion criteria. To maximize the ethical effect of the review results, audience-appropriate transparency was considered when conveying the insights generated from the study and the interest of the potential readers.

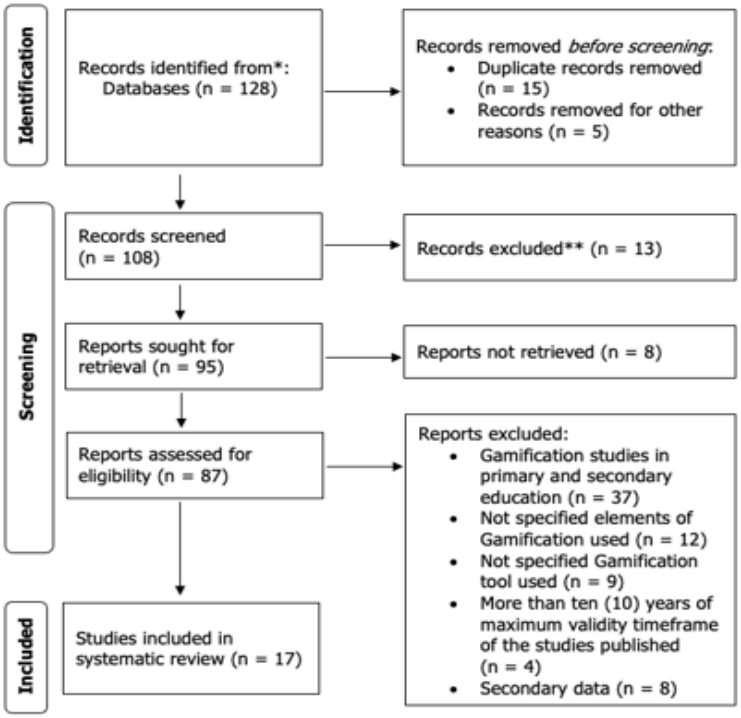

Figure 1. Flow chart of the study selection process. Adopted from the PRISMA 2020.

Results and Discussion

1. Learning experience in terms of duration and gamification elements

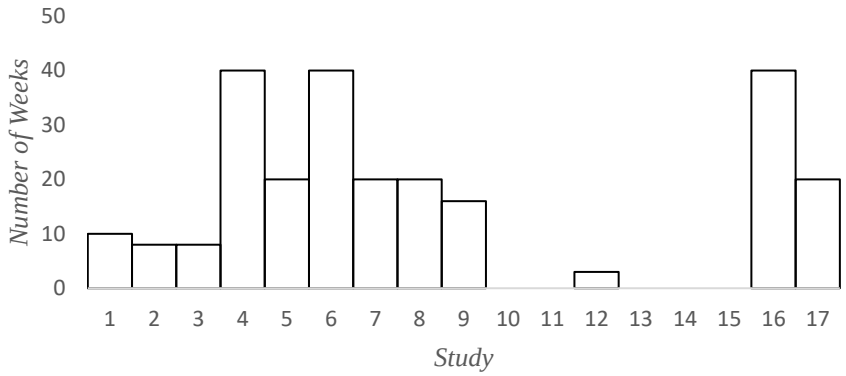

Figure 2. Duration of Implementation of Gamification

Figure 2 shows the duration of implementation of gamification among the studies selected. Most of the studies applied gamification for a semester. The finding suggests that gamification researchers need considerable time to generate the results of its implementation.

This study has generated a different perspective on gamification for tertiary education. Recognizing how educational gamification programs are implemented, as well as the challenges and barriers that they face, it is critical to the success in academic training and student performance, and the researchers believe that a detailed review can benefit both educators who implement these educational gamification strategies and the researchers who will explore in this field. In general, though gamification benefits have been established, challenges and barriers were apparent in its implementation in terms of engagement, performance, task completions and attitude. These findings provided evidence that gamification still has many opportunities to be improved.

Gamification is effective when well-planned implementation (Dichev & Dicheva, 2017). Regarding the integration of gamification, duration and game elements play a crucial factor in the successes and challenges in achieving learning outcomes. The findings revealed that regardless of the implementation duration, barriers were apparent. This implies that as educators design a gamified lesson or class, they must take note of the potential challenges and drawbacks that may come along the way in the duration of the implementation. In addition, to generate a meaningful result, at least six weeks to a semester will be the duration. This may mean that gamification is not just a one-time experience, but a learning process that has to be continuous and the momentum should be maintained. This is in line with the behavioristic view, which holds that human beings are strongly influenced by events in their environment that provide them with particular experiences (Anindyarini et al., 2018). Teachers need to craft well-thought gamified lessons and strategically implement them to achieve the course outcomes in students' context.

Gamification in education uses game mechanics and elements in the educational environment (Kiryakova et al., 2014). Regarding the gamification elements used. It can be gleaned that most studies used point system, level, and cooperation in the implementation. This is adherent to the idea that rewarding the efforts and achieving results by awards leads to increased motivation for participation and activity. In addition, cooperation among students is a key component in implementing active learning effectively (Kiryakova et al., 2014). Despite the good intentions of these strategies, if this is not well-communicated to the students, giving points, assigning level, and requiring group tasks may become detrimental to the achievement of learning outcomes. Educators implementing gamified lessons should ensure that students can grasp why this system of reward and game mechanics are used so that students are extrinsically and intrinsically motivated (Nicholson, 2015). It should also be made clear that the learning outcomes were their ultimate goals, not rewards.

Overall, the outcomes of the selected studies revealed that gamification showed positive effects. However, the findings also revealed that challenges and barriers in achieving the learning outcomes were also evident upon the implementation. These challenges and barriers were synthesized using Braun and Clarke's (2006) six-step thematic analysis, which unveiled that some students were not fully - engaged, did not complete required tasks, did not perform well, and did not show a good attitude.

2. Elements in integrating gamification into students' learning experience

Table 1
Gamification Elements Applied in the Studies

Domain		**Frequency**
Performance	Point	17
	Level	9
	Progression	1
Ecological	Imposed Choice	1
	Time Pressure	7
Social	Competition	5
	Cooperation	8
Personal	Objective	2
Fictional	Storytelling	1

Table 1 shows the general distribution of the selected studies. The table presents the program/course, design, participants, focus, outcomes and the identified key challenges of the gamification among the selected studies. These key challenges highlighted significant findings that show the other perspective in the implementation of educational gamification. It can be noted that students have challenges in achieving full engagement, completion of a task, good performance, and portraying a good attitude. This is in contrast to the findings in the literature that gamification can improve student motivation, engagement, and academic success at various levels of education (Manzano-León et al., 2021).

3. Key challenges and barriers in integrating gamification into students' learning experience

Not all Students are Full-engaged. Engagement is one of the strengths of gamification, as revealed in the outcomes of the studies. However, it can be noted that not all students were fully engaged. In fact, Barna & Fodor (2018) mentioned in their study that a relatively high portion of students could not reach all the required levels of the four modules, and the participants did not feel the mid-term exercises as enjoyable as the students of non-gamified courses. Similarly, some IT students did not find the gamification-enhanced lectures immersive since most of their everyday lives are similar to the gamified lectures (Varannai et al., 2017). This may mean that gamified lessons were not appealing to all students. This finding is in line with the concept of learning styles, which states that people have different preferences for what type of instruction or study works best for them. (Pashler et al., 2008). Educators must therefore understand the context of the students and their learning styles and tailor their learning styles to the gamification design he/she will implement.

Tasks were not completed. In gamified learning, tasks are crucial since most activities involve students' need to complete specific tasks to receive rewards. Giving points, competing against others students, working in teams, and time pressure enable the students to participate in-class activities. Yet, studies revealed that not all tasks were completed for varying reasons. For example, in the study of Campillo-Ferrer et al. (2020), participants find it difficult in following the steps in Kahoot quiz creation, such as accessing the platform, choosing questions, brainstorming with a list of possible answers, or adding pictures. Some students also find that game features impede socialization, generate anxiety, lead to poor learning habits, and impede course completion (Alabbasi, 2017). Students perceived gamified courses to have more work than other courses (O'Connor & Cardona, 2019). These unfinished activities can be attributed to the number of tasks given to students and the demand for each task to complete. This suggests that educators should be cognizant of the amount of work and the degree of difficulty of each task to be accomplished according to the students' capacity and capability. Ultimately, accomplishing the task and outcomes should bring fun and enjoyment to the student.

Performance was Compromised. Contrary to most of the results in the literature that gamification has a positive impact on achieving learning outcomes, some students were not performing well when activities were gamified. Smiderle et al.'s (2020) study noted that gamification showed a negative effect on the ranking of extroverted participants. High-achieving students, on the other hand, benefit more than low-achieving students, implying that gamification may not be sufficient to help low-achieving students in some situation (Sanchez et al., 2020). This shows that the gamification design could not address the interest of students with different learning styles and levels. Educators must ensure the gamified lessons must be designed so that the performance of potentially low-achieving students can be enhanced.

Problems in Attitude Arose. When using gamification, the students' character is tested (Sailer et al., 2017). In doing the assessment, when the duration of gamification is very long, students tend to cheat and procrastinate. This was revealed in O'Donovan et al.'s (2013) study, where students only answered them days before the deadline. With students cramming to accomplish the task, cheating was evident. Some students colluded because of competition for them to receive rewards. Other students did not attend class regularly where they missed classroom activities. Some students were unable to perform well in the activities (Papp, 2017). It can be gleaned from these findings that gamification can make students lenient as some designs encourage students to be overly autonomous in accomplishing the tasks. This implies that when the purpose of gamification is well-established, the student tends to

be more extremely extrinsically motivated, whereas giving rewards adversely affects their attitudes. This also tends to make students procrastinate in their tasks. It is important that constant feedbacking and monitoring are part of the design so students will be reminded to maintain integrity and diligence as they achieve the learning outcomes.

Conclusion

After the systematic review, it is found out that the key challenges and barriers are observed in the implementation of gamification as there are students who are not fully engaged, which may be detrimental to the task completion and performance of the students as a whole. If not well-designed, students' attitudes may be adversely affected. It also identified the implementation duration, which spans six weeks to a semester, and game elements used in tertiary education are points, level, and cooperation. Therefore, no matter how the design and implementation are well-planned, obstacles and drawbacks will be present. This research reinforces the idea that knowing the challenges and barriers will help implementors of gamification to strategize in overcoming these obstacles that may come in their way. In addition, this study tries to give insights that barriers and challenges can be considered in integrating the established gamification frameworks. Transparency and openness to criticism stand out as strengths of the systematic review using the PRISMA method.

Recommendation

To solidify and strengthen the results of this study, it is highly recommended that further empirical research focused on key challenges and barriers be conducted. Moreover, most research on gamification at the tertiary level has been carried out by researchers from foreign countries. Because of this, it is strongly recommended to conduct research about gamification at the tertiary level in Asia, particularly in the Philippines.

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