Motivational Effects of Gamification Apps in Education: A Systematic Literature Review

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Abstract: *Gamification is considered by many scholars to be an effective tool for engaging individuals in teaching and learning process, organizational task, business environment, and other recreational activities. However, some students and tutors of various institutions of learning across the globe lack clear understanding on how gamification applications positively affect teaching and learning via intrinsic and extrinsic motivations. Despites all its potential benefits as suggested by prior literatures with regards to flexibility and externalization of learning process, yet some colleges and universities are not fully convinced that use of gamification elements motivate students to engage more on their learning activities which in turns change attitudes and behaviours. Hence, the need for study to extract these motivational effects of gamifications applications from the existing body of knowledge. Therefore, this study utilized some of the comprehensive databases such as ScienceDirect, Web of science, IEEE Xplore, and SpringerLink, with the aims of identifying, extracting, analyzing and highlighting the motivational effects of gamification systems in education. Out of the articles discovered, 37 were fully read and analyzed. The study results highlight the motivational effects of gamification applications in education, and found badges, levels, feedbacks, points, and leader-board to be the most pleasant elements of gamification applications that motivate individuals, as they increase participation and engagement in learning process. Finally, the study suggests area of future work.*

Keywords: *Gamification apps, Motivational effects, eLearning, students, Teaching & Learning Process.*

1. Introduction

Nowadays, evolving technologies (ICT), have changed the ways in which individuals carry out their task, how businesses conduct their business activities, how students receive lectures and relate with one another through online discussions, how knowledge/skills are being acquired and tested, and how competitions are becoming increasingly effective. (Antonaci et al., 2019). In modern days, information systems are frequently been premeditated with their contributory aspects (Hassan et al., 2019). Information systems are designed to brand people to be more efficient than before via better delivery of communicable knowledge and informational response (Toda et al., 2019). The world continue to witness the coming or emerging of new technologies (i.e., emerging technologies), information systems, human-communication services and their enabling infrastructure are becoming more different from the one we used to see in the past (Hassan et al., 2019).

Hwang and Choi (2020) stressed that the focus of modern technologies has since moved from the systems efficacy and tools to easing human life to be more diverse, through the creation and implementation of applications that entertain individuals. For example, games and social acquaintances such as places of social interaction & applications (Schöbel et al., 2020; Toda et al., 2019). Individuals and organizations have begun to feel the impact through an extensive thoughtful of "gamification applications" on user's reimbursements and the response provided by these applications to their users (Jun et al., 2020). These include, but not limited to informational benefits, feedback and performance reports (Mitchell et al., 2018), but also "affective benefits and constant feedback" such as entertainment and enjoyment (Hassan et al., 2019), social benefits, feedback and social interaction via social networking sites (Toda et al., 2019), to mention but few. Similarly, majority of the modern information systems and services are making effort toward facilitating users' engagement, not only by providing users with systems that supply accurate information but also through provision of an effective system that can bring social experiences (Koivisto & Hamari, 2019) to add support to both "usefulness and self-determination" of system usage (Hassan et al., 2019). However, Jun et al. (2020) stressed that gamification goes beyond usefulness through proficiency and self-determination, or pleasure, but also tried to merge both ideas and engagement in the design in order to increase users' utility via increasing optimistic users' motivation. Thus, current information systems are

considered by many as "motivational information systems" (Matallaoui et al., 2017).

The integration of gamification elements into modern information systems, helps brings extra motivation to individuals and organizations in achieving desired goals (Çeker & Özdamli, 2017). Additionally, the entertainment erection of gamification apps also "motivates and improves" students' engagement towards their lesson activity, which in turns affects their learning ability positively (Çeker & Özdamli, 2017; Sanchez et al., 2020). Similarly, the integration of modern technologies into our life has gotten to the schoolrooms, as tutors now utilize new high-tech resources such as gamification apps to aid classroom education (Sanchez et al., 2020), e.g., use of videos in lecture notes which can be watched by students at anytime, anywhere (van Roy & Zaman, 2019). Also, both students and instructors can utilize combination of the above-mentioned approaches within social networking sites designed for teaching and learning purposes (Stuart et al., 2019).

Prior studies e.g., (Çeker & Özdamli, 2017; Shpolianskaya & Seredkina, 2020) have shown that students' groups that utilize gamification apps perform academically better than those groups that do not use it. Since the inception of gamification in the last decade, Di Pietro and Distefano (2019) and Gul and Bilgin (2020) argued that the technology is increasingly receiving the attention of academics and other practitioners. The main idea behind gamification rudiments usage in Schooling is to move the fun aspect of audio-visual games to non-game surroundings. However, Marcu and Danubianu (2019) argued that the transfer of game elements to non-game environment is not sufficient to describe the concept of "gamification" but rather to say that gamification produced an activity that bring game-like experiences. Also, van Roy and Zaman (2019) and Stuart et al. (2019) stressed that the use of game and gamification systems in education does not only motivate students to learn, but also supports their psychological needs Sailer et al. (2017), as " per Self-Determination Theory" (SDT), which allows them to "internalize the outside guidelines that are game based in need of supporting contexts" (Mitchell et al., 2018), and also fosters the feelings of independence, competency and relatedness among students.

Despite this credence and availability of different "gamification apps in Education" which aims at motivating students (Sailer et al., 2017), experimental validation of "gamification apps" is still needed in order to prove its valuableness (Antonaci et al., 2019; Kim et al., 2018; Schöbel et al., 2020). Furthermore, Antonaci et al. (2019) stressed that there is absence of clear understanding of the main effects of gamification apps on "students,

tutors and learning process in general". Hence, the need for both exploratory and experimental studies to further assess the motivational effects of gamification apps in Education, as the former technique will assist in getting more ideas on how the process takes place (Di Pietro & Distefano, 2019), while the later will offer exhaustive opinion on how certain individuals' emotional needs fulfilment develops through the implementation of various "gamification apps" (Toda et al., 2019). Therefore, this study will systematically review current literatures that are related to gamification apps, with the aims of identifying the benefits/importance of motivation, motivational effects of gamification apps on teaching and learning, and suggest how gamification apps can be linked with other variables such as individuals' psychological needs.

In order to achieve these objectives, the following research questions were asked; i) what are the benefits/importance of motivation? ii) what are the motivational effects of gamification apps in Education? iii) how individuals' psychological needs influence the use of gamification apps?

2. Literature Review

2.1. Gamification

Çeker and Özdamli (2017) stressed that Gamification is a process which involves an exertion that attempts to combine numerous instruction and knowledge philosophies together in order to achieve certain tasks which are complex in nature. This is because in educational setting students usually face problems according to their psychological needs and interests. Also, gamification is defined as the usage of actual game components in areas that have non game backgrounds in order to attain a chosen result or conduct. Furthermore, Shpolianskaya and Seredkina (2020) described gamification as the consumption of game essentials in learning process for the purpose of achieving a desired result, via teamwork and rivalry among students. However, Mitchell et al. (2018) stressed that gamification is different from game in that "games only aim at entertaining users", while gamification on the other hand involves the use of these games components that entertain users in order to change their conduct and defiance towards a particular task. Therefore, gamification is considered by many as a strategy or style of improving services and/or existing systems through "affordances for knowledge that are similar to the ones found in normal games" (Hsieh & Yang, 2020).

In recent days literature, Huotari and Hamari (2017) have shown that the extensive existence of modern smartphones contributed positively to the growth and development of gamification apps across the globe by different

fields of human endeavours, as the use of these gamified packages generate emotional results i.e., gameful knowledges (Dietrich et al., 2019), which in return inspire explicit behavioural results. Therefore, gamification from educational context is defined as an instrument for improving students' attitudes and behaviours towards learning process, with the aim of increasing knowledge acquisition and sharing (Ramadan et al., 2019).

2.2 Motivation

The idea of motivation was derived from the notion of "motive" (Ryan, 2012). Furthermore, Koivisto and Hamari (2019) stressed that to some degree, the term is considered by many to be the driver of peoples' conduct, a view that eventually led to the thought of motive as another psychological procedure that interrelates with other psychological functions (Forbes, 2011). This has led to the idea of depiction motive based on person's action, thus making it of different kind e.g., motive of knowledge, motive of analysis, motive of leisure and motive of interpretation (Ryan, 2012). However, Stroianovska et al. (2021) in their work defined motivation as "the psychological creations of character which seems to be an explanation for "psychological notions" e.g., ethical principles, self-assessment and intent that were categorized as complex motivational structures (Mitchell et al., 2018), assimilating collections of emotional desires which are facilitated by individuals' mindfulness (Bellemare et al., 2016; Forbes, 2011). Similarly, Yang et al. (2020) argued that motivation is part of human and individual as character, is branded by the presence of a specific ideas, ethical values, and dynamic goals which such individual tries to achieve throughout his/her life. Therefore, these psychological developments make people moderately steady in their positions and autonomous from other environmental inspirations that surround them (Fokides et al., 2019).

2.3. Motivational Effects of Gamification Apps in Education

Nowadays, gamification systems and other encoded computer systems are all over the places, are designed mainly with the resolve of indorsing users' satisfaction (Koivisto & Hamari, 2019). Additionally, information systems designed with games components are increasingly becoming part of our lives (van Roy & Zaman, 2019). These systems nowadays, turn out to be the source of entertaining people of different kinds (Jang et al., 2018). For instance, a typical game is recognized for its capability to occupy and motivate individuals. Furthermore, Helmefalk et al. (2020) stressed that while playing games, people usually experience "supremacy, capability, pleasure and

involvement", all of which intrinsically motivate individuals and change their behaviours towards a particular task (Kirmizi & Kirmizi, 2015).

The important part of playing games is people's desire for the imaginary scene of the game activity, as well as the get-together and pleasure of the action (Mitchell et al., 2018). Furthermore, Fitz-Walter et al. (2017) in their study stressed that the inclusion of game essentials into knowledge acquisition and sharing process via "gamification apps" in education have increased learners' desires to learn, as the systems positively changed students' behaviours towards learning process (Antonaci et al., 2019). Though, conducts change is just one portion of "gamification apps" with regards to users' experience. Majority of these gamified apps also have "usability goals", (Fitz-Walter et al., 2017), such as efficacy, good learning ability, usefulness, and pleasantness. Also, experience goals for pleasure-seeking handlers also exist on these systems as well, e.g., "entertainment, amusing, and emotive fulfilment" (Kivunja, 2015).

Literature Hong and Masood (2014) showed that the used of gamification apps in education, such as "gamified teaching methods (GTM)" have improved students' engagement in learning process, as students who participated in "gamified teaching method (GTM)" displayed high level of competency and experienced an advanced stage of motivation to acquire knowledge compared to those students that passed through the traditional "conventional teaching methods (CTM)". Similarly, Çeker and Özdamli (2017) argued that gamified teaching method affords the needed learning atmosphere via its game procedure and subtleties which were extremely motivational and convincing in nature. Its encourages students to engage more (Hong & Masood, 2014). Furthermore, students that participated in gamified teaching method demonstrated advanced interest and pleasure in learning, as the use of videos into lecture notes which can be watched anytime, anywhere, provided them the opportunity to collaborate, acquire knowledge independently and test the knowledge acquired (Fine & Corte, 2017). Again both students and instructors can utilize the gamified teaching method within social network sites designed for teaching and learning purposes (Toda et al., 2019), as the use of "gamification apps" is increasingly becoming imperative in the educational sector.

Feng et al. (2018) argued that marks and responses were the two greatest unnoticeable 1omponents of "gamification apps" but are essentials for academic activities. Marks and responses, or in other words "points and feedback" are basically given to individuals as a reward for effectively accomplishing a particular events in gamified setting (Huotari & Hamari, 2017). For instance, awarding marks or points to a particular student

signifies his/her competency in relation to "gamification instrument" (Högberg et al., 2019), which in turn increases his/her status and acknowledgement among other fellow students. Summary of the articles included in the review is presented in **Table 1**.

Table 1: *Summary of topics, aims and findings of the viewed articles on gamification apps, motivation and motivational effects of apps in Education*

Authors/Year	Topic	Aims of the study	Findings
Çeker and Özdamli (2017)	What "Gamification" is and what it's not	To elucidate what gamification is, how it differs from games and game-based learning, and to explain successful gamification applications in the education sector.	Gamification in education increases student's curiosity to teachings and enhance competition spirit in lesson rooms, through instruments like points, badges, levels and league tables, feedbacks. That group who uses gamification engage more in lesson than those who do not use
Sanchez et al. (2020)	Gamification in the classroom: Examining the impact of gamified quizzes on student learning	To enhance the understanding of the circumstances under which gamification can improve learning outcomes	Provides tutors with insights on the possible effects of gamification in an online quiz and stressed that instructors need to be aware of certain students' characteristics that may modest the effects of gamification.
Antonaci et al. (2019)	The Effects of Gamification in Online Learning Environments: A Systematic Literature Review	To investigate gamification effects in an online learning environment. Such as students' failure and lack of engagement due to the development of feeling of isolation.	Use of Leader boards, points, experience points and Levels improved students' performance and reduce the feelings of self-isolation. Also found Badges to has no effects on lower schools.

Koivisto and Hamari (2019)	The rise of motivational information systems: A review of gamification Research	Aim at comprehensively reviewing and synthesizing current literatures on the concept of game like apps field.	Exposed that gamification applications design is difficult because; of its complexity and multi-layered, thus making it hard to transmit to other surroundings. That gamified instruments were often used to change behaviours, and this adds extra coating to gamifications design coverage.
Groening and Binnewies (2019)	"Achievement unlocked! - The impact of digital achievements as a gamification element on motivation and performance"	To examine the performance and motivational aids of gamification in relation to digital learning.	That achievements improve motivation compared to no achievements. While motivation increases commitments over time.
Hong and Masood (2014)	Effects of Gamification on Lower Secondary School Students' Motivation and Engagement	To investigate the effects of gamification teaching methods on secondary school students in terms of engagement and motivation.	Discovered lack of knowledge between conventional and gamification teaching methods among students of lower secondary schools, as to what differentiate the two.
Fitz-Walter et al. (2017)	"Driven to drive? Investigating the effect of gamification on learner driver behaviour, perceived motivation and user experience"	To design a gamified logbook application that can address usability and playability issues.	Exposed that gamified diary was more pleasant and more inspiring than the traditional methods of record keeping.

van Roy and Zaman (2019)	"Unravelling the ambivalent motivational power of gamification: A basic psychological needs perspective"	To explore students' experience with game elements that are designed and implemented on digital platform in order to afford need satisfaction.	Found game strategy on a gamified instructive podium foster feeling of autonomy, competence and relatedness amongst students.
Hassan et al. (2019)	"How motivational feedback increases user's benefits and continued use: A study on gamification, quantified-self and social networking"	To determine how feedbacks from gamified systems improved users' satisfaction and lead to perceived benefits.	Discovered that majority of contemporary systems aid user participation, by providing accurate and effective information via social experience in order to support usefulness and the self-purposefulness of system use. Modern information systems nowadays are considered as "motivational information systems".

As seen in **Table 1**, majority of the articles included in the reviewed stressed that use of gamification apps in education really increases students' motivation and engagement. Furthermore, gamification apps elements such as "scores-points, badges, levels, league tables" and feedbacks also increases learners' interest to teachings, enhances competitive lifeforce in lesson-rooms, fosters feelings of autonomy and competence amongst students, and also inspires learners to partake more on learning processes (Antonaci et al., 2019; Çeker & Özdamli, 2017; Groening & Binnewies, 2019).

3. Methodology

3.1. Research design

The study adopted a four-phase systematic review approach as per (Goksu & Cavus, 2019). First, relevant articles were methodically acknowledged in the first phase, after which they were grouped together.

Thirdly, inclusion and exclusion activities took place in the third phase. Lastly, the relevant articles were examined using the research background of motivational effects of gamification apps. The following subsections give details of our review process.

3.2. Database search

Having identified our research topic, academic databases were searched for related literature. The literature search was carried out in some of the reputable databases. Four scholarly databases were searched, ScienceDirect, Web of science, IEEE Xplore i.e., (IEEE), and SpringerLink using keywords that best describe our research topic. 167 articles, conference papers, workshops and bulletin papers were found. **Fig. 1**, described our search processes.
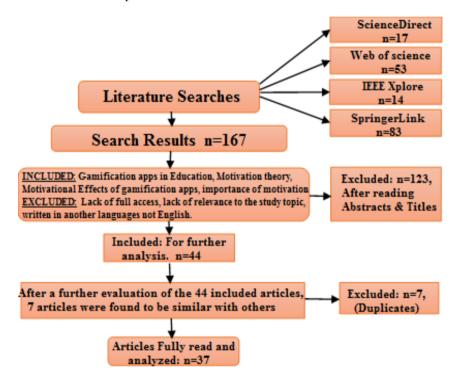

Fig. 1. Literature search process

3.3. Search Criteria

The study begun the search for relevant literature using keywords that best defined our research topic such as "gamification systems",

"gamification apps in Education", "motivation," "motivational effects of gamification apps in Education", "importance of motivation". 167 articles were discovered as seen in **Fig. 1**. The articles were grouped together for further extraction.

3.4. Inclusion and exclusion criteria

For each of the discovered articles, introductory importance was determined by title. From the title, then abstract and if the title and abstract appeared to deliberate on the method of our systematic review procedure, then its full reference would be obtained, and grouped together for further evaluation in the second stage. However, articles whose title and abstract doesn't seem relevant to the review topic, or are written in another language not English, and closed access articles were excluded in the third stage. Similarly, duplicate articles were also excluded after further analysis. Therefore, 37 articles were fully read and synthesized.

3.5. Data extraction

Data from the selected studies were extracted and transferred into worksheet planned for this assessment. Articles with motivational effects of gamification apps in Education, secondary or higher education were grouped separate, while those with gamifications as a source of motivation and "students' engagement via gamifications apps" were grouped together, and articles with motivation theories and importance of motivation were also grouped separately. Furthermore, articles that are considered to be rationally relevant were examined again for the purpose of precision and obtaining a reliable result.

4. Results and Discussion

The paper aimed at identifying the motivational effects of "gamification apps" in education. Firstly, the study discovered that motivation is very important in Education. Nowadays, schools need to motivate students, in order to get them occupied with their learning activities which in turn increased their participation in teaching and learning process. This outcome appears to be in line with the findings of prior study. That "gamification systems" are becoming more relevant in education than before (Koivisto & Hamari, 2019). Furthermore, used of gamification apps is becoming increasingly important and it's yielding a positive result, as many schools, colleges and higher institutions of learning have begun to implement it on their "teaching and learning" process.

Secondly, the study discovered that gamified methods of teaching, nowadays allowed students to externalized the knowledge acquisition and sharing process (Hassan et al., 2019), thus, changing their attitudes and behaviours toward learning activities due to the "game elements" that are associated with it and also improve their desire to learn. Similarly, the study found that the pleasantness components of gamification apps such as entertainment, amusing and emotive fulfilment also inspire students to participate more in learning activities. This result is in line with the findings of Sogunro (2015) that "modern methods of teaching" improved students participation in learning activities.

Furthermore, the study results discovered that "gamification apps" have the capability to occupy and motivate individuals, thus making "teaching and learning" more effective via "gamification methods" in terms of students participation Çeker and Özdamli (2017), as groups that participated in gamification method of teaching tend to be more competent and "experienced an advance level of motivation" compare to those that uses the traditional conventional methods of teaching. This outcome reinforce the findings of Stuart et al. (2019), that groups that uses "gamification teaching methods" displays more competency than those groups that do not used it. Similarly, the study discovered that used of gamification apps also affords the required learning atmosphere via its game procedures and intricacies that are extremely motivational and convincing in nature (Hong & Masood, 2014; Sanchez et al., 2020).

The study also found that both tutors and students that employs "gamification systems" established advanced curiosity and desire to teaching and learning, for instance used of videos as lectures note nowadays allowed students to collaborate, acquire knowledge independently and test the acquired skills, as these videos can be watch anytime, anywhere. This result also is in line with the findings of (Sailer et al., 2017). Hence, our results deliver an experimentally resulting evidence that used of "gamification apps" in education motivates both tutors and students to participate and engaged more on their teaching and learning processes.

Thirdly, the study also discovered that marks and responses or in other words "points and feedbacks" were the two most essentials components of gamification that motivates students, as it increases their rank and acknowledgement among their fellow students, and also makes others to work hard in order to get more marks. This result is in support of the findings of Högberg et al. (2019), that given marks or points to someone in "gamification instruments", signifies the person competency, thus, increasing the person status among fellow associates and in turn increases

his/her learning ability. The study results are pretty meaningful in the field of game and gamification studies, simply because previous studies focused more on usage and effects of gamification elements which may either be harmful or helpful, with little emphasis on motivation and motivational benefits of gamification apps.

4.1. Conclusion and Future Work

Gamification apps has become an important tool for education, as colleges and institutions of learning that successfully implemented gamification applications has begun to feel the positive impacts of the applications. "Points, levels, badges, leader boards and feedbacks" were the most effective components of gamification apps that motivates students to engage and participate more on their learning activities. However, other individuals' psychological requirements need to be integrated into "gamification applications elements". As with every study, this study too has some limitations. The study is limited to highlighting the benefits and importance of motivation, and identifying the motivational effects of gamification apps in teaching and learning process, with much emphasis on student's motivation from empirical data. Therefore, future works should employ either a quantitative or qualitative approach to further investigate the motivational effects with much emphasis on tutors. Furthermore, future studies should investigate the manner in which gamification systems are implemented in organizations, as suggested by prior study Toda et al. (2019), that the success of gamification applications largely depends on how the systems were implemented and used in organizations.

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