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GAMIFICATION ELEMENTS AND ITS IMPACT ON STUDENTS

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ABSTRACT

This study reviewed past research with regards to gamification and to propose a conceptual framework model by mapping the relationships between gamification elements and its impacts towards university students' learning outcomes. This paper synthesized the extant literature on gamification elements by conducting a review of the literature on gamification in the context of students' learning in higher education. This paper has highlighted the gamification elements i.e. composed by rewards, feedback, points, badges, leaderboards, levels, progress bar, challenges and avatar that shown to influence and positively affecting students' learning experience in Higher Education Institutions (HEIs) especially in improving their level of motivation, aid in engagement, improving result and achievement as well as inducing positive learning attitude. Investigating the impact of gamification elements means understanding under what circumstances gamification can be implemented to stimulate positive student's learning behaviour in HEIs thus maximizing the use of gamification as an innovative approach of a new educational technology tool in teaching and learning. The findings of this paper provide reference for practitioners in mechanism design to encourage full potential of the implementation of gamification by manipulation of various element in gamification to support an interactive and conducive learning experience.

Keywords: Game, learning, students

INTRODUCTION

Games have been a part fragment of human societies throughout history. With the advancement in technology, games are gradually common and become part of the human life in the modern world. In an educational setting through technology progression, innovative approach needs to be taken so that

the teaching and learning process is able to evolve in line with the current technology development. Education, both teaching and learning are essential to be innovative and flexible to satisfy the demands of new generation learners and thus able to overcome the current and future educational challenges. The current traditional method tends to be outdated and in times no longer relevant with the needs, requirements and learning styles of the current learners. The introduction of gamification is one of the new pedagogy styles in education that fitting with the needs of the characteristic of digital native students.

Gamification can be defined as "the use of game design elements in a non-game context" (Deterding et al., 2011). The definition accentuates rather than only focussing on game-based technology, other game related practices or full developed games, the utilization and use of the core game design elements and characteristics for games are at best to be integrated into a non-game contexts i.e. regardless of specific usage intentions, contexts, or media of implementation. In the context of learning or training application, gamification can be described as the use of game elements or game thinking in a non-game context in order to increase engagement between students and learning application (Firas Layth et al., 2016). Given an attention on Higher Education Institution (HEIs) as one of the service organization, Huotari and Hamari (2017) explained gamification as "a process of enhancing a service with affordances for gameful experiences in order to support users' overall value creation". This explanation highlights gamification's benefits, i.e. corresponding goals which are to afford gameful experiences and to support the student's experienced value-in-use of the core service during the teaching and learning process.

Previous study by Mohd Hishamuddin et al. (2018) reviewed the gamification elements and their impacts on teaching and learning. However, this study disregard and overlook the different variables such as the diverse characteristic in user profile, goal and learning styles that possess by the different groups of the said target users shall consequently have different needs thus dissimilar requirements. It is argued that the design of gamification elements must be in accordance to the user needs and requirements, thus each group of the target user need be studied as a separate entity. Further study must be conducted to investigate the effectiveness of gamification as new pedagogy in teaching and learning as we contend that its impact depends profoundly on the implementation of various gamification elements. Also, studies proposing conceptual framework model by mapping the relationships between gamification elements and its impacts on students learning are sparse. Accordingly, this research proposes to review the concept of gamification emphasis towards students' learning in higher education. The focus of this study is to identify and propose the conceptual framework model by mapping the relationships between gamification elements and its impacts towards students learning outcomes.

RESEARCH STRATEGY

To accomplish the objectives of this study, the researcher accessed several electronic databases such as ScienceDirect, Scopus, Springer, Emerald and Google Scholar to search articles related to gamification in education targeting students of higher education as the user. The reviewed documents include journal papers, conference papers and books. Keywords used were related to 'gamification', 'gamification elements', 'learning', 'higher education', 'tertiary', 'university level', 'benefit', and 'impact'. However, some research material that are not directly associated to the keyword used but significant and decisive for all stages of education are remained. These selected articles have been analysed in this study to recognize the concept of gamification, identifying the gamification elements, determine the impact of the said gamification elements and consequently to develop and propose the conceptual framework model by mapping the relationships between gamification elements and its impacts on students' learning outcome. The result i.e. the finding and discussion have been reported in the next section.

LITERATURE REVIEW

Gamification Elements and Its Impact on Students' Learning in Higher Education Institutions (HEIs)

Gamification can be well defined as the utilization of game elements in a non-game context to increase the engagement between human and computers hence created a novel instrument that able to resolve problem efficiently (Deterding et al., 2011; & Zicherman et al., 2011). From the established definition, it can be construed that the gamification elements are the main principal of the gamification design framework. The statement is supported by the research done by Nah et al. (2013) that include the gamification element as part of system design in developing gamification framework in creating engagement and cognitive absorption. Consequently, successful gamification depends on a good design of gamification elements that is to ensure the effectiveness of its usage and become a tool or instrument that beneficial to the user i.e. in presenting an interactive and exciting contents to learners.

Previous studies on gamification reveals that various elements such as scores, points, badges, aim and goals, leaderboard, feedback, reward, experience, achievement, profile, difficulty, challenge, collaboration, level, virtual goods, progress bar are used in gamification environments (Barata et al., 2013; Cózar-Gutiérrez & Sáez-López, 2016; Özgür et al., 2018; Subhash, & Cudney, 2018; Koivisto, & Hamari, 2019). To incorporate the right elements is crucial to design and establish a gamification system that are well-balance and meaningful to the users (Nicholson, 2012; Sanmugam et al., 2015). In a gamified setting, it is crucial for the goals, the missions and the functioning of each element of gamification to be make clear (Mese & Dursun, 2019). According to Bunchball Inc. (2010), the feeling of approval i.e. the satisfaction in fundamental human needs and desires which includes the human desire for reward and prize, personalization, autonomy to make choices, altruism and rivalry will aid in increase of motivation to utilize the gamified elements. Moreover, a well balance and adequate combination of several game mechanisms and dynamics integrated into gamified design will help to generate an environment and setting that improve the users' motivation, develop positive personal attitudes and create an enjoyable interface for the users' (Neeli, 2012). Consequently, the implementation and manipulation of game features and elements shall assist and encourage learners especially unenthusiastic students to be more interested and improve their level of engagement in their own learning process and interactions with others.

Research done by Alomari et al. (2019) was carefully selected as one of the most recent and comprehensive study that reviewed previous research on gamification elements targeted students' learning in tertiary education. By implementing Preferred Reporting Items for Systematic Review and Meta-Analyses (PRISMA) protocol, the said researcher discovered that the most frequently used gamification elements in the past studies focussed on students of university level were points, badges, leaderboards, levels. Other gamification elements i.e. reward, progress bar, challenges, feedback and avatar were revealed to be less applied. However, in this study we intend to explore all the mentioned elements as it is argued that it is needed to examine various elements i.e. its impact on students learning as it will ease and support future researcher to determine the most suitable elements that need to be included as part of gamification design framework.

Through reviewing literature reviews, this study reorganizes the identified gamification elements into a more systematically means through subdivisions of gamification elements. Conger (2016) as cited in Fischer et al. (2016) described rewards a part of game mechanisms elements that actively influence and act as a core part of other gamification elements i.e. feedback and progress bars. Meanwhile, Lister (2015) further explained that elements of gamification such as points, badges, levels and leaderboards were part of feedback elements that serve as an encouragement to learners. However, gamification elements such as challenges and avatar stand independently without interconnecting interactively with others. Figure 1 reflect the said relationship and subdivision between the gamification elements.

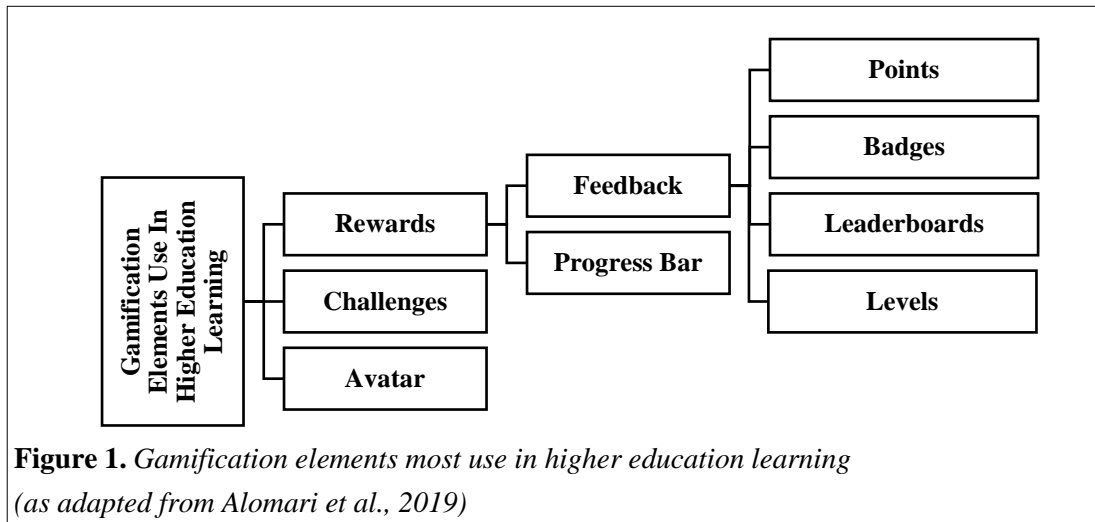


Figure 1. Gamification elements most use in higher education learning
(as adapted from Alomari et al., 2019)

Rewards

According to Goshevski, et al. (2017), the reward-based notion in gamification infers the implementation of external rewards to modify students' behaviour through extrinsic motivation. Glover (2013) further mentioned that rewards must be reachable and desirable to offer enough extrinsic motivation, nevertheless infrequent enough that giving sense of pride and achievement in receiving one. Meanwhile, Jackson (2016) and Wiggins (2016) explained that rewards can be implemented as part of game-design elements to improve learning experience that consequently offer extrinsic motivation and credit for time, effort, and skills that the students give in completing the task. Besides extrinsic motivation, rewards may also increase intrinsic motivation especially targeted to those learners that poorly perform in academic (Hanus & Fox, 2015).

The rewards elements certainly able to increase students' level of engagement (Cronk, 2012) and through the design of the system i.e. frequency and consistency should be well planned to reward users to acquire new skill, receive in-game currency or items of diverse rarity hence assist to improve players engagement i.e. participation and involvement during learning activity (Measles & Abu-Dawood, 2015). However, rewards as in prizes should boost additional engagement, such as giving an exploration quest for the players, but ought to not promotes negative rewards, such as being exempted from a task (Glover, 2013). And although it offers short-term benefits, rewards give instant effects and suitable for teaching new skills or carrying out tasks thus increase result and achievement for players who do not have internal motivation (Goshevski et al., 2017). Nah et al. (2013) as cited in Alsawaier (2018) explained the execution of numerous gamification elements such as rewards for achievement in completion of task will encourage users' intended behavioural change that is positively influence the learning process.

Feedback

Feedback reflect for posts of course content that allow rapid and quick quality measurement/evaluation of the players' performance (Fischer et al, 2016). The immediate and constructive feedback is the key reason that aid users to feel motivated in their completing their given task thus improving result of the players' (Kiryakova et al., 2014). The study further explained that feedback can be executed as part of a tools in gamification elements that aid in improvement of students' achievement through correction of error in completing the quest and therefore reassure and motivate the players' to continue undertake the upcoming designed task in the gamified learning system. Based on the research done by Ding, Guan & Yu (2017), students felt active and interested to learn in a gamified setting, perhaps because the goals were presented clearly before the start of the mission and feedback on the performance was immediate. Feedback shall include elements such as points, badges, levels and leaderboards (Lister, 2015).

Points

Points are defined as numerical units indicating progress (Seaborn, 2015). The numerical value i.e. point or scores represent the user's performance and achievement in completing the require task/quest. Students are motivated to engage in completing the given task after a points-based system was integrated as part of game mechanics into learning course (Thamvichai & Supanakorn-Davila, 2012) i.e. because of the use of points are connected with intrinsic motivation, measured as achievement associated features that reflect the effort of players and a direct indicators of the students' performance and result (Von Ahn & Dabbish, 2008; Xi & Hamari, 2019). Meanwhile, Richter et al. (2015) described that points improve the sense of motivation through the assistance of social motivations, needs based theories and rewards based theories. Asiksoy (2018) further mentioned the positive potential of implementing the said elements to ease students' learning and accordingly improving their level of motivation as part of the positive effects proposing the incorporation of gamification into gamified flipped classroom environment.

Kuo and Chuang (2016) in their studies also determined how the point-based system able to support educator to stimulate students to be more motivated hence resulting positive learning attitude and consequently aid in creating positive competition among learners during their learning activities atmosphere. Moreover, points also trigger competition which consequently affecting a variation of players' rank and position (Leemkuil et al., 2000; Fu, 2011; Liu et al., 2011). Besides, points inspire and excite person's desire to attain reward which signify as recognition in an education setting (Alomari et al., 2019) thus encourage the students to score a better result. Through the measure of degree of the progress of the students and the reflected achievement in point system, later it incite individual-efficacy (Gnauk et al., 2012) and support learning activity thus thriving the users' result and achievement. Last of all, point based system also aid to improve students' engagement i.e. increase the degree of their attention, curiosity and optimism because of its function that able to create a fun and entertaining learning experience (Davis et al., 2018; Alomari et al., 2019).

Badges

A digital badge is a depiction of an achievement, interest or affiliation of player's and reflected in the form of graphic, presented online, and comprises metadata with relations that ease to clarify the setting of the gamified environment, meaning, sequence and outcome of a task (Gibson et al., 2013). According to Pirker et al. (2014), the integration of badges in several of case studies does not give much impact to the student's academic achievement, but focally intended at stimulating competitive motivation. According to Malone (1981), Butler & Bodnar (2017) and Balci et al. (2018), badges have been discovered to increase motivations of students during learning process due to characteristic that incorporates the visual element, information concerning the objective, ways to conquer each specific badge, as well could also be equipped with story elements and series of tasks (Malone, 1981).

Badges signify a student's involvement and achievement (Simões, et al, 2013). Additionally, badging design arrangements are evolving to encourage students to engage in positive and constructive learning behaviours, aid students in tracking progress in learning and content paths and accordingly indicate and credential engagement, learning achievement and result of students' performance (Gibson et al., 2013; Hakulinen et al., 2013; Denny et al., 2018; Rincon-Flores et al., 2019) i.e. by improving their self-confidence to participate in the class discussion and activities, therefore improving and encouraging students achieve higher academic achievement (Huang & Hew, 2018).

Moreover, badges aid in improving self-qualities i.e. competence and efficacy either individually or socially, as its key characteristic help the players to create the status of an individual in the game setting (Richter et al., 2015).

Leaderboards

McNamara et al. (2010) well-defined leaderboards or ranking as the number of points earned by the players' and may display all scorer achievements or a set number of ranking and/or may be compared to other players within a certain area, level or age range. The practice of leaderboards as part of gamification elements that been introduce in education also have influence and encourage students' positive learning behaviours by creating a sense of competition between learners (Alomari et al., 2019). This is supposed to help uphold and support learners' motivation in the learning activity (Schreuders & Butterfield, 2016).

According to Silva (2010), the use of leaderboards as part of social game mechanism to improve the student's motivation by creating a new interaction instrument with other students in the class. Other previous studies have also specified the implementation of leaderboards as part of reward system in gamification shall aid to improve learners' motivation i.e. through the encouragement of competition (DomíNquez et al., 2013; Kuo & Chuang, 2016) i.e. by forming an assessment in achievement among students which inspire them to improve their degree of involvement and engagement in learning activity (Hew et al., 2016; Khaleel et al., 2016). Leaderboards also able to significantly increased students' behavioural engagement in during the learning process (Coetzee et al., 2014 as cited in Hew et al., 2016; Ding et al., 2018) i.e. due to the position of standing a student may well achieve if the player get a higher order or rank than the others (Mese & Dursun, 2019). Consequently, this can boost students' interactions with the topic in discussion and consequently improve their performance and aid individuals to take part actively during the learning course (Suh et al., 2018).

Levels

The purpose of having levels in the gamification is to split and break down the gamification contents into small, separate and controllable stages i.e. to able the player to target and reach an achievable milestone in smaller step (Gåsland, 2011). The advanced the level the learners' must undertake, the more effort and time they need to devote themselves into accomplishing the given quest (Nah et al., 2014). As mentioned by Suh et al. (2018), levels encourage a dynamic that inspires and motivates players to keep improving their rank by accomplishing goals or by reaching milestones within the gamified system. Moreover, levels reflect the strategy of the gamified system i.e. through story or mission progression that carefully design in sequencing and particularly order that able to increase student's level of engagement through high and low points to grab attention at critical point that create a sequence known as an interest curve (Stott & Neustaedter, 2013).

Besides, well balance on the level of difficulty of the task shall lead to the improvement satisfaction of the need for competence and then induce positive learning attitude within the student's personality (Sailer et al. (2017). In a gamified design, every learning activity will be conducted in a form of task or a mission that will designated carefully in accordance with the subject complexity and each completion of the said task shall give students a sense of progression towards mastery and the feeling of rewards (De-Marcos et al., 2014). Consequently, according to Barata et al. (2013), the integration of levels as part of the gamification elements into gamified course also has successfully reduced grade differences among students and helped them to score better during the assessment.

The improvement in the result of the students was assumed due to effective implementation of levels as part of gamification element that act as progress indicators that able to guide and increase player performance i.e. possibly by creating a clear connection between player determination in completing the task and their achievements, through giving a clear performance goals (Mekler et al., 2013). Moreover, Zickermann (2010) also mentioned that the players feel fun and able to enjoy the learning experience in the gamified setting because the completion of level able to encourage a sense of exploration and a feeling that the students are being rewarded because of the achievement.

Progress Bar

Toda et al. (2019) describes progress bar as an extrinsic guidance that provide and aid users to know their advance progress in process of completing the task thus permitting these users to locate themselves in the game setting quest. In learning environment, tracking progress to achieve goals is vital within games as it helps the students to recognize the remaining tasks that is mandatory to accomplish in ensuring success (Glover, 2013) and keep them motivated to proceed and venture to the subsequent learning task (Denden et al., 2017) as students shall use the progress bars to aid them to monitor their development and achievement, and they proceeded in accordance with their progress. Ding et al. (2017) believed that students focused to complete their mission based on the accomplishments showed in progress bars and by doing that, they able to increase their cognitive engagement i.e. through self-regulation (Appleton et al., 2008). Meanwhile, Kiryakova et al. (2014) affirmed that tracking the students' progress is crucial to realize the learning objectives, therefore aid students to achieve a better result and achievement. Moreover, by visualizing a student's accomplishments, the progress bar in combination of experience points system also aims to allow learners to improve their individuals' sense of achievement and aptitude (Ryan et al, 2016 as cited in Ding et al., 2017).

Challenges

Challenges alongside leaderboard and badges were instigated as game element aims to form an autonomy for the learners (Ding et al., 2017). In a gamified atmosphere, the students are stimulated to engage and take part in the learning activities actively, able to deduce insightful reasoning and make proper evaluation notwithstanding of whether they attain success in their task or not. The reason is not to undermine the importance of task but rather to motivate the learners to give their full effort in solving various learning challenges (Alsawaier, 2018). Baard et al. (2004) mentioned that to overcome the learning challenges and achieve success, the aspect of competency is link to the motivation. Challenges/tasks that users perform shall help motivate the players to advance towards well-defined goals and objectives (Kiryakova et al., 2014).

Craven (2015) highlighted the nature of gamification that able to create immersive experience that creates engagement i.e. infers to the approaching the implementation of gamification holistically in a manner that combines effective elements such as quests and challenges. Moreover, most students experience the fun and enjoyment part in a gamified setting as part of positive influence in resolving given task and overcoming challenges as they participate in solving critical thinking questions (Alsawaier, 2018). According to Francisco-Aparicio et al. (2013), when users involve in gamified setting, they enthusiastically immerse themselves in the assign virtual tasks for the determination to feel the sense of joy and play.

Avatar

Avatar displays player information such as student's name and their choice of character (Villagrasa et al., 2014). Todor and Pitică (2013) explained that after applying the avatar as one of the elements into gamified platform, the students' attention and curiosity in the subject improved. Avatar also permitted players without restrictions to express their thoughts i.e. through personalization and consequently integrate positive roles in promoting students' engagement in virtual discussions (Ding et al., 2017). Avatars represent a chance for players to endeavour into a risk-free world and given the autonomy to make choices and design their own avatars i.e. personalization thus generates an atmosphere where students can "find their own voice" (Boss, 2009, p. 4). This infers that being able to create their own avatars had some effects on students' behavioural engagement. Personalization of avatar also helps to uplift and increase learners' engagement and motivation during the learning activities (Jackson, 2016). The players who usually use different avatars, such as the act as a fantasy character is proven to be successful in schools (Nasir & Saxe, 2003). Figure 2.0 shows the synthesised game elements used for the HEIs learning environments. The figure been derived from a careful literature review conducted.

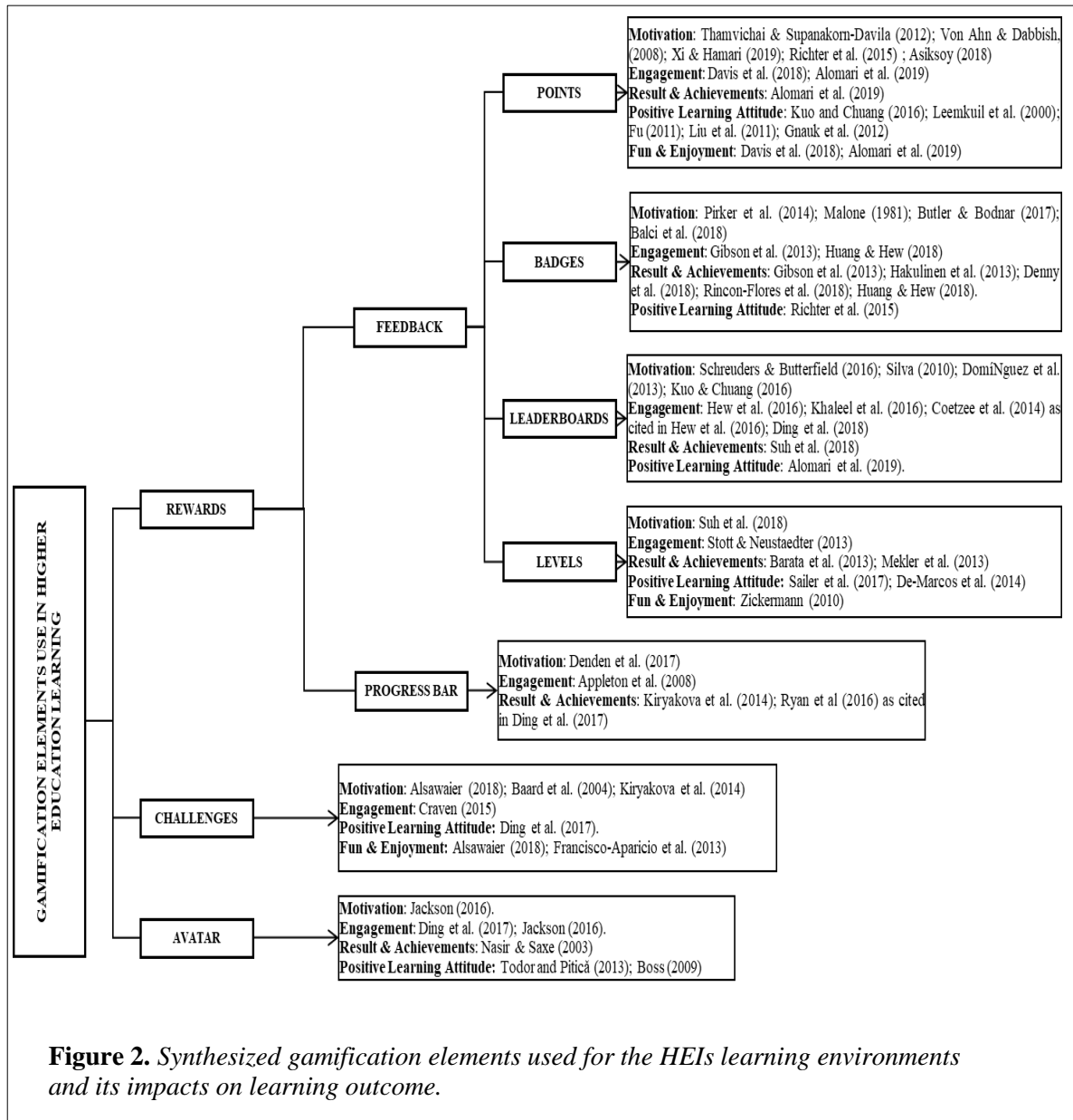


Figure 2. Synthesized gamification elements used for the HEIs learning environments and its impacts on learning outcome.

PROPOSED CONCEPTUAL FRAMEWORK OF GAMIFICATION ELEMENTS AND ITS IMPACT ON LEARNING OUTCOME

Figure 3.0 shows the proposed conceptual framework of gamification elements and its impact on HEIs students’ learning outcome. From this figure, it can be seen that all gamification elements have impacts towards students’ learning outcome, i.e. improving their motivation in learning, encourages engagements between co-learners and instructors, increase result and achievement, giving them a positive learning attitude and as well as creating a fun and enjoyable learning experience.

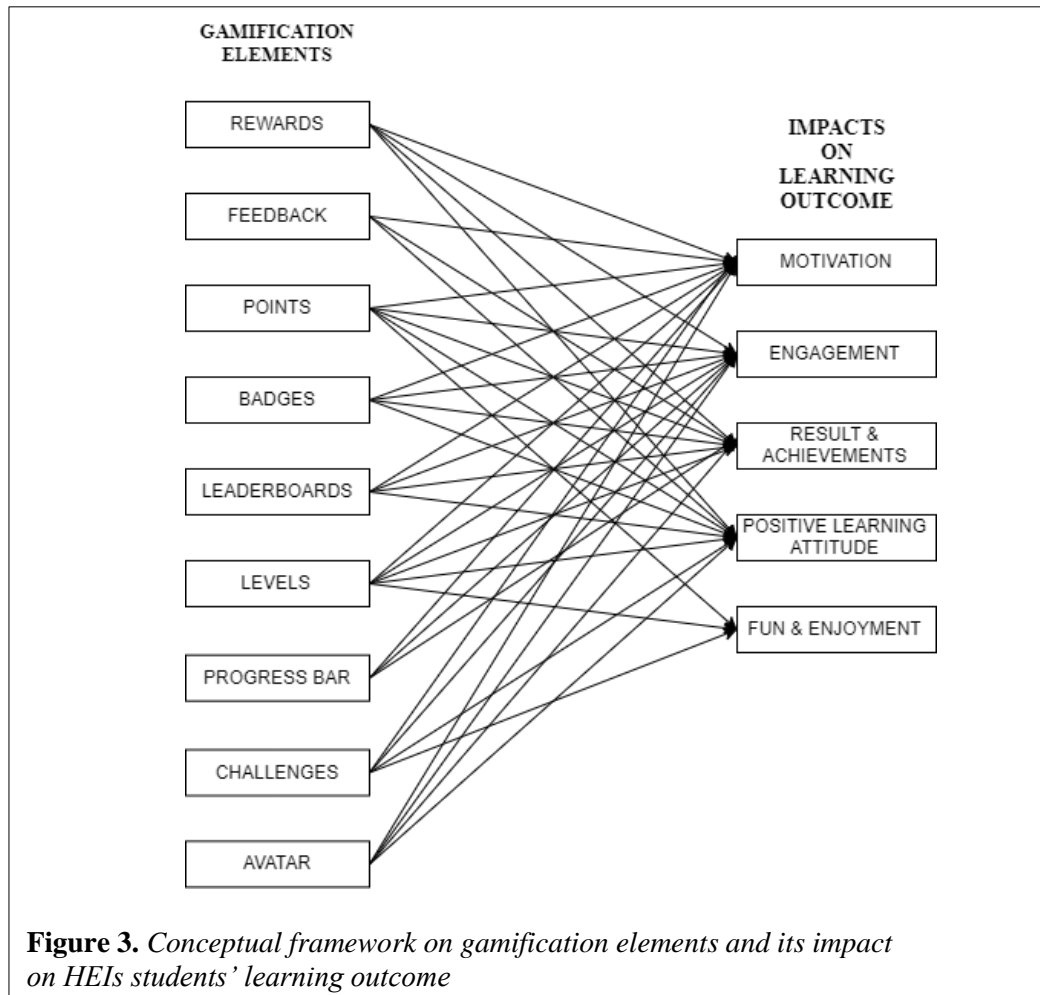


Figure 3. *Conceptual framework on gamification elements and its impact on HEIs students' learning outcome*

CONCLUSION

The integration of game elements in gamification needs to go in line with the needs and characteristic of the users i.e. to include existence of various player types such as achievers, explorers, socializers and killers. Any gamified system should be adaptive towards the needs of the users instead of setting up a system and assuming that it suits all types of users. This will allow the students to find the path that suits their personality and needs; but at the same time guide the students to achieve the intended learning outcome. Consequently, the most important aspect in designing gamification system is to identify and integrate the most suitable gamification elements available in accordance to the needs of users' i.e. what they want to achieve in the end of completing the task. This can be achieved through the identification of the impacts of gamification elements on the learning outcome. Based on the proposed conceptual framework, the most prevalent impacts of gamification elements towards learners' in higher education are increasing students' level of motivation, aid in engagement, improving result and achievement as well as inducing positive learning attitudes. The least impact of the said gamification elements are to create fun and enjoyment learning experience. The result provide reference for practitioners in showing how gamification elements are linked and affecting the students' learning in a HEI, thus encourage full potential of the implementation of gamification by manipulation of various element i.e. points, badges, leaderboards, levels, reward, progress bar, challenges, feedback and avatar in gamification to support a well balance and affective learning experience. Thus, the conceptual framework developed through this study shall assist future researchers and game developers in designing a gamified education application that able to match between the distinct needs, characteristics and requirements of students with their desired learning

outcomes through proper integration of available elements to maximize the effectiveness of gamification as a new pedagogy in teaching and learning as it is concluded that its impact depends profoundly on the manipulation of various gamification elements.

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