

Online Game-Based Formative Assessment: Distant Learners Post Graduate Students' Positive Perceptions Towards Quizizz

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Abstract— In educational context, gamification can be applied at all levels namely elementary education, lifelong education, and higher education. 'Quizizz' is an online game that is used by educators for academic purposes. It allows educators to conduct self-paced online formative assessments in a fun and engaging manner. This study is a quantitative study undertaken to explore the perception of 91 distant post graduate students towards Quizizz. Most of these post graduate students are English teachers serving at elementary schools, secondary schools and tertiary institutions. However, in this article only the students' positive perceptions towards Quizizz and its benefits to the learning process are discussed. The questionnaire consists of 29 items. The data were analyzed descriptively (frequency, percentage, mean and standard deviation) using SPSS version 25. The most prominent finding is the respondents were able to reflect on their errors after answering the Quizizz questions. In addition, they could learn the topic better when they were asked to construct questions for Quizizz based on the learnt topics. They prefer to be given the opportunity to refer to their notes when answering the questions in order to reduce their anxiety level. They preferred Quizizz to be carried out in the form of homework in comparison to face to face classroom activities as they could answer the questions when they are fully prepared and in a more relaxed environment. They also agreed that Quizizz is able to provide a platform which promotes positive reinforcement, motivation and immediate feedback when their marks are being displayed on the leaderboard. It is hoped that these findings could encourage educators to integrate Quizizz as a form of formative assessment more effectively.

Index Terms— distance learners, motivation, online games, post graduate students.

1 INTRODUCTION

THE term 'gamification' is generally used to denote the application of game mechanisms in non-gaming environments for instance in academic environment [1]. In educational context, gamification can be applied at all levels namely elementary education, lifelong education, and higher education. The growing popularity of gamification is due to the widespread belief on its potential to foster motivation, behavioral changes, healthy competition and collaboration. From traditional lecture halls where most of the teaching and learning activities were conducted in a teacher-centred approach, learners are now experiencing a more dynamic, student-centred learning environment with gamification being increasingly adopted as one of the instructional strategies. Gamification is one method that has been linked to increased enjoyment and engagement [2], [3], [4]. When students are highly motivated, their engagement increases, leading to desirable learning behaviors and knowledge enhancement.

Gamification is a potential tool to enhance participation of students in classroom, as it allows them to use the fun elements of gamified learning to enrich their imagination and thinking skills [5]. Proponents of gamification claim that gamification leads to positive learning outcomes. They assert that gamification reinforces important skills in education, such as problem-solving, collaboration, and communication. Furthermore, the need for interaction among the group members in gamification encourages students to play an active role in the learning process. Since there are many studies which indicate the positive aspects of online games, the researchers employed an online game namely Quizizz in their post graduate classroom. There is an inherent diversity of learners in distance postgraduate classroom as students of different age groups may enroll themselves in such courses, and these students usually differ in their values, attitudes and learning styles as a result of generational gap. Postgraduates from the elder age groups face a lot of difficulties in their studies due to lack of motivation, concentration and retention power, possibly due to their multiple commitments towards personal life, work and education. As a result, these students often suffer from high anxiety levels that negatively affect their learning. On

top of this, generational differences in embracing the newer technologies in education remain as a major problem among distance postgraduate students. It is believed that students from the younger age groups are generally more adept in using online learning strategies and tools, and consequently have a more positive outlook on using them in studies as compared to their elder counterparts. As such, this study was undertaken to study the distance postgraduate students' perceptions towards implementation of Quizizz. Nevertheless, this paper only highlights the students' positive perceptions towards Quizizz and its benefits. Thus, the researchers attempted to provide answers on the following research questions in this paper:

1. What are the positive perceptions of 'Quizizz' among distant post graduate students?
2. What are the benefits of 'Quizizz' among distant post graduate students?

2 LITERATURE REVIEW

Gamification helps students enjoy their learning through the use of game-design elements in non-gaming contexts. It is an educational approach with a great potential to address problems around students' motivation and engagement. Incorporating the fundamentals of behaviourism and connectivism, gamification leads to positive learning outcomes in a multitude of ways.

2.1 Theoretical Background

2.1.1 Connectivism

Ryan and Powelson [6] stated that a learner is most likely to be interested and engaged in learning characterized by autonomy and purpose. Students are more likely to be highly motivated if they have the autonomy in determining their own learning and, when they feel connected to and supported by other students. In this context, the social interaction and online communities which are important components of gamification may seem relevant for them. The proponents of connectivism explain that learning that takes place in the digital age with regards to learners' connection with the content and others in the community. They also proposed that students learn and work in a networked environment [7]. As a result, the students

continually and actively acquire new knowledge every day within the learning community. This enable learners to become autonomous and independent in building their own knowledge base [8]. Gamification also incorporates connectivism approach in gamification through the elements of competition and collaboration with other members of the learning community [9]. Leaderboards, guilds, groups, and other collaboration strategies in games could bring together such communities to promote a sense of interrelated purpose [10], [11].

2.1.2 Behaviorism Theory

Behaviourism theory includes Skinner's operant conditioning focuses on extrinsic rewards as a motivation for human. It involves memory and skill development through repetition which appear in Quizziz. The use of rewards and punishment in Quizizz, promotes certain behavioural patterns with different forms of positive reinforcement. Such reinforcements could be used in game design to promote long-term player engagement [12]. Similarly, positive reinforcements in the form of points, badges or leaderboards are provided to students in order to engage them with learning tasks and encourage them to continue learning.

2.2 Gamification

Gamification refers to the use of game characteristics and elements (such as points, leaderboards, levels, challenges and badges) in non-game contexts [1]. According to Hamari et al. [2], gamification is the act of creating gameful experiences while Werbach [13] described gamification as the process of making activities more game-like. Gamification is increasingly gaining popularity as an effective way to deliver learning contents to digital native students. Gamification has been adopted in classroom context to support learning in a variety of contexts and subject areas to help educators address students' attitudes and behaviours, such as participation, collaboration, self-guided study and creativity [14]. Gamification has also been used by educators as students' assignments and assessments, while encouraging their exploratory approaches to learning, and classroom retention. This is because the game elements would engage learners and change their behaviour in a desirable way similar to what happens in games [15], [16]. There are four game elements that are deemed salient to tertiary education namely: narrative, challenge, progression and feedback. Narrative involves the use of stories to engage students in learning, such as a case study; the use of a task that is both challenging and fun; progression refers to the flow of learning activities (tasks) while feedback is the use of frequent and prompt responses that encourage students to learn. These elements are important to motivate students to be more engaged in the learning activities [17].

2.3 Benefits of Gamification

Current literature seems to uphold the view that gamification increases the students' motivation to learn Alsawaier [18], Bell [19], Bevins and Howard [20], Faiella and Ricciardi [21] leading to better classroom participation with an increase in the number of passing students [22]. With greater motivation and classroom participation, students may find learning process becoming more meaningful. Thus, gamification is often considered as a powerful tool for acquisition of

knowledge and enhancement of the 21st century learning skills such as problem-solving, collaboration and communication among students [23]. Researchers have linked the increase in students' motivation to learn in gamification with nature of games. It has been stated that the fun nature of games is the one that helps to intensify students' intrinsic motivation to engage in learning activities [24]. Students perceived gamified lessons to be more motivating, and interesting than conventional lessons [23]. Thus, gamification is also beneficial to transform boring tasks into interesting ones [21]. Gamification leads to positive cognitive learning outcomes [2], [20], [25]. It has been reported that learning achievement and higher order thinking skills are enhanced by gamification [25]. Gamification is also beneficial in enhancing students' involvement in learning process, as interactivity of games supports active learning, problem-based learning, and experiential learning [26]. On the other hand, Dicheva et al. [23] stated that gamification contributes to significantly greater student engagement and participation, higher rates of attendance, higher passing rates and increased undertaking of difficult assignments. Besides, the design of gamification generally delivers tasks with increasing level of difficulty. As students' competency increases, they would be guided to a more challenging task. In this process, students are allowed to advance to a more difficult task only when they manage to complete the task beforehand. This is to ensure that the students have acquired at least the minimum level of competency in completing the tasks. Therefore, gamification is shown to be beneficial for mastery of skills and knowledge among the students [27]. Apart from that, students spend a lot of time to improve their problem-solving skills within the context of game (or the gamified lesson). As such, they voluntarily involve themselves in extended practice while developing personal qualities such as persistence, creativity and resilience [28]. Schunk et al. [29] stated that gamification could foster the initiation or continuation of students' goal-directed behavior and motivation. Caponetto et al. [14] had reported the possibility of using gamification to develop students into autonomous learners. Gradually over the time, they may develop themselves into independent learners who take full responsibility of their own learning.

2.4 Motivation

Gamification turns course content into a 'game' with activities that resemble learning environment. These activities incorporate elements such as repeated self-learning, ongoing interaction and feedback which are aimed to increase learning interest and motivation of students [30]. The game format provides students with interesting choices, desirable goals, immediate feedback and opportunities to see and evaluate their improvement [31]. These features are usually available in gamification. Motivation is an important factor that resulted in continued learning. Students could be motivated to engage in learning tasks to the extent that they feel they could be successful at certain skills or knowledge and to the extent they perceive that the task as being important to them. Apparently, the students would be able to choose and engage themselves in appropriate learning task(s) according to their capabilities and priorities. Games are generally difficult to beat at the first time of playing, thus, students need to try playing it repeatedly to discover the rule set and mechanics. It is common for student users to be highly motivated in trying to accomplish a particular level of the game in order to move to the next level.

Similarly, students may show the same sense of motivation in completing their task(s) when the learning content is mapped with game design as they strive to progress from one level of difficulty to another. In this context, gamification may not only help to enhance students' motivation, but also their perseverance. It is important to ensure that students are motivated to learn. This is because motivated students are more enthusiastic about learning and they truly enjoy the learning process with high determination to succeed [32]. It is indeed the motivational strength of games that has led to the increasing use of gamification for learning [33]. Other scholars, Malone and Lepper [34] had reported the essential features that make learning intrinsically motivating for students. These features are challenge, fantasy, curiosity and control. Advantageously, these features are present in games, leading to strong belief that gamification could increase students' motivation. Apart from that, students often find incentives such as stars, points, leader-boards, badges, and trophies which are common in games as enjoyable and interesting [35], [36]. Thus, when these incentives are found in gamification, it is expected that students would be equally interested in pursuing the gamified learning content.

2.5 Affective Level

Games invoke a range of powerful emotions, from curiosity to frustration to joy [37]. However, the positive emotions outweigh the negative emotions. These positive emotions resulted in the students' reduction of their affective level. Faiella and Ricciardi [21] revealed that gamification helps to lower anxiety or worry over the consequences of not doing well among students. Some of these positive emotional experiences are optimism and pride [28]. In the context of gamification, these generally help learners to persist through negative emotional experiences and even transform them into positive feelings, which leads to resilience during times of failure by reframing failure as a necessary part of learning. Emotional aspect in gamification focus primarily on positive affect such as enjoyment and fun. Consequently, the students will feel less stress and anxious. Nevertheless, gamified experience could also result in negative emotions, which interact with cognitions to influence behavior. The range of negative emotions triggered by games includes frustration, anger, anxiety, and sadness Hamari et al. [2].

3 METHODOLOGY

3.1 Setting

The respondents for this study comprised of 60 post graduate students who enrolled in a distant learning course, 'Psycholinguistics & Language Teaching'. Most of them teach English as their first degree is Teaching English as a Second Language. Their age range is from 26 to 50 years old. These Masters of Teaching English as a Second Language students are English teachers who serve at primary schools, secondary schools and tertiary institutions. Most of them possess a degree in Teaching English as a Second Language. This course is offered within 14 weeks or one semester by the Faculty of Education in a public university in Malaysia. These students only came to the main campus during the one-week school holiday as they live all over throughout Malaysia. Therefore, the course lecturer only met the students twice in a semester or only 32 hours. Normally, the lessons are taught into two modes namely via face to face and online. Ten topics

are taught via face to face (during the school holidays) and the following for topics are delivered via online (when the students are at home). One of the evaluations is online quiz. Online quiz contributes to 30 percent of the total percentage of evaluations. The online quiz covers only 6 topics. For all the quizzes, the students were given 3 minutes to answer each item. Each topic consists of 5 questions. They could refer to the notes and discuss with their friends to answer each item. In this study, since the course lecturer is aware about the students' anxiety level in answering quiz questions, she used a few strategies to reduce the students' affective level. The students were given two modes of answering the Quizizz questions: (a) the students were instructed to answer the questions immediately after the face to face lessons (b) the students were instructed to answer the Quizizz questions at home as homework. In the context of Quizizz, the 'homework' feature allows students to set a particular task as homework, and keep it active for up to two weeks. They were asked to read some notes which were uploaded in a learning management system designed by the university. Besides reading, they were expected to watch a few videos in which the links were given in the same learning management system. After they have read and watched the video on a certain topic within two weeks, they were assigned to answer Quizizz questions to ensure that the students do their reading at home and to serve as a yardstick of the students' comprehension of the topic.

3.2 Research Instruments

The undertaken study was conducted using quantitative approach. Although qualitative method such as interview may produce valuable data that can reveal respondents' feelings and perceptions, analyzing written transcripts and transcribing verbatims can be time consuming and labor intensive [38]. Quantitative instrument such as questionnaire, on the other hand, allows easier compilation of respondents' responses in the form of numerical scores along a continuum that are assigned to their different perceptions [39]. The research instrument is a questionnaire that consists of 29 items. The items were constructed based on the themes derived from the interview responses of the previous cohort. The questionnaire used four Likert scale ranging from (1) strongly agree (2) agree (3) disagree (4) strongly disagree. The items were given to two experts to be reviewed for validity purposes, namely two academic members; each from the Centre of Innovation in Teaching and Learning, UKM and Centre of Educational Evaluation, UKM. The expert from the Centre of Educational Evaluation, UKM was selected to validate the items due to his/her expertise in item development while the expert from Centre of Innovation in Teaching and Learning, UKM was selected due to his/her familiarity with the constructs studied in this research. The experts validated the items in terms of the content and face value. A pilot study was carried out to determine the reliability of the items. Based on the pilot study, the Cronbach Alpha value for each item is above 0.7, thus, all the items are accepted. The questionnaire was disseminated to all the students (96 respondents) during the second meeting when they had completed all the online game assessments. However, only 91 of them returned the questionnaire to the researchers. The data collected from these respondents were analyzed descriptively (frequency, percentage, mean and standard deviation) using SPSS version 25.

4 RESULTS AND DISCUSSION

4.1 Positive Perception on Quizizz among Distant Post Graduate Students

TABLE 1
STUDENTS' PERCEPTION ON QUIZZ

Item	Statement	Strongly disagree	Disagree	Agree	Strongly agree	Mean	SD
1	I am motivated to answer Quizizz questions.	0 (0.0)	0 (0.0)	35 (38.5)	56 (61.5)	3.62	0.489
2	I could reflect my errors after answering the Quizizz questions.	0 (0.0)	1 (1.1)	27 (29.7)	63 (69.2)	3.68	0.492
3	I find that Quizizz is user friendly	0 (0.0)	1 (1.1)	38 (41.8)	52 (57.1)	3.56	0.521
4	I find that it is easy for me to understand the instructions in the Quizizz.	0 (0.0)	1 (1.1)	35 (38.5)	55 (60.4)	3.59	0.516
5	I find that the colors are attractive	0 (0.0)	2 (2.2)	26 (28.6)	63 (69.2)	3.67	0.518
6	I find that the prompt responses help me to discover my error instantly.	0 (0.0)	1 (1.1)	46 (50.5)	44 (48.4)	3.47	0.524
7	My problem solving skills is improved when I attempt to answer the Quizizz questions.	0 (0.0)	4 (4.4)	63 (69.2)	24 (26.4)	3.22	0.512

1-strongly disagree; 2- disagree 3-agree 4-strongly agree

In regards to perception on Quizizz, the highest score was obtained by Item 2 'I could reflect my errors after answering the Quizizz questions' (Mean = 3.68 SD = 0.492). In Item 1, most of the respondents (61.5%) stated that they strongly agreed that they were motivated to answer Quizizz questions (Mean = 3.62 SD = 0.489). Bicen and Kocakoyun [40] have reported similar findings. However, they used a different online game, Kahoot!, instead of Quizizz. Their findings show an increase of students' motivation in revising the lessons and helping to reflect on their mistakes. The ability of Kahoot! in motivating the students was associated to the 'rewards' mechanism of the gamification. Parallel to Quizizz, the students obtained the rewards in terms of motivational gifts, prompt answers and their achievements are in the form of ranking are displayed on leaderboard. In Item 6, majority of the respondents (98.9%) in this study also stated that prompt responses in Quizizz helped to discover their error instantly (Mean = 3.47 SD = 0.524). These were in agreement to the findings by Bicen and Kocakoyun [40] who reported that Kahoot! allows students to check on their achievement and thereafter, improve areas of weaknesses. In this context, Quizizz is also a type of online gamification that provides a platform for the students to engage in academic reflection as it could shorten feedback cycles, hence, provide opportunities to assess their own performance or capabilities [41].

The findings of this study (refer to Item 3) have also indicated a high level of agreement among distant post-graduate students that Quizizz is user friendly (Mean = 3.56 SD = 0.521) and in Item 4, it was easy for them to understand the instructions (Mean = 3.59 SD = 0.516). In addition, in Item 5, the findings also indicate that the colours used in it as attractive (Mean = 3.67 SD = 0.518). Similar findings were reported by Zhao [42] whereby students expressed their agreement that Quizizz was easy to use and they loved the features of Quizizz, including colour, music and memes. In a different study, Bicen and Kocakoyun [40] reported that students found that Kahoot! used simple design which was easy to navigate and used in different platforms, with remarkable colour harmony and pictures. The findings of this study (refer to Item 7) show that almost all (95.6%) the distant post graduate students agreed that their problem solving skills was improved when they attempted to answer the Quizizz questions (Mean = 3.22 SD = 0.512). This finding support Suo et al. [43] study in which they reported that gamification enhanced problem solving skills. On overall, majority of the distant post graduate students in this study perceived Quizizz as an effective tool in creating a positive learning experience and helps them in understanding a lesson in a more user-friendly manner and at the same time brings much benefits to them.

4.2 Benefits of Quizizz among Distant Post Graduate Students

4.2.1 Converging and Enhancing Cognitive Activities

TABLE 2
CONVERGING AND ENHANCING COGNITIVE ACTIVITIES

Item	Statement	Strongly disagree	Disagree	Agree	Strongly agree	Mean	SD
8	I can organize my thoughts better by using Quizizz to learn in the classroom.	0 (0.0)	3 (3.3)	64 (70.3)	24 (26.4)	3.23	0.496
9	I learn about the topic though short quizzes given in the Quizizz.	0 (0.0)	2 (2.2)	51 (56.0)	38 (41.8)	3.40	0.535
10	I retain information and knowledge better through the use of Quizizz.	0 (0.0)	1 (1.1)	47 (51.6)	43 (47.3)	3.46	0.523
11	I can understand a particular topic easily with the use of Quizizz.	0 (0.0)	5 (5.5)	53 (58.2)	33 (36.3)	3.31	0.571
12	I can recall important points of chosen topic	0	1	45	45	3.48	0.524

	accurately with Quizizz.	(0.0)	(1.1)	(49.5)	(49.5)		
13	I discover a lot of others useful information and knowledge while using Quizizz.	0	7	48	36	3.32	0.612
		(0.0)	(7.7)	(52.7)	(39.6)		
14	I could pay more attention while using Quizizz as compared to normal lessons.	0	9	33	49	3.44	0.670
		(0.0)	(9.9)	(36.3)	(53.8)		
15	I learn the topic better when I need to construct questions for Quizizz with others.	0	4	35	52	3.53	0.584
		(0.0)	(4.4)	(38.5)	(57.1)		
16	I tend to think fast when I attempt to answer Quizizz questions.	1	7	40	43	3.37	0.677
		(1.1)	(7.7)	(44.0)	(47.3)		

For benefits of Quizizz in terms of converging and enhancing cognitive activities, highest score was obtained by item 15, 'I learn the topic better when I need to construct questions for Quizizz with others' (Mean = 3.56 SD = 0.584). Mean scores of above 3.00 were shown for all items related to benefits of gamification in terms of converging and enhancing cognitive activities as most of the distant post-graduate students agreed that gamification helped them to organize their thoughts better (Mean = 3.23 SD = 0.496); to learn about the topic through short quizzes (Mean = 3.40 SD = 0.535); to retain information and knowledge better (Mean = 3.46 SD = 0.523); to understand a particular topic easily (Mean = 3.31 SD = 0.571); to recall important points of chosen topic accurately (2nd highest) (Mean = 3.48 SD = 0.524); to discover a lot of others useful information and knowledge while using Quizizz. (Mean = 3.32 SD = 0.612); to pay more attention while using Quizizz as compared to normal lessons (Mean = 3.44 SD = 0.670); to learn to topic better while constructing questions for Quizizz (highest score) (Mean = 3.53 SD = 0.584); and to increase their thinking speed when they attempt to answer Quizizz questions (Mean = 3.37 SD = 0.677). These findings were in agreement to a study by Basuki and Hidayati [44] whereby

Quizizz was perceived as challenging, mind stimulating and capable of revealing students' real competence. Additionally, Bicen and Kocakoyun [40] reported that using gamification (Kahoot!) enabled undergraduates in their study to understand lessons better, besides helping the students to learn difficult topics and making it easier to recall information. Bicen and Kocakoyun [40] also stated that Kahoot! enhanced students' interest in learning and their rapid thinking skills, apart from better retention of learning content. On top of that, the study by Bicen and Kocakoyun [40] have associated Kahoot! to an increase in students' attention in learning. Similarly, Zhao [42] has linked the increase in students' concentration level to application of Quizizz in an Accountancy classroom. On overall, the findings of the current study suggest that Quizizz is an effective gamification to enhance students' learning. This was in line to Suo et al. [43] who concluded that Quizizz improved students' learning. The findings are based on their work on the application of Quizizz in an Arabic course. In addition, other researchers, Boulden et al. [45] also have similar findings whereby their students were more focused and attentive with the use of Quizizz.

4.2.2 Reducing Students' Affective Level

TABLE 3
REDUCING STUDENTS' AFFECTIVE LEVEL

Item	Statement	Strongly Disagree	Disagree	Agree	Strongly agree	Mean	SD
17	I tend to discuss with the person/close to me when answering the questions.	5 (5.5)	19 (20.9)	46 (50.5)	21 (23.1)	2.91	0.812
18	I prefer to be given the opportunity to refer to my notes when answering the questions.	1 (1.1)	8 (8.8)	35 (38.5)	47 (51.6)	3.41	0.699
19	It strengthen my relationships with my classmates when we attempted to answer the Quizizz questions together.	0 (0.0)	4 (4.4)	48 (52.7)	39 (42.9)	3.38	0.573
20	My retention power is longer when I need to answer Quizizz questions.	0 (0.0)	5 (5.5)	65 (71.4)	21 (23.1)	3.18	0.508
21	I prefer Quizizz as a homework than in class activity	7 (7.7)	32 (35.2)	34 (37.4)	18 (19.8)	2.69	0.878

In this study, the educator used a few strategies to reduce the students' affective level. In terms of reducing learning affective level, the highest score was obtained by item 18, 'I prefer to be given the opportunity to refer to my notes when answering the questions' (Mean = 3.41 SD = 0.699). In Item 19, almost all students (95.6%) agreed that Quizizz strengthen their relationships with classmates when they attempted to answer the Quizizz questions together (Mean 3.38 SD = 0.573). However, the findings in Item 17 indicate that the students moderately agreed (73.6%) that they tend to discuss with the person/close to them when answering the questions (Mean = 2.91 SD = 0.812). Similar findings have been reported by Ab Rahman et al. [46] that using Kahoot! and Quizizz encouraged students to participate actively in small-group discussions. Additionally, a study by Basuki and Hidayati [44] have also

stated that respondents preferred the collaboration and competitiveness in Kahoot! and Quizizz sessions.

In Item 20, the distant post graduate students in this study also showed their agreement that Quizizz increased their retention power (Mean = 3.18 SD = 0.508). A large number of them (90.1%) also preferred to be given the opportunity to refer to notes when answering the questions in Quizizz (Mean = 3.41 SD = 0.699). More than half of them (57.2%) expressed their preference if Quizizz was to be used as a homework than in class activity (Mean = 2.69 SD = 0.878). Putz et al. [47] have reported that gamification increase short-term knowledge memorization of students. Similarly, Sitzmann et al. [48] and Dicheva et al. [23] stated that employing gamification in education helps to boost self-efficacy and knowledge retention of students. Besides, Faiella and Ricciardi [21] revealed that

gamification helps to lower anxiety or worry over the consequences of not doing well among students. In regards to Quizizz being used for homework, it has been reported by Metwally et al. [49] that respondents in their study enjoyed doing homework with 'Pomawin', a gamified homework app. In the context of Quizizz, the 'homework' feature allows students to set a particular task as homework, and keep it active for up to two weeks. This enable students to play (or learn) at any time and from anywhere, at their own pace. This will enhance their autonomy in learning

5 CONCLUSION

5.1 Summary

With the growing popularity of gamification and widely reported success of its application in educational contexts, it is important to shed a more realistic light on the research in this field by understanding students' perception on gamified learning. Accordingly, the current research had been successful in highlighting the positive perceptions of distance post-graduate students towards Quizizz as a form of formative assessment and its related benefits in learning. It had been shown that Quizizz helped the students in converging and enhancing cognitive activities, improving their affective level and providing positive reinforcement, motivation and immediate feedback in their learning.

5.2 Implications

The outcome of this research has shown that distance postgraduate students had positive perceptions on benefits of Quizizz including for converging and enhancing cognitive activities, improving affective level and providing positive reinforcement, motivation and immediate feedback. This implies the potential of gamification as an important technology in distance postgraduate education, particularly in blended learning approach which incorporates traditional face-to-face instruction with gamified contents. A lecture series that is based on progressively complex concepts may benefit from gamification due to the game mechanics that can introduce difficult tasks as gradual levels of play. This allows for mastery learning of students at their own pace. A curriculum designed using principles of gamification also holds the promise of solving a great challenge on how to retain students' motivation and engagement in learning. As such, there is ample opportunities to use gamification as a curricular design template for all levels of education, particularly post graduate studies due to the limited retention power, low motivation and high anxiety of the students.

5.3 Future research

The current study has successfully addressed the distant post graduate students' positive perceptions towards Quizizz as an online game-based formative assessment. Nevertheless, there is still room for improvement in regards to research on benefits of Quizizz in distance learning. This is because discussing Quizizz only with reference to its effectiveness, usefulness, and capability of changing learning behaviours among the distant post graduate students on a superficial level may not be sufficient without considering the contextual factors that could affect the outcomes of gamification. For instance, postgraduate students' personality and learning style may seem to be important *contextual factors* within the research domain. Additionally, their gender and marital status might also have

an impact on how they perceive Quizizz as a tool for formative assessment. As such, future research in this area could be focused on studying contextual factors and demographic differences in perceived benefits from Quizizz among the distant post graduate students in order to come up with a more comprehensive picture on how actually gamification positively impacts their learning.

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