Gamification in Learning: Students' Motivation and Cognitive Engagement in Learning Business Using Quizizz

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Abstract: Gamification has received extensive research attention within the context of language and scientific courses, involving the integration of game-based features into non-gaming scenarios to enhance user experience and engagement with technology. However, contradictory findings have emerged in students' perceptions of gamification across various aspects such as motivation and engagement, as noted in previous studies. Given the conflicting findings from prior research on students' perception toward gamification in learning, a need for further investigation becomes evident. Recognising the significance of broadening gamification exploration beyond language and science-oriented courses, this study aims to examine students' perceptions of gamification in learning. Additionally, it seeks to evaluate students' levels of motivation and cognitive engagement while studying Business using the Quizizz platform. To achieve these objectives, a mixed-method approach was employed. Data collection was conducted through online questionnaires and interviews. The quantitative data from the questionnaires underwent descriptive analysis, while the qualitative data gathered from online interviews were subjected to narrative analysis. The findings of the study suggest that students demonstrate a high level of motivation and cognitive engagement when employing Quizizz for Business studies. Participants expressed favourable opinions of Quizizz due to its interactive gamification components. Importantly, elements like points, rewards, leaderboards, and varying levels of difficulty within Quizizz emerged as crucial factors influencing students' motivation and cognitive engagement in the context of Business learning.

Keywords: Cognitive engagement, Gamification elements, Gamification in learning, Mixed-method approach, Motivation

1.   Introduction

In recent years, technology has transformed education systems, placing increasing emphasis on learning through modern technological approaches rather than traditional methods (Alabbasi, 2018). Research indicates that a significant number of students lack interest and attention in learning due to the continued use of traditional methods whereby teacher conveys information through presentation based on lecture slides or textbooks, while students spend their time listening and taking notes (Munuyandi et al., 2021). Educators frequently encounter challenges in motivating students to learn, encouraging their active participation during learning sessions (Alabbasi, 2018; Pais et al., 2018; Rahayu et al., 2022). In traditional teaching methods, students mostly learned through repetition and memorisation which leads to boredom. Boredom and lack of interests towards learning stem from repetitive activities that lack complexity and cognitive stimulation (Rahayu et al., 2022). Learning

objectives can be better achieved by implementing suitable teaching approaches that align with the advancements in information and communication technology (Razali et al., 2020). One such approach within the realm of ICT that has begun to permeate educational contexts is known as gamification (Razali et al., 2020; Rahayu et al., 2022). The concept of gamification involves integrating game-based elements into non-gaming settings to enhance user experience and engagement with technology (Alabbasi, 2018; Gomez-Carrasco et al., 2019; Rahayu et al., 2022).

Gamification has found widespread application in diverse fields, including business, marketing, medicine, and is now emerging in educational contexts. Notably, gamification is increasingly being employed within educational settings to enhance student motivation and engagement, as evidenced by previous studies (Razali et al., 2020; Rahayu et al., 2022). Various gamification elements, such as points, difficulty levels, leaderboards, rewards, collaboration, and competitiveness, contribute as entertaining components of lesson plans, essential for motivating and engaging students (Alsawaier, 2018; Razali et al., 2020; Rahayu et al., 2022). Motivation represents a pivotal element in the teaching and learning process, closely intertwined with learning itself (Alsadoon et al., 2022). In parallel, engagement denotes an individual's enthusiasm and emotional commitment to learning activities (Alsawaier, 2018). These two components often converge, particularly in the realms of intrinsic motivation and cognitive engagement (Alsawaier, 2018; Rahayu et al., 2022). A key facet of engagement in learning contexts is cognitive engagement, characterised by students' earnest efforts to comprehend a subject matter and their sustained dedication to studying over extended periods (Rahayu et al., 2022). It is argued that a combination of robust motivation and high levels of cognitive engagement results in an effective learning experience (Alsawaier, 2018).

The primary objective of gamification lies in stimulating learners to adopt desired behavioural changes (Al-Dosakee et al., 2021). Gamification captures students' interest in learning materials, prompting enthusiastic participation in learning activities (Alsadoon et al., 2022). Through interaction with gamified learning activities, students immerse themselves in virtual challenges with the goal of deriving enjoyment, active participation, and learning (Alsawaier, 2018). Gamification in learning entails integrating gamified elements into educational activities to amplify motivation and engagement (Razali et al., 2020). These game elements contribute as entertaining components of lesson plans, essential for engaging students (Alsawaier, 2018). Various gamification elements, such as points, difficulty levels, leaderboards, rewards, collaboration, and competitiveness, can impact students' motivation and cognitive engagement (Pais et al., 2018; Razali et al., 2020).

Research have demonstrated that gamification may catalyse engagement and motivation, all of which are required to create great learning (Alsawaier, 2018). Previous studies have primarily focused on students' perceptions of gamification in learning within language (Fithriani, 2021; Cruz & Guayara, 2021) and scientific courses (Hursen et al., 2019; Jones et al., 2019; Rahayu et al., 2022). For example, Fithriani (2021) and Jones et al. (2019) uncovered that a majority of participants exhibited positive perceptions is using gamification tools such as "Kahoot" in learning English and Biology respectively. These findings highlighted that gamification integration able to heightened students' interest and willingness to learn. In another study that involved learning computer science, it has been shown that an online gamified learning environment increased students' motivations in learning (Alsadoon, 2022). When it comes to science education, students often grapple with understanding scientific subjects, contributing to elevated rejection and dropout rates (Kalogiannakis et al., 2021). Consequently, the incorporation of gamification elements and components into science courses is able to mitigate obstacles to science education by boosting students' motivation, cognitive and metacognitive achievements, and overall learning satisfaction (Kalogiannakis et al., 2021). However, it is worth noting that not all gamification approaches have proven effective in influencing students' motivation and engagement. For instance, according to Hanus and Fox (2015), students who participated in gamified learning sessions experienced diminishing enthusiasm and engagement over time. The study by Hanus and Fox also revealed that the incorporation of gamification elements such as leaderboards, badges, and competitive elements has no significant impact on educational outcomes, and in some cases, may even adversely affect students' motivation. In another study by Kyewski et al. (2018), which employed the "Moodle" application for university students' learning, it was concluded that gamification elements such as badges had no discernible effect on students' enthusiasm for learning (Kyewski et al., 2018).

One of the gamification platforms used in past studies is Quizizz. Kalogiannakis et al. (2021) conducted a systematic review of gamification for learning, and identified "Kahoot" as the most

commonly utilised pre-existing gamified platform. Other examples of Web 2.0 gamification applications, including "ClassDojo," "Socrative," "Quizizz," "Zondle," and "3D GameLab," were also employed in various instances. Notably, Quizizz incorporates gamification elements such as points, rewards, leaderboards, and varying levels of difficulty, making it particularly well-suited for implementation as a formative assessment tool in the learning process (Pitoyo et al., 2020). For example, the implementation of gamification in learning English through Quizizz led to increased attention and engagement with learning activities (Pitoyo et al., 2020). Students exhibited positive perceptions and experiences when utilising Quizizz as a teaching and learning approach (Pitoyo et al., 2020; Razali et al., 2020; Handoko et al., 2021).

The contradictory findings concerning students' perceptions of gamification in learning in the context of motivation and engagement, as documented in past studies, warrant further investigation. Additionally, due to the necessity of exploring gamification beyond language and science-related courses, the present study aims to investigate students' perceptions of gamification in the context of business. To achieve a comprehensive understanding of the topic, the study employs a mixed-method approach for data collection. This approach aligns with previous research recommendations, which emphasize the effectiveness of utilising mixed methods to thoroughly explore how gamification elements impact students' motivation and cognitive engagement (Alsadoon et al., 2022). In particular, this study utilises the Quizizz Application, chosen due to its suitability within the current learning environment and the relatively limited research that has utilised Quizizz as a gamification tool. Quizizz, a freely available educational gamification platform, facilitates engagement among a large number of participants through interactive and enjoyable features (Pitoyo et al., 2020). Notably, Quizizz offers a visually appealing interface that is user-friendly and easily understood by students (Handoko et al., 2021).

2. Method

2.1 Participants

The participants for the study consisted one hundred eight Business students from the upper secondary form (Form 4 and Form 5) of a local school. The number of sample size was determined according to the sampling ratio proposed by Krejcie and Morgan (1970). Moreover, the study adopted a purposive sampling method to select the participants, wherein the sample was chosen based on specific criteria. The initial criterion for participant selection was enrolment as Form 4 or Form 5 Business students at a selected local high school. Another criterion stipulated that students must have engaged in a minimum of 3 gamification sessions while learning Business through Quizizz. Among the total participants, 5 students voluntarily participated in the interview sessions.

2.2 Design

This research employed a mixed-method approach, utilising both a cross-sectional online survey and online interview sessions. This combined approach aimed to achieve a deeper understanding and more comprehensive insights into students' perceptions of gamification within Business learning through Quizizz, and highlight the gamification elements within Quizizz that influenced their motivation and cognitive engagement.

2.3 Instruments

The primary tool utilised for collecting quantitative data was an online questionnaire, comprising three distinct sections: Section A, Section B, and Section C. Section A encompassed 3 items concerning demographic information, while Section B contained 8 Likert scale items aiming to evaluate students' motivation levels in Business learning using Quizizz. Section C consisted of 8 Likert scale items focusing on gauging students' cognitive engagement levels when learning Business through Quizizz. Participants were required to select one of the following responses: 1 = Strongly disagree, 2 = Disagree, 3 = Uncertain, 4 = Agree, or 5 = Strongly agree. The questionnaire was adapted from survey instruments employed in prior research studies by Pintrich and DeGroot (1990) and Greene & Miller

(1996). The adapted questionnaire items were later validated by an expert in the field. The reliability of the questionnaire was assessed, yielding a Cronbach's alpha score of 0.92 for internal consistency, which signifies a high level of reliability, as demonstrated in Pintrich & DeGroot's study (1990). The online questionnaire was created using Google Forms.

In addition, the qualitative data were gathered via online interview sessions. These online interviews were carried out to gain insight and elicit verbal justifications regarding students' perceptions of gamification in Business learning through Quizizz. During these interview sessions, students expressed their viewpoints concerning the pivotal gamification elements within Quizizz that have the potential to impact their motivation and cognitive engagement in learning Business.

2.4   Procedure

Gamification activities in learning Business were conducted by the instructor during face-to-face learning sessions in the classroom. The form 4 and form 5 Business syllabus were transferred into Quizizz application. In order to avoid interfering with the instructor's lesson plan, gamification was implemented as part of learning activities and formative assessments after completing each learning unit rather than implemented as the entire lessons by the instructor. After completing a minimum of 3 gamified learning sessions using Quizizz with the instructor, participants received the Google Form link through messaging apps like WhatsApp, Telegram, and Facebook Messenger. Before answering the online questionnaire, participants were required to read, comprehend, and provide their consent on the same Google Form link.

Upon completion of the online questionnaire assessing students' motivation and cognitive engagement levels while learning Business through Quizizz, five participants were selected for an online interview session. This session aimed to elicit insights into their perceptions of gamification in Business learning via Quizizz. Each interview was conducted individually, and participants were provided with a consent form that they signed, indicating their voluntary participation in the study. They were assured that their involvement and responses would be kept confidential and used solely for academic purposes. The interviews focused on their experiences with Quizizz, particularly the gamification elements that influenced their motivation and cognitive engagement. Each interview session lasted approximately 30 to 45 minutes for each participant. Throughout the interview sessions, the researcher recorded both audio and visual content. Verbal data collected during the interviews were transcribed and evaluated while maintaining participants' anonymity. For analysis, a narrative analysis approach was employed. This involved the researcher dissecting and interpreting the participants' personal experiences and stories related to their use of Quizizz. The goal was to identify the specific gamification elements within Quizizz that impacted their motivation and cognitive engagement. The application of narrative analysis was crucial for gaining deep insights into the participants' thoughts and perspectives. Information derived from the interviews was transcribed, translated, and manually organized into themes by the researcher, aligning with the research objectives.

3.   Results

3.1   Students' Motivation and Cognitive Engagement in Learning Business using Quizizz

The quantitative data on students' level of motivation and cognitive engagement in learning Business using Quizizz were presented by the overall means, standard deviations and the percentage of responses for each statement. Overall, the students were highly motivated and cognitively engaged in using Quizizz for their Business learning with the overall means 4.40 and 4.34 respectively. The overall standard deviation for students' level of motivation items and cognitive engagement shows that the data were clustered around the mean with the value 0.64 and 0.56 respectively.

Table 1. Overall Means & Standard Deviation for Students' Level of Motivation & Cognitive Engagement

Variable	Total Sample, N	Mean	Std. Deviations
Motivation	108	4.40	0.64
Cognitive Engagement	108	4.34	0.56

Table 2 illustrates the percentage of students' responses, reflecting their motivation levels. Meanwhile, Table 3 showcases the percentage of students' responses, indicating their cognitive engagement levels when utilising Quizizz for Business learning. The Likert scale responses range from 1 = Strongly Disagree (SD) to 5 = Strongly Agree (SA), encompassing 2 = Disagree (D), 3 = Uncertain (U), and 4 = Agree (A) in between. The collected data highlights a notable level of motivation and cognitive engagement among students engaging in Business learning through Quizizz. This is discerned through the substantial percentage of positive responses, encompassing both "strongly agree" and "agree" categories.

Table 2. Percentage for Students' Level of Motivation

No.	Items	Percentage of Responses (%)				
		SD	D	U	A	SA
1.	I enjoy learning Business using Quizizz.	0.9	0	10.2	24.1	64.8
2.	I feel motivated in using Quizizz for my Business learning as it is so interesting.	0.9	1.9	11.1	28.7	57.4
3.	After using Quizizz, I feel confident in applying things that I learn in a real-world context.	0.9	0	17.6	32.4	49.1
4.	I become more interested in the learning materials when using Quizizz for Business learning	0.9	0	15.7	31.5	51.9
5.	The game elements in Quizizz have motivated me to participate in the learning activities.	0.9	0.9	12.0	33.2	52.8
6.	Using Quizizz helps to improve classroom competitiveness among classmates.	0	0.9	6.5	36.1	56.5
7.	After using Quizizz, I am eager to improve my grades for Business class.	0	0.9	9.3	33.3	56.5
8.	I feel motivated to use Quizizz more often in the future to learn Business concepts.	0.9	0	15.7	25.9	57.4

According to Table 2, a significant majority of students find enjoyment in learning Business through Quizizz, with 64.8% of respondents strongly agreeing and 24.1% agreeing with this sentiment. Regarding the second statement, a substantial portion of respondents (57.4% strongly agreed, 28.7% agreed) express feeling motivated when using Quizizz. A notable percentage of participants (49.1%) feel a boost in confidence in applying their learning to real-world contexts after using Quizizz, and an additional 32.4% agree with this statement. The fourth statement highlights that 51.9% of respondents strongly agree they become more interested in learning materials after using Quizizz, while 31.5% also agree. The gamification elements within Quizizz are noted to motivate students to actively engage in learning activities, with a majority agreeing (52.8% strongly agree, 33.2% agree). The competitive aspects of Quizizz increase classroom competitiveness among peers, as expressed by most participants (56.5% strongly agree, 36.1% agree). A significant number of respondents (56.5% strongly agree, 33.3% agree) are motivated to enhance their business learning grades through Quizizz. Lastly, 57.4% of respondents strongly agree they feel highly motivated to use Quizizz more frequently in the future to learn Business concepts, followed by 25.9% agreeing with this statement.

Table 3. Percentage of Responses for Students' Level of Cognitive Engagement

No.	Items	Percentage of Responses (%)				
		SD	D	U	A	SA
1.	I am able to understand the learning contents better by relating it to things I already know.	0	0	16.7	29.6	53.7
2.	I am able to connect what I am learning with my own experiences.	0	0.9	13.9	40.7	44.4
3.	I figure out how the information might be useful in the real world	0	0	14.8	39.8	45.4
4.	I will think through topics and decide what I am supposed to learn from the topics.	0	0	12.0	39.8	48.1
5.	I always ask myself questions to make sure I understand what it is about.	0	0	9.3	38.9	51.9
6.	I am able to make up my own examples to help me understand the important concepts that have been taught.	0	0.9	20.4	31.5	47.2
7.	I always review previously solved problems to help me figure out how to do similar problems on my own.	0	1.9	16.7	30.6	50.9
8.	I will take note of the topic that I have or have not mastered.	0	0	12.0	31.5	56.5

Referring to table 3, the majority of respondents found that they could comprehend learning materials more effectively by connecting them with their existing knowledge through Quizizz usage (53.7% strongly agreed, 29.6% agreed). A noteworthy 85.1% believed they could link their learning with personal experiences (44.4% strongly agreed, 40.7% agreed). The study revealed that students managed to grasp how acquired information holds relevance in real-life scenarios following their engagement with Quizizz (45.4% strongly agreed, 39.8% agreed). Further insights from the table indicate that 48.1% strongly agreed and 39.8% agreed that they contemplate topics and decide on what they need to learn from them. As for the fifth statement, 51.9% strongly agreed that students consistently pose questions to ensure comprehension of learning materials, followed by 38.9% who agreed. This trend indicates a high level of cognitive engagement with the learning content. Respondents strongly believed that Quizizz facilitated their ability to generate personal examples in understanding pivotal concepts (47.2% strongly agreed, 31.5% agreed). Additionally, most respondents indicated a habit of reviewing previously solved problems to aid their understanding of tackling similar problems independently (50.9% strongly agreed, 30.6% agreed). The final statement underscores that Quizizz use increases cognitive engagement, leading students to take note of topics they have or haven't mastered. This sentiment was echoed by 56.5% of respondents who strongly agreed, and 31.5% who agreed with the statement.

3.2   Students' Perceptions on Gamification in Learning Business using Quizizz

From the conducted online interviews, all participants consistently conveyed their positive perceptions regarding the utilisation of Quizizz for Business learning. Furthermore, they expressed that Quizizz played a crucial role in augmenting their motivation and cognitive engagement throughout their business learning journey. The interview findings collectively yielded a single prominent theme, deduced from the recurring pattern in participants' responses. This central theme revolves around the positive behavioural transformations observed during gamification sessions facilitated by Quizizz in the context of Business learning.

3.3 Critical Gamification Elements in Quizizz that Influence Students' Motivation & Cognitive Engagement

Based on the participants' feedback, gamification elements like points, rewards, leaderboards, and level of difficulty within Quizizz were highlighted as critical factors that significantly impact students' motivation and cognitive engagement in the context of Business learning. It is notable that various participants held distinct viewpoints regarding the most crucial gamification elements in Quizizz, influencing their motivation and cognitive engagement in Business learning. According to the participants, each gamification element serves a distinct purpose that shapes student behaviour. One of the participants emphasised points as a crucial gamification element, motivating students to engage thoroughly in quizzes to secure accurate answers and maintain their point count. Conversely, another participant attributed increased motivation to rewards, which spurred their efforts to excel in responding to Business questions through Quizizz and enhance their scores. The leaderboard, according to several participants, emerged as a pivotal gamification element. It was perceived as a representation of their achievements, reflecting the dedication they invested in learning and actively participating in the activities. Moreover, participants were in consensus about the significance of the level of difficulty in Quizizz. This aspect was deemed critical, as it compelled students to be more adequately prepared to tackle quizzes, consequently bolstering their motivation and cognitive engagement in Business learning. Based on the interview responses, all the gamification elements in Quizizz were actually connected to the points elements. In order to be the top player in Quizizz, students need to pass different levels of difficulties and obtain rewards to improve the score points and to get the highest rank in leaderboards, in which therefore, named points as the most critical gamification elements in Quizizz.

4. Discussions

The findings obtained through the online survey highlights a significant level of motivation and cognitive engagement among students using Quizizz for Business learning. These outcomes are consistent with previous studies by Gulinna and Lee (2020), Pitoyo et al. (2020), and Handoko et al. (2021) that also employed Quizizz in educational contexts. The intrinsic link between students' motivation, engagement, and learning in the present study is well-established. This notion aligns with the conclusions drawn by Pitoyo et al. (2020) and Handoko et al. (2021), who identified motivation as a crucial determinant of successful learning. As a result of Quizizz integration, students exhibited heightened motivation and interest in Business subject matter. Handoko et al. (2021) further affirmed that Quizizz fostered an excitement for learning materials, driving focused attention during gamification sessions due to the aspiration to expand their knowledge for future assessments. Gamification elements present in Quizizz served as vigorous motivators for active participation in Business learning activities, corroborating earlier findings by Gulinna & Lee (2020). Furthermore, Quizizz's influence on promoting competitiveness within the classroom echoed previous observations. Studies by Pitoyo et al. (2020) demonstrated students' affinity for Quizizz's competitive nature, perceiving it as a catalyst for engagement and critical analysis, enhancing their enthusiasm, and fostering a dynamic classroom atmosphere. Another notable result of using Quizizz was its capacity to connect students' understanding of Business learning materials with real-world experiences. These findings were similar to those of Alsawaier (2018), who proved that gamification improves cognitive engagement. When students review previously solved problems and independently address similar ones, they demonstrate cognitive engagement, actively engaging their thought processes, interpretation, and application of knowledge in relation to Business concepts.

The insights gathered from the interview sessions revealed a dominant theme: positive behavioural change. All participants uniformly conveyed their favourable perceptions and experiences with Quizizz, considering it a valuable learning activity and formative assessment tool for their business class. Alsawaier's (2018) perspective highlighted that gamification elements contribute to the entertaining aspect of educational design, which in turn fosters positive behavioural shifts in learners. The integration of gamification within the learning environment was shown to heighten students' engagement, cultivating a robust interest in learning—an attitude corroborated by multiple studies (Alsawaier, 2018; Fithriani, 2021; Cruz & Guayara, 2021; Alsadoon et al., 2022). The spectrum of positive behavioural changes encompassed students' newfound excitement, enjoyment, heightened

enthusiasm, and increased interest in engaging with Business concepts via Quizizz. Participants enthusiastically embraced Quizizz as a tool for Business learning, enthusiastically endorsing its implementation due to its dual purpose of learning and enjoyment during gamification sessions. The interactive interfaces of Quizizz were credited with enhancing understanding of Business-related content, which resonates with previous research by Handoko et al. (2021). This research highlighted how the interactive and visually appealing nature of Quizizz stimulates students' learning engagement. Furthermore, participants commended Quizizz for its capacity to facilitate effective revision through past exercises, subsequently enhancing their motivation to explore learning materials and fostering heightened enthusiasm during gamification sessions. Additionally, Quizizz was reported to nurture classroom competitiveness among participants during collaborative learning. This shift towards competition contributed positively to the learning environment. Collectively, these manifestations of positive behavioural changes emphasise that students hold a favourable view of Quizizz's role in Business learning. They expressed an eagerness for more gamification sessions, acknowledging the tool's capacity to elevate motivation and cognitive engagement while transforming learning into an interactive and enjoyable experience.

The current research delved into four integral gamification elements within Quizizz, namely Points, Rewards, Level of Difficulty, and Leaderboards. These elements, as highlighted by Handoko et al. (2021), are critical in attracting and engaging students with Quizizz. Among these elements, Points hold particular significance, serving as a fundamental motivational factor. In Quizizz, Points function as a form of generic rewards, bestowed upon students upon correctly answering questions and completing the provided tasks. A key insight from participants is that Points play a pivotal role in Quizizz by determining a student's ranking on the leaderboard at the culmination of the activity. This ranking dynamic intensifies students' motivation and resolve to address Business-related queries within Quizizz. Furthermore, the participants attested that the quest for higher Points within Quizizz acts as a powerful impetus, compelling them to tackle business-related questions with heightened determination. The correlation between Points and motivation resonates with Rahayu et al.'s (2022) findings, where Points were shown to induce passion, satisfaction, enjoyment, and a generally favourable disposition toward learning. These qualities are directly intertwined with intrinsic motivation, shedding light on how Points contribute to fostering a more engaging and motivated learning experience. As the research underscores, Points within Quizizz hold the dual role of serving as a form of recognition while also igniting a sense of healthy competition, thereby fostering greater motivation and enthusiasm among students as they engage in Business learning activities.

In the Quizizz platform, rewards are known as Power-Ups, offering additional capabilities that enhance a participant's chances of achieving a higher score. All respondents in the study concurred that Rewards introduces an element of excitement and game-altering dynamics to the learning experience. This aligns with Razali et al.'s (2020) observations, wherein students engaging with gamification consistently find Rewards captivating and motivational, largely due to their interactive nature. Indeed, Rewards emerged as a focal point of the participants' discourse, with one expressing how Rewards significantly heightened their motivation when tackling Business-related questions through Quizizz. The view aligns with Handoko et al.'s (2021) perspective, which underscores that Rewards function as a form of immediate feedback. As participants succeed in the learning activities and complete Quizizz questions successfully, they are rewarded, tangibly acknowledging their acquired knowledge. This feedback mechanism, presented in an appealing manner, cultivates a sense of accomplishment and engagement among students. Additionally, the participants emphasised that Rewards bear a substantial impact on their overall performance, influencing their original Points and, consequently, their positioning on the leaderboards. This transformative potential underscore the cascading effect of gamification elements, such as Rewards, in heightening motivation and engendering an elevated level of participation and investment in the gamification sessions facilitated through Quizizz. By introducing an element of novelty, challenge, and the promise of immediate benefits, Rewards invigorate the learning experience, aligning with the study's findings and echoing the significance of gamification in fostering active and motivated participation among students.

Leaderboards within the Quizizz platform showcase the ranking of each student based on their performance in the sessions. The study revealed that Leaderboards wield a notable influence over students' engagement and ignite their competitive spirit. Participants attested that the Leaderboards provide a visual representation of their scores, thereby stimulating a motivation to enhance their

rankings and intensify their competitive drive when tackling Business-related questions. This sentiment resonates with the understanding that individuals are more likely to be motivated to showcase their achievements when engaged in competitive environments. As underscored by the participants, the visibility of their scores on the Leaderboards acts as a catalyst for self-improvement, fuelling their determination to climb higher in the rankings and outperform their peers in responding to Business questions. This aligns with the notion put forth by Rahayu et al. (2022), wherein students' self-perceptions can be positively influenced through comparison to both inferior and superior peers. The drive for upward comparison, where students strive to match or surpass superior peers, can serve as a motivating force propelling individuals to exert more effort and dedication into their endeavours. In this context, the urge to secure a higher standing on the Leaderboards translates into an increased level of cognitive engagement with the learning materials associated with Business subjects. As students actively work to better their scores and elevate their positions, they inevitably immerse themselves deeper into the learning process. This dynamic interaction aligns with the study's findings and corroborates the integral role that Leaderboards play in not only fostering competition but also elevating students' involvement and commitment to mastering the content presented.

The level of difficulty within the Quizizz platform is dependent on the specific game parameters set by the instructor. This encompasses facets such as time constraints, available attempts, and the nature of questions presented during Quizizz sessions. The participants concurred that the level of difficulty served as a catalyst for enhancing student preparedness, fostering a heightened sense of readiness to tackle the quiz at hand. As highlighted by Handoko et al. (2021), the element of varying difficulty levels provides students with an avenue to gauge their comprehension of specific subjects. The diverse range of difficulty levels inherent in Quizizz engenders an environment in which students are motivated to augment their grasp of Business-related concepts. As demonstrated by one of the participants, the varying levels of difficulty sparked an eagerness among students to fortify their comprehension of Business topics, driven by the aspiration to elevate their performance within the Quizizz framework. This sentiment aligns seamlessly with the observations made by Handoko et al. (2021), as students' motivation to enhance their knowledge base directly correlates with the prospect of improved outcomes in the Quizizz sessions. The implementation of differentiated levels of difficulty compels students to strive for personal growth, ultimately augmenting their understanding of Business concepts. By confronting progressively challenging questions, students are emboldened to refine their skills and extend their cognitive engagement with the subject matter.

5. Conclusion

The findings of the study provide additional insights into students' perceptions of gamification in learning, particularly regarding its influence on their motivation and cognitive engagement in Business learning. The present study reported a high level of students' motivation and cognitive engagement in using Quizizz for Business learning. Quizizz is an effective tool for improving students' learning and understanding as it generates an analytical representation of the student test responses. Through the online interviews conducted, students show positive behavioural changes when implementing Quizizz as part of the learning activities and formative assessment in learning Business. Students have positive perceptions in using Quizizz and expressed that the gamification approach was beneficial compared to conventional learning.

The findings also revealed that elements in Quizizz such as Points, Rewards, Leaderboards and Level of difficulty were significant for students' motivation and engagement as each of these elements bring different values and influence students differently. Comprehending how gamification elements in Quizizz affect students' motivation and cognitive engagement is critical as it enables both instructors and students to enhance the teaching and learning strategy for other academic courses. Moreover, details understanding on how each gamification elements such as points, rewards, leaderboards and level of difficulty in Quizizz influence students' motivation and cognitive engagement in the current research acts as a foundation for future researcher to create and construct future gamification platforms that can sustain students' motivations to study for a longer length of time. When students become more motivated to improve their grade for Business subjects, they eventually also need to increase their level of cognitive engagement with the learning materials in order to have a meaningful learning experience using gamification.

Future studies on gamification in learning should encompass longitudinal research in the context of business learning and other subjects. Longitudinal studies would allow for the tracking of students' progress over an extended period. Furthermore, to achieve more generalisable outcomes, it is recommended to include students from diverse educational backgrounds and levels, such as bachelor's degree students from Malaysia or other countries. To enhance the robustness of findings, a larger sample size is advisable. This expanded sample size will facilitate the generalisation of results beyond what researchers initially reported in preliminary studies. Ultimately, this broader perspective will enable researchers to propose more effective instructional strategies, specifically aimed at enhancing students' motivation and cognitive engagement in various subjects including Business.

6. Co-author contributions

The first author conceptualised the study, conducted data collection and analysis, and wrote the initial manuscript. The second author contributed by providing guidance in study planning and design, offering insight into the preparation of the manuscript draft, and playing a crucial role in both revising and finalising the overall organisation and written content of the manuscript.

7. Acknowledgement

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