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Research Article

The use of game-based learning to enhance student engagement in the acupuncture programme: South African students' opinions

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Article Info	Abstract
	Student engagement plays an important role in promoting student success at higher education institutions. It is of profound significance to improve student engagement through the utilisation of effective pedagogical approaches, such as game-based learning. However, there is a lack of study in the South African context focusing on game-based learning at higher education institutions. This study aimed to explore students' views and experiences on game-based learning at an identified university in South Africa. The constructivism learning theory was anchored in this study as a theoretical lens. In this study, the authors adopted a qualitative single case study design within an interpretivist paradigm. A purposive sampling technique was followed to recruit participants from a public university in South Africa since it is the only university that provides acupuncture programmes in this country. Six participants were recruited for this study. The authors utilised thematic analysis to analyse the data. The findings of this study revealed that participants shared positive views and attitudes toward game-based learning. They believed that game-based learning significantly motivated them in the learning process. Furthermore, game-based learning also reduced their stress in learning compared to the learning in normal classrooms. They reported that game-based learning not only improved their engagement in learning but also enhanced their knowledge and skills. This study also highlighted that game-based learning should be well-planned to avoid demotivating students. It can be concluded that game-based learning is an effective approach to improve student engagement. Further studies should be conducted with diverse research approaches at different higher education institutions.

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Introduction

Higher education plays a vital role in promoting students' competence in the world of work. However, the literature reveals that there is much criticism of poor student academic performance and achievement at higher education institutions [HEIs] (Lim, 2017; Schreiber & Yu, 2016; Ting et al., 2020). One of the most critical reasons cited is low student engagement at HEIs (Lewin & Mawoyo, 2014). Student engagement refers to students' participation in sound academic activities both inside and outside of the classroom (Delialioğlu, 2012; Mandernach, 2015). Kahu (2013) contends that student engagement is a crucial indicator of students' learning and achievement at HEIs. Fitzgerald et al. (2012) are of the view that engagement is of profound importance in improving students' achievements at HEIs.

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There are many factors that influence students' academic performance which are beyond the control of HEIs; De Villiers and Werner (2016) indicate that student engagement seems to be the one that can be enhanced. To improve students' engagement at HEIs, Plass et al. (2015) propose that game-based learning is an effective pedagogical approach. Game-based learning is defined as conducting academic activities through games to achieve learning outcomes (Adipat et al., 2021). This study aimed to explore students' views and experiences of game-based learning in an acupuncture programme at an identified South African HEI.

Game 1. 30s acupuncture quiz competition   Game 2. Ba Duan Jin exercise

Figure 1. Game-based learning activities at the identified HEI

Schreiber and Yu (2016) articulate that the quality of South African higher education has improved significantly since 1994, post the first democratic election. However, Cloete et al. (2015) reveal that students' academic performance is an intractable challenge. This view concurs with Ivala and Kioko (2013) who affirm that poor academic performance at HEIs worsens the shortage of skills in the working world. Ivala and Kioko (2013) further highlight that lecturers should motivate students to improve their academic performance by implementing engaging pedagogies in teaching and learning (Yaccob et al., 2022). In their work, Mee et al. (2020) and Subhash and Cudney (2018) agree that game-based learning encourages students' engagement because games require collaboration, interaction, and teamwork. Students can share their opinions and engage in discussion and learning through effective teamwork in games (Anak Yunus & Hua, 2021). The authors are of the view that there is a need to employ pedagogical approach to effectively improve student engagement at HEIs. In the authors' opinion, adopting game-based learning in the acupuncture programme will significantly promote students' engagement in learning.

In this study, the authors employed a qualitative case study design within an interpretivist paradigm. Wawrzynski et al. (2012) articulate that little research has been conducted focusing on students' engagement and their academic performance in South Africa. Therefore, South African educators utilise concepts, theories, and models from developed countries, such as America, to guide their studies of student engagement. In the authors' view, this will negatively influence the value of research since the findings are from different contexts. Hu (2022) contends that it is of profound importance to explore contextualised phenomena. Wawrzynski et al. (2012) further emphasise that student academic performance is significantly influenced by student background and learning environment. Therefore, this study made contributions to enriching contextualised insights into the role of game-based learning in promoting student engagement in South Africa.

Literature Review

Importance of students' engagement at higher education institutions

Student engagement in HEIs has gained increased attention globally due to its important role in advancing students' academic performance. This view concurs with Collaco (2017), who reveals that it is crucial to improve student engagement in HEIs. Astin (1984) defines engagement as the energy that students devote to their academic experience physically and psychologically. Skinner et al. (1990) state that student engagement refers to behavioural involvement in academic activities. Similar sentiments have been expressed by Kuh (2009), who explains student engagement involves both time and effort that the student devotes to activities linked to required learning outcomes. Barkley (2010) points out that students' active thinking is of profound importance in identifying effective engagement. They are not merely

being entertained. Siddiqi et al. (2022) conclude that student engagement is critically important for instruction-based learning, particularly in HEIs, as it has a direct connection with the students' outcomes whose socio-psychological experiences steers them toward certain pre-determined goals. On the contrary, Ting et al. (2020) believe student engagement is about how the institution deploys its resources and organises the curriculum, other learning opportunities and support services to induce students to participate in activities that lead to the experiences and desired outcomes such as persistence, satisfaction, learning and graduation.

Solomonides (2013) articulates there is no one definition that satisfies all stakeholders; because no single research can investigate every perspective of student engagement (Kahu, 2013). Therefore, Bond et al. (2020) point out that it is important for researchers to define student engagement for their particular studies. In this study, student engagement refers to the time and effort invested by students for the purpose of improving the students' learning experience and learning outcomes (academic performance). Despite the disagreement on the definitions of student engagement, the literature reveals that researchers concur on the significant role of student engagement in promoting student learning and academic performance (Mandernach, 2015). Lim (2017) articulates that there is a need for lecturers to adopt diverse pedagogical approaches to motivate student engagement in learning. The reason is that low engagement will negatively influence learning outcomes (Lim, 2017). Kahu (2013) indicates that there is much research focusing on exploring the role of student engagement in advancing students' learning and achievements from theoretical and practical perspectives. Lewin and Mawoyo (2014) assert that the reason is due to the importance of student engagement in promoting their academic performance.

According to Lewin and Mawoyo (2014) and Schreiber and Yu (2016), student engagement is a reliable predictor of student academic performance at HEIs. Ting et al. (2020) agree with De Villiers and Werner (2016), who point out that there are two key components that significantly influence student engagement: the time and effort that students spend on academic activities and how lecturers or institutions organise learning activities. To gain a better understanding of student engagement, Astin (1984) and Fredricks et al. (2004) conceptualise the behavioural, emotional, and cognitive dimensions of student engagement with sociocultural theories. They believe student engagement can be enhanced from four dimensions: behavioural, psychological, sociocultural, and holistic perspectives (Kahu, 2013). According to Kahu (2013), the behavioural perspective refers to effective teaching practice and student behaviour, while the psychological aspect focuses on an internal process. The sociocultural perspective takes the crucial role of sociocultural context into consideration. The holistic perspective aims to involve all the above-mentioned perspectives at the same time. Schreiber and Yu (2016) suggest that student engagement provides a useful framework to examine higher education's promotion of student persistence and retention in South Africa (Wawrzynski et al., 2012). The authors identify game-based learning as an effective pedagogical approach to improve student engagement.

Introduction of game-based learning as an instructional tool

Game-based learning is an approach to education that involves using games to teach a range of skills and knowledge. It has gained popularity in recent years because of its potential to engage students and enhance their learning experiences. Game-based learning therefore fundamentally differs from gamification as it includes an actual game that creates the learning experience and teaches or reinforces knowledge and skills. It promotes the collaborative construction of knowledge achieved through learner-game, learner-learner and learner-instructor interactions coupled with meaningful feedback (Jääskä & Aaltonen, 2022). Trybus (2015) defines game-based learning as a process of adopting the rules of games and applying them to real-life settings to engage students. Hashim et al. (2019) state that game-based learning refers to a pedagogical approach with defined learning outcomes through the utilisation of games. Adipat et al. (2021) articulate that game-based learning is the application of digital games to facilitate stakeholders (lecturers and students) to achieve learning outcomes. However, Plass et al. (2015) argue that these games do not have to be digital games. Plass et al. (2015) believe the most important distinguishing characteristic is that games must facilitate the learning process to achieve learning outcomes.

In this study, games refer to a broader definition which includes any activities that are fun and interesting with the aim of improving learning outcomes. There are several elements in games that contribute to their significant role in

promoting student engagement at HEIs. Mee et al. (2020) and Subhash and Cudney (2018) articulate that fun in games is one of the most important factors that motivate students' interest in learning. In their work, Maasum et al. (2015) suggest that games require teamwork, collaboration and interaction, which are essential skills in the world of work in 21st century.
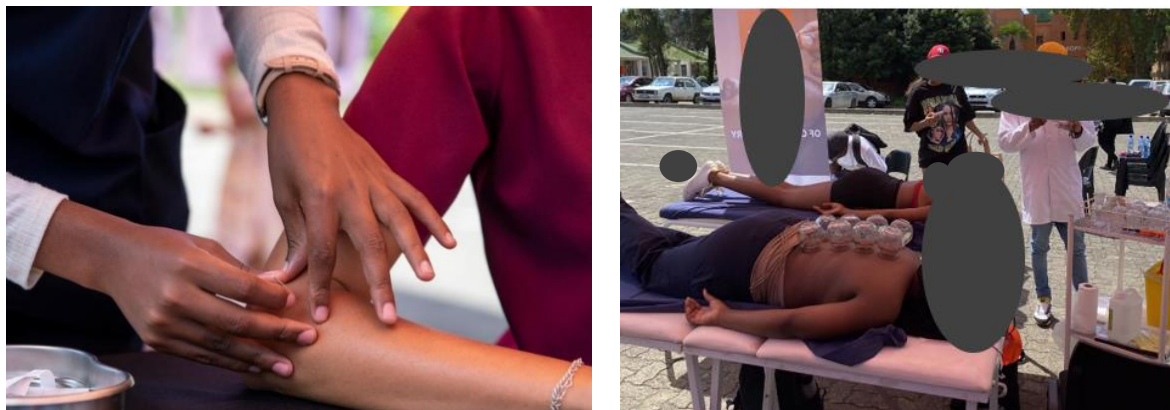
Game 3. Demonstration of acupuncture techniques   Game 4. Demonstration of cupping techniques
Figure 2. Game-based learning activities: Demonstration of acupuncture and cupping techniques

Value of game-based learning in promoting students' engagement

Adipat et al. (2021) articulate that game-based learning encourages students to learn by trial and error. It is achieved by arranging content knowledge with a set of pre-designed rules and consequences. According to Pyle (2018), rules are the key differential factors of games from play which is non-rule governed. In the authors' view, appropriate games make learning more effective as they provide for student-centred learning. This view concurs with Yaccob et al. (2022), who state that games are an effective pedagogical approach to engaging students in academic activities. Cheng and Su (2011) indicate that there are many advantages of employing games as educational tools; for instance, games are appealing to students and hence offer a more attractive learning environment; it is of particular significance to reduce student stress and pressure in learning; and it promotes teamwork in an entertaining environment (Akour et al., 2020). The motivational psychology involved in game-based learning allows students to engage with educational materials in a playful and dynamic way (Adipat et al., 2021). Game-based learning is not just creating games for students to play; it is designing learning activities that can incrementally introduce concepts and guide users towards an end goal (Plass et al., 2015).

Furthermore, game-based learning helps to improve students' learning by enhancing contextual understanding and thinking processes (Chow et al., 2011). It is increasingly becoming an effective approach to creating meaningful and engaging lessons (Yaccob et al., 2022). Rahmani (2020) reports that the benefits of game-based learning include enhancing motivation and attitudes, superior cognitive achievements and engagement in academic activities. Hashim et al. (2019) point out that it is important that game-based learning is appropriately planned and organised in order to effectively promote student motivation. The reason is that when there is a lack of motivation, it will be a challenge to engage students in learning. Therefore, Hashim et al. (2019) state that game-based learning is supported by constructivism learning in which students are the focus of the learning process.

Collaco (2017) states that it is important to increase student engagement in HEIs by adopting enjoyable academic activities that enhance interaction and teamwork. Motivation is a core influencer to promote interaction in the learning process. Alomari et al. (2019) suggest that learning outcomes will be improved by enhancing student engagement in classes through games. Pyle (2018) argues that when considering game-based learning as a teaching approach, HEIs should create a positive learning environment for students regardless of age. Furthermore, Plass (2015) contends that good games aim to be within a player's zone of proximal development. Buckley et al. (2017) report that extra attention is needed to avoid demotivating students when designing lessons with games. Welbers et al. (2019) caution us to be mindful that students may feel demotivated when they show poor performance in games.

Theoretical Framework

The theoretical framework underpinned in this study was the constructivism theory. Experts in the viewpoint of constructivism believe that knowledge is constructed by the student and that the student develops her/his own understanding through experience (Weegar & Pacis, 2012). Lev Vygotsky is considered to be the founder of constructivism, who stresses the role of social interaction and instruction in learning (Golder, 2018). Vygotsky believes that social life is primary in the learning process. In his work, he propounded that all learning occurs within the zone of proximal development (ZPD). According to Vygotsky, ZPD refers to the gap between students' existing abilities and the abilities that they can achieve with assistance (Hassad, 2011). Constructivism theory believes that social and group interactions contribute to individual's learning (Hassad, 2011; Muhajirah, 2020).

The major emphasis in constructivism is that students are active in constructing knowledge and meanings (Golder, 2018; Shah, 2019). Students develop the ability to identify, examine and solve problems by themselves. Furthermore, students should be motivated to be self-aware, self-facilitated and self-regulated. Shah (2019) indicates that students will acquire when learning in groups from each other. Constructivists contend that new knowledge is developed between students and environmental factors (Ertmer & Newby, 2013). Consequently, it is critical that learning takes place in authentic settings, which directly relevant to the students' lived experience (Burhanuddin et al. 2021). Golder (2018) is of the view that students build their knowledge through individual experiences and interactions, rather than by transferring knowledge externally. Therefore, constructivists believe that there is no objective reality that does not change.

Constructivists argue that learning must be integrated into the process of constructing knowledge rather than receiving knowledge (Muhajirah, 2020). The reason is that this learning strategy will better assist students in transferring and transforming knowledge which is the aim of education (Muhajirah, 2020). Constructivists agree that the existence of the objective world; however, they are of the view that we understand the world through subjective interpretations of individual experiences (Ertmer & Newby, 2013). According to constructivism theory, learning is a process of constructing meaning from experiences (Burhanuddin et al. 2021). Experts in the stance of constructivism stress the learning process instead of remembering knowledge and emphasising learning outcomes.

In Vygotskian classrooms, lecturers act as facilitators to provide guidance and support to students whenever they are needed (Muhajirah, 2020). Students are encouraged to engage to discussions, collaboration and teamwork. According to Piaget and Vygotsky, the ideal classroom is leading towards the concept of constructivism itself, which is to build knowledge from students' individual in the learning process (Burhanuddin et al. 2021). For this reason, it is of profound significance that learning takes place in the real world. The constructivist viewpoint believes that knowledge transfer can be supported by engagement in real tasks anchored in meaningful contexts (Ertmer & Newby, 2013).

Within the constructivist learning theory, students decide their learning process by developing the course syllabus, prioritising topic areas, establishing peer accountability, facilitating class sessions, and engaging in ongoing evaluation (Hains & Smith, 2012). Therefore, lecturers serve as facilitators who coordinate students' learning (Kitiashvili, 2020). Lecturers provide feedback on learners' progress and conduct assessments to improve learning; learners develop self-assessment skills (McCombs & Whisler, 1997; Weimer, 2002). Students feel accepted and supported; learning is based on participation. The more actively students can participate, the more they are empowered and responsible for their learning (Hackathorn et al., 2011). In the authors' opinion, the constructivist learning theory was suitable to be utilised as a theoretical lens in this study. The reason was that they believed that to effectively promote student engagement, game-based learning should be based on constructivism learning theory.

Research Problem

In this study, the authors asked the main research question:

- What are the students' opinions about teaching acupuncture programme with game-based learning?

Sub-questions:

- What are students' attitudes towards teaching the acupuncture programme with game-based learning?
- What are the benefits of teaching the acupuncture program with game-based learning?
- What are the challenges of teaching the acupuncture program with game-based learning?

Method

Research Design

Research methodology is a systematic process to identify and analyse information of research which includes research paradigm, research design and research methods (Venketsamy & Hu, 2022). In this study, a qualitative approach was adopted to explore students' views and experiences of game-based learning to promote their engagement in learning. A set of student directed game-based learning activities (Appendix A) were proposed and designed to promote students' understanding of acupuncture techniques and concepts, improve their confidence, stimulate their interest and increase their engagement with fellow students through vivid and appealing scenarios. The authors believed that qualitative study was suitable to be utilised in this study since they aimed to explore students' lived experiences. This view concurs with Hu et al. (2022) and Venketsamy et al. (2022), who state that qualitative research is of particular significance in exploring participants' experiences and characteristics. This study was conducted at an identified public university in Gauteng province. In this study, a single case study design within an interpretivist paradigm was adopted. The authors agree with Hu and Venketsamy (2022) and Yin (2018) that a single case study should be employed when a case is critical, unusual, common and relevant to the research. The selected case was critical since the authors acknowledged poor student engagement and academic performance in the identified programme. The selected case was also unusual because the identified case (acupuncture programme) was the only programme in the South African context. It is also a common situation since student engagement is a common issue globally. The identified case was relevant to the authors because they were lecturers at the identified university.

Participants

In this study, a purposive sampling technique was utilised to recruit participants. The authors placed a research invitation poster on the noticeboard on the identified campus. Students who responded to the poster were invited to participate in a semi-structured interview. The inclusion criteria included: a) students must be registered students for the Bachelor's Degree of Health Sciences in Complementary Medicine; b) participants had to be in the third or fourth year of their study in the acupuncture programme; c) participants must participate in the game-based learning activity (Appendix A); d) participants must be above the age of 18; and e) participants must express their willingness to voluntarily participate in the study. Six students agreed to voluntarily participate in this study by signing a research consent form.

Table 1. Biographical data of participants

No	Year of Program	Gender	Age	Codes
1	3rd year	Female	22	P1-F-23
2	4th year	Female	23	P2-F-23
3	3rd year	Female	24	P3-F-24
4	3rd year	Male	24	P4-M-24
5	4th year	Male	26	P5-M-26
6	3rd year	Female	23	P6-F-23

Data Collection Tools

The semi-structured interviews (See Appendix B) took place between February and March 2023 Table 1 below illustrates the participants and the respective codes used in the data analysis. To ensure confidentiality and anonymity, pseudonyms were used throughout the research.

Data Analysis

In this study, thematic analysis was utilised in data analysis. Hu et al. (2022) and Venketsamy et al. (2021) state that thematic analysis is a useful approach to identify similarities and dissimilarities of opinions in qualitative data. Furthermore, Hu et al. (2022) affirm that through thematic analysis, researchers will be able to clarify important aspects of the findings of studies. Therefore, the authors followed the six-step thematic analysis proposed by Creswell (2014) to analyse the raw data systematically. The data were analysed inductively. The authors reviewed the raw data several times to become familiar with the data (Step 1). The authors thereafter started to code data (Step 2) and recognised initial themes (Step 3). The initial themes were reviewed (Step 4) and refined (Step 5). In the end, the authors used these codes and themes to answer the research question. To ensure the trustworthiness of this study, the authors employed multiple techniques to improve the credibility, conformability, dependability and transferability of the findings. These techniques included well-planned research design and methods, thick descriptions of data, and an audit trail that was audited by a second coder.

Ethical Committee Permission

Ethical concerns were ensured. An ethical approval letter was obtained from a research committee at a public university in Gauteng province (Ref: REC-1443-2022).

Results

This study explored students' views ad experiences of game-based learning to promote student engagement at an identified HEI in SA. Participants shared positive views and attitudes toward game-based learning. They believed game-based learning effectively motivated their engagement in the course since this innovative pedagogical approach significantly improved their interest in the learning process. However, students also highlighted that sufficient time should be allocated to game-based learning. Furthermore, they believed that each game-based learning should be well-planned in advance. During the data analysis, three themes emerged from the raw data, namely: i) Students' views and attitudes toward game-based learning; ii) Benefits of game-based learning; and iii) Challenges in game-based learning. Verbatim quotes were included in the section below.

Theme 1. Students' views and attitudes of game-based learning

The findings of this study revealed that all participants acknowledged positive views and attitudes toward game-based learning in the acupuncture programme. They agreed that game-based learning not only was interesting but also significantly enhanced learning. Through the acupuncture quiz competition, they could identify their deficiencies in knowledge. With game-based learning they felt relaxed and refreshed after practising the Ba Duan Jin (an exercise in the game). P1-F-23 and P6-F-23 reported that game-based learning was beneficial for their mental and general health. They believed collaboration and teamwork in game-based learning strengthened their communication skills and improved their confidence. P1-F-23 said,

> I found the experience very fun! I feel it made engaging with our content and revising very effortless and enjoyable. I do feel that this method of testing each other and engaging with our academic content as well as other aspects of acupuncture in Chinese medicine is so beneficial to our learning. The entire day also gave us a breathing space where we didn't think about work or things that were due just for a few hours.

P2-F-23 added:

> I had a good time with the activities that we had, especially the 30 seconds game [acupuncture quiz competition]. I also got to be tested about things that I struggle with, especially when I needed to think rapidly of answers to the questions. The Baduanjin exercise was also amazing, and I was so much excited that we finally tried to perform it better than when we were practising before. Seeing the people interested in receiving treatment and also curious about who we are really made me happy because it is indicative of a successful event we had.

Both P3-F-24 and P4-M-24 reported that game-based learning was fun and facilitated them to identify weaknesses in their study without any stress. They further indicated that meeting students from different years and fields of study was a great experience. P3-F-24 said: "*There were things I remembered that I didn't even know I knew, and then there were things that I thought I knew but forgot under pressure.*" P4-M-24 articulated: "*I had a wonderful experience during this day. I had so much fun and learned a lot about where I was lacking during the games we were playing.*" P5-M-26 stated: "*It was a nice experience showing my profession to everyone, doing cupping and needling and being able to explain what acupuncture is to other people.*"

P6-F-23 contended that:

> The play learning base improved my health not only by doing the therapeutic exercise but also improved my mental health as I got to be around people and smile. Most students normally live alone and don't socialise with other people. You can have fun and learn at the same time, and improve physical health because of the movements [Ba Duan Jin exercise]. Furthermore, it helped me with my communication skills, it felt amazing doing cupping while people were lined up waiting for me to treat them and seeing the interest in their eyes when they asked about cupping.
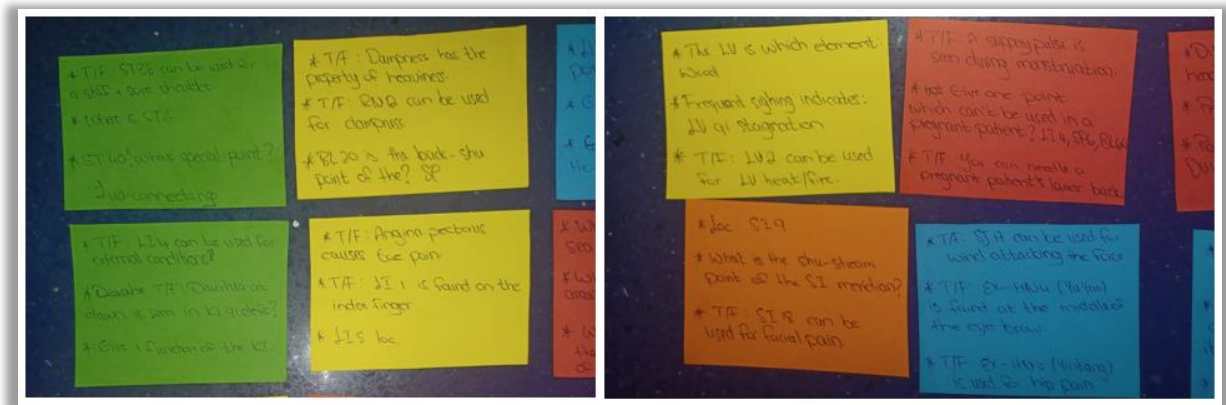

Figure 3. Acupuncture competition: Quizzes developed by students

Theme 2: Benefits of game-based learning

The findings highlighted several benefits of implementing game-based learning in the acupuncture programme. Participants indicated that the benefits included stress relieving, identification of strengths and weaknesses in the study, improving confidence and promoting teamwork. They concurred that games effectively motivate them to engage in learning; for instance, P1-F-23 stated: "*The adrenaline that comes with winning pushes me to study ten times more than I already am, and that will work in my favour in terms of revising the content that I need to cover because no one likes to lose.*" P2-F-23 added: "*I got to see my strengths and weaknesses, I got challenged, felt energised and I got to socialise with other people.*" P3-F-24 said: "*I had to work with my classmates as a group in order to provide correct answers. This showed how helpful group work can be.*" P3-F-24 further indicated:

> I feel we get to engage with the content in a fun way, which takes the stress and anxiety out. I also feel it makes us feel proud to represent our faculty on days like these [Note: Students were playing games in an outdoor area on campus]. We also get to interact with the other years which also makes us feel more like a unified group which I do feel we need a lot more of.

P4-M-24 articulated: "*It was fun yet informative, challenging in a good way and it pushed me to think quicker than usual. I am challenged to think quicker and that will work to my advantage in exams and in clinical practice.*" He further explained that the acupuncture quizzes assisted him in identifying gaps that he needed to revise. P5-M-26 believed the benefits of the games were stress relieving. Furthermore, he reported that he felt it was easier to study in groups. P6-F-23 said:

Game-based learning was a great tool to practice accessing stored information and knowledge in a fast-paced and stressful manner, which I feel is the same situation we undergo during the reporting of cases to you after assessing patients. It was helpful to listen to the way that other students described points, syndromes, or theories that helped me find new ways of both understanding the work and better remembering it. It can help one to revise what they don't know, and you can also learn from others what you could not describe.

Theme 3. Challenges in game-based learning

Despite participants expressing positive views on game-based learning, they highlighted that there were some challenges. One of the most crucial perspectives that participants pointed out was the importance of well-planned programmes for game-based learning. To this, P1-F-23 said:

I think next time, the date of the event [game-based learning] should be announced much earlier. This will allow us to spread the word about the event through posters and social media, attracting more people to come to the event. I also feel like we should also have some people who will always be on standby waiting for people to come or approaching people adjacent to us informing them of our profession and what we have to offer.

P2-F-23 said: "*I would definitely advise more of these types of play-based learning opportunities, preferably out of the sun though; i.e., in a shady area, or possibly a hall, where we could be more constructive.*" P3-F-24 stated: "*The only challenge was the time taking during the weeks to organise the event [game-based learning].*" P5-M-26 added: "*The only challenge I experienced was that we were doing the activities under the sun, and it resulted in me having a headache after the activities.*"
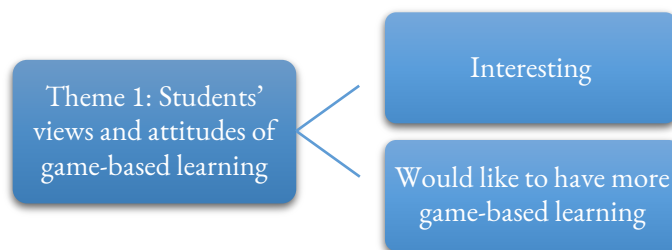
Summarily: Graphically

Figure 4. Codes of Theme 1: Students' views and attitudes of game-based learning
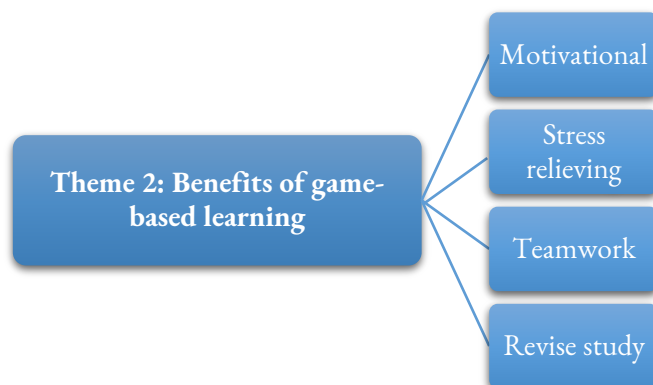

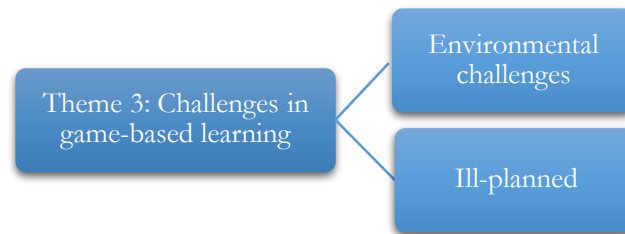**Figure 5.** Codes of Theme 2: Benefits of game-based learning

Figure 6. Codes of Theme 3: Challenges in game-based learning

Discussion

Student engagement plays an important role in improving academic outcomes at HEIs, which further influences students' success in the world of work. Collaco (2017) states that one of the challenges teachers face in higher education is engaging their students. Due to the critical role of student engagement at HEIs, De Villiers and Werner (2016), Lim (2017) and Lewin, and Mawoyo (2014) are of the view that there is a need to improve student engagement at HEIs. The findings of this study concurred that student learning outcomes are closely linked to their engagement in the study. Evidence can be found in P1-F-23's response, where she indicated that she would engage more in the study due to game-based learning. This finding agrees with Lewin and Mawoyo (2014) and Schreiber and Yu (2016), who emphasise that it is of importance to improve student academic performance through student engagement in learning. The authors believe the increased time spent on revising content knowledge will improve their learning outcomes in the programme.

The findings of this study also highlighted that game-based learning was an effective pedagogical approach to promote student engagement. The authors contend that well-planned academic activities utilising games will significantly motivate student engagement in the learning process. In their work, Adipat et al. (2021) articulate that psychological motivation is one of the key benefits of employing games in teaching and learning (Shah, 2019). The reason is that literature reveals games will effectively strengthen student motivation in learning. Mekler et al. (2017) point out that it will be a challenge to improve students' academic performance when there is a lack of motivation. The literature shows that student engagement can be strengthened from behavioural, psychological, sociocultural, and hosted dimensions (Kahu, 2013). In this study, the students planned the entire game-based learning programme (Appendix A). According to the constructivism learning theory, students are the key factor in teaching and learning (Golder, 2018; Kitiashvili, 2020). Students will be motivated to develop new knowledge from their existing knowledge if students engage in learning actively (Burhanuddin et al. 2021; Emaliana, 2017; Shah, 2019). In the authors' opinion, active involvement in the lesson plan for game-based learning assists students in extending their knowledge and skills from their existing knowledge. This is of particular significance since students' academic performance is affected by their background (Wawrzynski, Heck & Remley, 2012). Furthermore, Yaccob et al. (2022) agree with Cheng and Su (2011) that there are many other advantages of implementing games in teaching and learning.

The findings of this study affirm the significance of game-based learning in reducing student stress and pressure (Akour et al., 2020; Cheng & Su, 2011). According to the constructivism learning theory, students developed skills during communication and teamwork in the process of learning (Burhanuddin et al. 2021). The findings of this study also highlighted that students felt more supported and collaborative instead of being isolated. Consequently, the authors are of the view that it is of profound significance to employ game-based learning in the acupuncture programme at HEIs. This view concurs with Pyle (2018), who suggests that HEIs should provide a friendly learning environment for students regardless of their age. The authors agree that game-based learning is one such pedagogical approach that improved student learning experiences. To avoid demotivating students, game-based learning should be well-planned before its implementation (Welbers et al., 2019; Yaccob et al., 2022). Furthermore, sufficient time should be allocated to plan game-based learning.

Conclusion

Students' competencies are one of the most important concerns for higher education globally. The reason is that HEI should ensure graduates are competent in the world of work through effective teaching and learning. Although there are debates on the definitions of student engagement, the literature agrees on the importance of increased student engagement in improving student academic performance (Kahu, 2013; Lim, 2017). Therefore, it is of pertinent significance to promote student engagement at HEIs (Schreiber & Yu, 2016; Ting, Tan & Voon, 2020). This study reveals that game-based learning is an effective pedagogical approach to improve student engagement at HEIs. The findings of this study supported that game-based learning motivated students to be involved in their learning. Moreover, students felt less stress in game-based learning activities compared to normal classroom teaching. Active involvement in planning game-based learning will encourage students to be engaged in the learning process.

There is a lack of research focusing on student engagement at HEIs in the South African context, particularly in the field of health sciences. This study made contributions to enriching data on the contextualised lived experiences of African students with regard to game-based learning at HEIs. The findings of this study revealed that there were several benefits of game-based learning, such as increased motivation, reduced stress, and enhanced collaboration. Contextually, the findings of this study also concurred with Hu and Venketsamy (2022) who report that African students seem to prefer group study. The reason is that they do not feel isolated when studying in groups.

Recommendations

This study attempts to address the lack of research on game-based learning at HEIs through a case study in a contextualised HEI. Emanating from the findings of this study, the authors recommended the following:

- Student engagement plays an important role in predicting students' academic performance which significantly influences their competence in the world of work. It is recommended that HEIs should adopt diverse pedagogical approaches to improve student engagement in their institutions.

- Game-based learning is an effective pedagogical approach to improve student engagement at HEIs. It is therefore recommended that HEIs should consider employing game-based learning at HEIs.

- To effectively implement game-based learning and avoid demotivating students, it is further recommended all game-based learning activities should be well-planned. Lecturers should encourage students to be involved in planning the lessons.

Recommendations for future research

In the authors' opinion, this study should be explored at different HEIs nationally and internationally. They recommend that game-based learning also should be investigated using different research approaches, such as quantitative or mix-methods approaches.

Limitations of the Study

The authors employed a qualitative approach to explore students' lived experiences of game-based learning at an identified HEI in the South African context. This study was limited to exploring students' experiences at one HEI to which the authors had direct access. Consequently, the findings of this study lacked comparison. Although the authors followed a rigorous research design to ensure the trustworthiness of this study, the subjective analysis brought by the interpretivist paradigm was also considered as a limitation.

Acknowledgments

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References

Adipat, S., Laksana, K., Busayanon, K., Asawasowan, A., & Adipat, B. (2021). Engaging students in the learning process with game-based learning: The fundamental concepts. *International Journal of Technology in Education*, *4*(3), 542-552. https://doi.org/10.46328/ijte.169

Akour, M., Alsghaier, H. & Aldiabat, S. (2020). Game-based learning approach to improve self-learning motivated students. *International Journal of Technology Enhanced Learning*, *12*(2), 146-160.

Alomari, I., Al-Samarraie, H., & Yousef, R. (2019). The role of gamification technique in promoting student learning: a review and synthesis. *Journal of Information Technology Education: Research*, 18, 395-417. https://doi.org/10.28945/4417

Anak Yunus, C. C., & Hua, T. K. (2021). Exploring a gamified learning tool in the ESL classroom: the case of Quizizz. *Journal of Education and e-Learning Research*, *8*(1), 103-108. https://doi.org/ 10.20448/journal.509.2021.81.103.108

Astin, A. W. (1984). Student involvement: A developmental theory for higher education. *Journal of College Student Personnel*, *25*, 297-308.

Barkley, E. F. (2010). *Student Engagement Techniques: A Handbook for College Faculty*. San Francisco, CA: Jossey-Bass.

Bond, M., Buntins, K., Bedenlier, S., Zawacki-Richter, O. & Kerres, M. (2020). Mapping research in student engagement and educational technology in higher education: a systematic evidence map. *International Journal of Educational Technology in Higher Education*, *17*(2), 1-30. https://doi.org/10.1186/s41239-019-0176-8

Buckley, P., Doyle, E., & Doyle, S. (2017). Game on! students' perceptions of gamified learning. *Educational Technology & Society*, *20*(3), 1-10.

Burhanuddin, N.A.N., Ahmad, N.A. Said, R.R. & Asimiran, S. (2021). Learning theories: Views from behaviourism theory and constructivism theory. *International Journal of Academic Research in Progressive Education and Development*, 10(1), 85–98.

Cheng, C.H. & Su, C.H. (2011). A Game-based learning system for improving student's learning effectiveness in system analysis course*, Procdia*, (31), 669-675. https://doi.org/10.1016/j.sbspro.2011.12.122

Chow, A. F., Woodford, K. C., & Maes, J. (2011). Deal of no deal: using games to improve student learning, retention and decision-making. *International Journal of Mathematical Education in Science and Technology*, *42*(2), 259-264.

Cloete, N., Maassen, P. & Bailey, T. (2015). *Knowledge Production and Contradictory Functions in African Higher Education*. Cape Town: African Minds Publishers.

Creswell, J.W. (2014). *Research Design: Qualitative, Quantitative and Mixed Methods Approaches* (4th ed.). California: Sage.

Collaco, C.M. (2017). Increasing student engagement in higher education. *Journal of Higher Education Theory and Practice*, *17*(4), 40-47.

Delialioğlu, Ö. (2012). Student engagement in blended learning environments with lecture-based and problem-based instructional approaches. *Educational Technology & Society*, *15*(3), 310-322.

De Villiers, B. & Werner, A. (2016). The relationship between student engagement and academic success. *Journal for New Generation Sciences*, *14*(1), 36-50.

Dichev, C. & Dicheva, D. (2017). Gamifying education: what is known, what is believed and what remains uncertain: a critical review. *Int J Educ Technol High Educ*, *14*(9), 1-36. https://doi.org/10.1186/s41239-017-0042-5

Emaliana, I. (2017). Teacher-centered or student-centered learning approach to promote learning? *Jurnal Sosial Humaniora*, *10*(2), 59-70.

Ertmer, P. A., & Newby, T. J. (2013). Behaviourism, cognitivism, constructivism: Comparing critical features from an instructional design perspective. *Performance Improvement Quarterly*, 26(2), 43-71.

Fitzgerald, H.E., Bruns, K., Sonka, S.T., Furco, A. & Swanson, L. (2012). The centrality of engagement in higher education. *Journal of Higher Education Outreach and Engagement*, *20*(1), 245-253.

Fredricks, J. A., Blumenfeld, P. C., & Paris, A. H. (2004). School engagement: Potential of the concept, state of the evidence. *Review of Educational Research*, *74*(1), 59–109. https://doi.org/10.3102/00346543074001059.

Golder, J. (2018). Constructivism: A paradigm for teaching and learning. *International Journal of Research and Analytical Reviews*, 5(3), 678-686.

Hackathorn, J., Solomon, E.D. & Blankmeyer, K.L. (2011). Learning by doing: An empirical study of active teaching techniques. *Journal of Effective Teaching*, *11*(2), 40-54.

Hashim, H., Rafiq, K.R.M. & Yunus,M.M. (2019). Improving ESL learner' grammar with gamified-learning. *Arab World English Journal*, 5 (5), 40-50. https://dx.doi.org/10.24093/awej/call8.12

Hassan, K.E. (2011). Quality of College Life (QCL): Validation of a measure of student well-being in the Middle East. *International Journal of Educational and Psychological Measurement*, 8(1), 12-22.

Hu, Z. (2022). COVID-19 patient's views and experience of Traditional Chinese Medicine treatment in South Africa. *Alternative Therapies in Health and Medicine*, 28(7), 65-71. https://pubmed.ncbi.nlm.nih.gov/35648696/

Hu, Z. & Venketsamy, R. (2022). Implementation example of TPACK model in health sciences education: Exploring of the students' views on clinical simulation in the acupuncture programme at a South African University. *Journal for the Education of Gifted Young Scientists*, *10*(2), 251-263. http://dx.doi.org/10.17478/jegys.1092471

Hu, Z., Venketsamy, R. & Razlog, R. (2022). Exploring health sciences students' experiences of interprofessional education to improve quality learning outcomes. *Journal for the Education of Gifted Young Scientists*, *10*(3), 385-398. http://dx.doi.org/10.17478/jegys.1126020

Ivala, E. & Kioko, J. (2013). Student levels of engagement in learning: A case study of Cape Peninsula University of Technology (CPUT). *Perspectives in Education*, 31(2), 123-134.

Jääskä, E & Aaltonen, K. (2022). Teachers' experiences of using game-based learning methods in project management higher education, *Project Leadership and Society*, *3,* 100041, ISSN 2666-7215. https://doi.org/10.1016/j.plas.2022.100041.

Kahu, E. R. (2013). Framing student engagement in higher education. *Studies in Higher Education*, *38*(5), 758-773. https://doi.org/10.1080/03075079.2011.598505

Kaplan, D.E. (2018) Piagetian Theory in Online Teacher Education. *Creative Education*, 9, 831-837. doi: 10.4236/ce.2018.96061.

Kitiashvili, A. (2020). Shifting from a teacher-centred to a student-centred approach in the general education of Georgia: Attitudes and classroom practices of teachers. *International Journal of Innovation and Research in Educational Sciences*, *7*(6), 552-564.

Kuh, G. (2009). What student affairs professionals need to know about student engagement. *Journal of College Student Development*, *50*(6), 683–706.

Lewin, T. & Mawoyo, M. (2014). *Student Access and Success: Issues and Interventions in South African Universities*. Cape Town: The South African Institute for Advancement.

Lim, W.N. (2017). Improving student engagement in higher education through mobile-based interactive teaching model using Socrative. *2017 IEEE Global Engineering Education Conference*, 404-412.

Maasum, T. N. R. T. M., Mustaffa, R., & Stapa, S. H. (2015). Young learners' perceptions of learning English using language games in a non-formal context. 6th International Conference on Social Sciences (pp. 11-12), September, III, 104-112. Turkey: Istanbul. ISBN 9788890916335.

Mandernach, B.J. (2015). Assessment of student engagement in higher education: A synthesis of literature and assessment tools. *International Journal of Learning, Teaching and Educational Research*, *12*(2), 1-14.

McCombs, B.L. & Whisler, J.S. (1997). *The Learner-Centered Classroom and School: Strategies for Increasing Student Motivation and Achievement. The Jossey-Bass Education Series*. San Francisco, CA: Jossey-Bass.

Mee, R. W. M., Shahdan, T. S. T., Ismail, M. R., Ghani, K. A., Pek, L. S., Von, W. Y., Woo, A. & Rao, Y. S. (2020). Role of gamification in classroom teaching: pre-service teachers' view. *International Journal of Evaluation and Research in Education*, *9*(3), 684-690. http://doi.org/10.11591/ijere.v9i3.20622

Muhajirah, M. (2020). Basic of learning theory: (Behaviorism, Cognitivism, Constructivism, and Humanism). *International Journal of Asian Education*, 1(1), 37-42. https://doi.org/10.46966/ijae.v1i1.23

Plass, J.L., Homer, B.D. & Kinzer, C.K. (2015). Foundations of game-based learning. *Educational Psychologist*, 50(4), 258-283. https://psycnet.apa.org/doi/10.1080/00461520.2015.1122533

Pyle, A. (2018). *Play-based learning*. Canada: Encyclopedia on Early Childhood Development.

Rahmani, E. F. (2020). The benefits of gamification in the English learning context. *Indonesian Journal of English Education*, *7*(1), 32-47. http://doi.org/10.15408/ijee.v7i1.17054

Schreiber, B. & Yu, D. (2016). Exploring student engagement practices at a South African university: Student engagement as reliable predictor of academic performance. *South African Journal of Higher Education*, 30(5), 157-175. http://dx.doi.org/10.20853/30-5-593

Shah, R.K. (2019). Effective constructivist teaching learning in the classroom. *International Journal of Education,* 7(4), 1-13. https://doi.org/10.34293/education.v7i4.600

Siddiqi, A.F., Shabbir, M.S., Abbas, M., Mahmood, A. and Salman, R. (2022), "Developing and testing student engagement scale for higher educational students", *Journal of Applied Research in Higher Education*, *14*(1) 424-439. https://doi.org/10.1108/JARHE-11-2020-0388

Skinner, E. A., Wellborn, J. G., & Connell, J. P. (1990). What it takes to do well in school and whether I've got it: The role of perceived control in children's engagement and school achievement. *Journal of Educational Psychology*, *82*, 22-32.

Solomonides, I. (2013). A relational and multidimensional model of student engagement. In E. Dunne, & D. Owen (Eds.), *The Student Engagement Handbook: Practice in Higher Education*, (1st ed., pp. 43–58). Bingley: Emerald.

Subhash, S., & Cudney, E. A. (2018). Gamified learning in higher education: systematic review of the literature. *Computers in Human Behavior*, 87, 192-206. https://doi.org/10.1016/j.chb.2018.05.028

Ting, J.K.S., Tan, V.M. & Voon, M.L. (2020). Factors Influencing Student Engagement In Higher Education Institutions: Central To Sustainability And Progression Of The Institution. *European Journal of Molecular & Clinical Medicine*, *7*(8), 468-473.

Trybus, J. (2015). Game-Based Learning: What it is, Why it Works, and Where it's Going." New Media Institute. Accessed April 6. http://www.newmedia.org /game-based-learning--what-it-is-why-it -works-and-where-its-going.html.

Venketsamy, R. & Hu, Z. (2022). Exploring challenges experienced by foundation phase teachers in using technology for teaching and learning: a South African case study. *Journal for the Education of Gifted Young Scientists*, *10*(2), 221-237. http://dx.doi.org/10.17478/jegys.1085660

Venketsamy, R., Hu, Z., Helmbold, E., & Auckloo, P. (2022). Implementing the Japanese Lesson Study as a professional development tool in South Africa. *Journal for the Education of Gifted Young Scientists*, *10*(3), 349-362. http://dx.doi.org/10.17478/jegys.1129982

Venketsamy, R., Smart, L. & Hu, Z. (2021). Creating and leading a learning environment in diverse Foundation Phase classrooms in a South African school. *Journal for the Education of Gifted Young Scientists*, *9*(4), 349-364. http://dx.doi.org/10.17478/jegys.1012179

Wawrzynski, M.R., Heck, A.M. & Remley, C.T. (2012). Student Engagement in South African Higher Education. *Journal of College Student Development*, 52(1), 106-123.

Weegar, M.A. & Pacis, D. (2012). *A Comparison of Two Theories of Learning - Behaviorism and Constructivism as applied to Face-to-Face and Online Learning*. Presented at the E-Leader Conference. Manila, Philippines.

Weimer, M. (2002). *Learner-Centred Teaching: Five Key Changes to Practice*. San Francisco. CA: Jossey-Bass.

Welbers, K., Konjin, E. A., Burgers, C., de Vaate, A. B., Eden, A., & Brugman, B. C. (2019). Gamification as a tool for engaging student learning: a field experiment with a gamified app. *E-learning and Digital Media*, 16(2), 92-109. https://doi.org/10.1177/2042753018818342

Yaccob, N.S., Rahman, S.F.A., Mohamad, S.N.A., Rahim, A.A.A., Rashid, K.K.A., Mohammed, A., Aldaba, A., Yunus, M.M. & Hashim, H. (2022). Gamifying ESL classrooms through gamified teaching and learning. *Arab World English Journal*, (8), 177-191. https://dx.doi.org/10.24093/awej/call8.12

Yin, R.K. (2018). *Case Study Research and Applications: Design and Methods* (6th ed.). The United States of America: Sage.

Appendix A. Example of a game-based learning lesson plan

<div align="center">

Game-Based Learning Activities

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Modules: Complementary Medicine Practice 3
             Clinical Practice 1 (acupuncture)
Location: Campus Library Parking
Time: 10:00-12:00 17 February 2023

Time	Activities	Goals
10:00-10:20	Game 1- Acupuncture competition 1 (30s quizzes)	Strengthen students' acupuncture content knowledge (Basic theories)
10:25-10:35	Game 2- Qigong exercise: Ba Duan Jin	Promote general health
10:40-11:00	Game 3- Acupuncture competition 2 (30s quizzes). *Demonstration of acupuncture techniques*	Strengthen students' acupuncture content knowledge (Acupoints and Meridians)
11:05-11:15	South African Performance	Promote culture integration
11:20-11:40	Game 4- Acupuncture competition 3 (30s quizzes) *Demonstration of cupping techniques*	Strengthen students' acupuncture content knowledge (Acupoints and Meridians)
11:45-11:50	Game 5- Qigong exercise: Ba Duan Jin	Promote general health
12:00	Signatures on the posters	
12:00	End	

Appendix B. Semi-structured interview questions

Semi-structured Interview Questions

Q1. Please describe your views of game-based learning in the acupuncture programme.

Q2. Please describe your experiences with game-based learning in the acupuncture programme.

Q3. What are the benefits of game-based learning in the acupuncture programme?

Q4. Please describe your challenges in game-based learning in the acupuncture programme.

Q5. What would you suggest to improve game-based learning in the acupuncture programme?