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Gaming and Gamification in Physical and Health Education: Problems and Prospects

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Abstract
The use of gaming in education is becoming a popular topic among educators and educational institutions. Educational technology is being harnessed to develop games to simplify and improve learning but this will not be effective unless the technology tool is in line with the curriculum. Gamification is seen as a tool for increasing students' motivation and engagement and developing team spirit, and collaboration abilities to achieve learning objectives. This paper therefore highlights the prospects and challenges of adopting gamification in teaching Physical and Health Education. The factors militating against the adoption of gamification by Physical and Health Education teachers as identified by this paper were; curriculum factors, teacher-related factors, institutional factors and technical factors. The prospects highlighted were that gamification encourages students' participation and fosters team spirit and collaboration, improves students' retention and critical thinking ability, makes learning fun and easy, improves students' self-confidence and helps students with attention problems to stay focused in class. The paper recommended that curriculum planners should not take eyes away from the overwhelming prospects of gaming and gamification hence it should be incorporated in the curriculum of Physical and Health Education in secondary schools. Also, more empirical studies that will evaluate the effect of educational games on students' performance in physical and health education should be conducted

Keywords: Gaming, Gamification, Physical and Health Education, Curriculum Factor, Prospects, Challenges

Introduction

Advancement in science and technology has led to the evolvement of new teaching strategies that are student-centred. 21st-century teaching involves the use of appropriate instructional strategies that will capture the interest of the learners to deliver the learning objectives. A 21st-century teacher is expected to be equipped with skills that will make instructions appealing to students and arouse their interest and participation in class. Today's teachers must understand that students must take delight in what they are being taught, and thus must employ innovations in instructional strategy to achieve this objective (Okuneye & Taiwo, 2021). The role of teachers in the 21st century is to help every student by inspiring creativity, encouraging collaboration and also to develop critical thinking. Gamification is the 21st-century strategy used to encourage critical thinking, develop problem-solving skills and stimulate student's interest in the teaching and learning process. Gamification in the educational domain harnesses the motivating power of games to promote the desired outcome in students. It involves using game-based elements such as point scoring, peer competition, teamwork; and score tables to drive engagement; thereby helping students to assimilate new information and test their knowledge (Buck, 2017). Gamification is an innovation which involves the use of didactic games to improve the teaching and learning process; it also denotes pupils' activity that bring fun and pleasure for pupils and also realizes stated educational goals (Vankus, 2005). Games that incorporate curriculum content or other educational material are referred to as educational games (Michel, 2016). Gamification is the use of game-based elements such as mechanics, aesthetics, and game thinking in non-game contexts aimed at engaging people, motivating action, enhancing learning, and solving problems (Deterding et al., 2011).

Huang and Soman (2013) defined gamification as “the craft of deriving all the fun and addicting elements found in games and applying them to real-world or productive activities. Huang and Soman (2013) described gamification as a "series of design principles, processes and systems used to influence, engage and motivate individuals, groups and communities to drive behaviours and effect desired outcomes. Moreover, gamification is defined as "applying techniques based on games and video games to motivate students and encourage their positive progress" (Carrillo et al., 2019). Gamification is essentially taking a conceptual piece of learning (module, course, quiz etc.) and incorporating it into a game styled interaction. The integration of game-based learning into Physical and Health Education where learners gain points to receive a higher rank among each other is another example of how gamification is applied to classroom teaching (Plass et al., 2012). In the use of games in gamification education, students are required to achieve points and the players that receive the highest points would automatically win the whole game. This allows students to compete in a friendly way be more active in answering questions and be eager to learn to obtain points to "win" the game. Yolageldili and Arikan (2011) explained that respondents see games as a significant role in classroom teaching and learning. These games are also able to provide teachers with a variety of benefits for their classrooms to achieve learning outcomes. Moreover, learners not only learn in a fun environment but can enhance their creativity and problem-solving as they are learning subconsciously. The study of Lay et al. (2016), indicated that respondents show a positive attitude in the use of game-based learning since it assisted in their confidence and the product was easy to use. The importance of game knowledge where for the most part, instructional designers who know little about game development will, therefore, know little about training, education and instructional design (Hirumi et al., 2010).

Educational games also known as didactic games or serious games are games with defined learning objectives, though they are often confused with normal games Yue and Zin (2009) argued that games like chess cannot be viewed as didactic games as these improve logic skills, reasoning, and other traits valued in education but they are not considered educational because they do not deliver content or relay curriculum material. Games that incorporate curriculum content or other educational material are referred to as educational games (Michel, 2016). Educational games are considered powerful tools that have the potential to improve the teaching and learning process, yet teachers' choice of teaching physical and health education in schools is very rare. This paper, therefore, attempts to highlight the prospects and challenges militating against the adoption of gamification in Lagos State and to suggest solutions to the challenges identified.

Prospects of Gamification in Teaching and Learning Physical and Health Education

The use of games and game components in teaching and learning in physical and health education encourages students' participation in the teaching and learning process because children love games, it will develop their interest in the concept being taught, increase efficiency, eliminate uninteresting and repetitive concepts, help achieve learning objective and manage time. Gamification in physical and health education will help students to remember what they have learnt as active participation is encouraged. Instead of rote memorization, students can use games to remember the critical points that they can apply in examination situations as well as in real-world situations. According to Padurean, (2013), gamification is essential in the educational process because it makes the class funnier and the students are encouraged to actively participate and do not perceive their contribution as a must, a mandatory activity. It increases and activates students' interest and encourages students to understand each other, work together, and protect their groups throughout the lesson (Dilshoda, 2021). Games can also be applied to practical situations, especially where the facilities and equipment are not available, games can still be used to achieve the desired outcome. For instance, games like Scrabble game can be used to make Scrabble class interest and capture the interest of the students. Also, athletic games can be used to teach students athletic techniques where the equipment and facilities are not available or the present situation does not permit physical classes for instance during the COVID-19 pandemic schools were shut down and classes were taken online. Boyle, (2011) posits that games play a vital role in building students' self-confidence. As educational tools, games are constructive as they liven up teaching methods which are normally considered dull. Also, games can help capture the attention of students with attention problems.

Gamification in Physical and Health Education will help Physical and Health Education teachers achieve lesson objectives. The teacher's choice of instructional games should depend on the student's age, topic to be taught, level of the student, teacher's mastery of the functionality of the game, time of lesson, class size, and resources available among others. Games can also be used to teach other skills such as critical thinking, problem-solving,

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sportsmanship, interaction and collaboration with peers. Gamification is used to increase engagement by incorporating game elements into an educational environment. It enhances levels of student engagement similar to what games can do, to improve their particular skills and optimize their learning (Smiderle et al., 2020). According to Wu et al. (2012), gamification can provide a rich learning context to help learners construct higher-level knowledge through ambiguous and challenging trial-and-error opportunities. Through games, students can learn in an exciting, entertaining way while increasing their knowledge and understanding of the subject matter (Chow et al. 2011). Debra (2001), compared playing the video game for 30 minutes with watching an educational video for 30 minutes. The children playing the video game expressed more enjoyment and learned the same as those watching the television program. Lieberman stressed that this was interesting given that the children watched the video only once all its information was conveyed at once while the video game delivered a limited amount of information in 30 minutes, the player repeating the 30-minute sessions several times.

Challenges of Gamification in Physical and Health Education

Gamification is considered powerful tools that have the potential to improve the teaching and learning process in physical and health education, yet teachers' choice of educational games in teaching physical and health education in junior secondary schools in Lagos is very rare. The following factors are observed as factors militating against the adoption of gamification by physical and health education teachers in Lagos State such as curriculum factors, teacher-related factors, institutional factors, technical factors and training factors.

Curriculum factors

These are factors related to the curriculum, these factors are inconsistent government policy in physical and health education curriculum, short time allocation, recently physical and health education which is a stand-alone subject in junior secondary school was merged with three other subjects such as ICT, basic science and basic technology, this reduces the time allotted for physical and health education which may not give the teacher enough time to incorporate gamification in content delivery. Also, the current physical and health education curriculum does not provide for the incorporation of gamification in content delivery. The Nigerian educational system often prioritizes traditional pedagogical approaches over innovative methods like gamification, leading to a misalignment between the curriculum goals and the incorporation of gamified elements (Adedoja & Omolayo, 2019). The curriculum in PHE may be overloaded with content, leaving little room for integrating gamified activities effectively (Adeyemo, 2018). The examination-driven curriculum places more emphasis on rote memorization and content coverage, leaving little space for experiential and gamified learning (Oluwole, 2018).

Teacher-related factors

Teacher-related factors relating to the teacher, are factors within the control of the teacher. They are factors such as educational level, attitude and beliefs towards games, teacher's technological competence, pedagogical skills, motivation and encouragement, age, educational experience, and experience with educational games among others. These factors influence the adoption of educational games for content delivery. The attitudes of teachers towards technology and games greatly influence their decisions and integration of games into their teaching. If teachers' attitudes toward the use of educational games are positive, then they can easily provide useful insight into the adoption and integration of educational games for teaching and learning processes. Teachers' attitudes and beliefs towards gamification play a crucial role in its adoption and implementation in PHE. Studies such as Becker et al. (2018), have indicated that teachers who perceive gamification as a valuable instructional strategy are more likely to integrate it into their teaching practices. Similarly, Deterding et al. (2011), stated that positive attitudes towards technology integration and innovative pedagogical approaches are associated with a greater willingness to explore gamified methods in PHE. To promote the widespread adoption of gamification in PHE, it is essential to support PHE teachers through professional development initiatives, technological training, and ongoing pedagogical support.

Teacher Technological Competence is another teacher's factor affecting the widespread adoption of gamification in PHE. Effective implementation of gamification requires teachers to possess adequate technological competence. Teachers need to be proficient in using gamification platforms, tools, and applications to design engaging and interactive learning experiences. Lack of technological skills or training may hinder teachers' ability to utilize gamification effectively, impacting its integration into PHE curricula (Deterding et al., 2011). In addition to technological competence, teachers' pedagogical knowledge is vital for successful gamification in PHE.

Understanding the principles of game-based learning, instructional design, and assessment strategies is essential for designing meaningful gamified activities aligned with learning objectives (Miller & Robertson, 2010). Teachers with a strong pedagogical foundation can scaffold student learning experiences effectively within gamified environments (Becker et al., 2018).

Institutional factors

These are factors that are within the school but outside the teacher's control. Previous studies have identified budget constraints, scarce resources, small time allocation, lack of facilities and equipment, school management support, institutional policies and lack of infrastructure as institutional factors affecting the adoption of gamification in physical and health education (Zhu & Mugenyi, 2015). Vannatta, and Fordham (2004) opined that a teacher's time committed to teaching and the amount of technology training are reliable factors of technology use in the classroom. They asserted that teacher trainers and administrators should not only "provide extensive training on educational technology, but should also facilitate a contribution to teaching improvement". Norris et al. (2003) also pointed out the importance of access to technology. Therefore, an understanding of institutional characteristics that influence teachers' adoption and integration of ICT into teaching is relevant. One of the key institutional factors influencing the adoption of gamification in PHE is the alignment with curriculum standards and learning objectives. For gamified approaches to be effectively integrated, they must align with the educational goals outlined in national or state curricula (Foster & Shah, 2015). Institutions that prioritize curriculum flexibility and innovation are more likely to embrace gamification as a means to enhance student engagement and achievement in PHE. The availability of resources, including technology, funding, and instructional support, significantly impacts the implementation of gamification in PHE. Schools with sufficient resources can invest in gamification platforms, tools, and training programs for teachers (Martin, 2018). Conversely, resource constraints may hinder institutions' ability to adopt and sustain gamified approaches, limiting their integration into PHE curricula. Administrative support and the policy environment within educational institutions also play a crucial role in promoting gamification in PHE. Strong leadership endorsement, clear guidelines, and supportive policies facilitate the implementation of innovative teaching practices, including gamified approaches (Gee, 2007). Conversely, institutional barriers, such as restrictive policies or bureaucratic hurdles, may impede teachers' autonomy and creativity in adopting gamification strategies.

Technical factors

These are factors such as a lack of credible educational games, non-availability of reliable technical support, and weak information and communication technologies. Laptop problems and Internet outage, lack of consistent technical support, and lack of educational management mechanisms to support the game initiatives (Rhema & Miliszewska, 2010). The accessibility of technology infrastructure within educational settings is a critical technical factor affecting gamification in PHE. Schools with robust technological infrastructure, including reliable internet connectivity, sufficient computing devices, and access to educational software, are better equipped to implement gamified approaches (Pellas et al. 2019). Conversely, institutions lacking adequate technological resources may face challenges in effectively integrating gamification into PHE curricula. The compatibility of gamification platforms with existing educational technologies and systems is essential for seamless integration. Gamification tools and applications should be compatible with the Learning Management Systems (LMS) or digital platforms used by schools to deliver instructional content and manage student progress (Cao et al. 2019). Compatibility issues may arise if gamification platforms require separate logins or do not integrate smoothly with existing educational software, impacting their usability and adoption. The design of gamification interfaces significantly influences user engagement and experience in PHE. User-friendly interfaces that are intuitive, visually appealing, and accessible to diverse learners enhance the effectiveness of gamified activities (Kapp, 2012). Teachers should consider factors such as navigation ease, clear instructions, and feedback mechanisms when selecting or designing gamification interfaces for PHE. Ensuring the privacy and security of student data is paramount when implementing gamification in PHE. Gamification platforms may collect and store sensitive information about student performance, behaviours, and interactions (Beghetto & Kaufman, 2014). Educational institutions must adhere to data privacy regulations and implement robust security measures to protect student confidentiality and prevent unauthorized access to personal data. Effective technical support and maintenance mechanisms are essential for sustaining gamification initiatives in PHE. Schools should provide ongoing technical assistance to teachers and students to address any issues or challenges encountered during the implementation of gamified activities (Martin, 2018). Regular maintenance and updates of gamification platforms ensure their reliability, performance, and compatibility with evolving technological standards.

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Resource Factors

Resource factors affecting the adoption of gaming and gamification are lack of financial resources (Jakovljevic, 2009), insufficient funds, expensive and poorly managed resources (Jakovljevic, 2009; Gunga & Ricketts, 2007), funding for and investments to support programmatic change, lack of financial support and high cost of internet (Kasse & Balunywa, 2013). Technological resources, including hardware, software, and internet connectivity, are essential for implementing gamification in PHE. Schools need access to computers, tablets, smartphones, and other digital devices to support gamified learning activities (Kuo et al. 2013). Additionally, reliable internet connectivity is crucial for accessing online gamification platforms and resources. Schools lacking adequate technological resources may face challenges in effectively integrating gamification into PHE curricula. Access to gamification platforms and tools is vital for educators to design and implement gamified activities in PHE. These platforms offer features such as points, badges, leaderboards, and progress tracking to enhance student engagement and motivation (Seaborn & Fels, 2015). Schools should invest in gamification platforms that align with their educational goals and provide educators with the flexibility to customize gamified experiences for their students. Content resources, including educational materials, multimedia resources, and learning modules, support the design and delivery of gamified lessons in PHE. Teachers require access to relevant content resources, such as videos, interactive simulations, and educational games, to create engaging and informative gamified activities (Martin, 2018). Schools should provide educators with access to curated content repositories and digital libraries to facilitate the development of gamified curricula.

Training Factors

Effective integration of gamification in Physical and Health Education relies heavily on the training and professional development of teachers. Pedagogical training is essential for teachers to effectively incorporate gamification into PHE. Teachers need to understand the principles of game-based learning, instructional design, and assessment strategies to create meaningful gamified activities aligned with learning objectives (Miller & Robertson, 2010). Training programs that provide pedagogical guidance and hands-on experience in designing gamified lessons can empower teachers to utilize gamification effectively in PHE. Adequate technological training is also important for teachers to navigate gamification platforms and tools successfully. Teachers should receive training on how to use gamification software, integrate digital resources, and troubleshoot technical issues (Hamari et al., 2014). Technical training programs should cater to varying levels of technological proficiency among educators, ensuring that all teachers feel confident in leveraging gamification in PHE. Content-specific training is necessary to ensure that gamified activities align with the objectives and standards of PHE curricula. Teachers should receive training on how to integrate gamification into specific topics, such as fitness training, nutrition education, or health promotion (Becker et al. 2018). Content-specific training enables educators to design gamified lessons that address the unique needs and interests of students in PHE. Continuous professional development is also essential for educators to stay updated on emerging trends and best practices in gamification and PHE. Schools should provide ongoing training opportunities, workshops, and collaborative platforms for teachers to share experiences and resources related to gamified teaching methods (Papastergiou, 2009).

Conclusion

Gamification in physical and health education plays an important role in improving students' creative, critical and problem-solving skills. The integration of interesting and engaging activities sparks students' interest in classroom activities. This paper highlighted the prospects and challenges of the adoption of gaming and gamification in physical and health education. The factors militating against the adoption of gamification by physical and health education teachers as identified by this paper were; curriculum factors, teacher-related factors, institutional factors and technical factors. The prospects highlighted were; that gamification encourages students' participation and fosters team spirit and collaboration, improves students retention and critical thinking ability, makes learning fun and easy, improves students' self-confidence and helps students with attention problems to stay focused in class.

Suggestions

To effectively harness the prospects of gaming and gamification highlighted in this paper, there is a need to address the challenges identified as hindering the adoption of gaming and gamification in Lagos State, the following are suggested:

1. Curriculum planners should not take eyes away from the overwhelming prospects of gaming and gamification hence it should be incorporated in the curriculum of Physical and Health Education in Secondary Schools.
2. The government should provide ICT facilities and resources in schools that will facilitate the use of games in physical and health education content delivery.
3. Educational technologists should design varieties of educational games that are indigenous and can be adapted for different topics in the curriculum.
4. More empirical studies should be conducted to establish the effect of educational games on students' performance in Physical and Health Education.
5. There should be continuous professional development for teachers to stay updated on emerging trends and best practices in gamification and PHE.

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