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Gamifying Learning in High Schools: Perceptions of Students in Selected African Countries

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Abstract: The aim of this paper was to present the findings from an empirically grounded investigation into the perception of Students on gamifying learning in high schools within African countries, informing the current literature on gamification in learning within African contexts and providing a new approach on how gamification can be incorporated into learning within African countries namely Namibia, Nigeria, Ghana and Kenya. The study was conducted in four countries in Africa. 800 quantitative survey questions were distributed among high school students in these countries. However, 525 questionnaires were completed. Simple random sampling technique was used. Descriptive Statistics was used to analyse the findings using the Statistical Package for Social Sciences (SPSS). The findings revealed that students are already actively involved in gamified learning activities in class and found them useful for their learning. However, there is a need to look at the distractive tendencies it poses in class. Recommendations on how to incorporate gamification in learning within African countries are proposed.

Keywords: Gamification; education; high school; technology

1. Introduction

Today's students are accustomed to innovative technologies that offer them a variety of learning techniques that they can adopt in their learning process (Iyawa et al., 2017; Ujakpa et al., 2020). This generation of Students which Cord et al. (2015) referred to as digital natives are used to the digital language of computers and the internet where they are exposed to video games and other interactive devices and software such as smartphones and instant messaging applications.

Playing games with these devices that have the requisite software has become common among young students (Entertainment Software Association, 2012). This has increased their propensity to explore the world of computer games. This exploration goes a long way in increasing their practical skills and exposing them to more technical ways of doing things. Gamifying the learning engagement and processes through this medium is a welcome development. Even though gamification has been applied in domains like business, fitness and health (Rahah et al., 2018), the role it plays in education cannot be overemphasised (Iyawa, Masikara, Osakwe & Oduor, 2019). Deterding (2014) and Landers (2014) noted that gamifying education and learning dates to psychological learning theories.

Literature has revealed that education and learning are the most common contexts of empirical gamification research (Landers, 2014; Seaborn & Fel, 2015; Deterding, 2014; Iyawa et al., 2019). Varying types of gamification techniques have been used as forms of reinforcement strategy to gamify learning experience techniques such as points, leaderboards, challenges, badges, levels (Barata et al; 2013; Kim, Rothrock & Freivalds,

2016; Yildirim 2017). The use of gamification techniques in the school curriculum can help offer an inclusive activity as it will enhance students' sense of competition, interaction and motivation (Alomari, Al-samarrace & Yousef, 2019). Despite the important role of gamification in learning, some authors are of the opinion that gamification techniques cannot offer the best option on students learning outcomes (Ding, Er, & Orey 2018; Van Roy & Zaman 2018; Alomari et al, 2019). Critics contended that gamification could derail learning with so many distractions and competitive stress. They argue it does not consider some Students' pedagogical needs (Rabah et al 2018). On the other hand, Dicheva et al. (2015) noted that gamifying learning environment with the appropriate gaming techniques will enhance students' engagement and learning experience. Educational gaming techniques may offer a powerful tool for knowledge acquisition, problem solving skills, collaboration and communication (Bush, 2015; Gruss, 2016; Rohani & Pourgharib (2013). This means gamification is a motivational element in learning processes.

Results from several studies have opened many controversial issues in gamification. While some see it as a necessary distraction (Ding et al. 2018; Butter & Bodner 2017), others see it as a value added to students' engagement and learning experience (De Marcos et al. 2017; Dicheva et al. 2015; Barata et al. 2013; Kim et al. 2016; Yildirm, 2017).

While there are many studies exploring gamification for learning in high schools (Admiraal et.al. 2014), as well as a systematic review on the role of gamification in learning (Surendeleg, Murwa, Yun & Kim, 2014), there is a dearth of studies exploring the perception of students towards gamification in learning within high schools in African contexts. The purpose of this paper is to investigate how high school students perceive the use of gamified learning in learning within African countries. Exploring the perception of high school students regarding gamification in learning within this context could provide a better insight into the challenges and benefits of gamification in an African context, which could offer suggestions on how to develop appropriate strategies and techniques for gamification to enhance learning in African learning institutions. This paper contributes to the current literature on gamification from an African perspective.

This paper is structured as follows: Section 2 presents the literature review; methodology is presented in Section 3; findings and discussion in Section 4, following by conclusion.

2. Literature Review

Gamification technique came from "the process of game-thinking and game mechanics to engage users and solve problems" (Zichermann, 2011). Gamification is "the use of different methods such as mechanics, framework and dynamics to provide the desired behaviour that is now being used in various areas of endeavour" (MacMillan, 2011).

The use of gamification in learning has been documented in several studies where students have been found to have a positive attitude towards using gamification for learning (Buckley & Doyle, 2014; Dichev et al., 2014; Cheong, Filippou, & Cheong, 2014; Franco-Mariscal, Oliva-Martinez, & Gil, 2015; Armier, Shepherd, & Skrabut, 2016). The benefits of gamification are numerous. Gamification can be a real game changer for students learning engagement and experience if they know how to use it. As an intrinsic motivator, gamified learning can increase student engagement, create active Students and rescue students from stress (Shute & Ke 2012).

Studies have tried to differentiate the concept of gamification and game-based learning. The main difference between gamification and game-based learning is that gamification applies gaming elements in a non-game environment, however, game-based learning applies a gaming approach to teach specific concepts (Fatta et al., 2018).

Strategic gamified activities can also be beneficial to students substituting class worksheets. Students can be assigned 'guests' to learn about a new subject or how to

complete a project (Lee, 2014,). Also, team-building games like Jeopardy can be used to study before a test (Ryerson University, 2019). All these make learning fun and interactive.

Gamification also gives Students the opportunity to see the real-world applications of what they learn in the classroom. It ultimately enables them to put what they have learnt into practice in their professional or personal settings (Vieluf et al., 2012). In essence, gamification and its techniques offer an effective non-formal learning environment that helps Students to practice real-life situations and challenges (Furdu, Tomozei, & Kose, 2017). Schell (2010) envisioned that a time will come when everything in our daily lives will become gamified. This means that the use of gamification for various activities will soon become a common phenomenon in our everyday engagements, be it health, business, government and most importantly education.

Currently, student engagement in gamification and other learning techniques have received much attention (Dixson, 2015; Mohd et al 2016). This is due to the fact that there is a need for students to be engaged actively for better performance. Quite a number of researchers have explained what student engagement is all about. Some of them look at student engagement as activities performed by students through physical means (Dixson, 2015; Mohd et al 2016). Others view it as students' online participation in their learning environment or cognitive, behavioural and emotional process (Modh et al 2016 and He et al 2016).

Lack of engagement is also looked at as a factor for poor graduation rates in high schools (Strydom, Mentz & Kuh, 2010; Titus & Ng'ambi, 2014). This is due to the fact that engagement opens up a series of activities in which these students can participate, thereby motivating them to be active participants in learning. Engagement will also remove any apathy students have on some subjects and this will consequently enhance their performance. (Fitzgerald, Bruns, Sonka, Furco & Swanson, 2012).

Gamified learning has been seen as a learning methodologies that can engage and motivate high school students to participate actively in learning through collaboration and association (Morschheuser et al., 2017). The positive association can be created through gamifying learning as rewards usually come with each achievement. This type of approach is already gaining momentum and is even being considered as the future of education since a majority of teachers and educators are already gamifying their classes and practices.

In Africa, the tendency to adopt gamification is high. This is because Africa has the youngest and fasted growing population in the world. By 2055, the continent's youth population (aged 15-24), is expected to more than double the 2015 total of 226 million (UNCTAD, 2017). A large percentage are either in high schools or in related educational institutions. They belong to the generation referred to as the digital natives (Prenskey, 2001) since according to Prenskey (2001), they grew up with technology and understand it more than the older generation, thereby making it easy for them to manipulate and use it.

Furthermore, Africa is the second-largest continent using mobile technologies in the world (JTB Tourism Research, 2017). It has also been noted that 70% of the world's population will be using smartphones by 2020 (Ericson Mobility Report 2015) while the Global Mobility Report (2015) suggests that there is an 85% mobile subscription rate in sub-Saharan Africa, but this figure is expected to reach 100% by 2020 and 105% by 2021 with over 1 billion subscriptions.

A continent with such huge investment in technology, and which has a majority of its population as digital natives will surely thrive in the area of gamified activities among its youth. Therefore, it is pertinent to develop these activities for high school students to improve their learning skills, capabilities, performance and experience (Buckley & Doyle, 2014; Sanmugan et. al., 2016).

3. Methodology

This study used the quantitative research approach where survey questions were employed as a means for collecting data from the participants. The quantitative research method deals with quantifying and analysing variables in order to get results (Apuke, 2017). It involves the utilisation and analysis of numerical data using specific statistical techniques to answer questions like who, how much, what, where, when, how many, and how (Apuke, 2017).

Survey data was collected from 525 participants in 4 different African countries namely Namibia, Nigeria, Ghana and Kenya contributing to a response rate of 65.63%. This response rate was sufficient, representative, and conforms to Mugenda and Mugenda (2008), who stated that a response rate of 50% is adequate for analysis and statistical reporting; a rate of 60% is good while a response rate of 70% and over is excellent."

This survey, which was undertaken in 2021 and took a period of six weeks to complete. Data was collected using online survey questions. The online survey questionnaire was found to be convenient for the leaners since it was easy to complete and submit by clicking on a submit button. The geographical spread of the said countries above made the online survey a suitable tool for the researchers, considering the fact that the surveyed participants from the said countries spread over 3 regions in Africa. These countries were selected in order to get comparative perceptions of students towards gamified learning. The high schools were randomly selected online, while the principals were contacted telephonically before an official notification was sent to them. All ethical issues were treated through an informed consent form sent through email to the principals on behalf of the students. The distribution of survey questions that were specifically targeted at, and randomly distributed to high school students is as follows:

Table 1: Distribution of Survey Questions

Countries	Total number of questionnaires distributed	Total number of Questionnaires received	Percentage
Namibia	200	102	51%
Nigeria	200	182	91%
Ghana	200	129	64.5%
Kenya	200	112	56%
Total	800	525	65.63%

The collected data was then descriptively analysed using the Statistical Package for Social Sciences (SPSS).

4. Findings and Discussions

The findings of the study indicate that the time students utilise technologies for homework and school-related activities are very little. Karim et al., (2015) noted that time is one of the vital instruments for learning. Therefore, adequate time must be allocated for homework and school-related activities for proper learning engagement. For instance, only 5% of the Students use technologies for 7 hours and above every week, while 11% use technologies between 4 to 6 hours every week. Furthermore, 15% of the Students use computers for 3 to 5 hours every week while 69% of the students indicated that they use computers between 0 to 2 hours every week.

The findings show that the majority of the students (96%) indicated that they always feel motivated when a teacher uses technology such as Chrome book, smart Boards or clickers in the classroom. This 96% of Students is made up of 63% and 33% who noted that they always feel very motivated and just motivated when a teacher uses technology in the classroom. However, 4% of the students disagreed.

From the responses given by the respondents, 56% of the students believe that they can use educational games to learn; 20% noted that in as much as they learn with educational games, they do not really know much about how to use them to learn; while 24% of the respondents indicated that they had no knowledge of the use of educational games.

The findings also indicate that students do not constantly use educational games in class, though this could vary from school to school. From the survey conducted, 11% of the respondents indicated that they use educational games in a class all the time while 45% of the respondents use it sometimes. The study also revealed that in some schools, educational games are used once in a long while as indicated by 35% of the respondents, while 9% of the respondents noted that they do not use educational games at all.

The majority of the respondents (76%) indicated that they want educational games to be incorporated into their school activities. 15% noted that they do not want educational games to be incorporated in their school, while 9% of the respondents are not sure.

Learning engagement refers to different types of behaviours exhibited by students. According to Coates (2009), there are several components of learning of engagement, which include active learning, a supportive learning environment, and student/staff interactions. These components of learning engagement could be achieved through use of appropriate gaming techniques. The survey conducted indicates the responses from students on how the use of educational games enhanced their active engagement in classroom learning. 63% of respondents agreed or strongly agreed they always want to explore all the options when playing educational games because it is very challenging. This shows that when the students are engaged in these games, the innate adventurous capability in them is ignited, which makes them want to know more and see the game to the conclusive end as can be seen from the responses where 50% of the respondents indicated that they always want to complete games when they play. Again, findings from the respondents reveal that 54% of the students do not get bored when they play educational games, while 19% disagreed. For students to be fully engaged when using educational games, the application must be appealing, user friendly, educative and engaging. This will make the students to be actively involved and it will enhance their learning achievement as indicated by 68% of the respondents who revealed that they get more actively involved in courses that use technology, particularly educational games. In the area of interaction and collaboration, there is a consensus that educational games could enhance engagement. For instance, 72% of the respondents indicated that educational games make them feel connected to other students, while 78% of the respondents believed that educational games allow them to collaborate with others easily both in and outside the school.

Studies have revealed that technology enhances the learning experience due to its interactivity and how it engages students (Osakwe, 2017, Venkatesh, 2003). It facilitates a deeper understanding of concepts (Bryan, 2015). This can be seen from the responses where 63% of the respondents indicated that educational games help them to understand the subject material more deeply. The respondents (61%) went further to reveal that educational games motivate them to explore many topics they may not have understood before, do creative things (68%), impact positively of their learning achievement (69%) and bring reality in the classroom (73%).

Even though educational games create a positive learning experience for students, there is this other side of the coin which must not be overlooked. There are distractive tendencies of these games. From the responses, there was an overwhelming agreement by 82% of the respondents noted that educational games can also be distractive. This aligns with some studies which have stated that the use of games for education is a distraction (Ding et al 2018; Butler & Bodner 2017). While there are positive responses from respondents, the responses of the other respondents who were not in total support of gamification in education should not be overlooked as this could be an area for further research.

The findings suggest that the majority of the students (69%) rarely use technologies for school-related work. However, the majority (96%) feel motivated when their teachers incorporate technologies into their learning. This suggests that gamification could be a viable option for enhancing learning in high schools within African countries. Therefore, the management of schools in Africa should improve students' access to technology. School managers could make arrangements to provide students with mobile technologies that could support learning and gamification to enhance students' learning. The majority of students (56%) understand how to play games with electronic devices while the remaining are either not conversant with games or do not know how to play games with electronic devices. As a result, to fully implement gamification in learning in African contexts, there is a need to enhance the basic computer user skills of students and introduce the concept of gamification in learning to students from an early grade. It is, therefore, recommended that computer user skills be introduced as a compulsory subject to students in primary schools to improve their computer knowledge skills before they graduate to high school. This is particularly relevant to students in rural settings who are rarely exposed to technology. This calls for governments and school administrators to equip primary schools and secondary schools within African countries, especially in rural areas, with computers where students can learn computer skills. While gamification in learning is an innovative approach, there is a tendency to be a source of distraction (Ding et al, 2018). However, gamification for learning should be controlled within these environments. For example, games should focus on practical subject components and be used as assessment tools.

5. Conclusion, Limitations of the study and next steps

Enhancing students' engagement and learning experience through learning activities is very vital for the development of learning capabilities and competencies. Using games in the learning process could be effective due to the fact that it has the potential of enhancing and supplementing techniques used in engaging Students. Various studies point to the fact that gamification in education will go a long way in exposing the potentials in Students (Alomari, Al-samarrace & Yourself, 2019). This also has its negative implications in the class and in education generally. For instance, overindulging Students may lead to distractions as noted by some of the respondents. Therefore, for gamification to be fully entrenched as part of the teaching and learning process, efforts will have to be made to analyse the pros and cons of its use for teaching and learning in other to achieve positive engagement and a better learning experience.

Finally, this study was conducted in 4 African countries. This limits the research to the findings in these four countries. It is therefore suggested that more research should be carried out in other African countries. This will go a long way to ascertaining the perceptions of high school students towards gamified learning in the continent. It was also observed from the analysis that gamified learning can improve students' learning experience. Further research is thus, needed to streamline techniques that can be used to achieve this goal.

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