Integrating Gamification into the Nigerian Education System: Principles and Fundamental Strategies

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Abstract: This paper presents a critical analysis of gamification as a concept with relevance to the Nigerian educational system. With the changing needs of students today, it is only imperative that new methods of teaching and learning be developed, one of which is gamification which was the onus of the paper. The rationale gamifying education was firstly presented as well as the potential benefits of gamification. The principles of gamification drawn from the four freedom of play and the Self-Determination Theory of Ryan and Deci (2000) were adequately discussed. Guidelines for the integration of gamification in schools were also presented, with implications for the Nigerian educational system. Challenges against the effective utilization of these guidelines were presented, as well as suggestions on possible strategies for the uptake of gamification in school.
Keywords: Gamification, Game-Based Learning, Gamificadion Principles.

I. INTRODUCTION

The realization that education evolves across time and space is so pervasive that the definition of what education is, how it should be transmitted and whether it should be preserved or modified has taken a central debate within scholarly circles for centuries. With this realization comes the need for implementing an educational system that is unique to a society, as well as open to modification to meet evolving trends in that society. No other time in history has society been faced with newer educational paradigms as today due to the ubiquitous influence of information and communication technology tools. These tools have not only changed the methods of instruction, the medium through which instruction is provided, but also the learners who are popularly called digital natives. According to Onye and Yunfei (2016), digital natives are students who grew up with digital technologies and exhibit different learning styles, attitudes to learning processes and require a different approach to teaching. In fact, the first usage of the term 'digital native' by Prensky (2001) was used to describe individuals who due to their age and time of birth do not benefit from existing educational system as it did not capture their learning needs and abilities.

Teachers and educational policy developers are therefore faced with the challenge of motivating and engaging, as well as adopting or adapting technological tools to solve the problems of students' learning. The use of modern educational paradigms has reinforced the need for ICT integration to implement active learning. One of such paradigms is the use of gamification which was critically explored in this paper. This paper concerns with the need for introducing gamification in the educational enterprise in Nigeria, as well provide adequate principles for successful implementation of this learning paradigm. This becomes necessary considering the result that millennial students with access to digital devices prefer using them for social activities and not academic activities (Ugwu & Anekwe, 2017). Presenting a case for the introduction of gamification requires not only a clear understanding of what it is but more importantly the positives and pitfalls of using it in an educational setting, as well as explore the current implications and future possibilities of gamification. This has the potential of developing robust interventions, rather than taking a shot in the dark.

II. GAMIFICATION: CONCEPT CLARIFICATION

Kapp (2012) defined gamification as the utilization of game-based mechanics, aesthetics, and game thinking to engage people, motivate action, promote learning and solve problems. On the part of Kiryakova, Angelova & Yordanova (2014), gamification is an integration of game elements and game thinking in activities that are not games. A look at these definitions appears like something that schools have always implemented. For centuries schools have implemented game elements such as assigning points for completing assignments, which are translated as badges in the forms of grades. Furthermore, those students who have minimum required performance are scaled up to a new class at the end of an academic session (Lee & Hammer, 2011). This is in

agreement with the definition provided by Kiryakova et al (2014) who opined that the key features of gamifications are users are all participants; challenges that users perform and progress towards clearly defined goals; points that are accumulated as a result of executing tasks; levels which users pass depending on points; badges which serve as rewards for completing actions; ranking of users according to their achievements. However, what has been shown by research is that adoption of these gaming elements has not increased the level of engagement displayed by students when tasked with learning processes.

Utilization of gamification principles in education differs from the earlier mentioned practices whereby the mode of teaching integrates elements relevant to education such as: mechanical elements, such as incremental progression, onboarding and instant feedback; personal elements such as status and visibility, collective responsibility, and leaderboards or ranking; and emotional elements particularly psychological state of flows Using gamification in education must include the four freedom of play as espoused by Osterweil which are the freedom to fail, freedom to experiment, freedom of identity, and freedom of effort (Oxford Analytica, 2016).

- **Freedom to Fail:** This is perhaps the most important freedom as applied to gamification in education. The very nature of games implies the ability to play with little or no persistent or harmful consequences. This is different from the real world where failure is often met with serious and longlasting consequences. In most technological-enabled games, a failure does not mean the end of the game, it offers the opportunity to start again, learn from mistakes and do something differently.
- **Freedom to experiment:** In games, players are allowed to do things differently because failure is not final. Even after multiple efforts, a person is free to adopt different strategies, use different information and accomplish goals in various ways.
- **Freedom of identity:** One fundamental characteristic of games is that they allow a person to assume different identities depending on the circumstance, which greatly resembles that of real life. An individual can be a spouse, son, father or professional depending on the situation. Similarly, in games, a person is free to redefine their identity to become what is needed to achieve their objective. A person can become a soldier, villain, spy, captain in order to meet specific objectives, without being forced to be themselves.
- **Freedom of Effort:** Allow a person the freedom to determine the effort they put to a task, the frequency or intensity of the effort is a fundamental freedom of play. Games can be paused at the players' discretion, without consequences. Players are permitted to go through a period of intense activity and relative inactivity, where they can reflect on the task they have achieved and what led to failure or success.

It is essential to understand that implementation of these "freedoms" is not absolute for gamification to be successful. Rather, just like games, these freedoms are combined into a complex mix whereby restrictions are provided to varying degrees. On the framework of these freedoms, principles for integrating gamifications in education have been espoused by different authorities which are discussed later.

Theoretical Framework: Self-Determination Theory

Self-determination theory (SDT) is a product of about 50 years of research by Richard M. Ryan and Edward L. Deci (2000). The theory is a meta-theory for framing motivational studies along with a continuum of motivation and provides a description of intrinsic motivation and various forms of motivation. Within the framework of SDT, three broad types of motivation are assumed to guide all human activities: autonomy, competence, and relatedness. Autonomy refers to a sense of internal assent of one's own behaviour, competence refers to the ability to control the process and to attain mastery of the process and outcome, while relatedness involves a state of connectedness and interaction with others in the community. The blend of these various motivational types determines the degree of intrinsic or extrinsic motivation a person experiences. Achievement of these need is not based on an objective assessment but on the personal perception of the person, as such what carries weight in SDT is not the quality of motivation but the strength (Ryan & Deci, 2000). This has led to the distinction between (i) amotivation: no motivation, (ii.) extrinsic motivation: regulated externally and (iii) intrinsic motivation.

When applied to education generally, this theory posits that all students irrespective of their demographic characteristics such as age, gender, socioeconomic status, nationality, cultural background, and educational level hold an inherent tendency for growth manifested in the form of intrinsic motivation, curiosity, and psychological needs. This growth mindset is what provides the pedestal for high-quality classroom engagement and overall school functioning (Reeve, Deci and Ryan, 2004). This theory differs from other motivational theories in that while other theories explain how students' belief, goals, and expectations, SDT places emphasis on developing high-quality classroom instruction as a key to vitalizing students' intrinsic motivational resources as the pedestal for high-quality engagement. Therefore, SDT firstly identifies the inner motivational resources students possess and offers suggestions on how teachers can utilize and develop such resources for students' optimal academic growth (Niemeic & Ryan, 2009).

When viewed from the prism of gamification, self-determination theory, provides ample explanation for the increasing need for the introduction into the education sector. The result that students learn better when they determine the outcome, content, and process of their learning is well-rooted in the scientific literature (Reeve, 2012). Providing engagement comes from students fulfilling the three broad needs within the SDT framework: autonomy, competence and related. Gamification provides the opportunity for students to choose and determine the nature, frequency, and intensity of their learning, as well as learning goals that appeal to them, as well as the path and resources for achieving them. This way students can feel their behaviour is their personal choice and would be most likely engaged in the task. Gamification further provides competence need by ensuring that students feel a sense of mastery of skills and confidence in their ability. This is because gamification provides instant and direct feedback, optimal challenges and freedom from derogatory evaluation. Gamification accomplishes this through the provision of reasonable small chunks of learning goals with increasing difficulty, tasks with pleasantly surprising positive feedback, different pathways for advancing or retracting through learning paths, and enjoyable learning and fun learning activities. Gamification fulfills the need for relatedness by providing a means for connectedness to peers, belonging to communities and contributing to things greater than oneself. Gamification provides related by ensuring that peers offer their comments, rating and share the success of group members. This is further achieved by providing opportunities to discover and join learning communities, tools for interaction, collaboration, discussion, and mutual assistance, visualization of social status, reputation and contribution, and appreciation of others effort and success (Shi & Cristea, 2016, Werbach & Hunter, 2012).

From this perspective of SDT, Brull and Finlayson (2016) and Lazzaro (2004) provided empirical-based evidence why gamification works in education. Research evidence showed that gamification helps people learn by doing, which ultimately improves processes and outcomes. Gamification provides learners with the opportunity to learn at their convenience and at their own pace. Participants enjoy the freedom to fail in a non-threatening environment, and learners can experience emotions such as frustration, wonder, mystery, and amusement, each providing a personal connection to the game and others playing the game. In a research conducted by Ventura, Shute, and Weiman (2013), it was shown that frequent players of video games displayed greater persistence in solving academic anagrams and riddles compared to other students who reported that they were infrequent players of video games. This suggests that applying gamification principles in education that promote grit, persistence, and motivation which are all essential for sustaining engagement among students (Reeve, 2012).

Principles of Gamification in Education

While the concept of gamification appears simple, practical application and implementation of the concept requires careful understanding of certain principles. Principles guiding gamification have been offered by scholars including Chauhan, Tanaja and Goel (2015), Kiryakova, et al (2014), Ark (2014). These principles are succinctly presented below

- **Conceptual Challenges**: Introducing gamification firstly requires a challenging and rigorous task that promotes deeper conceptual learning rather than the recall of facts. While making the process as entertaining as possible, the end goal should be to promote conceptual understanding of processes and outcome. This can be integrated with other aspects of instruction and assessment.
- **Productive Failure**: Introducing gamification into education requires that students can fail. Feedback on performance, either positive or failure should be provided as soon as possible. This is because gamification allows creating and testing pathways, hypotheses, and methods for achieving desired outcomes.
- **Accessibility**: For gamification to be successful, every "player" or students must have equal access to resources and information, despite the rate of their individual progress. Skill mastery and improvement should not be limited by space and time constraint.
- **Deeper Learning**: Along with the conceptual challenges of solving problems in gamification, the task involved in the learning process should require critical thinking, smart processes and strategic problem-solving. This requires providing students with new and unfamiliar learning task.
- **Careful Calibration**: Productive gamification involves maintaining the zone of proximal development – the gap between what a student knows and what he or she can achieve. Careful calibration involves that the task of the games are not too simple so as to create boredom or so difficult that they induce frustration and disengagement.

Guideline for Integrating Gamification in the School Environment

From the principles discussed above on how to effectively develop gamification for the educational system, specific guidelines that can improve adaptation of these principles have been offered by scholars and practitioners. Huang and Soman (2013), Kiryakova, et al (2014), and Lee and Hammer(2011) offered a five-step process for applying gamification in education which is represented in the figure below.
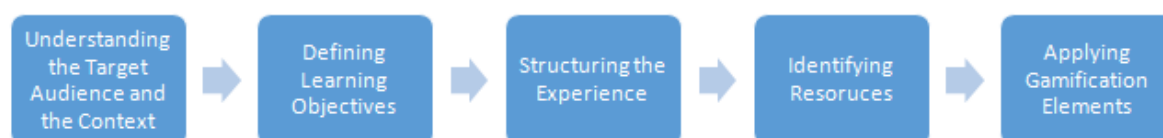
Fig 1: Gamification integration process in Education (Adapted from Huang and Soman, 2013:7)

- **Understanding the Target Audience and the Context:** Before the introduction of any educational programme, it is imperative that an understanding of the learners' character be established. This is done in order to establish how the new tools and techniques will be used as well as determine if they would be suitable. Characters to analyze includes age, learning abilities, current skill-set etc. This analysis provides useful information on the group size, sequencing of tasks, expected difficulty leveletc. It is also important that the designer analyze the environment in which the processes will be conducted. Questions such as where the programme will be conducted (e.g. classroom, office, homes, or a combination of these places)? Will the programme be completed individually or in groups? If it is in a group, what is the appropriate size of the group? Getting answers to such questions helps the instructor to determine the points to assign to the completion of various tasks in the process.

- **Defining Learning Objectives:** The guiding question at this phase is: What does the instructor what the students to accomplish after going through the gamification programme. The answer to this question needs to be specific and clearly defined, and also direct the nature, sequence, and duration of the task presented to students. Huang and Soman, (2013) presented three learning objectives that gamification can achieve. These are general instructional objectives, specific learning objectives, and behavioural objectives. General instructional objectives might mean students' completing an assignment, test or quiz. Specific objective involves students understanding a concept and capable of demonstrating it after a class. Behavioural objectives may involve students concentrating in class, minimizing distractions and completing a quiz faster. It is possible for some gamification programme to integrate these objectives into a programme. After deciding on the learning objectives, the instructor can then design the educational content and the game mechanics and techniques required to achieve them.

- **Structuring the Experience:** This phase involves breaking down the task and content into manageable chunks and designing the sequence of their presentation. This involves setting stages, steps, modules, and milestone. This helps to quantify what students need to learn at the completion of each milestone. This has the advantage of keeping students engaged when they received immediate feedback on their performance, and it reinforces their confidence that what they need to accomplish is measurable and achievable. Further suggestions for ensuring a robust educational content based on gamification includes providing learning activities that are designed to be repeated in case of an unsuccessful attempt, flexible to be tailored and adaptable to students' potential and skill level, follows structured level of difficulty, and capable of being achieved using more than one approaches or methods.

- **Identifying Resources:** After establishing the phase, milestone, or phases that instruction will be presented, the instructor will them determine which will be gamified and the rules to apply. Huang and Soman, (2013:12) provided a set of questions that can help instructors make ample consideration on aspects to gamify: Can a tracking mechanism be applied to this specific stage? What would be the currency and what determines the accomplishment of a level? Are there clear rules that can be implemented? Does the overall system give the student and/or instructor feedback? Tracking mechanism refers to the tools used to measure students' progress in learning the program, currency is the unit of measurement which could be points, time, money etc. Level is the specific amount of current required to determine if an objective has been achieved or not, while rules are boundaries for what a student is permitted or not allowed to do in the gamification process. Feedback refers to a mechanism for determining the extent of students' progress in the gamification process.

- **Applying Gamification Elements:** This phase involves the actual application of game-like elements in the learning programme. These elements basically involve the performance of tasks to accumulate points, transition to higher levels based on the point accumulated, the winning of awards and the display of badges. The nature of points and award received is dependent on which element is included in the programmes, the difficulty of the task and the nature of performance (individual or groups). When a task involves group collaboration, award received should be visible and made public.

Challenges of Gamification in Nigeria Educational System
- **Poor Awareness among Students:** As a relatively new idea in the education sector, most Nigerian teachers are not well aware of gamification and the principles guiding it. To most teachers, gamification simply involves the provision of technology-enabled games for students to play with, without aligning it with learning

objectives. Such teachers and policy makers therefore advocate for the provision of technology gadgets. This poor understanding is a challenge against the integration of gamification in Nigeria school.

- **Game Selection:** As widely acknowledged that gamification improves students engagement, selecting the game and determining which gaming principle(s) to integrate for the achievement of learning objectives had proved challenging (Harviainen, 2014). In addition, most gamification processes are technologically-dependent. The affordances of these tools and facilities are cost intensive, with schools in Nigeria suffering from funding deficit unable to purchase most of them.

- **Distractive Tendency:** Introduction of gamification elements in schools has the potential of distracting students. For some students, the entertainment and fun provided by gamification might disrupt their ability to focus on the educational objectives and learning goals. Furthermore, while some teachers may want to monitor these students in order to minimize distraction, this might go against the freedom that gamification provides and therefore reduces engagement and motivation.

- **Competitive Framing:** A fundamental hallmark of gamification is the freedom it offers students to explore and experiment at their own pace. Against this background, some students have adopted a competitive approach towards gamification and displayed an inordinate desire to come first at all cost. Some have resorted to cheating in order to come first. When other students know about this, they might become demotivated and adopt the same attitude towards learning, rather than deeply pursuing the learning objectives.

- **Assessment Challenges:** Using performance as a measurement for learning in gamification process has been criticized. As shown by Harviainen, Lainema and Saarinen (2014), the "player" or student who scores the highest may not be the ones who learnt the most. Determining the students who have achieved the learning objective is a critical factor that needs to be addressed within the Nigerian context before implementing gamification in the school system.

Strategies for Integrating Gamification in Nigerian Schools
Considering the challenges of gamification in the Nigerian educational system, the following strategies are hereby suggested for improved uptake

 i. Teachers and educational administrators should be provided training opportunities for not only greater awareness, but also better understanding of what gamification is, the guiding principles and the guidelines for integrating it into the school curriculum.
 ii. Government at the federal and state levels, as well as international educational agencies should make provision for equipping schools with state-of-the-artequipment and facilities for students to experiment with and explore the benefits of gamification in their schools. Teachers should be trained on the usage of these tools, in order to minimize distraction.
iii. Uniform assessment framework should be developed that establishes statewide benchmark for performance. This will limit the tendency for students to be unduly competitiveas well as empirically verify the extent to which learning goals have been achieved.
 iv. Finally, researchers and practitioners within the Nigerian educational system should endeavor to conduct field studies on the effect of gamification on the performance of students. This has the potential of providing country-specific evidences and developing home-grown solutions for improving students' performance through gamification

III. CONCLUSION

Different times call for different approach to teaching and learning. The current crop of students who are generally referred to as digital natives require a new set of content knowledge, but also a different skill-set to confront the challenges of the modern world. Gamification is one of teaching method that promises to not only increase students' motivation and engagement, but also meets their need for fun and experimentation. When properly understood by instructors, adequately designed and implemented in the learning process, there is the tendency for positive students' attitude and behaviour towards learning.

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