GAMIFYING THE CLASSROOM WITH MOBILE DEVICES TO ENHANCE STUDENTS' OF PUBLIC JUNIOR SECONDARY SCHOOL ACADEMIC PARTICIPATION IN RIVERS STATE

UKALA, Chinyere Catherine (Ph.D)
kateukala@gmail.com
Department of Educational Management
Faculty of Education
University of Port Harcourt

ABSTRACT

This study investigated ways classroom could be gamified with mobile devices to enhance junior secondary school students' academic participation in Rivers State. Three research questions and three null hypotheses guided the study. This is an analytical survey that involved a sample of 378 teachers from a population of 2,700 teachers spread across Rivers State. This represented 14% of the population. The instrument used in the study was questionnaire tagged "Gamification of classroom with mobile devices to enhance junior secondary school academic Participation in Rivers State (GCMDEJSSAP) developed by the researcher. The instrument was validated and the reliability yielded an index of 0.76. The research questions were answered using mean and standard deviation while the null hypotheses were tested with independent samples z-test at 0.05 alpha level. The findings revealed among others that the ways classroom can be gamified through integration of new approach to learning process and pedagogy are by incorporating technological change in the classroom using mobile devices as the new generation of learners are immersed in the digital world from birth. Challenges to gamifications of classroom instructional process are teacher incapacity, adoption reluctance and inaccessibility of instructional programmes. The need to empower teacher with technological knowledge for gamification through sponsored training and empowerment among others were recommended.

Keywords: Gamification, Mobile Devices and Academic Performance.

INTRODUCTION

Gamification is a process of using play to learn through rules, dialogue and healthy competition with others. It is a form of active learning process which also promotes competitiveness and competences. It helps the participant to bond and build better relationship with truth, confidence and dignity. It also brings out the best in the individual and collaborative effort with others. Gamification also instil into the participant a sense of self-discipline, self-discovery, team spirit, learning how to win and loose honorably without bitterness, envy or jealousy. It is about finding solution to problems through net-working.

Gamification of learning environment is not alien to Africa. It is indigenous to African traditional system of education which is hardly applied in modern times even with the sophisticated mobile devices available. This process of learning is central to African traditional system of education where children are taught through moonlight play, games of various types like the local abacus ("okwe" in Igbo language) which trains the analytical mind right from childhood, folklores and "Oga" (in Igbo language), which teaches self discipline and the spiritual laws of cause and effect among others. Gamification is an

approach to motivate students to learn by using game design element in learning process. The goal is to maximize engagement, participation and fun through capturing the interest of the learner and inspiring him to a better learning outcome.

Gamification in education could be seen as the process of transferring an academic component with games to demystify a concept which ordinarily would have been seen by the learner as an abstract. The use of games makes a construct real and natural to the learner. It decodes a complex idea to a natural phenomenon and bring life into it. This encourages participation and the use of dialogue in solving problems and makes the learner curious to help in finding solutions by himself which invariably gives him a sense of self-fulfilment, and courage to forge ahead in facing future challenges. It turns a difficult concept into fun and easy to understand and comprehend. In support of this Wheeler (2015) opined that game-based learner is effective for a number of reasons which he highlighted as follows:

- Firstly, there is an impressive array of transferable skills to be acquired especially if the games played are designed effectively.
- Secondly, most people now have the capacity to play games the more, using smartphones, touchscreen, tablets and handheld consoles.
- Thirdly, as we have already seen, many online games have very rich social dimension, which lead gamers to extend their learning further through discussion, collaboration and competition (p.77).

On the other hand according to Nigerian National Policy on Education Section 1 subsection 3b education maximizes the creative potentials and skills of the individual for self-fulfilment and general development of the society. As a result, if we must have a quality, comprehensive, functional and relevant education that will help the development of the child and the society at large, we must have to adopt the technological change that is ruling the world and making the world a global village through these devices.

The only thing that is permanent in life is change and life is change. The future of quality education delivery lies in the adoption of technological change. FRN (2013) opined that educational activities shall be learner centered for maximum self-development and self-fulfilment that teaching should be practical, activity based, experiential and IT supported, and that the acquisition of functional skills and competencies necessary for self-reliance must be adopted in the system. Moreover in Section 2 article 29 stated that:

> In recognition of the prominent role of Information and Technology (IT) in advancing knowledge and skills necessary for effective functioning in a knowledge driven world, government shall provide adequate infrastructure and develop capacity for effective utilization of Information Technology (IT) to enhance the delivery of Basic Education in Nigeria (p.15).

This study is anchored on Social Cognitive Theory by Albert Bandura (1977) which states that human behaviour is extensively motivated and regulated by the ongoing exercise of self-influence. There is a link between what exercises that go on in the environment cognitive enhancement of students. Researchers have shown that there is interconnectedness between social interaction and cognitive enhancement.

Despite the lackadaisical attitude of the school system to effectively use and implement the use of mobile devices to enhance teaching and learning and student participation in the learning process there are some benefit accruable from their proper use. This is outlined by Bell and Ans in Amia-Ogan and Osuji (2016):

- Global access to knowledge
- Instant sharing of experience and best practices
- Self paced and self based learning
- Learning become interactive and joyful through multimedia tools
- Opening windows for new atmosphere of innovation
- Bringing excitement and motivation, proud of owing technology, feeling of in-a-way
    being ahead of time.

Moreover a research carried out by Peckenkina, Laurence, Oates, and Hunter (2017) revealed that after measuring the relationship between students" application usage and their engagement, retention and academic achievement in the subject area students retention rates, and academic performance increased and that there was a positive correlation between students' scoring highly on the application and achieving higher academic grade.

Statement of the Problem

Effective students' classroom participation which is critical to learning is increasingly becoming an issue particularly at the early years of schooling namely primary and junior secondary school (Basic level). Surprisingly, these children who are not learning fast in classroom instructional process seem to demonstrate high level of proficiency in the manipulation of mobile devices at home even without being taught. Unfortunately, these devices are considered in most schools as distractions and hence banned. Incidentally in today digital age, gamification has been a popular tact to encourage behaviours and increase motivation and engagement. With these the researcher as well as members of the public and other stakeholders in education wondered why gamification with mobile devices should not be implemented into educational programme helping learners to achieve their objectives and give them the advantage to compete globally in the 21st century as leaving in the digital age is different to any previous form of education we are used to. In today's world knowledge is highly interconnected than ever, so also are humans, and we now see these mobile devices knowledge being used to negotiate and interact within and around the globe, making the world a global village.

Aim and Objectives

The study aimed at investigating ways classroom could be gamified with mobile devices to enhance junior secondary students' academic participation in Rivers State, Nigeria. Specifically, the study sought to:

1. Determine ways in which classroom can be gamified through the use of mobile devices to enhance junior secondary school academic participation in Rivers State.
2. Ascertain the benefits of gamifying the classroom through the use of mobile devices to enhance junior secondary school academic participation in Rivers State.
3. Examine the challenges militating against the use of gamification through mobile devices to enhance junior secondary school academic participation in Rivers State.

Research Questions

The following research questions were answered in this study.

1. What are the ways in which classroom can be gamified through the use of mobile devices to enhance junior secondary school academic participation in Rivers State?

2.   What are the benefits of gamifying the classroom through the use of mobile devices to enhance junior secondary school academic participation in Rivers State?

3.   What are the challenges militating against the use of gamification through mobile devices to enhance junior secondary school academic participation in Rivers State?

Hypotheses

The following null hypotheses were tested at 0.05 alpha levels.

1.   There is no significant difference between male and female teachers on ways in which classroom can be gamified through the use of mobile devices to enhance junior secondary school academic participation in Rivers State.

2.   There is no significant difference between male and female teachers on the benefits of gamifying the classroom through the use of mobile devices to enhance junior secondary school academic participation in Rivers State.

3.   There is no significant difference between male and female teachers on the challenges militating against the use of gamification through mobile devices to enhance junior secondary school academic participation in Rivers State.

Methodology

The study adopted analytic survey. This involved a sample of 378 teachers from a population of 2,700 teachers spread across Rivers State. This represented 14% of the population. The instrument used in the study was questionnaire tagged "Gamification of classroom with mobile devices to enhance junior secondary school academic Participation in Rivers State (GCMDEJSSAP) developed by the researcher. The instrument was validated and the reliability yielded an index of 0.76. The research questions were answered using mean and standard deviation while the null hypotheses were tested with independent samples z-test at 0.05 alpha level.

Results

Research Question One

What are the ways in which classroom can be gamified through the use of mobile devices to enhance junior secondary school students' academic participation in Rivers State?

Table 1: Weighted mean and standard deviation scores on the ways classroom can be gamified through the use of mobile devices to enhance junior secondary school students' academic participation

s/n	Items	Male teachers= 153		Female teachers= 225	
		Mean	Sd	Mean	Sd
1	The teachers should make the students co-designers	3.43	0.11	3.09	0.34
2	Educational video game should be incorporated into the curriculum	3.59	0.05	3.12	0.56
3	The teachers should make use of badges	3.21	0.22	3.87	0.01
4	There should be the use of virtonomics	2.97	1.07	3.66	0.21
5	Abandon grade and use expansion points to award marks	3.01	0.90	3.12	0.33
6	Students do not design or create their own game of play	3.71	0.19	3.44	0.42
7	Gamify homework to make learner continue after school hours	3.15	0.23	3.26	0.66
8	Gamification should focus on meaningful learning task	3.18	0.22	3.39	0.11
9	The teachers make progressive visible	2.98	1.02	3.09	0.71
10	The teachers, should have instant feedback	3.17	0.15	2.88	1.20
		32.4	4.16	32.92	4.55
		3.24	0.42	3.29	0.46

Table 1 revealed that items with serial numbers 1-10 have their various mean values above the criterion mean value of 2.50 and are therefore agreed by the respondents as the ways in which classroom can be gamified through the use of mobile devices to enhance junior secondary school students' academic participation in Rivers State. The ways classroom can be gamify are that: teachers should make students co-designer, incorporation of educational games in the curriculum, the use of badges, the use of virtonomics, abandonment of grade and use expansion points to award marks, students do not design or create their own game of play, homework, work should be gamified to make learner continue after school hours, gamification should focus on meaningful learning task, the teachers make progressive visible, the teachers should provide instant feedback.

Research Question Two

What are the benefits of gamifying the classroom through the use of mobile devices to enhance junior secondary school students' academic participation in Rivers State?

Table 2: Weighted mean and standard deviation scores on the benefits of gamifying the classroom through the use of mobile devices to enhance junior secondary school students' academic participation

		Male teachers = 153		Female teachers = 225	
		Mean	Sd	Mean	sd
11	It improves learning cohesiveness	2.77	1.77	3.01	1.00
12	It brings about behavioural change	3.67	1.09	3.21	0.10
13	Gamification provides better learning environment	3.43	0.12	3.39	0.88
14	It appeals to the overall learning	3.58	0.11	3.67	0.26
15	It enhances learners concentration	3.66	0.32	2.99	0.92
16	Gamification makes learning interactive	3.31	0.53	3.21	0.66
17	Gamification promotes retention	3.54	0.37	3.31	0.65
18	Gamification encourages slow learners	3.33	0.71	3.24	0.20
19	It initiates healthy competition	2.88	0.35	3.44	0.67
20	It develops in the students sense of achievement	3.21	0.23	3.31	0.21
		33.38	5.6	32.78	5.55
		3.34	0.56	3.28	0.56

Table 2 revealed that items with serial numbers 11-20 have their various mean values above the criterion mean value of 2.50 and are therefore agreed by the respondents as the benefits of gamifying the classroom through the use of mobile devices to enhance junior secondary school students' academic participation in Rivers State. The benefits of gamifying the classroom are that: it improves learning cohesiveness, it brings about behavioural change, gamification provides better learning environment, it appeals to the overall learning, it enhances learners' concentration, gamification makes learning interactive, gamification promotes retention, gamification encourages slow learners, it initiates healthy competition and it develops in the students' sense of achievement.

Research Question Three

What are the challenges militating against the use of gamification through mobile devices to enhance junior secondary school students' academic participation in Rivers State?

Table 3: Weighted mean and standard deviation scores on the challenges militating against the use of gamification through mobile devices to enhance junior secondary school students' academic participation

s/n		Male teachers= 153		Female teachers= 225	
		Mean	Sd	Mean	sd
21	Most schools see the use of mobile devices as a distraction	3.37	0.12	2.98	0.98
22	Dearth supply of usable games	3.54	0.23	3.31	0.38
23	Lack of clear instructional objectives	3.47	0.22	3.87	0.12
24	There is lack of facilities to encourage gamification	2.99	0.13	3.84	0.23
25	Teacher incapacity	3.76	0.24	2.71	0.87
26	Poor time management for the programmes	3.90	0.11	3.56	0.12
27	School system adoption reluctance	3.88	0.51	3.22	0.61
		24.91	1.56	23.49	3.31
		3.56	0.22	3.36	0.47

Table 3 showed that items with serial numbers 21-27 have their various mean values above the criterion mean value of 2.50 and are therefore agreed by the respondents as the challenges militating against the use of gamification through mobile devices to enhance junior secondary school students' academic participation in Rivers State. The challenges of gamification are that: most schools see the use of mobile devices as a distraction, there is dearth supply of usable games, lack of facilities to encourage gamification, lack of clear instructional objectives, teacher incapacity, poor time management for the programmes and school system adoption reluctance.

Hypothesis One

There is no significant difference between male and female teachers on ways in which classroom can be gamified through the use of mobile devices to enhance junior secondary school students' academic participation in Rivers State.

Table 4: Independent z-test on the mean ratings of male and female teachers on the ways in which classroom can be gamified through the use of mobile devices to enhance secondary school students' academic participation in Rivers State.

Gender	N	Mean	Sd	Df	z-cal.	z-crit.	Decision
Male teachers	153	3.24	0.42				Not statistically significant
Female teachers	225	3.29	0.46	376	1.00	1.96	

Table 4 showed that male teachers have mean and standard deviation scores of 3.24 and 0.42 while female teachers have mean and standard deviation scores of 3.29 and 0.46 respectively. With a degree of freedom of 376, the calculated z-test value of 1.00 is less than the critical table value of 1.96; therefore, the null hypothesis is accepted. By implication, there is no significant difference between male and female teachers on ways in which classroom can be gamified through the use of mobile devices to enhance junior secondary school students' academic participation in Rivers State.

Hypothesis Two
There is no significant difference between male and female teachers on the benefits of gamifying the classroom through the use of mobile devices to enhance junior secondary school academic participation in Rivers State.

Table 5: Independent z-test on the mean ratings of male and female teachers on the benefits gamifying classroom through the use of mobile devices to enhance secondary school students' academic participation in Rivers State.

Gender	N	Mean	Sd	df	z-cal.	z-crit.	Decision
Male teachers	153	3.34	0.56				Not statistically significant
Female teachers	225	3.28	0.56	376	1.20	1.96	

Table 5 showed that male teachers have mean and standard deviation scores of 3.34 and 0.56 while female teachers have mean and standard deviation scores of 3.28 and 0.56 respectively. With a degree of freedom of 376, the calculated z-test value of 1.20 is less than the critical table value of 1.96; therefore, the null hypothesis is accepted. By implication, there is no significant difference between male and female teachers on the benefits of gamifying the classroom through the use of mobile devices to enhance junior secondary school academic participation in Rivers State.

Hypothesis Three
There is no significant difference between male and female teachers on the challenges militating against the use of gamification through mobile devices to enhance junior secondary school students' academic participation in Rivers State.

Table 6: Independent z-test on the mean ratings of male and female teachers on the challenges militating against the use gamification through mobile devices to enhance secondary school students' academic participation in Rivers State.

Gender	N	Mean	Sd	Df	z-cal.	z-crit.	Decision
Male teachers	153	3.56	0.22				Statistically significant
Female teachers	225	3.35	0.47	376	5.00	1.96	

Table 6 showed that male teachers have mean and standard deviation scores of 3.56 and 0.22 while female teachers have mean and standard deviation scores of 3.35 and 0.47 respectively. With a degree of freedom of 376, the calculated z-test value of 5.00 is greater than the critical table value of 1.96, therefore, the null hypothesis is rejected. By implication, there is a significant difference between male and female teachers on the challenges militating against the use of gamification through mobile devices to enhance junior secondary school students' academic participation in Rivers State.

Discussion of Findings
The findings of this study are discussed under the following subheadings.

Ways Classroom can be Gamified
The ways classroom can be gamify are that: teachers should make students co-designer, incorporation of educational games in the curriculum, the use of badges, the use of virtonomics, abandonment of grade and use expansion points to award marks, students do not

design or create their own game or play, homework should be gamified to make learner continue after school hours, gamification should focus on meaningful learning task, the teachers make progressive visible, the teachers should provide instant feedback. It was found that there is no significant difference between male and female teachers on ways in which classroom can be gamified through the use of mobile devices to enhance junior secondary school students' academic participation in Rivers State. The importance of gamification cannot be overemphasized. The finding of the study is in line with Opurum (2014) who found that gamification can be carried out in the school through active involvement of the students and instant feedback on the students.

Benefits of Gamifying Classroom

The benefits of gamifying classroom are that: it improves learning cohesiveness, it brings about behavioural change, gamification provides better learning environment, it appeals to the overall learning, it enhances learners' concentration, gamification makes learning interactive, gamification promotes retention, gamification encourages slow learners, it initiates healthy competition and it develops in the students' a sense of achievement. It was found that there is no significant difference between male and female teachers on the benefits of gamifying the classroom through the use of mobile devices to enhance junior secondary school academic participation in Rivers State. In line to this Akpa (2017) established that gamification is beneficial and rewarding to both the students and the teachers in the enhancement of quality educational development.

Challenges of Gamifying Classroom

The challenges of gamification are that: most schools see the use of mobile devices as a distraction, there is dearth supply of usable games, lack of facilities to encourage gamification, lack of clear instructional objectives, teacher incapacity, poor time management for the programmes and school system adoption reluctance. The study showed that there is a significant difference between male and female teachers on the challenges militating against the use of gamification through mobile devices to enhance junior secondary school students' academic participation in Rivers State. The work of Uzonna (2000) was in agreement with this study. This is because he found that teacher's incapacity has marred the use of gamification in the school system. More to this finding was Ndukwu (2016) who reported that lack of school facilities has discouraged effective use of gamification in the schools. Still in line with the finding, Monday (2017) found that teacher's negative attitude has adversely affected the effective and efficient use of gamification in the school. There are more to the challenges of gamification in the school. The study carried out by Akaranta (2015) corroborated this study because he found that inadequate allotment of time incapacitates gamification in the school.

CONCLUSION

Based on the findings of this study, it was concluded that gamification through the use of mobile devices is indispensable and incredible in enhancing academic participation in Rivers State.

RECOMMENDATIONS

The following recommendations were made in this study:

1.   Gamification should be fully integrated into the school curriculum in order to enhance students' participation in arduous academic activities with keen interest.

2.   Orientation services should be organized for the students by the school administrators on the importance of their full participation in gamification for improved academic participation.
3.   Government, Unicef, Unesco and TET-Fund should supply the schools with games, mobile devices and befitting classrooms that can encourage and sustain gamification in the schools.
4.   The need to empower teacher with technological knowledge for gamification through sponsored training and empowerment among others were recommended.

REFERENCES

Akaranta, A.D. (2015). *Time management and gamification in the schools*. Port Harcourt: Fred Publishers.

Akpan, E.E. (2017). Benefits of gamification in enhancing students learning phobia. *Journal of Educational Development, 2(1), 22-30.*

Amue-Organ, O. T. & Osuju, U.C. (2016) Availability and utilization of digital instructional materials in public senior secondary schools in Port Harcourt metropolis, Rivers State. *Nigeria international Journal of Academic 2(1), 129-130* Bandura, Albert (1977). *Social learning theory*. New York: General Learning Press.

Federal Republic of Nigeria (2013) National Policy on Education, Lagos: NERDC Press.

Federal Republic of Nigeria (2014) U.B.E. Universal Basic Education for Nigeria. Abuja: NERDC Press.

Monday, I.K. (2017). *Attitude of teachers toward the use of gamification in secondary schools in Rivers State*. Istanblle Press.

Ndukwu, C.U. (2016). Facilities provision and effective gamification in secondary schools. *Journal of Education Review, 3(1), 19-25.*

Opurum, U.E. (2014). Uses of gamification for instructional delivery in secondary schools. *Journal of Educational Development, 2(1), 15-22.*

Peckenkina, E., Laurence, D., Oates, E., & Hunter, H. (2017). Using a gamified mobile app to increase student engagement, retention and academic achievement. *International Journal of Education Technology in Highlighter Education (2017)* 14-31 Retrained 6 June 2017 from https://www/reseachgate.nets>publication

Uzonna, A.K. (2000). Challenges to the use of gamification in the schools. *Journal of Education Review, 3(1), 10-18.*

Wheeler, S. (2015). *learning with 'e's: Educational theory and practice in the digital age.* UK: Crown House Publishers. Badges