



Effect of Gamification on Performance and Interest of Students in Basic Technology in Rivers State

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ABSTRACT

This study investigated the effects of gamification on students' performance and interest in Basic technology in junior secondary school in Rivers State. Five research questions and hypotheses guided the study. The population of this study comprised 764 JSS 2 students from selected Public Junior Secondary Schools in Rivers State and sample of 166 students (92 male and 74 female) was used for the study. Purpose sampling technique was adopted to compose the sample. A pre-test post-test quasi experimental design was used. Two instruments namely; Basic technology achievement tests (BTAT) and Basic technology Interest Inventory (BTII) were used for data collection. The obtained data were analysed for means and standard deviations. These were used to answer the research questions while paired t-test and analysis of covariance (ANCOVA) were used to test the hypotheses. It was found that gamified teaching method (GTM) significantly improved students' academic performance and showed significant effect on students' interest. However gamified teaching strategy did not affect students' interest and performance based on gender. Based on these findings, it is recommended thus; junior secondary schools should adopt gamified teaching method in basic technology since it improves students' academic performance and could enhance students' interest in basic technology. The implications of the results include the need to carry out further investigation on gamified teaching methods with emphasis on students' interest in basic technology.

Keywords: Gamification, Motivation, Engagement, Secondary Education, Academic Achievement

INTRODUCTION

The introduction of technology as a way of doing things based on scientific knowledge has brought about improvement in the standard of living in the society. Chou and Yu-kai (2015), opined that technology has been transforming human life in one way or another for centuries but in this computer age, the pace of technology is continuously changing. Technology leads to economic development of the society where it is applied, and it can be applied to all areas of human life such as religion, business, politics, academics, socials etc.

The relevance of the knowledge of Basic Technology to individuals in order to live an effective and productive life in the society in which they find themselves is not in doubt. The subject is necessary in today's world and impacts in almost everything an individual does for survival in the society. The knowledge of Basic Technology helps to prepare individuals with the needed skills and knowledge required to bring about solutions to various problems that face mankind. Daniel (2012) posits that a good foundation in Basic Technology is an essential step for the study of science and other related disciplines. Furthermore, for a nation to be competitive in a global market and in this technological era it is required of the nation to be scientifically and technologically outstanding and Basic Technology is the pivot of these subjects. In agreement to this, Ale and Lawal (2010) asserted that the difference between a developed and developing nation is based on their level of technological attainment and ingenuity.

Basic Technology is designed in series for junior secondary schools in Nigeria in accordance with the new curriculum developed by the Nigerian Education Research and Development Council (NERDC) for

the nine-year Basic Education Programme. The series cover synthetic and natural materials, wood, metals, plastics, ceramics, energy, technology and machines necessary as the bedrock for a successful technological development. It is a foundation subject with the purpose of inculcating technological literacy in the students, exposing them to the world of work in tangent with their talents and interests for wise vocational choice and inculcation of the right attitude towards work. Basic Technology is the foundation upon which students' technological development is built as it affords students the opportunity to use technology and develop good attitudes towards the use of technology in the industry. The teaching of Basic Technology became necessary due to the increased national attention towards vocational education and this has helped in reducing ignorance about technology.

Research abounds on the factors militating against the academic performance of junior secondary school students in Basic Technology. As Udoma (2015), asserts some of such factors include but are not limited to; lack of problem-solving skills, lack of interest by students and methods of teaching such as the traditional chalk-and-talk method. Having the 21st century learners fill the classroom, the task for educators due to the learners' profile and characteristics have changed. These learners want to be challenged and engaged through a learning process which connects them to a different learning process. Educational institutions the world over have recognized the salient roles technology plays in the learning process and environment. Hence, this has made the business of education in the developed world highly hinged on digital technology. With technological advancements, learning has changed; fun, engagement and interaction are now keys to make learning interesting for today's 21st century learners.

In the quest to discover new ways of enhancing the teaching and learning of Basic Technology as a bedrock for a successful technological development, there is great need to foster innovative teaching strategy aimed to improve students' interest and academic performance in Basic Technology. There is need for practical, hands-on activities and active participation of students in the learning process as to build their interest and academic performance in the subject of Basic Technology. Recently there has been an increasing interest in the use of game features in non-game applications with the aim of increasing motivation, engagement, interest and performance and this gave rise to the introduction of the term gamification.

Gamification is one of the most important technology trends. The term itself comes from the digital media industry and was used for the first time in 2008, but its wider usage started two years later. Authors of academic research papers on one side and professional industry reports on the other side agree on the general definition of gamification as the integration of gaming dynamics in non-gaming environments (Zichermann, 2011). Gamification is a relatively new concept but an old practice. Games and the elements that make up games have been incorporated into other areas of life throughout history. This is particularly true of education where the need to ensure student interest and participation has meant that game mechanics such as challenges, rewards, group tasks, puzzles have become core teaching tools. Games and game elements have been used as tools for learning as they help simulate real-life situations in safe and often entertaining environment and they often tend to engage players and participants so much that they are emotionally immersed in the process, thereby enjoying the task and challenges it offers.

As a new mode of teaching and learning, the principal appeal of gamification is the liberty that it provides students and teachers as encapsulated by the four freedoms: the freedom to fail, freedom to experiment, freedom of effort and freedom to self-express. Those freedoms represent a welcome pedagogical shift for those students whose educational potential is being hampered by conventional teaching methods. Teachers today still face difficulties in keeping their students engaged and motivated to learn in the classrooms. Hugos, and Michael (2012) found in their study that most teachers are still bound to conventional teaching methods and very much preferred the teacher-centered approach which resulted in negative impact on students' intrinsic motivation and engagement to learn within the classroom walls. Not to mention, Kapp, (2013) study which found that student motivation and interest towards classroom activities as well as academic performance were generally below average in Mathematics. Furthermore, Kumar, (2013) found that the preferred conventional teaching methods which incline towards teacher-centered learning tends to adopt a one-way communication which proved to be ineffective when it comes

to developing students' thinking abilities and inhibits from exploring their true potential. Thus, several suggestions in reforming the education system were brought forward including the promising gamified teaching method (Marczewski & Andrzej, 2015). Their study had shown positive effects of gamification in motivating and inspiring certain behavior as well as keeping them interested and willingly engaged with their learning environment.

Meaghan (2005) opined that gamification increases student interest in class activities as it allows learning to be flexible, justifying why gamifying the classrooms is very necessary. Literature abounds concerning the fact that gamification has the potential to arouse students' interest to learn thereby improving their academic performance. The Macquorie Dictionary, 1987 as cited in Carmichael, Callingham, Hay and Watson (2010) defined interest as "the feeling of one whose attention or curiosity is particularly engaged in something". Carmichael et al further stated that interest is a state where the learners become very engrossed in the learning task that they lose all sense of time. Hence, student interest in Basic Technology would imply active involvement and participation in learning activity, curiosity to discover more, regular attendance to class among others. Offorma (2003) posits that the instructional strategy adopted in teaching any subject matter could have either positive or negative effects on students' interest.

Furthermore, some of the proponents of gamification were emphatic in advocating that gamifying the classroom has the capacity of inculcating in the students, problem-solving, critical thinking, collaborative and inquiry skills which are cardinal in attaining high academic performance in Basic Technology in Nigerian Secondary Schools. Hence, gamification would make available various activities that would enable the facilitation of the relevance of Basic Technology and subsequently enhance students' academic performance. The teacher in applying gamification strategy in teaching and learning would seek to ease the student's problems by creating a balance between the lessons learnt and relating same to solving real life problems. The teacher in his interactions with his learners performs a variety of roles. He is firstly a teacher whose business is to transmit knowledge, and in doing this he specifies the objectives of his lesson and examines the needs and background of the students for relevance of the topic and its suitability. Also, the teacher applies other teaching strategies such as the discussion strategy to the teaching-learning process; the teacher plays the role of a manager, guide, initiator, referee and a summarizer.

The discussion teaching method is a design that provides opportunity for discussion between teacher and students, and students to students. It is a strategy that centres on shared conversations, discussions and exchange of ideas in class. It gives opportunity for all to sit and listen, as well as talk and think, thus emphasizing the process of "coming to know" as valuable as "knowing the right answer. In other words, students in a discussion class are not passive listeners neither is the teacher a sole performer. Students are allowed to develop critical thinking ability, learn to evaluate ideas, concepts and principles, procedures and even programmes and policies on the basis of clearly set criteria. Essentially too, the discussion strategy encourages cooperative team work between teacher and students and amongst students. The traditional known method of teaching in secondary education is the discussion. The gamification strategy is widely known in other contexts, it is still a relatively new concept in the field of education especially secondary education, (Zichermann, 2011). Therefore, there is need to verify the effect of gamification on interest and academic performance of Junior Secondary School Basic Technology students in Rivers East Senatorial District.

Statement of the Problem

Learning in the classroom is something that is usually not considered fun or entertaining, however, to engage in the act of learning which has to do with gaining knowledge, skill or attitude a learner must be motivated. There is a tremendous need to make the learning process challenging, engaging and motivating for the 21st century learners and this has become a major challenge for the teachers.

Basic Technology is a subject in the curriculum of Junior Secondary Schools in Nigeria, aimed at helping students acquire knowledge, skills and attitude about technologies. The relevance of Basic Technology for sustainable development and growth of any nation is not in doubt. Knowledge of Basic Technology is a fundamental tool in the study of science and related courses. However, lack of interest and poor

academic performance of Junior Secondary School students in Nigeria in Basic Technology have become of very great concern to all stakeholders in Education.

The researcher observed the poor academic performance of students who sat for Junior West Africa Examination Council (WAEC) examination in basic technology between 2010 and 2019. The failure could be attributed in part to the teaching strategy adopted by teachers in teaching the subject matter. Hence, to improve students' academic performance in Basic Technology, it is expected of the teachers to adopt innovative strategies which may have the capacity to spur students' interest as well as keep them motivated enough to stick with the learning process in teaching the subject matter. This study therefore sought to find out the extent to which gamified teaching method can enhance Junior Secondary School students' interest and performance in Basic Technology.

Aim and Objectives

The aim of this study is to investigate the effect of gamification on interest and academic performance of students in Basic Technology in Public Junior Secondary Schools in Rivers State. Specifically, the study sought to;

1. determine the effect of gamified teaching method (GTM) on students' performance in Basic Technology.
2. ascertain the effect discussion method (DM) on students' performance in Basic Technology
3. find out the difference in academic performance in Basic Technology between students taught using gamified teaching method (GTM) and those taught with discussion method (DM).
4. determine the difference in performance between male and female students taught Basic Technology using gamified teaching method (GTM) and those taught with discussion method (DM).
5. examine the difference in students' interest towards Basic Technology between those taught using gamified teaching method and those taught with discussion method.

Research Questions

The following research questions guided this study;

1. What is the effect of gamified teaching method on students' performance score in Basic Technology?
2. What is the effect of Discussion method (DM) on students' performance score in Basic Technology?
3. What is the difference in performance scores of Basic Technology student taught with gamified teaching method and those taught with discussion method?
4. What are the effects of gamified teaching method and discussion method on the performance scores of male and female students in Basic Technology?
5. What is the difference in the interest mean scores of students taught Basic Technology using GTM and those taught with DM?

Hypothesis

The following hypotheses were tested at probability level of 0.05.

H0₁: There is no significant effect of gamified teaching method on performance of students in Basic Technology.

H0₂: Discussion method does not have significant effect on performance of students in Basic Technology.

H0₃: There is no significant difference in the performance scores of Basic Technology students taught with gamified teaching method and those taught with discussion method.

H0₄: The performance scores of male and female students taught Basic Technology with gamified teaching method and those taught with discussion method does not differ significantly.

H0₅: There is no significant difference in the interest of students in Basic Technology between those taught with gamified teaching method and those taught with discussion method.

METHODOLOGY

The research design adopted for this study is quasi experimental design using non-randomized, non-equivalent, pre-test and post-test experimental group design. A quasi-experiment is an empirical research study that is used to estimate the causal impact of an intervention on a target population this was because true randomization was not possible but intact classes were purposively assigned to the experimental and control groups. The population of the study comprised all the 764 JSS2 students from three purposively

selected schools in Rivers East senatorial District. Sample of the study comprised 166 JSS2 Students (74 female students and 92 male students). The control group consisted of 80 students (37 female students and 43 male students) and the experimental group comprised 86 students (37 female students and 49 male students). Intact classes were used; hence, there was no randomization. Purposive sampling technique was used to select the three co-educational Secondary school students because it involves the use of specific cases which possess the specific characteristics to be studied. Two instruments for data collection were developed and used for the study which includes a Researcher-made students Basic Technology Achievement Test (BTAT) and students Basic Technology Interest Inventory (BTII). The BTII consisted of 15 items to access the interest of the students in Basic technology. It comprised questions that were used to probe students' interest, attitude, values and curiosity. The instrument was structured along a 4-point modified Likert scale of: Strongly Agree (SA) = 4 points, Agree (A) = 3points, Disagree (D) = 2 points, Strongly Disagree (SD) = 1 point while the BTAT consisted of twenty-five (25) structured multiple choice test items comprised the subject matter from the national Basic technology curriculum for Junior Secondary Schools. The researcher ensured that the students are assessed on all important areas of the subject matter. The tests were graded at four (4) marks to give a total of 100 marks.

To ensure the validity of the instruments of this study, the draft copies of the two instruments (BTAT and BTII) were given to one expert in Curriculum Studies and Educational Technology Department and two experts in Measurement and Evaluation to establish their face and content validities. The specialists were requested to ascertain whether the instruments were suitable enough to generate the required data and whether the items were adequate. The reliability coefficients of the instruments were determined using Kuder-Richardson Formula 21 (KR 21) and Cronbach Alpha respectively. A coefficient of 0.80 was obtained for BTAT and 0.85 for BTII.

The method of data collection was done in phases. In the first phase, the researcher visited the chosen schools to seek for permission to use the students as well as some facilities in the selected schools. Thereafter a pretest was administered to the students to determine their baseline knowledge. This was immediately followed by exposure and readiness assurance of the experimental group on the workings of a gamified classroom and this phase lasted for one week. This was followed by the administration of treatment in both experimental and control groups. Three topics (Workshop Safety, Freehand Sketching and Energy and Power) were taught concurrently in the three schools using the appropriate treatment in each school for a period of three weeks. Then the BTAT was reshuffled and administered as well as the BTII to the three groups as post-test. Mean and standard deviation were conducted on research questions while the hypotheses were tested using paired t-test, one-way and two-way analysis of covariance and analysis at 0.05 alpha level of significance.

RESULTS

Research Question One: *What is the effect of gamified teaching method on students' performance score in Basic Technology?*

This question was answered using mean and standard deviation, which were computed using the scores of the students before and after the treatment. The results of the analysis are as presented in table 1.

Table 1 mean on the performance of student before and after using GTM

Mode of test	N	Mean	SD	Gained mean
Posttest	86	78.08	8.55	29.43
Pretest	86	48.65	8.20	

Results in table 1 show that the mean scores of the students expose to GTM were 78.08 (SD = 8.55) and 48.65 (SD = 8.20) respectively before and after exposing them to GTM. This yielded a gained mean score of 29.43 from the pretest and posttest. Thus, gamified teaching method (GTM) has positive effect on the performance of students in basic technology.

Research Question Two: *2. What is the effect of Discussion method (DM) on students' performance score in Basic Technology?*

To answer this research question, mean and standard deviation were employed on pretest and posttest performance scores in Basic technology. The result obtains are as presented in table 2

Table 2 Mean on the pretest and posttest performance scores of the students in DM group in Basic Technology

Mode of test	N	Mean	SD	Gained mean
Post test	80	56.64	6.75	10.71
Pre test	80	45.93	7.71	

In table 2, it is shown that the mean scores of the students before and after exposing them to Discussion method of teaching Basic Technology were 45.93 and 56.64. This yielded a gained mean score of 10.71 from the pretest to posttest period.

Research Question Three: *What is the difference in performance scores of Basic Technology student taught with gamified teaching method and those taught with discussion method?*

In order to answer this research question, the mean and standard deviation descriptive statistics were employed. They were computed for the group of students taught with gamified teaching method and those taught with discussion method. In relation to their pretest and posttest scores, later the mean score gained from the pretest and post test period were obtained for each group and compared. The results obtained are presented in table 3.

Table 3: Mean difference in performance of Basic Technology students taught using GTM and DM

Teaching Strategies	N	Pretest		Post Test		Gained Mean
		Mean	SD	Mean	SD	
GTM	86	48.65	8.21	78.08	8.55	29.43
DM	80	45.93	7.71	56.64	6.75	10.71

Table 3 shows that the students in the GTM group had the mean scores of 48.56 (SD = 8.21) and 78.08 (SD = 8.55) respectively in their pretest and posttest scores in Basic Technology. These yielded a gained mean score of 29.43 from their pretest scores to their posttest scores. For the group taught Basic Technology with DM, they had the mean score of 45.93 and 56.64 respectively during the pretest and posttest. Thus, they gained a mean score of 10.71 from the pre to the post test.

Comparatively, the group of students taught Basic Technology using GTM gained a higher mean score than their counterparts taught with DM with a difference of 18.72.

Research Question Four: *What are the effects of gamified teaching method and discussion method on the performance scores of male and female students in Basic Technology?*

This research question was answered using mean and standard deviation. To execute these, the pretest and posttest scores on Basic Technology were considered based on the instructional strategies and gender. Thereafter, the results obtained are presented in table 4.

Table 4 mean difference in performance of Basic Technology Students taught using GTM and those taught with DM based on their gender.

Teaching Strategy	Gender	N	Pretest		Post test		Gained Mean
			Mean	SD	Mean	SD	
GTM	Male	49	48.29	8.28	79.39	8.96	31.10
	Female	37	49.14	8.20	26.35	7.74	27.21
	Total	86	48.65	8.21	78.08	8.54	29.43
DM	Male	43	45.07	7.53	56.06	6.64	10.99
	Female	37	46.92	7.90	57.32	6.89	10.40
	Total	80	45.933	7.71	56.64	6.75	10.71
Total	Male	92	46.78	8.06	68.48	14.14	21.70
	Female	74	48.03	8.07	66.84	12.03	18.81
	Total	166	47.34	8.06	67.57	13.23	20.41

Table 4 shows that the male students taught with GTM had the mean scores of 48.29 (SD=8.28) and 79.39 (SD = 8.96) thus they gained a mean value of 31.10 from the pretest to the post test. The female students in the GTM group had the mean scores of 49.14 (SD = 8.20) and 76.35 (SD = 7.74) respectively for the pretest and the posttest. That means they gained a mean score of 27.21 from the pretest to the post test. In essence the male students taught with GTM gained higher mean scores than their female counterpart by a difference of 3.89.

However, the mean scores of the students taught with GTM irrespective of their gender are 48.65 (SD = 8.21) and 78.08 (SD = 8.54) for their pre and posttests, which gave a gained mean score of 29.43.

Conceding the DM group, the male students had the mean scores of 45.07 (SD = 7.53) and 56.00 (SD = 6.64) for their pretest and posttest. That means they had a gained mean score of 10.99 on the other hand the females taught with DM had the mean scores of 46.92 (SD = 7.90) and 57.32 (SD = 6.89) for their pretest and posttest respectively. On this basis they gained a mean score of 10.40, which is lower than that of their male counterparts by a mean difference of 0.59

Furthermore, when the male and female students' performance were considered irrespective of their group, it was found that the male students had the mean scores of 46.78 (SD = 8.06) and 68.48 (SD = 14.4) for their pretest and posttest respectively. This earned them a gained mean score of 21.70 from their pretest to the post test which on the other hand, the females irrespective of their teaching strategy group had the mean scores of 48.03 (SD = 8.07) and 66.84 (SD = 12.03) respectively for the pretest and posttest. Thus, they gained a mean score of 18.81, which is lower than that of the males by a difference of 2.89. In all the male students' performance in Basic Technology is higher than that of the females.

Research Question Five: *What is the difference in the interest mean scores of students taught Basic Technology using GTM and those taught with DM?*

This research question was answered using mean scores of the students in the pretest and posttest based on their teaching strategy groups. The results obtained are as displayed in table 5.

Table 5 mean scores of students' interest in Basic Technology based on their teaching strategy group

Group	N	Pretest		Post Test		Gained mean
		Mean	SD	Mean	SD	
GTM	86	22.85	3.21	36.71	7.18	13.86
DM	80	22.63	3.18	34.55	5.29	11.92

From table 5: It could be deduced that the students that were taught Basic Technology using GTM had the mean scored of 22.85 (SD = 3.21) and 36.71 (SD = 7.18) respectively for their pretest and posttest in interest scale, thus they gained a mean value of 13.86 from the pre – to the post test period. On the other hand, the students that were taught Basic Technology using DM had the mean scores of 22.63 SD = 3.18 and 34.55 (SD= 5.29) is their pre and posttest in interest scale, thus they gained a mean value of 11.92 from the pretest to the post test.

In all the students exposed to gamified teaching method gained a higher mean value them their counterparts taught with DM with a mean difference of 1.94

Hypothesis One: There is no significant effect of gamified teaching method on performance of students in Basic Technology.

This null hypothesis was tested with paired t–test using the pretest and post test scores of the students who were taught Basic Technology with GTM. The results obtained after the analysis are presented in table 6.

Table 6. Paired t–test on the effect of gamified teaching method on students' performance in Basic Technology

Test	N	Mean	Std	Mean Gained	Df	t-value	P-value
Post test		78.08	8.55				
	86			29.43	85	30.37	0.00
Pretest		48.65	8.21				

In Table 6, it is shown that the t-value obtained when the pretest mean score 78.08 (SD = 8.55) and the posttest mean scores of 48.65 (SD = 8.21) were subjected to paired t -test is 30.37. This is obtained at df of 85 and p-value of 0.00 ($p < 0.00$), which is lower than the chosen 0.05-level of significance. Thus, gamified teaching method had a significant effect on the performance of students in Basic Technology. Thus, the null hypothesis is rejected.

Hypothesis Two: Discussion method does not have significant effect on performance of students in Basic Technology.

This null hypothesis was tested with paired t–test using the pretest and post test scores of the students who were taught Basic Technology with Discussion Method. The results obtained are presented in table 7.

Table 7: paired t–test on the effect of DM on performance of students in Basic Technology.

Test	N	Mean	SD	Gained mean	Df	t-Value	p-value
Post Test		56.64	6.75	10.71	79	11.33	0.000
Pre test		42.93	7.71				

In table 7 it is shown that when the pretest mean of 45.93 (SD = 7.71) and the posttest mean value of 56.64 (SD = 6.75) were subjected to paired t-test a t – value of 11.33 was obtained of df of 79 at 0.000 ($p < 0.05$) level of significance. Thus, since the produce is lower than 0.05 the chosen level of probability, it is then deduced that discussion method had a significant effect on performance of students in Basic Technology, Thus the null hypothesis is rejected

Hypothesis Three: There is no significant difference in the performance scores of Basic Technology students taught with gamified teaching method and those taught with discussion method.

This Hypothesis was tested using one-way analysis of covariance (ANCOVA) using the pretest and posttest of the students in the two groups GTM and DM. The results obtained are displayed in table 8.

Table 8: Summary of analysis of covariance on the differential effects of GTM and DM on students’ performance is Basic Technology.

Source of covariance	Sum of Squares	Df	Mean square	F. value	P-value
Pretest performance	1428.94	1	1428.94	27.80	0.000
Group Teaching Str.	16809.71	1	16809.71	327.05	0.000
Error	8377.98	163	51.399		
Total	28865.37	165			

In table 8, it is shown that the F-value 327.05 was obtained at df I and 163 at 0.000 level of significance ($P < 0.05$), which is lower than 0.05, the chosen level of probability. Thus, the null hypothesis is rejected indicating the GTM is significantly more effective than DM on the performance of students in Basic technology.

Hypothesis Four: The performance scores of male and female students taught Basic Technology with gamified teaching method and those taught with discussion method does not differ significantly.

This hypothesis was tested using two-way analysis of covariance (2-way ANCOVA), using the pretest of the students as the covariance while their posttest was the dependent variable on their gender (moderating variable). The results obtained are deployed in table 9.

Table 9: Summary of 2-way ANCOVA on the differential effects of GTM and DM on performance of students in Basic Technology based on their gender

Source of variances	Sum squares	Df	Mean square	F-value	P-value
Pre performance	1445.95	1	1445.95	28.620	0.000
Teaching strategies (Group)	16178.12	1	16178.12	320.22	0.000
Gender	77.83	1	77.83	3.142	0.078
Teachings Strategies and Gender	158.73	1	158.73		
Error	8134.13	161	50.52		
Total		165			

In table 9, it is shown that the F-value for teaching strategy (Group) 320.22 was obtained at df of 1 and 161 at 0.000 level of significance ($P < 0.05$), which is lower than 0.05, the chosen level of probability. Thus, the effect of the teaching strategies on the performance of students in Basic Technology significantly differ. This is in favour of GTM.

Again table 9 also shows that the F- value for gender 1.54 was obtained at df of 1 and 161 at 0.216 ($P > 0.05$) level of significance, which is greater than 0.05, the chosen level of probability. Thus, the performance of male and female students taught Basic Technology with GTM and DM did not significantly differ. Table 9 also shows that the F. value for interaction effect between teaching strategy and gender 3.142 was obtained at df of 1 and 161 at 0.078 level of significance ($P > 0.05$), which is greater than 0.05, the chosen level of probability Thus, the interaction effect between teaching strategy and gender did not significantly affect the performance of students in Basic technology.

Hypothesis Seven: There is no significant difference in the interest of students in Basic Technology between those taught with gamified teaching method and those taught with discussion method.

In order to test this null hypothesis, the pretest interest score of the students were taken as the covariance while the posttest interest scores of students served as the dependent variable based their groups. These data were subjected to one-way analysis of covariance (ANCOVA). The results obtained are as displayed in table 10.

Table 10: Summary of ANCOVA on the differential effects of GTM and DM on the interest of students in Basic Technology

Source of variation	Sum of squares	Df	Mean square	F	p-value
Pre interest score	129.58	1	129.58	3.27	0.073
Teaching strat. (Group)	182.032	1	182.032	4.59	0.034
Error	6469.95	163	39.693		
Total	6792.78	165			

Table 10 shows that the F-value for the teaching strategy (Group), 4.39 was obtained at df of 1 and 165 at 0.5000 level of significance ($P < 0.05$), which is lower than 0.05, the chosen level of probability. Thus, there is a significant difference in the effect of GTM and DM on interest of students in Basic Technology so the null hypothesis is rejected indicates that GTM is a more effective teaching strategy than DM in improving students' interest in Basic Technology.

DISCUSSIONS

Effect of the gamified teaching method on students' performance in Basic Technology

From the study, the findings revealed that students who were taught using GTM performed better in basic technology than students that were taught using DM in public secondary schools in Rivers State. An experiment conducted on students of an e-learning course showed the negative effects of social comparison on motivation. The experiment proved especially that gamification is not an important motivating factor for all of them because some students do not like to compete with their classmates (Domínguez et al., 2013). Studies stated that gamification increases student engagement and participation in class and online settings (Hamari et al., 2014b; Barata et al., 2013) and, above all, experience points, levels, leader boards, challenges and badges are the most consensual game elements used in gamification. This implies that when students are fully engaged in any teaching or class activity, it increases their performance. When learning becomes dynamic and not conventional, participation of students tends to be enhanced.

Furthermore, a study carried out by Dervis (2002) on the impact of information and communication technologies in learning as it concerns the use of technology assisted gamification activity, revealed that teaching language with ICT together with gamification context significantly improved learning and language acquisition. Also, observations show that technology assisted learning also minimizes distraction of children and boost learning.

From the study, the findings revealed that male and female students when taught using GTM performed better in basic technology than when taught using DM. Daniel (2012) studied gamification in education to improve elementary mathematics through engagement; his findings revealed that in WASSCE there was a 62.9% failure rate in mathematics. He focused on how the introduction of gamification as an educational tool and to find out how effectively it can be used to enhance the teaching and learning of mathematics. This validates the findings of the present study. This reveals that using gamified teaching method enhances student's ability to comprehend as well as helps them understand even the most dreadful subject.

Nevertheless, gender difference also occurs in the realm of the classroom as physically, male students tend to be more active and restless if they have to sit for longer periods than female students while female students are perceived to be more motivated than male students, they perform well in school (Dervis, 2002). In a research conducted by Ibrahim (2015), on the effect of gamification-based teaching practices on students' achievement and attitude towards lessons, showed that even though the gamification-based teaching practices did not affect students cognitively, it provided students with positive sentimental attitudes towards lessons. It further revealed that gamification-based teaching practices held a positive impact on student achievement and their attitude towards lessons.

From the study, the findings revealed that both male and female students developed more interest in basic technology when taught using gamified teaching method. A research carried out by Hyo-Jeong (2004) on gamified digital mathematics lessons for lower primary school students shows that gamified environment had a positive effect on students' motivation resulting in students retaining the focus on the given exercise for a longer period, thereby solving more tasks. In a study carried out by Alexandra (2017) reveals that gamification can foster growth and motivate students to come together, work, learn and compete. The researcher posited that 80% students admitted that they would be more productive if their institution where they work or learn would be more game-like. This implies that student's interest on a particular subject increases when gamified teaching method is used. Also, there is a great opportunity out there for gamified learning that should be recognized and embraced by the modern secondary education.

CONCLUSIONS

The results of this study have provided ideas about the potentials of an alternative teaching strategy in junior secondary school Basic technology. The findings from this study could also persuade teachers to employ alternative strategies combined with technologies in their classroom to help students with different learning styles, reveal different methods of teaching, give students extra time for collaboration on one-on-one basis with their teacher and avenue for students to have momentous discussion with peers.

The advantages of implementing gamified strategy could perhaps enhance teacher effectiveness and consequently affect positively students' academic performance and interest in junior secondary school basic technology.

RECOMMENDATIONS

Based on the findings and conclusion of the study, it is recommended as follows:

1. The use of gamified methods of teaching should be encouraged so as to compliment other traditional methods
2. Basic technology subject should be taught more using gamified than DM method
3. Teachers should develop the attitude of engaging students more during teaching; this will enhance their participation thereby increasing their performance.
4. The Government should consider implementing the gamified teaching strategy in basic technology, as it engages and motivates students' interest

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