



Comparative Analysis of the Learning Abilities of Students Who Play Computer Games with Students Who Do Not Play Computer Games in Ogun State, Nigeria.

¹*Elizabeth Titilayo Aduloju, Ph.D;* ²*Charles Olawale Soyeye*

^{1,2}Department of Communication Studies, Catholic Institute of West Africa, Port Harcourt, Nigeria.

Email: t.aduloju@ciwa.edu.ng¹, cshoyege@gmail.com²

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ABSTRACT

With the proliferation of the Internet, interest in online games has steadily increased, and currently, online video games have become very popular in Nigeria. However, there is an assumption that the games, regardless of their type and form, are time-consuming and do not promote intellectual skills as much or at all. Many students in Ogun State, Nigeria, are used to playing computer games outside of school, but the use of computer games as a teaching tool in the curriculum of secondary schools in Ogun State has not been approved. This study examined the use of computer games as a learning tool by secondary school students in Ogun State, Nigeria. It compared the learning abilities of those who play computer games with those who do not and also investigated whether computer games can serve as learning tools for secondary school students in Nigeria. The study used a quasi-experimental design and selected four hundred (400) Junior Secondary School Two (JSS 2) students in three (3) senatorial districts in Ogun State, Nigeria. The study found, among other things, that there was no significant difference in the learning abilities of students who play computer games and those who do not. Based on the findings, the study concluded that it would be appropriate to integrate computer games into the Nigerian education system to further improve the learning skills of students in secondary schools.

Introduction

Cognitive development is the improvement of intelligence, creative thinking, and the ability to solve problems; it begins in infancy and continues through adulthood. Children grow up playing, with or without purpose, and play is natural and necessary for their development. Play brings children joy, amuses them, and motivates them so that they are encouraged to continue playing. Through play, children develop their cognitive, social, physical, and emotional skills. With the recent proliferation of the internet, interest in online games has steadily increased, and currently, online video games are the most popular type of game in our society, especially among young people in Nigeria. For example, Asaolu (2019) asserts that "computer games have recently become increasingly popular among adolescents and young adults in Nigeria due to increased access to computers, the Internet, cell phones, and other technological devices and services" (p. 1). As part of the educational benefits through the use of ICT, computer games can be learning tools, motivators, and curiosity generators, and thus an effective means of optimising student learning and performance in daily educational practice (Papadakis, 2018). In addition, there are several benefits of exposing young children to computer games, such as decision-making, task switching, object tracking, and better visual acuity, all of which are associated with the brain's ability to perceive and make decisions (Landau & Nguyen, 2019; Ugwuanyi, Okenyi, Ezema, & Amoke, 2020).

Onyeka, Sajoh, and Bulus (2013) note that the environment appears to have an impact on an individual's intellectual development; consequently, rapid societal and technological changes can likely have a major impact on how young people think and learn. Undoubtedly, research has shown that gaming itself is addictive and can lead to social isolation, lack of socialisation, or poor academic performance (Han-Tang, Mu-Hong, Po-Cheng, & Ya-Mei, 2017). Behnamnia, Kamsin, Ismail, and Hayati (2022) consider that gaming in all its forms, including computer games, seems to affect children and adolescents in several ways, including their thinking, learning ability, and socialisation. Nonetheless, social relationships play an important role in the academic success of any individual, young or old. Social cognition is considered key to the learning process, as learning requires that a young person be able to interact effectively with others and function in society. More than that, Asaolu (2019, citing Adeosun 1996) proposes the application of cybernetic pedagogy to the Nigerian education system through the development and use of educational games.

Sowunmi and Aladejana (2016) emphasise that the use of computer game applications in schools in developing countries like Nigeria has not gained popularity. The reason for this is not far-fetched, as Asaolu (2019) points out that "Nigerian teachers in training to teach computer skills to learners (at primary and junior secondary levels) still need a lot of training themselves" (2019, citing Adeosun 1996), especially on the potential of computer games for learning" (p. 1). Consequently, this study examines the potential of computer games as educational tools for building intellectual competencies among

secondary school students in Nigeria. It is believed that if computer games could be integrated into the educational system, it would enhance the teaching and learning processes of schools in Ogun State.

Statement of the Problem

Most young people are addicted to computer games and spend a lot of time playing such games, which robs them of a lot of time that they should be investing in academic activities and intellectual pursuits that are conducive to their academic performance (Aduloju, 2020). This lack of academic attention and indiscriminate provision and possession of electronic devices, often used just for fun without any significant learning outcome, is common in secondary schools in Ogun State, Nigeria. As observed, many students in Nigeria are accustomed to playing computer games outside of school, but the use of computer games as educational tools in secondary schools in Nigeria has not been implemented. More so, there is an assumption that games, regardless of the type and form, are time-consuming and have little or no positive value for intellectual skills. Similarly, games may be an important reason for the steady decline in learning and reading habits, as computer games are now found almost everywhere, including portable and mobile devices, making gaming an option for everyone, regardless of location or personality.

Hence, the poor academic performance of students raises several questions about how computer games can improve teaching and learning in secondary schools. Thus, this study compared the learning abilities of those who play computer games with those who do not play computer games and also examined the possibility of incorporating computer games as educational tools for secondary school students in Ogun State.

Research Questions

- What are the types of computer games played by secondary school students in Ogun State, Nigeria?
- In what ways can the learning abilities of students who play games be compared with those of students who do not play computer games in Ogun State, Nigeria?
- What is the possibility of incorporating computer games into the educational system in Ogun State, Nigeria?

Research hypothesis

H₀₁: There is no significant difference in the learning abilities of students who play computer games and those who do not play computer games.

Literature review

The notion of a game and a computer game

Prensky (2001) states that games refer to a subset of both play and fun that gives pleasure or enjoyment. He further writes that play is where someone chooses to do an activity for entertainment or pleasure, whether individually or in social groupings. He also suggests that it can create the 'fun factor' that increases our involvement, thus helping us to learn. Similarly, Huizinga, cited in Gray (2013), defines play as "a free activity standing quite consciously outside 'ordinary' life as being 'not serious', but at the same time absorbing the player intensely and utterly. It is an activity connected with no material interest, and no profit can be gained from it. It proceeds within its own proper boundaries of time and space according to fixed rules and in an orderly manner" (p. 15). According to Smed&Hakonen (2003, p. 36), a "game" is defined as "a universal form of recreation generally including any activity engaged in for diversion or amusement and often establishing a situation that involves a contest or rivalry." Games, according to Mlumun, Ebem, Chiedozie, Umar, and Christian (2021), are activities that possess the following characteristics: fun, constrained to place and time, unknown outcome, not necessarily accomplished useful things, directed by rules and not real.

Further still, a game is usually a set of activities that involve one or more players (Dempsey, Lucassen, Haynes, & Casey, 1996). The characteristics of games include competition and goals, game rules (Alessi & Trollip, 1991; Derryberry, 2007), challenging activities (Malone & Lepper, 1987), risk and consequences (Derryberry, 2007), choices (Hannafin& Peck, 1988; Derryberry, 2007), fantasy elements, and entertainment aspects (Cruickshank & Telfer, 1980). Randel, Morris, Wetzel, & Whitebill (1992) insist that players will be motivated via challenge, fantasy, and curiosity, thus prompting an awareness of learning, while Juul (2005) states that a game can also be defined as:

In a rule-based system with variable and quantifiable outcomes, where different outcomes are assigned different values, the player exerts effort to influence the outcome, the player feels emotionally attached to the outcome, and the consequences of the activity are negotiable (p. 36).

A computer game is a game played on a computer carried out with the help of a computer programme (Smed&Hakonen, 2003). It requires display hardware (i.e., a television or monitor) and input devices (e.g., a mouse, keyboard, or joystick) for interaction (Kirriemuir, 2002). Christopher (1999) proposes that computer games consist of four key elements:

1. a setting that represents reality but is not necessarily realistic;
2. roles or agendas for the participants;

3. rules for achieving some goals or outcomes;
4. scoring or monitoring, some kind of feedback or indicator (p. 442).

In a nutshell, computer games are programmes that allow a player to interact with a virtual game environment for entertainment and fun. There are many types of computer games available, ranging from traditional card games to more advanced video games such as role-playing games and adventure games.

Computer games as tools for building learning abilities

Granic, Lobel, and Engels (2014) note that computer games make students creative. They also state that computer games improve young people's decision-making speed. According to a study from the University of Rochester, Granic, Lobel, and Engels (2014) found that children who played action-based computer games made decisions 25% faster than others without sacrificing accuracy. Other studies suggest that most expert gamers can make choices and act on them up to six times a second—four times faster than most people—and can pay attention to more than six things at once without getting confused, compared to only four by the average person. Granic, Lobel, and Engels (2014) study also revealed that computer games increase students's self-confidence and self-esteem as they master them. Similarly, Ogo-Chukwu & Fomsi (2019) streamline the gains of computer games into three:

- It increases students' motivation to learn. Educational games make learners enjoy and participate fully in the class, and this motivates students and helps them to be attentive and focused on the subject. Competition and teamwork (which are features of games) are exciting for students. When students are motivated, they put in more time and effort into learning and persist in finishing challenging tasks to achieve positive results (Liu, 2014). Educational games stimulate students to learn and understand some dreaded subjects, like mathematics. In a conventional mathematics class, a teacher solves some problems. The instructor displays the rudiments of the lesson to the learners and gives the students some assignments; the more he or she practices, the more he or she grasps the concept. However, oftentimes, these assignments become monotonous and tedious for the students, but when students play mathematics video games individually, competitively, or collaboratively, it increases their desire to learn the subject against the traditional classroom style of learning.
- It helps students develop modern competencies and skills. In contemporary education, the purpose of education has ceased to be just to inculcate literary skills and content knowledge in students and has shifted to developing modern skills and competencies in students, which will be beneficial to them even when they enter the workforce. These modern skills are higher-order thinking skills (critical thinking and problem-solving skills) and social skills (communication and collaboration).
- It facilitates understanding and helps retain content. Games are used in the classrooms not just for fun, but to facilitate learning. If the game is designed well, it can promote learning in students (Mingfong, 2013). Teed (2016) further explains that employing games to learn does not just make learning more fun; it also immerses the learners in the material, so they learn better. The more students are engaged, the easier they understand the course content, and that better understanding translates into excellent learning outcomes.

Given the benefits of gamification in engaging students in the classroom, as outlined above, teachers must employ this teaching strategy. Bally (2017) stresses that students' engagement and active participation lead to an improved learning atmosphere. Students are immersed in the academic process. It could be in their studies, group work, or general class activities. The critical point is that the students are highly active and participate in academic activities. It has been proven that when learners are intensely active in academic activities, it enhances learning, increases their rate of motivation, and enables them to better comprehend and retain what is taught. Student engagement is when learners are actively involved in the classroom with digital tools that excite them (Deneen, 2010). The concept of engagement is very relevant to this study because, with the employment of games in the classroom, students can actively participate in the learning activities. They can play the games in the physical class or on their own. Hence, learning can take place at any time. They would understand and retain what they had learned. Although playing games is very challenging, learners have to be innovative and think critically. This enhances their creativity, thinking abilities, and skills. No doubt, the positive effects of gamification lead to students learning outcomes and engagement. Thus, based on the accumulated benefits and effectiveness of computer games in secondary schools, it is suggested that computer games could be incorporated into their educational system.

Theoretical framework

Social learning theory

The social learning theory, propounded by Albert Bandura in 1977, has been widely applied in the area of media effects on children and young people (McQuail, 2011). This theory argues that the media do have cognitive effects on people, and they can be a source of observational learning. According to the social learning theory, people learn through direct learning or observation (Bandura, 1994; Anaeto, Onabanjo, & Osifeso, 2008). People also learn through indirect sources like the media (McQuail, 2011). That is to say, people can learn through television, movies, or video games. The theory also argues that people are more likely to imitate rewarded behaviours that they have witnessed than the behaviours that are punished (Buckley & Anderson, 2006). McQuail (2011) stated that the theory identified four basic processes of learning: attention, retention, production, and motivation. Attention has to do with concentrating on media content that has potential relevance to our lives' interests and needs. Retention has to do with preserving and recalling what has been learned and adding it to the stock of prior knowledge. Production is the actual application of what has been learned to a situation where it can either be rewarded or punished, leading to increased or decreased motivation.

Bandura demonstrates the social learning of aggressive behaviours by showing a group of children a film of an adult behaving aggressively towards an inflatable toy, a bobo doll. Some of the children saw the aggressive adult being reinforced by another adult, while another group saw them being punished. A control group saw the model behave without any positive or negative consequences. Afterwards, the children were allowed to play with a variety of toys, including bobo dolls. It was found that those who saw the aggressive behaviour being punished were less likely to imitate aggression as opposed to those who saw the behaviour being reinforced. (Sammons, 2009). This theory is relevant to this research because it argues that people can learn new information and behaviours by watching other people, and it also explains the influence computer games have on children and their learning.

Methodology

The study adopted a quasi-experimental research design as the research method. The data was collected specifically based on a group comparison of pre-test and post-test studies conducted between experimental and control groups. The target population of this study was all JSS 2 students in Ogun State. Available data from the Ogun State Ministry of Education indicated that there were 185,017 students in JSS 2 across the state, including 107,102 in public schools and 77,915 in private schools, as of the 2021–2022 academic session.

The local government areas and schools were randomly selected through lucky-dip randomization, while the purposive sampling technique was used to select appropriate respondents for both pre-test and post-test experiments. This technique helped to determine those who played computer games and those who did not. The proportional sampling of the groups revealed that 177 and 223 students participated in the pre-test and post-test, respectively. The pre-test was given to students who do not play computer games, while the post-test was given to students who play computer games and thereafter tested for any significant difference.

To determine the sample size, the Krejcie & Morgan (1970) formula was used as presented below:

$$s = \frac{X^2 N P (1 - P)}{e^2 (N - 1) + X^2 P (1 - P)}$$

$$n = \frac{3.814 (185,017)(0.5)(1 - 0.5)}{(0.05)^2(185,017 - 1) + 3.814(0.5)(1 - 0.5)}$$

This result to;

$$n = \frac{176,413.71}{462.54 + 0.9535}$$

Analysing further, we have

$$n = \frac{176,413.71}{463.4935} = 380.62 = 400 \text{ (approx.)}$$

Thus, the sample size for this study was approximately four hundred (400) for adequate representation of the school. Respondents were selected from JSS 2 across 12 junior secondary schools in 12 local government areas in Ogun State.

Research instruments

The research instrument employed in the study was the Mathematics and English Assessment Test (MEAT), in the form of a questionnaire, and the Classroom Observation Schedule (COS). The tests, questionnaire, and observation schedule instruments were developed by the researchers to measure students' achievement in mathematics and English. The pre-test assessment test was administered to measure the achievement of students who do not play computer games in mathematics and English, while the post-test was administered to students who play computer games to measure their achievement in mathematics and English subjects. A total of 400 copies of questionnaires were administered, out of which 400 copies were properly completed and returned, representing a 100% response rate. This was because the researcher, with the assistance of teachers in the schools, administered the questionnaire and collected it. All returned questionnaire copies were, therefore, used for the statistical analysis. Data gathered with the questionnaire administered and returned were analysed below.

Data Presentation

Table 1: Proportions of Groups of Respondents by Schools

No.	School	Group			% Share of Total	
		Pre-Test	Post-Test	Total	Pre-Test	Post-Test
1	Louisville Girls High School, Ijebu-Itele	14	16	30	46.7	53.3
2	Federal Science and Technical College, Ijebu-Imushin	17	23	40	42.5	57.5
3	Ijebu Ode Grammar School	19	21	40	47.5	52.5

4	Our Lady of Apostles Senior Secondary School	12	18	30	40.0	60.0
5	St. Stephens Comprehensive High School	15	15	30	50.0	50.0
6	The Ambassadors College, Ota	14	16	30	46.7	53.3
7	Anglican Grammar School (Senior), Okenla	13	22	35	37.1	62.9
8	Calvary Heritage College, Ijoko	14	16	30	46.7	53.3
9	Ebenezer Grammar School, Iberekodo	15	20	35	42.9	57.1
10	FUNAAB International School	19	21	40	47.5	52.5
11	Abeokuta Grammar School, Idi Aba	12	18	30	40.0	60.0
12	Catholic Comprehensive High School, Panseke	13	17	30	43.3	56.7
	Total	177	223	400	44.2	55.8

Table 1 above showed that 44.2% of the respondents participated in the pre-test, while 55.8% took part in the post-test. Subsequently, the table showed the proportions of the group by the schools selected for the study. In the above table, it is apparent that there was an unequal distribution of the research instrument among the schools. It was, as said earlier, a proportionate distribution based on the numerical strength of individual schools, both for the pre-test and post-test.

Table 2: Age and sex distribution of respondents

Variables	Frequency	Percentage
Sex		
Male	234	58.5
Female	166	41.5
Total	400	100
Age(years)		
9-11 years	147	36.7
12-14 years	168	42.0
15-17 years	85	21.3

The gender and age distribution of respondents surveyed is shown in Table 2 above. The data from the table implied that the majority of the respondents surveyed are below 14 years of age, which is opined as the average of most students in the JSS 2 class. Also, the unequal gender distribution of the questionnaire was not purposefully done but revealed the male numerical dominance in secondary schools in Ogun State.

Data Analysis

Table 3: Respondents that play and do you play computer games

	Frequency	Percent	Valid Percent
Valid Yes	223	55.7	55.7
Valid No	177	44.3	44.3
Total	400	100.0	100.0

The analysis of participants on whether they play computer games is presented in Table 3 above. The table revealed that a higher percentage (55.7%) of the participants played computer games, while a lower percentage (44.3%) of the respondents did not play computer games. This indicates that more students are exposed to computer gaming in secondary schools.

Table 4: Types of computer games played by the respondents

		Frequency	Percent
Valid	Sports/Racing	78	19.5
	Shooting/Action	101	25.3
	Puzzle/Arcade/Board Game	59	14.8
	Simulation/Strategy	35	8.8
	Role-playing game (RPG)	49	12.3
	Total	223	55.8
	System	177	44.3
Total	400	100.0	

Table 4 shows the distribution of students based on their choice of computer games. To this end, 78 ticked sports or racing, 101 clicked shooting or action, 59 of them played puzzles, arcades, or board games, 35 played simulations or strategies, and the remaining 49 clicked role-playing games. In other words, table 4 indicated that 25.3% of the participants played shooting or action, followed by 19.5% of the participants who expressed their preference for sports or racing games. Further, the table revealed that 14.8% and 12.3% of the participants played puzzle/arcade/board games and role-playing games (RPG), respectively. The least-ranked game is a simulation/strategy game. Many factors could have influenced the choices of games played by students, such as the nature of the game, the difficulty in learning the game, the use and non-use of network data, whether it is an individual, group, or two-person game, and the availability of power supply. These factors, individually or collectively, may probably account for students' choices of games.

Table 5: Primary platform for playing games

		Frequency	Percent
Valid	Android	57	14.3
	iOS	91	22.8
	Google Play Store	61	15.3
	Apple Play Store	35	8.8
	Handheld (DS, PSP etc.)	109	27.3
	Total	223	55.8
	System	177	44.3
Total	400	100.0	

Table 6 above indicates that 27.3% of the students play games using handheld inbuilt games; this is followed by iOS, which accounts for 22.8% of the participants exposed to computer games. The table further reveals that 15.3% and 14.3% of the participants use Android and the Google Play Store, respectively. The Apple Play Store, however, accounted for the least number of participants who play computer games. The lowest rank in the Apple Play Store may reflect the high cost and affordability of *Apple* products.

Table 6: Types of Computer Games Played

		Frequency	Percent
Valid	Sports/Racing	78	19.5
	Shooting/Action	101	25.3
	Puzzle/Arcade/Board Game	59	14.8
	Simulation/Strategy	35	8.8
	Role-playing game (RPG)	49	12.3
	Total	223	55.8
	System	177	44.3
Total	400	100.0	

The data in Table 6 above indicate that 25.3% of the participants played shooting or action, followed by 19.5% of the participants who expressed their preference for sports or racing games. Further, the table revealed that 14.8% and 12.3% of the participants played puzzled, arcade, and board games and role-playing games (RPG), respectively. The least-ranked game is the simulation/strategy game.

Table 7: Incorporating Computer Games in the Curriculum?

	Frequency	Percent	Valid Percent
Valid Yes	318	79.5	79.5
No	82	20.5	20.5
Total	400	100.0	100.0

The data as shown in Table 7 above revealed that the majority of the participants (79.5%) wanted computer games to be incorporated into their educational system, and again, 20.5% of participants did not. The accumulated benefits of computer games in enhancing the academic performances of students might account for this.

Analysis of the test of hypotheses

The students who do not play computer games (pre-test) and students who play computer games (post-test) were given a Mathematics and English Achievement Test (MEAT) that tested their knowledge on different topics from the Junior Secondary School Two (JSS 2) Mathematics and English syllabus to answer. The instrument was administered to the students after they were grouped based on their exposure to computer games. The question items were marked and scored out of a maximum of 40. The data obtained were used to test the hypothesis set for this study and analysed using descriptive statistics and a t-test. The results are indicated in Table 8 below.

Table 8: Learning abilities of students who play and don't play computer games based on MEAT (Descriptive and T-test of Test Scores)

Variable	Group	N	Mean	Std. deviation	Df	t-value	Sig.
MEAT	Pre-Test	177	33.45	3.750	398	1.314	0.192
	PostTest	223	31.57	4.125			

Source: SPSS Output

The results from Table 8 as presented above showed that the pre-test group had 177 participants, while the post-test group had 223 participants. The pre-test group obtained an average score of 33.45 out of 60, while the post-test group obtained 31.57 out of 60 in the achievement tests. The t-test analysis reveals that the computed probability value is 0.192, which is greater than the level of significance of 0.05. Therefore, the mean scores of both the pre-test group and post-test group were not significantly different at the 0.05 level of significance because ($t = 1.314$, $p\text{-value} > 0.05$). Thus, the hypothesis, which states that "there is no significant difference in the learning abilities of students who play computer games and those who do not play computer games," is accepted. Therefore, the groups were deemed similar on the MEAT measure and had comparable characteristics, hence homogenous.

Discussion of Findings Based on the Research Questions

This study examined computer games as educational tools for building intellectual capabilities among secondary school students in Nigeria, using Ogun State as a case study. The study utilised primary data generated through experimental research design and structured questionnaires administered to 400 respondents selected from different Junior Secondary School II (JSS 2) across different LGAs in Ogun State. The data employed in the study were collected from the Mathematics and English Assessment Test (MEAT), which was constructed to determine the knowledge and comprehension of learning of the students in major subjects. The data obtained were coded and analysed using descriptive and independent t-test statistics. The descriptive analysis involves the use of tables, frequency counts, simple percentages, charts, and the mean and standard deviation. Therefore, the findings are discussed based on the research questions.

Research Question 1: What are the types of computer games played by secondary school students in Ogun State, Nigeria?

The focus of this research question was to find out the types of computer games played by students in secondary schools. The views expressed by the students surveyed showed that shooting/action and sport/racing are the most played computer games in secondary schools. This overtly or covertly robs on myriads of factors. The noblest amongst them are gender and motivation, without prejudice to the accessibility or financial status of parents. For instance, Lowrie & Jorgensen (2011) and Rehbein, Staudt, Hanslmaier & Kliem (2016) showed that males spent more time playing games than women. But Hsieh, Lin, and Hou (2016) and Yang & Quadir (2018) found that boys had less gaming flow experience than girls. In the study carried out by Çirak & Erol (2020), male participants spend more time playing games compared to females. Regarding game preferences, Heeter, Lee, Medler, and Magerko (2011) claim that males put great emphasis on performance while females are considered low-level performers.

In the context of the study, it can be said that experienced participants have higher motivation to play games. In addition, this study suggests that the environment or tools that players use to play digital games are important in terms of player motivation. It was seen that the motivations of online players are higher than those of those who do not play games via the Internet. The possibility of online games competing with other players and creating a

challenging environment may be the cause of this significant difference among the players. In addition to this, the current study showed that **Research Question 2: Is there any difference in the learning abilities of students who play computer games and those who do not in secondary schools in Ogun State?**

Thus, the finding negates and confirms the similar study earlier carried out by Ugwuanyi and Okenyi (2020), who investigated the effectiveness of digital game-based learning on the achievement of pupils in sciences using a pretest-posttest randomised control group design with 45 participants in select schools in Enugu State, Nigeria. The findings revealed that digital game-based learning significantly improves the achievement of primary school pupils at both pre-test and follow-up measures. The findings also indicate that pupils exposed to digital game-based learning (DGBL) participated more actively during the teaching situation than those who were exposed to the traditional method of teaching. Notwithstanding, the findings from the study, therefore, suggested that the use of digital or computer game-based learning should be intensified to enhance students' academic performances.

Research Question 3: What is the possibility of incorporating computer games into the educational system in Ogun State, Nigeria?

The majority of the participants (55.7%) that took part in the study are exposed to playing computer games; it would be appropriate to leverage computer games to further enhance their learning abilities by incorporating them into the educational system. Again, a higher percentage of the respondents, 79.5%, agreed with the fact that computer games should be incorporated into their educational system based on the positive effects of digitally based learning. As described in the literature, the result from this study indicates that there are several ways computer games can be used to support teaching and the educational system, which include the use of educational video games in the classroom, such as board games and cards, as a way of improving their academic performances. Also, educational skills like algebra, angles, trigonometry, and spelling are more effective when taught using effective gaming tools to deepen learning and understanding.

Conclusion and Recommendations

The study sought to compare the learning abilities of students who play computer games with those who do not play computer games among secondary school students in Ogun State, Nigeria. The study found that most of the participants play computer games. In addition, the study concludes that there is no significant difference in the learning outcomes of the pre- and post-test groups. However, since the majority of the study participants play computer games, it would be useful to incorporate computer games into the Nigerian education system to further improve their learning skills. Therefore, this study suggests that key stakeholders, including the government, school administrators, and teachers, should incorporate computer games as creative ways to improve knowledge absorption and retention, as well as the overall learning experiences of students in secondary schools. In addition, considering the increasing number of students that are exposed to computer games, teachers should be encouraged and empowered to use technological devices such as laptops and tablets so that their students can emulate them in using these devices positively for educational purposes. Thus, schools should be encouraged to expand their digital or computer-based learning and encourage students to develop and deepen their digital skills. This is important for students who do not have basic computer skills.

References

- Aduloju, E.T. (2020). *Media literacy skills: Essential for youth development in digital era*. Lulu Press Incorporation.
- Alessi, M.S. & Trollip, S.R. (1991). *Computer-based instruction*. Prentice Hall.
- Anaeto, S.G., Onabajo, O.S & Osifeso, J.B. (2008). *Models and theories of communication*. Nigeria African Renaissance book incorporated.
- Asaolu, O.S. Adoption & use of multimedia & interactive games for instructional purposes. *Afr J Comp Comp & ICT*. 4(3), 1-6.
- Bally, J. (2017). Student engagement in learning and teaching. Retrieved from <https://www.sheffield.ac.uk>als>students>.
- Bandura, A. (1994). Social cognitive theory of mass communication. In J. Briant & D. Zilmerman (eds.). *Media effects advances in theory and research*. (pp. 61-90). New Jersey: Lawrence Erlbaum.
- Behnamnia, N., Kamsin, A., Ismail, M.A & Hayati, A. (2022). A review of using digital game-based learning for preschoolers. *J. Comput. Educ.* Retrieved from <https://doi.org/10.1007/s40692-022-00240-0>.
- Buckley, K. E. & Anderson, C. A. (2006). A theoretical model of the effects and consequences of playing video games. In P. Vorderer & J. Bryant (Eds.), *Playing video games: Motives, responses, and consequences* (pp. 363-378). Lawrence Erlbaum Associates Publishers.
- Christopher, E. M. (1999). Simulations and games as subversive activities. *Simulation and Gaming*, 30 (4), 442.
- Çirak, N.S. & Erol, O. (2020). What are the factors that affect the motivation of digital gamers? *Participatory Educational Research (PER)*, 7(1), 184 – 200.
- Cruikshank, D. & Telfer, R. (1980). Classroom games and simulations. *Theory into Practice*, 75-80.
- Dempsey, J., Lucassen B., Haynes, L. & Casey, M. (1996). *Instructional application of computer games*. Paper presented to the American Educational Research Association, 8-12 April 1996, New York.
- Deneen, L. (2010). What is student engagement, anyway? Retrieved from <http://www.er.educause.edu>articles>what-is,stu>.

- Derryberry, A. (2007). Serious games: Online games for learning. Retrieved from http://www.adobe.com/resources/elearning/pdfs/serious_games_wp.pdf.
- Granic, I., Lobel, A. & Engels, R. C. M. E. (2014). The benefits of playing video games. *American Psychologist*, 69(1), 66–78.
- Gray, P. (2013). Definitions of play. *Scholarpedia*, 8(7), 1 – 4.
- Hannafin, M. & Peck, K. (1988). *The design, development and evaluation of instructional software*. MacMillan Publishing Company.
- Han-Tang, W., Mu-Hong, C., Po-Cheng, H. & Ya-Mei, B. (2017). The association between online gaming, social phobia, and depression: an internet survey. *BMC Psychiatry*, 2 (12), 92.
- Heeter, C., Lee, Y. H., Medler, B., & Magerko, B. (2011). Beyond player types: gaming achievement goal. In *Proceedings of the 2011 ACM SIGGRAPH Symposium on Video Games*, 43–48.
- Hsieh, Y. H., Lin, Y. C., & Hou, H. T. (2016). Exploring the role of flow experience, learning performance and potential behaviour clusters in elementary students' game-based learning. *Interactive Learning Environments*, 24, 178–193.
- Juul, J. (2005). *Half-real: Video games between real rules and fictional worlds*. The MIT Press.
- Kirriemuir, J. (2002). *The relevance of video games and gaming consoles to the higher and further education learning experience*. Techwatch.
- Krejcie, R.V. & Morgan, D.W. (1970). Determining sample size for research activities. *Educational and Psychological Measurement*.30, 607–610.
- Landau, S. & Nguyen, T. (2019). Effects of gaming on children's brains: Depression and social isolation. *Advances in Social Sciences Research Journal*, 6(9), 291–302.
- Liu, M. (2014). Motivating student to learn using a game-based learning approach: Gaming and education issues. Retrieved from www.edb.utexas.edu>liu>files>liu.
- Lowrie, T., & Jorgensen, R. (2011). Gender differences in students' mathematics game playing. *Computers & Education*, 57, 2244–2248.
- Mcquail, D. (2011). *McQuail's mass communication theory (6th ed.)*. Sage.
- Malone, T. & Lepper, M. (1987). Making learning fun: A taxonomy of intrinsic motivation for Learning. In: R. Snow & M. Farr (Eds.), *Aptitude, learning and instruction: Cognitive and effective process analysis*, 3, pp. 223-253. Erlbaum.
- Mingfong, J. (2013). Games for 21st century learning. Retrieved from singteach.nie.edu.sg>surteach-issue45.
- Mlumun, Y. S., Ebem, D. U., Chiedozi, O. J., Umar, M. I. & Christian, A.U. (2021). Intellectual impact of mobile educational games on secondary school education in Nigeria: Case study of Government Girls' College Makurdi. *American Journal of Information Science and Technology*. 5(3), 48-59. doi: 10.11648/j.ajist.20210503.11
- Ogo-Chukwu, C. F. & Fomsi, E. F. (2019). Gamification – influence on elementary pupils' learning outcomes and enlargement in English language; *International Journal of English language teaching*, 7(2), 50-62.
- Ogun State Ministry Of Education. (2021). Education statistics in Ogun State. Retrieved from teach.nie.edu.ng>teach-issue45.
- Onyeka, N. C., Sajoh, D. I., & Bulus, L. D., (2013). The effect of social networking sites usage on the studies of Nigerian students: *The International Journal of Engineering and Science (IJES)*, 2, 39-41.
- Prensky, M. (2001). *Digital game-based learning*. McGraw-Hill.
- Randel, J., Morris, B., Wetzell, C. & Whitebill, B. (1992). The effectiveness of games for educational purposes: A review of recent research. *Simulation and Gaming*, 23(3), 261-276.
- Rehbein, F., Staudt, A., Hanslmaier, M., & Kliem, S. (2016). Video game playing in the general adult population of Germany: Can higher gaming time of males be explained by gender specific genre preferences? *Computers in Human Behaviour*, 55, 729–735.
- Smed, J. & Hakonen, H. (2003). Towards a definition of a computer game. *TUCS Technical Report*, 34, 553-587.
- Sowunmi, O. & Aladejana, F. (2013), Effect of simulation games and assisted instruction on performance in primary science; *WEI International Academic Conference proceedings*; 4, 10-15.
- Ugwuanyi, C.S., Okenyi, E.C., Ezema, V. & Amoke, C. (2020). Effect of digital game-based learning on achievement of primary school pupils in sciences in Enugu State, Nigeria. *Journal of Educational Research on Children, Parents & Teachers*, 1(1), 35–48.
- Yang, J. C., & Quadir, B. (2018). Individual differences in an English learning achievement system: Gaming flow experience, gender differences and learning motivation. *Technology, Pedagogy and Education*, 27(3), 351-366