PERCEIVED INFLUENCE OF EDUCATIONAL VIDEO GAMES ON INTELLECTUAL DEVELOPMENT OF SCHOOL AGED CHILDREN IN EPE, LAGOS STATE

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Abstract

*The study determined the perceived influence of Educational Video Games on Intellectual Development of School Aged Children in Epe Local Government Area of Lagos State. Three research questions guided the study. The study adopted descriptive survey research design. The population for the study was 4,467 which comprised of 4,075 primary 5 pupils in public schools and 392 primary school teachers. Sample size for the study was 440. Validated questionnaire was the instrument used for data collection. R*eliability co-efficient index of 88.3% was obtained using Spearman's correlation method. *Data collected was analyzed using mean and standard deviation. Findings indicated that the types of educational games commonly played by pupils included snake and lather, maths games such as building blocks among others. Findings also revealed that the ways educational video games can influence intellectual development of school aged children included that it improve computational skills among others. Findings also indicated that the strategies for enhancing use of educational video games towards intellectual development of school aged children included parental monitoring of games played by children, reducing amount of time spent by children in playing games to avoid distraction among others. Among recommendations made was that parents should monitor types of online games played by their children and games should be appropriate to the age of the children.*

Keywords: Children, Cognitive, Education, School Aged, Video Game

Introduction

School age children are those between 6 to 12 years of age. Fisch, Lesh, Motoki, Crespo and Melfi, (2014) noted that during school age period, there are observable physical differences in height and weight of children. The language skills of children continue to grow at this developmental stage. School age children are highly active. They need physical activity and peer approval. School age children also want to try more daring and adventurous behaviours. At this age, children can concentrate effectively and learn in a school setting. Blumberg, Deater-Deckard, Calvert, Flynn, Green, Arnold and Brooks (2019) stated that at school age period, children are becoming focused and reading becomes more complex about the content of subjects rather than identifying letters and words.

School age children's ability to pay attention is important for success both at school and at home. According to Weimer, Parault, Fabricius, Schwanenflugel and Suh (2017), a 6-year-old should be able to focus on a task for at least 15 minutes. By age 9, a child should be able to focus attention for about an hour. One of the activities that keep children focused is playing games. A game is a type of play where participants follow

defined rules. School age children like playing video and computer games. Stakeholders in the educational sector are concerned about the roles of playing video games on the intellectual development of school age children. According to Blumberg, *et. al.* (2019), education experts view playing of video games as a main activity, that enhances learning experiences of children. Caliph and Wrought (2015) stated that playing games is regarded as one of the tributaries that pass on knowledge to the students since they are able to discover more about themselves, their surrounding environment and the world they live in simply by playing video games. The students' desire to participate in life also increases due to game playing. Sawalha (2017) stated that although there are different types of games for children, educational games should be encouraged as it will help the cognitive development of the children.

Educational games are games explicitly designed with educational purposes, or which have incidental or secondary educational value. Alaoun (2012) opined that all types of games may be used in an educational environment, however educational games are games that are designed to help people learn about certain subjects, expand concepts, reinforce development, understand a historical event or culture, or assist them in learning a skill as they play. Sawalha (2017) stated that educational games are designed to help people understand concepts, learn domain knowledge, and develop problem solving skills. Educational games are made predominantly for children and students of all ages, and can be used both inside the classroom and out. Dondlinger (2017) noted that educational games are games designed to aid in learning about specific subjects, in expanding concepts, in stimulating growth, in understanding a historical event or a culture, in developing a skill while playing; educational games can be applied in any educational environment using any gaming approach. Anderson and Jiang (2018) noted that educational video games include print images and pictures, quizzes, maths and money video games, reading and writing games, colouring and creative games. In the same line of thought, Wang, Taylor & Sun (2018) noted that there are several online math games available for children across multiple devices. Durkin and Barber, (2012) opined that there are problem-solving games that are available for free online. Dondlinger (2017) noted that educational game types include board, card, computer and video games. The focus of this study was computer and video games commonly played by school age children.

Computer and video games are technology based games. With the increase and availability of technological devices, there has been a shift in what types of games children play. Computer and video games have become more widely used than traditional board games. Barab, Scott, Siyahhan, Goldstone, Ingram-Goble, Zuiker and Warren, (2019) defined educational video game as a form of game played through an electronic device. According to Evans, Norton, Chang, Deater-Deckard and Balci (2013), educational video games have been divided into two major categories which are edutainment games and educational video games. Evans, *et. al.* (2013) further reported that edutainment games are those that are typically based on drilling fundamental lessons in a linear progression, with added entertainment value. This means that edutainment games entertains the children, gives them fun activities while teaching and educating them. Hence, children learn as they play the games.

On the other hand, educational video games are the types that solely encourage creative thinking and problem solving. This implies that the main focus of educational video games is to teach and educate children by making them think and reason logically. Educational video games are especially popular with teenagers and children as a form of entertainment, and the time spent playing video games has grown exponentially. Anani (2012) mentioned that educational game playing is a form of learning and the surrounding environment is considered as a media source for student learning. Educational video games serve various

purpose. Khatib (2020) noted that playing games positively affect various growth, intellectual, social, emotional, motion and language aspects. It also helps in building students' character through the effective participation of the student in the activities that are both fun and humorous. Educational video game playing also develops intercommunication and enhances reading skills like application, counting, creative thinking and visual differentiation as well as encouraging cooperation and participation among the students. Dondlinger, (2017) stated that educational video games are interactive play that teaches goals, rules, adaptation, problem solving, interaction, all represented as a story. Games can be used to enhance the intellectual development of school age children.

Intellectual development as used in the context of this study means the growth of a child's ability to think and reason. It entails how children organize their minds, ideas and thoughts to make sense of the world they live in. According to Hasan, Bègue, Scharkow and Bushman (2013), intellectual development refers to the changes that occur, as a result of growth and experience, in a person's capacity for thinking, reasoning, relating, judging, conceptualizing and understanding concepts. Between the ages of six and twelve (school age period) the child's capacity for thought and reasoning shows its most significant growth. Granic, Lobel and Engels (2014) reported that to an undetermined degree, children's intellectual growth is stimulated by the beginning of formal scholastic instruction and the acquisition of reading and writing skills which can be enhanced by early exposure to educative games.

At school age stage, thinking is said to be a matter of recognition, literal recall, and direct transfer of training which can be enhanced when children play video games. In an experimental study by Fisch, Lesh, Motoki, Crespo and Melfi, (2014) on effect of playing video games, it was assessed in regular players with several tasks such as attention, comprehension, memory and concentration. The authors reported that regular players performed better at these tests than non-players. The increase of performance seems induced by the activity of playing video games. In another study, Evans, Norton, Chang, Deater-Deckard and Balci (2013) asked students to play video games for half an hour a day for one month. The researchers observed the students' improvement at different tasks and the performance was measured using standardized test battery. The results indicated improvement in attention, memory, focus and comprehension. A research carried out by Omran, Idris and Hussin (2015) observed that students' academic performance is affected by numerous factors including age, parental influence, social-economic status, residential area of students, peer influence, media influence, environmental influence, instructional materials and activities the child engage in such as playing video games. In the same line of thought, Gilligan, Flouri and Farran, (2017) reported that children engagement in games should be monitored and efforts should be made to limit screen time (television and other media) to 2 hours a day. Revelle, (2013) noted that children should be taught to play games in appropriate, safe, supervised areas, with proper equipment and rules.Several empirical studies indicate that different variables can influence children's intellectual development, therefore, the present study determined the influence of educational video games on intellectual development of school aged children.

Statement of the Problem

In the present technological age, school age children are constantly enthusiastic about playing video games. Video games and digital media play a large role in many children's lives. Ferguson and Olson (2013) reported in a survey study that young children (ages 2 - 4) play video games for an average of about 20 minutes per day. The authors reported that this increases as children grow older. Children ages 5 - 8 play for an average of about 40 minutes per day, and children ages 8 - 12 play for an average of about 80 minutes per day. When children come in

contact with any mobile phone, the first thing they check is the game in the phone.

There are concerns on the amount of time spent by school age children in playing games. If children are not monitored, they will spend more time playing games to the detriment of their studies. On the other hand, educational video games can be utilized as a means of helping children develop their intellect. Some schools are gradually introducing educational video games in the curriculum of early school children. Despite video games' popularity and rising use in education, there is still relatively little research on their likely influence on children's brains and intellectual development. This study therefore determined the perceived influence of educational video games on intellectual development of school age children in Epe Local Government Area of Lagos State.

Purpose of the Study

The main purpose of the study was to determine the perceived influence of Educational Video Games on Intellectual Development of School Age Children in Epe Local Government Area of Lagos State.

Specifically, the study determined:

1. Types of educational video games commonly played by school age children,
2. Ways through which educational video games can influence intellectual development of school age children,
3. Strategies for enhancing use of educational video games towards intellectual development of school age children.

Research Questions

The following research questions guided the study.

1. What are the types of educational video games commonly played by school age children?
2. In what ways can educational video games influence intellectual development of school age children?
3. What are the strategies for enhancing use of educational video games towards intellectual development of school age children?

Methodology

The study adopted a descriptive survey research design. The study was carried out among primary school pupils and teachers in Epe local government area in Lagos State, Nigeria. **P**opulation for the study was 4,467 which comprised of 4,075 primary 5 pupils in public schools and 392 primary school teachers in Epe, Lagos State. (Source: Lagos State Ministry of Education). Sample size for the study was 440. This figure represents approximately 10 % of the population. Hence, pupils were 400 while teachers were 40. Simple random sampling technique was used to select 400 primary 5 pupils and 40 teachers from the 59 public primary schools in Epe Local Government Area of Lagos State. Questionnaire was the instrument used for data collection. The questionnaire was titled "Questionnaire of Educational Video Games and Intellectual Development of School Age Children" (QEVGIDSAC). It consisted of two sections. (Section A and B). Section A elicited information on demographic characteristics of the respondents while section B was based on the purposes of the study. The structured questionnaire were coded with nominal values assigned to each possible response expected from the respondents. A 4-point scale rated as follows was used: Strongly Agreed (4), Agreed (3), Disagreed (2), and Strongly Disagreed (1).

The questionnaire was validated by three Lecturers in School of Technical Education, Yaba College of Technology, Epe Campus. The validates made useful contribution and suggestions before drafting the final copy of the questionnaire. Reliability of the instrument was determined by test re-test method among10 primary school teachers in Ajah, Lagos State. These teachers are outside the population target. The questionnaire was administered again after two weeks. A reliability co-efficient index of 88.3% was obtained using Spearman correlation method. The questionnaire was

administered to the teachers and pupils and retrieved on the spot by the researchers with the help of three research assistants. Out of 440 copies of questionnaire distributed, 385 were correctly filled and returned indicating 88% return rate. The data collected was analyzed using mean and standard deviation. Mean rating from 2.5 and above were considered as agreed upon while mean rating of 2.49 and below were considered as disagreed upon.

Results

1. Gender of the teachers indicated that 23 (58%) were female while 17 (42%) were male. On the other hand, gender of the pupils showed that 209 (55%) were female while 176 (45%) were male.

Research Question 1: What are the types of educational video games commonly played by school age children?

Data for answering Question 1 is presented in Table 1.

Table 1: Mean and Standard Deviation Responses on Types of Educational Games Commonly Played by School Age Children (Result from Pupils)

S/N	Types of Educational Video Games	Mean	SD	Remark
1.	Snake and Lather	2.96	0.60	Agreed
2.	Maths games such as Building Blocks	3.68	0.76	Agreed
3.	Science and Technology games such as Word Puzzle	3.55	0.61	Agreed
4.	Aggressive games such as shooting stars	2.79	0.81	Agreed
5.	Entertainment games such as Subway Surfer	3.88	0.72	Agreed
6.	Cognitive games such as Spelling and word arrangements	3.90	0.76	Agreed
7.	Adventure Games such as hidden objects	3.73	0.81	Agreed
8.	Social games such as Temple run	3.80	0.51	Agreed
9.	Brain Teaser such as crosswords	3.66	0.82	Agreed
10.	Word Quiz	2.92	0.76	Agreed

Key: Number of Pupils = 385, SD = Standard Deviation

Table 1 contains the mean and standard deviation responses on the types of educational games commonly played by school age children in Epe, LGA. Data for this information was obtained from Primary 5 pupils. From the analysis, the types of educational games commonly played by school age children included snake and lather, maths games such as building blocks, Science and Technology games such as word puzzle, aggressive games such as shooting stars, entertainment games such as Subway Sufer, cognitive games such as spelling and word arrangements, adventure games such as hidden objects, social games such as Temple run, brain teaser such as crossword and word quiz. The mean values ranged from 2.92 to 3.90 which are all above the cut off point of 2.50. on the other hand, the standard deviation ranged from 0.51 to 0.82 implying that the mean values are close to each other.

Research Question 2: In what ways can educational video games influence intellectual development of school age children?

Data for answering Question 2 is presented in Table 2

Table 2: Mean and Standard Deviation Responses on Ways Educational Video Games can Influence Intellectual Development of School Age Children (SAC) (From Teachers)

S/N	Ways Educational Video Games can Influence Intellectual Development of SAC	Mean	SD	Remark
1.	Improve Computational Skills	3.86	0.43	Agreed
2.	Helps children to have self control	3.70	0.74	Agreed
3.	Some games make children to be aggressive	3.60	0.77	Agreed
4.	Helps children to have fast mental connections	3.41	0.45	Agreed
5.	Enhance reading and writing skills	3.50	0.86	Agreed
6.	Increases creativity among children	3.40	0.89	Agreed
7.	Enables children to have self confidence	3.60	0.77	Agreed
8.	Facilitates retention among children	3.26	0.94	Agreed
9.	Improves logical thinking among children	2.75	0.47	Agreed
10.	Enhance children's ability to focus and be attentive	3.78	0.73	Agreed

Key: Number of Teachers = 40, SD = Standard Deviation

Table 2 contains the analysis of the mean and standard deviation responses of the ways educational video games can influence intellectual development of school age children. From the analysis, the ways educational video games can influence intellectual development of school age children included that it **i**mprove computational skills, helps children to have self control, some games make children to be aggressive, helps children to have fast mental connections, enhance reading and writing skills, increases creativity among children, enables children to have self confidence, facilitates retention among children, improves logical thinking among children and it enhances children's ability to focus and be attentive. The mean values ranged from 2.75 to 3.86 which is above the cut off point of 2.50. on the other hand, the standard deviation ranged from 0.43 to 0.94 indicating that the mean values are close to each other.

Research Question 3: What are the strategies for enhancing use of educational video games towards intellectual development of school age children?

Data for answering Question 3 is presented in Table 3

Table 3: Mean and Standard Deviation Responses on Strategies for Enhancing Use of Educational Video Games for School Age Children (SAC)(From Teachers)

S/N	Strategies for Enhancing Use of Educational Video Games for SAC	Mean	SD	Remark
1.	Parental monitoring of games played by children	3.76	0.7	Agreed
2.	Parents buying educative video games for children	3.80	0.82	Agreed
3.	Reducing amount of time spent by children in playing games to avoid distraction	3.64	0.80	Agreed
4.	Ensuring that games played by children are within their age limit	3.52	0.52	Agreed
5.	Restricting adult rated games from children	3.23	0.77	Agreed

Key: Number of Teachers = 40, SD = Standard Deviation

Table 3 contains the mean and standard deviation responses of the teachers on the strategies for enhancing use of educational video games towards intellectual development of school aged children. From the analysis, the strategies for enhancing use of educational video games towards intellectual development of school age children included parental monitoring of games played by children, parents buying

educative video games for children, reducing amount of time spent by children in playing games to avoid distraction, ensuring that games played by children are within their age limit and restricting adult rated games from children. The mean values ranged from 3.23 to 3.80 which is above the cut off point of 2.50. on the other hand, the standard deviation ranged from 0.52 to 0.82 indicating that the mean values are close to each other.

Discussion of Findings

Findings on research question one indicated that the types of educational games commonly played by school age children included snake and lather, maths games such as building blocks, Science and Technology games such as word puzzle, aggressive games such as shooting stars, entertainment games such as Subway Sufer, cognitive games such as spelling and word arrangements, adventure games such as hidden objects, social games such as Temple run, brain teaser such as crossword and word quiz. In line with the findings, Anderson and Jiang (2018) noted that the types of educational video games include print images and pictures, quizzes, maths and money video games, reading and writing games, colouring and creative games. In sae vein, Wang, Taylor and Sun (2018) noted that there are several online math games available for children across multiple devices. In further support of the findings, Durkin and Barber, (2012) opined that there are problem-solving games that are available for free online.

Findings on research question 2 showed that the ways educational video games can influence intellectual development of school age children included that it **i**mprove computational skills, helps children to have self control, some games make children to be aggressive, helps children to have fast mental connections, enhance reading and writing skills, increases creativity among children, enables children to have self confidence, facilitates retention among children, improves logical thinking among children and it enhances children's ability to focus and be attentive. In agreement with these findings, Alaoun, (2012) opined that all types of games may be used in an educational environment, however educational games are games that are designed to help people learn about certain subjects, expand concepts, reinforce development, understand a historical event or culture, or assist them in learning a skill as they play. In same vein, Hastings, Karas, Winsler, Way, Madigan and Tyler (2019) stated that children who play video games are often very creative. To further buttress the findings, Barab, Scott, Siyahhan, Goldstone, Ingram-Goble, Zuiker and Warren (2019) reported that there are various famous cartoon characters which are incorporated in learning games to teach nursery rhymes, letters, numbers and many more; along with also teaching the children how to generally navigate, use the keyboard and mouse efficiently.

Findings on research question 3 revealed that the strategies for enhancing use of educational video games towards intellectual development of school age children included parental monitoring of games played by children, parents buying educative video games for children, reducing amount of time spent by children in playing games to avoid distraction, ensuring that games played by children are within their age limit and restricting adult rated games from children. In support of the findings, Revelle (2013) deduced that children should be taught to play games in appropriate, safe, supervised areas, with proper equipment and rules. Also, Gilligan, Flouri and Farran, (2017) reported that children engagement in games should be monitored and efforts should be made to limit screen time (television and other media) to 2 hours a day. To further support the findings, Barab, *et. al.* (2019) noted that parents should limit the amount of time children spend on playing computer and video games

Conclusion

Based on the findings of the study, it can be concluded that the types of educational games commonly played by school age children included snake and lather, maths games such as building blocks, Science and Technology games such as word puzzle,

cognitive games such as spelling and word arrangements among others. The ways educational video games can influence intellectual development of school age children included that it **i**mprove computational skills, helps children to have self control, among others. The strategies for enhancing use of educational video games towards intellectual development of school age children included parental monitoring of games played by children, reducing amount of time spent by children in playing games to avoid distraction, among others.

Recommendations of the Study

Based on the findings of the study, it was recommended that:

1. Parents and other adults should monitor the types of video games played by school age children.
2. Games played by children should be appropriate and focused on helping the children improve their intellectual development.
3. Different educational games should be downloaded by parents and other adults for school aged children in order to enhance their intellectual development.

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