# THE IMPACT OF DIGITAL STORYTELLING ON PUPILS' ACHIEVEMENT IN PHYSICAL AND HEALTH EDUCATION IN BASIC SCHOOLS IN ESAN NORTH EAST

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**Abstract**
*This study determines the effect of digital storytelling on pupils' achievement in Physical and Health Education Instruction in basic schools in Esan North East. The pre-test, post-test, control group, quasi-experimental design with 2x2x2 factorial matrix was adopted. 114 pupils from five Basic Schools in Esan North East LGA of Edo State were used for the study. Five instruments used were: Classroom Observation (CO), Pupils' Achievement Test on Physical and Health Education Instruction; Digital story package; Teachers Guide on Digital Storytelling Strategy (TGDSS); Operational Guideline for Conventional Group (OGCG). Four null hypotheses were tested at 0.05 level of significance. Data collected were analysed using ANCOVA. There was a significant main effect of the treatment on pupils' achievement in Physical and Health Education Instruction concepts ($F_{(1,102)} = .007$; $P<0.05$; $\eta^2 = .146$). Pupils in the Digital storytelling group had higher adjusted post-test achievement ($\bar{x} = 9.17$), while the conventional group had ($\bar{x} = 6.19$). Digital story telling facilitates effective learning and creates participation among pupils in the learning process and therefore should be integrated as part of school curriculum for the teaching of Physical and Health Education.*

**Keywords:** Storytelling, Digital Storytelling, Physical and Health Education Instruction, Storytelling Strategies, Digital Story Package

## Introduction

Establishing healthy behaviours during childhood is easier and more effective than trying to change unhealthy behaviours during adulthood. The school is a place where education and health programmes can have their greatest impact because it can reach pupils at influential stages of their lives. Toma, Oyebode, Toma, Gyang and Agaba, (2015). While Udoh, Ajala, Fawole, Okafor, and Nwana (1987) defined Physical and Health Education Instruction as an educational force or progress by which agents of education-teachers, parents, nurses or community health workers exert their influence on individual in such a way as to affect their health behaviour. It is a process with intellectual, psychological and social dimensions relating to activities which increase the abilities of people to make informed decisions affecting their personal, family and community well-being. This process is based on scientific principles, activities, learning and behavioural change in health personnel, consumers, youth and children. Lawani (2014) on the other hand stated that stories provide entertainment and convey information that educates receivers on moral issues and values that endure and benefit generations of different societies.

According to Ajisafe (1980) Physical and Health Education Instruction can be regarded as the sum total of experiences, which contribute to the development of desirable habits, attitudes and knowledge, related to an individual, family and community. It is a planned intervention, utilizing human learning to alter information, attitudes, skills and behaviours held by individual or groups in the direction of improved physical, mental, social and spiritual well-being. The early childhood phase of human development usually ranges from birth to eight years because these are very important developmental years the education administered to children is designed to contribute to their overall development of which Physical and Health Education Instruction is key (Education Corner, 2019). Using stories in the classroom has been found to be of great importance to the growth of children in their educational pursuit. The use of oral histories in the classroom is a very important tool in pupils' growth. When children listen to stories, their imaginations are enriched and stimulated especially on health related issues.

Today, classroom teaching and learning is enhanced with technology. Curriculum concepts are transformed into stories and supported with technologies in multimedia tools and embedded in learning channels of visual, auditory and kinaesthetic formats. Adding such aids makes a story become more mediated and digitalized through which it becomes richer in content and application. The action referred to as the delivery of the story is known as "Digital Storytelling". Contemporary technologies in education revolve around the use of computers. The computer as used in this study is a machine that can help with many different teaching and learning tasks when it is integrated into classroom activities. The most important aspect of computers in education is that they provide drill and practice

for the pupil. Teachers' activities may be tedious at times and computers provide motivation to the pupil to continue learning (Dogan & Robin, 2011). Recent developments in classroom activities of teaching and learning encourage methodologies that reflect learners' active participation, interactive patterns and inclusive learning. With the use of technology, teachers take kids beyond the traditional classroom limit, ensure adequate participation in teaching and learning process and create environment for experimentation and exploration. Major stakeholders in the Nigerian Education sector have expressed concern about the quality of health-related instructions among children in primary schools. The study is aim at the integration of the use of digital storytelling in the teaching and learning of Physical and health education instruction in Esan North East of Edo State.

**Hypotheses**

The following hypotheses were tested at 0.05 level of significance.

1. There is no significant effect of digital storytelling on pupils' learning achievement in Physical and Health Education instruction in basic schools in Esan North East
2. There is no significant gender effect of treatment on pupils' learning achievement in Physical and Health Education instruction in basic schools in Esan North East
3. There is no significant effect of games and physical activity concept familiarity on pupils' achievement in Physical and Health Education instruction in basic schools in Esan North East
4. There is no significant interaction effect of digital storytelling and gender on pupils' achievement in Physical and Health Education instruction in basic schools in Esan North East

**Methodology**

**Research Design**

A Pre-test-Post-test-control group quasi-experimental research design was adopted.

The design is schematically represented below.

$O_1$ $X_1$ $O_2$ Experimental group (Digital story telling)

$O_3$ $X_2$ $O_4$ Control group (Conventional method - CM)

Where: $X_1$ represents Physical and Health Education Instruction with Digital story telling

$X_2$ represents Physical and Health Education Instruction with Conventional method - CM

Where: $O_{1, \text{and}}$ $O_{3,}$ are pre-test observations for experimental groups and control group.

$O_{2,}$ and $O_{4,}$ are post-test observations for experimental groups and control group.

This study employed factorial matrix of 2 x 2 x 2 as presented below.

Table 1: A 2 x 2 x 2 Factorial Matrix

| Group | Game concept familiarity | | | |
|---|---|---|---|---|
| | Gender | Low | Medium | High |
| Digital story telling | M | | | |
| | F | | | |
| Conventional method – CM | M | | | |
| | F | | | |

**Sample and Sampling Techniques**

This study adopted pre-test, post-test, control group, quasi experimental design. Participants for this study comprised pupils from public primary schools in Esan North Local Government Area. The schools were randomly selected. Ten schools comprising 114 students were purposively selected from LGA. In each school, an intact class was selected out of all the nine representative schools for the study based on the following criteria:

i Relative distance from one another to avoid contamination

ii Government owned schools

iii Availability of qualified Pre-primary teachers teaching Physical and Health Education Instruction in Pupils

classes. These schools were randomly assigned to experimental and control groups using simple random sampling,

**Research instruments**

Five research instruments were used in this study. These are:

1. Classroom Observation (CO)
2. Pupils' Achievement Test on Physical and Health Education Instruction
3. Digital story package
4. Game concept familiarity
5. Operational Guideline for Conventional Group (OGCG)
6. Teachers' guide for Digital Storytelling strategy (TGDSS)

**Classroom Observation**

This is used to measure classroom processes which include specific teacher practices, holistic aspects of instructions and interactions between teachers and kids. Classroom observation is often regarded as a naturalistic method to observe those classroom practices of teachers that are affective or have positive impacts on certain Pupils pupils' outcomes. The scale to be used is adopted one from Consortium for Policy Research Education (1994).

**Pupils' achievement test on Physical and Health Education Instruction**

The pupils' achievement test in Physical and Health Education Instruction was designed and constructed by the researcher to measure pupils' level of achievement in selected Physical and Health Education Instruction concept based on the three levels of cognition, viz; remembering, understanding and thinking (Okpala, Unoche and Oyedeji, 1993)**.**

The instrument consists of two- sections A and B. Section A; sought personal information of pupils while section B consists of 10 multiple choice questions with three options. For each question, one correct answer and two other distracters were provided.

**Digital Story Telling Package**

The validation was carried out in line with the stipulated process of validating instructional package in educational technology which includes content validation, computer expert validation, educational technology validation, one-to-one validation, small group validation and field trial validation.

**Operational Guideline for Conventional Group (OGCG**)

This instrument was designed to guide the teachers in the control group. The lesson note on each topic was prepared by the researcher with focus on the behavioural objectives, presentation of content with the use of relevant instructional materials prepared by the researcher based on the same information incorporated in the package for the experimental group, and evaluation. The guide was also given to experienced Pre-primary teachers and lecturers for face and content validition. Observations and suggestions made were incorporated to improve the quality of the instrument.

**Teachers' guide for Digital Storytelling strategy**

This instrument was designed to guide the teachers in the experimental group on their expected role premised on the design of the study as a self-learning package thereby limiting the role of the teacher to that of moderator. The role of the teacher was limited to making preparation for the use of the Digital machine, allotting the learners to sit conveniently and monitoring the kids to ensure that they pay attention to the package. The operational guideline was given to experienced Pre-primary teachers and Childhood education lecturers for face and content validition. Their observations and suggestions were taken into consideration to improve the quality of the instrument.

Questions were drawn from the concept of Personal hygiene, Sanitation and Feeding habit. The instrument was given to expert in the fields of Physical and Health Education, education evaluation and educational technology for corrections and suggestions before it was used.

It has two sections with Section (A) containing demographic information such as Name of School, Pupils' Name, Class, Gender, and Age while section B contained the test items constructed. The option for the questions ranges from A to C. One mark was awarded for each correct option and zero for wrong option. This means that the total marks obtainable is 25. The test items were generated to covers three learning cognitive domains of knowledge, comprehension and Understanding in accordance with Yoloye (1984). The table of specification is presented in table 2.

**Table 2: Table of Specification for Physical and Health Education Instruction**

| Topic | Knowledge | Comprehension | Understanding | Total |
|---|---|---|---|---|
| Games | (1) 4 | (1) 3 | (1) 4 | 3 |
| Physical activities and exercise | (1) 3 | (1) 5 | (1) 4 | 3 |
| Personal hygiene | (1) 4 | (1) 3 | (1) 3 | 3 |
| Sanitation | (1) 4 | (1) 4 | (1) 4 | 3 |
| Total | 4 | 4 | 4 | 12 |

Validation and Determination of Reliability coefficient Pupils Achievement test

The initial draft of thirty multiple choice items was given to some lecturers in Human Kinetics and Health Education Department, Faculty of Education, National Open University of Nigeria. This was done to ascertain the face, content and construct validity of the instrument. The thirty (30) multiple choice items were reduced to twenty (20) items while fifteen (15) items survived scrutiny which fell within the discriminating indices of 0.4 to 0.6. It was later trial-tested in a representative lower Basic school that was not part of the study. The data collected were analyzed using Kuder-Richardson formula 20 (KR20). The reliability coefficient of 0.81 and an average item difficulty index of 0.49 were obtained.

**Digital Story Telling Package**

The validation was carried out in line with the stipulated process of validating instructional package in educational technology which includes content

validation, computer expert validation, educational technology validation, one-to-one validation, small group validation and field trial validation.

**Digital Storytelling Research Design**

The framework chosen to carry out this research was based on several rubrics that were rated using Likert-scale-like of measurement-excellent, good, satisfactory and needs improvement. The instrument was subjected to reliability test using Cronbach alpha and a reliability coefficient of 0.82 was obtained.

**Rubrics for Game Concept Familiarity on Local-games (RGCFL)**

This RGCFL was used to assess pupils understanding of Local Terms in the adapted Digital story games.

**Validation and Reliability of the Instruments (RGCFL)**

These instruments were given to specialists on educational digital games, professionals in early childhood education, computer experts, computer education specialists and primary three teachers in public schools for proper face and content validity. This was followed by single administration of RGCFL on 20 school pupils in two different schools (not part of schools used for the study). Reliability coefficient was computed for each of the two instruments, which was 0.85 for RGCFL by employing Cronbach's alpha.

**Method of Data Analysis**

Inferential statistics of Analysis of Covariance (ANCOVA) was used in testing the hypotheses using the pre-test scores as covariates and Estimated Marginal Mean was computed to show how the groups performed. All hypotheses were tested at 0.05 level of significance.

**Results and discussions**

1. **$Ho_1$:** There is no significant effect of digital storytelling on pupils learning achievement in Physical and Health Education instruction in basic schools in Esan North East

Table 3 reveals that there is a significant effect of digital storytelling on pupils learning achievement in Physical and Health Education Instruction in basic schools in Esan North East.

($F_{(1,102)} = .007$; $P<0.05$; $\eta^2 = .146$). Therefore, the null hypothesis is rejected.

**Table 3: Summary of 2x2x2 Analysis of Covariance (ANCOVA) of Pupils' Post Test Achievement by Treatment, Gender and Game Concept Familiarity.**

Dependent Variable: ACHIEVEMENT POSTTEST

| Source | Type III Sum of Squares | Df | Mean Square | F | Sig. | Partial Eta Squared |
|---|---|---|---|---|---|---|
| Corrected Model | 145.55[a] | 12 | 12.370 | 2.432 | .003 | .315 |
| Intercept | 610.241 | 1 | 660.821 | 194.912 | .000 | .672 |
| PRETEST | 2.136E-02 | 1 | 2.328E-02 | .007 | .934 | .000 |
| TREATMENT | 18.313 | 1 | 18.313 | 5.401 | .002* | .146 |
| GENDER | 5.153 | 1 | 5.153 | 1.520 | .221 | .016 |
| GAME FAMILIARITY | 12.695 | 2 | 6.348 | 1.872 | .159 | .038 |
| TREATMENT*GENDER | 2.806 | 1 | 2.806 | .827 | .482 | .025 |
| TREATMENT*GAME FAMILIARITY | 17.937 | 2 | 8.969 | 1.764 | .159 | .053 |
| GENDER*GAME FAMILIARITY | 2.540E-02 | 2 | 1.270E-02 | .007 | .931 | .000 |
| TREATMENT*GENDER*GAME FAMILIARITY | 6.848 | 2 | 3.424 | .673 | .571 | .021 |
| Error | 322.083 | 102 | 3.158 | | | |
| Total | 8454.000 | 113 | | | | |
| Corrected Total | 470.526 | 114 | | | | |

a. R Squared = .315 (Adjusted R Squared = .186) * Significant at 0.05

In order to determine the magnitude of achievement mean scores across the treatment groups, the estimated marginal means of the treatment groups and control group are presented in Table 4

**Table 4: Estimated Marginal Means for Pupils across the treatment Groups**

Dependent Variable: ACHIEVEMENT POSTTEST

| TREATMENT | N | Mean |
|---|---|---|
| Digital story telling | 54 | 9.17 [a] |
| Conventional Method – CM | 60 | 6.19[a] |

Table 4 shows that the pupils exposed to the Digital story telling strategy had the adjusted mean score ( $\bar{x}$ = 9.17) compared to those exposed to Conventional Method ( $\bar{x}$ = 6.19),

1. **$Ho_2$:** There is no significant gender effect of treatment on pupils learning achievement in Physical and Health Education instruction in basic schools in Esan North East

From Table 5, though female pupils obtained slightly higher achievement mean score ( $\bar{x}$ = 8.84) than their male counterpart ( $\bar{x}$ = 8.21). However, the difference was not significant. This means that there is no significant effect of gender on pupils' achievement in Physical and Health Education Instruction. ($F_{(1, 102)}$ = 5.401; P> .05). Therefore, $Ho_2$ is retained.

**Table 5: Estimated Marginal Means for Achievement of Male and Female Gender**

| GENDER | N | Mean |
|---|---|---|
| MALE | 47 | 8.21[a] |
| FEMALE | 67 | 8.84[a] |

a. Evaluated at covariates appeared in the model: Pretest = 4.94.
b. Based on modified population marginal mean.

5. **$Ho_3$:** There is no significant effect of games and physical activity concept familiarity on pupils' achievement in Physical and Health Education instruction in basic schools in Esan North East

Also from Table 5, it was observed that there is no significant effect of game concept familiarity on pupils' achievement in Physical and Health Education Instruction ($F_{(2, 102)}$ = 1.872; P> .05). Therefore $Ho_3$ is not rejected.

**$Ho_4$**: There is no significant interaction effect of digital storytelling and gender on pupils' achievement in physical and Health Education instruction in basic schools in Esan North East

Table 4 reveals that there is no significant interaction effect of digital storytelling and gender on pupils learning achievement in Physical and Health Education Instruction ($F_{(1, 102)}$ = .673; P> .05). Therefore, $Ho_4$ is retained.

**Discussion**

Table 3 reveals that there is a significant effect of digital storytelling on pupils learning achievement in Physical and Health Education Instruction. With the results -$F_{(1,102)}$ = 5.401; P<0.05; $\eta^2$= .146, the null hypothesis is rejected. This is in contradiction to a study conducted by the U.S. Department of Education (2007); it focused on the impact of computer software on academic achievement by elementary, middle, and high school pupils in Reading and Mathematics. The report concluded that "Test scores were not significantly higher in classrooms using the reading and mathematics software products than those in control classrooms," and there were "no significant differences in student achievement between the classrooms that used the technology products and classrooms that did not."

Results from Table 4 show that there is no significant gender effect of treatment on pupils' learning achievement in Physical and Health Education Instruction. The finding from this research corroborates the work of Dania (2014). His research focused on the effect of gender on pupils' academic achievement in secondary school social studies and the results showed that gender (male/female) had no significant effect on pupils' achievement in Social Studies and finally, result showed that there was significant interaction effect of treatment and gender on pupils' academic performance in Social Studies. Chibabi et al (2018) on the other hand studied the effect of laboratory method on pupils' achievement and retention in senior secondary schools biology in Kogi East Senatorial Zone, and revealed significant difference of the achievement, retention and interaction effect between teaching method and the gender of student in the mean gain achievement scores of pupils taught using laboratory method of teaching and their counterparts taught using traditional method of teaching. Another work that has a contrary result to the one obtained in this research is the work of Mwiigi (2014) on the effects of gender differences on student's academic performance in secondary schools in Ndumberi division, Kiambu county, Kenya in science subjects and languages. Results from its findings show that there were significant gender differences by overall performance with more boys passing in forms 1 and 2 as compared to the girls in the same divisions. At subject level girls attained a higher mean average mark in the languages as compared to the boys. Conversely, boys scored higher mean average in the sciences than girls.

Results from Table 5 show that there is no significant effect of game concept familiarity on pupils' achievement in Physical and Health Education Instruction. Thus the null hypothesis was retained. This result is consistent with results from the work of Kuo-Kuang et al (2015) studied the effects of learning styles and meaningful learning on the learning achievement of Gamification Physical and Health Education Instruction curriculum. Result of their findings showed that pupils with distinct gender present no significant difference in curriculum design and learning achievement in meaningful learning. Nnamani and Oyibe (2016) on gender and academic achievement of secondary school pupils in social studies in Abakaliki Urban of Ebonyi State revealed that the mean achievement score of female secondary school pupils was higher than the mean achievement scores of male pupils. The study also revealed that there are significant differences in the mean achievement of secondary school pupils in Social Studies based on gender.

## Conclusion

The findings of this research show that digital storytelling has a positive effect on pupils' learning achievement in Physical and Health Education Instruction. The outcome of the study shows that digital story telling as a tool in the teaching and learning of Physical and Health Education facilitates effective

learning and creates participation among pupils in the learning process and therefore improves retention and understanding. Digital story telling offers opportunities such as providing diverse classroom environment, personalising the learning experience with stories and associating same with daily life and environment.

**Recommendation**

1. Pupils should be taught and encouraged on how to generate digital story for their use
2. Government should integrate digital story telling in the school curriculum to facilitate learning and improve teaching outcome.
3. Teachers should be trained regularly on the use of digital technology as a tool in teaching and instruction.

**References**

Ajisafe, M.O. (1980). "Teaching Physical and Physical and Health Education Instruction". Ibadan: Macmillan Nigeria.

Chibabi, A. A., Umoru, S. E., Onah, D. O. Itodo, E. E (2018)."Effect of Laboratory Method on Pupils' Achievement and Retention in Senior Secondary Schools Biology in Kogi *East Senatorial Zone".* ***IOSR Journal of Research & Method in Education***. Volume 8, Issue (6) 31-39.

CPRE (Consortium for Policy Research in Education). (1994) Teachers' professional development and education reform. CPRE Policy Briefs. New Brunswick, NJ: Author.

Croft Community School (2019). "Croft Community School is A Basic School".http://schools.cms.k12.nc.us/croftES/Pages/TheBasicSchool.aspx

Department of Education, New Hampshire https://www.education.nh.gov/instruction/school_health/health_coord_education.htm

Dania, P. O. (2014). Effect of gender on students academic achievement in secondary school social studies. Journal of education and practice. Volume 5 no. 21.

Dogan, B. & Robin, B. (2011). "Implementation of Digital Storytelling in the Classroom by Teachers Trained in a Digital Storytelling Workshop" University of Houston, Educational Uses of Digital Storytelling. Retrieved August 1, 2011

Kuo-Kuang F.,Peng-wei X., Chungho S. (2015). "The Effects of Learning Styles and Meaningful Learning on the Learning Achievement of Gamification Physical and Health Education Instruction Curriculum". ***Eurasia Journal of Mathematics, Science and Technology Education, Ltd.***

Federal Ministry of Education. (2007). "*Nigeria Education Sector Diagnosis, Abuja"*: Nigeria Education Sector Analysis Unit.

Education Corner. (2019) https://www.educationcorner.com/early-childhood-education.html

Lawani, L. A. (2014). The effect of digital storytelling on Pupils pupils' achievement in moral instruction in basic schools in Oyo State. ***IOSR Journal of Research and Method in education***. 4(5) 26-34.

Mwligi (2011). *The Effect of Digital Storytelling in Improving The Third Graders'*

Okpala, P. N., Onocha, C. O. and Oyedeji, O. A. (1993). Measurement and evaluation in education, Ibadan: Strirling-Horden Publishers Ltd.

Nnamani, S.C and Oyibe, A.O. (2016). Gender differences in achievement of secondary school student in social studies in Abakaliki Urban of Ebonyi State. British Journal of Education Vol.4, No.8, pp. 72-83, August 2016 Published by European Centre for Research Training and Development UK

Toma, B. O., Oyebode, T. O., Toma, G. I. O. Gyang, M. D. Agaba, E. I. (2015). Evaluation of School Physical and Health Education Instruction in primary schools in Jos, North- Central Nigeria. ***Journal of Dental and Medical Sciences.*** Vol 14(3) 11-17, Udoh, C. O, Fawole, J.O, Ajala, J.A; Okafor, C. & Nwana, Q. (1987). *"Fundamentals of Physical and Health Education Instruction".* Ibadan: Heinemann Education Books. 195-245.

Yoloye, E. (1984). "The role of the home and school in helping the Individual towards self-realization and maximization of his or her potentials. Journals of the Nigerian Careers Council,3,1. Pp. 20-21.