

# Effect of Yoruba Puzzle Games on Pre-Service Teachers' Achievement in Yoruba Orthography

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## Abstract

*Yoruba orthography is the process of writing the Yoruba language correctly. Researchers' attention had focused on the effects of variables like environmental, family, school, teacher, to improve students' achievement in Yoruba orthography with little or no attention placed on puzzle games on students' learning outcome in Yoruba orthography. Therefore, this study investigated the effect of Yoruba puzzle games (Yoruba Word Paper Puzzle & Yoruba Word Digital Puzzle) on Colleges of Education students in Yoruba orthography. The study adopted pre-test, post-test, control group quasi-experimental research design. College of Education Yoruba pre-service teachers in Southwest were randomly selected. Three research hypotheses were tested in the study at 0.05 level of significance. **AIJOJŃ?? IDÁNRAWÒ FUN AKEKOBŃKOTO ÈLÈ YORUBÀ (AIIAAED) and instructional guides were used for data collection. These instruments were trial tested and found reliable with .65 coefficient after using Split-half Measure. Result showed that null hypothesis one ( $F_{(2, 38)} = 167.364$ ;  $p = .000 < 0.05$ ), was hereby rejected. While hypotheses two ( $F_{(1, 38)} = .006$ ;  $p = .937 > 0.05$ ), and three ( $F_{(2, 38)} = .482$ ;  $p = .624 > 0.05$ ) were hereby not rejected. Findings revealed that Yoruba Word Paper Puzzle & Yoruba Word Digital Puzzle were more effective in enhancing students' achievement in Yoruba orthography than the conventional strategy. Therefore, puzzle games would help students overcome the usual apprehension associated with orthography classes and tasks which in turn would bring about better performance in Yoruba orthography.***

**Key Words:** Yoruba Orthography, Puzzle Game, Digital, Background, Treatment

## Introduction

Language, according to Omoike, Alufogai & Idiakhwa (2020), has two forms-spoken and written. The spoken form of a language guides in writing text which Rubin et al (1981) put to mean an advanced code that emanates out of speech. In Writing, visual marks are placed on some kind of surfaces for the purpose of communication particularly to the readers (Crystal, 2003). Adetokun (2018) explains that in all the languages of the world, it is obvious that speaking a language precedes its writing which connotes that language is primarily spoken. Writing a language starts immediately the speakers have acquired knowledge about its vowels and consonants.

To acquire the writing skills of any language, one has to learn the letters in such language alphabet and learn how the sound or

sounds of each letter are the same or not the same. Knowledge about how the sounds in letters blend to make words that one hears or speak is equally important because the role of a school is to teach the correct spellings (Sebb, 2007). This is so because written language is more deeply formed by access to education and set of instructions. It is important to note that in writing, spelling is an essential practice. This position was made obvious in Arthur and Arthur (1976) when they asserted that weak spellers are at a serious disadvantage. They may be intelligent and educated, but their errors in spellings cause others (often erroneously) to consider them a trifle backward. They went further that until he faces the reality of his problem, the weak speller depends upon a poor compromise. The dangers of poor compromise are stunted vocabulary and incorrect usage

probably because the person has not learned to read carefully, has not learned to listen carefully, has not learned to memorise and to work in order to learn. Spelling is the key to any meaningful communication in written language. Language spelling is intertwined in the reading and writing skills. Berninger and Fayol (2008) explained that spelling is a code that uses letter sequence to represent specific words that have an associated pronunciation and meaning within the mental dictionary. Spelling poses a great deal of challenge for language users and it is learnt from a condition of repeated experience and memorization (Ogbu, 2020). When we talk of the correct spelling of a word, we refer to orthography and not to the phonetic writing. It is equally concerned with the symbols-letters/alphabets used to write the sounds in a language.

Enyia (2012) defines orthography to be a standard way of writing a language. Enyia (2012) further put it that orthography greatly influences the production of materials to be used in all educational endeavours/practices. It also simply means the process of writing appropriately. It is signs, rules and principles that are used to write a particular language in a correct and an appropriate manner. Likewise, Nordquist (2017), Adeniyi & Adesanya (2005) and Willianson (1979) confirmed that orthography is the practice or study of correct spellings according to an established usage. In a broader sense, orthography can refer to the study of letters and how they are used to express sounds and combined to form words. Furthermore, Willianson (1979) points out that the orthographies of Nigerian languages are said to be characterised and similar to sound in order to allow whosoever that pronounces them be able to spell them accurately at the first instance or glance. Orthography, as highlighted by Willianson (1979) has five basic principles which are accuracy, consistency, convenience, harmonisation, familiarity.

On Yoruba orthography, different renowned authors and researchers like Adeyinka (2019), Osoba and Olorunnisomo (2021), Adeniyi, Adesanya and Fakeye (2011),

Asahiah, Onifade and Adegunlehin (2020) Arohunmolase (1987), Bangbose (1965), Adetokun (2018), Johnson (1960), Adeniyi and Adesanya (2005), Willianson (1979) and Olumuyiwa (2013), have written articles in peer-reviewed journals, edited books and academic materials like projects to trace the origin of Yoruba orthography, its principles, practices, and rules.

Johnson (1960) emphasises that it was made known that the earliest attempt to reduce Yoruba language into writing was in the 19<sup>th</sup> century, when the Church Missionary Society planed a mission to the Yoruba country under the leadership of Henry Townsend and Samuel Ajayi Crowther. They made series of efforts to invent new characters, or adapt the Arabic, which was already known to Moslem Yorubas but the Roman character was eventually adopted. This is not because it is the one best acquainted with, but also because it would obviate the difficulties that must necessarily arise if missionaries were first to learn strange characters before they could undertake scholastic and evangelistic work.

Ferry, Åström and Romar (2022) state that becoming a teacher requires pre-service teachers to interpret experiences from different perspectives because of the reversal role from being a student to being a teacher. For teacher education programs to be most effective, they need to understand the knowledge that PSTs hold and develop in order to optimise professional learning.

In relation to education, Encyclopedia of Education (1971) believes that orthography serves as the pillar for literacy just because it is a viable tool to decoding and encoding words in reading and writing respectively. In Colleges of Education across southwest of Nigeria, existing minimum standards of when to teach which particular aspects of orthography among the pre-service Yoruba language teachers are contained in the Nigeria Certificate in Education Minimum Standards for languages 2020. In the document, orthography is a 2-unit course in first semester of 100L with code YOR<sub>1</sub>111 and titled *Àkoto Yorùbá* (Yoruba Orthography). In the course, students are supposed to be taught the following in a

chronological order;

- a) A flash back on how the Yoruba language became a written language paying attention to Bowdich, Kilham, Raban, Crowther, Townsend, Lepsius, Venn's efforts.
- b) The Yoruba orthography conference of 1875 as well as different efforts directed towards Yoruba orthography till date especially by Bamgbose 1966, 1975 and the Yoruba metalanguage volume 1 & II
- c) Modern Yoruba orthography with enough practical work d) Yoruba dialects- Ọ̀bá, Ìjẹ̀ Ẹ̀bù, Àkókó, Ìkálẹ̀ Ẹ̀t c

However, Goff-Kfour (2012) notes that quality education is the subject of much discussion among government policy makers, politicians, educators, psychologists, and philosophers world-wide. Increasingly, there is evidence of more agreement than disagreement on one particular point: The higher the quality of teacher training programs, the more effective teachers will be. So, this study focuses on how pre-service teachers' achievement in Yoruba orthography could be enhanced through games.

Students' achievement will be studied by investigating the effect of game-based language learning packages on students' learning outcome- achievement in Yoruba orthography. According to Vanessa (2016), achievement is concerned with level of academic content a student or learner acquires within a specified period. She emphasizes that it is often influenced by learning instruction.

Adetokun et al. (2023) explain that digital innovation has taken over quite a number of human activities to the extent that the entire world is now gravitating towards electronic everything like e-banking, e-commerce, e-library, e-governance, e-learning etc. the roles of technology in language teaching and learning can never be underestimated especially when the world is rapidly moving towards the Fourth Industrial Revolution driven by technology. They noted that traditional conception of learning no longer suffices because the current generation of learners live in a digital ecosphere and therefore, have interaction with digital

technologies.

It is from this premise that the researchers developed a Yoruba Word Digital Puzzle game for the teaching and learning of Yoruba orthography. It is a digital game- web application game designed by IT experts to allow players/users to spell or write the Yoruba language correctly. The game is developed to examine the contribution of game to the development of Yoruba orthography and for professional development of pre-service teachers. Yoruba Word Digital Puzzle game is a game where the player has several letters and he or she is expected to make words out of them. The search words are shown at the top of the screen in boxes in order to give the player an idea of what to look out for. The game gets more difficult as the player moves to higher levels. It will be played on an internet android phone or a computer. It is targeted at teaching different aspects of Yoruba orthography. Approximately, the game has different levels and stages which will capture conventional spellings and word divisions etc.

The second game is Yoruba Word Paper Puzzle. It is a self-developed puzzle game in which several words are embedded in letters scatted in small square boxes. Players are then charged to cross letters that will in turn form the standard and correct Yoruba words. It will also capture conventional spellings and word division.

Generally, game-based language learning could be simply put as learning through game playing which has defined learning objectives (Zhang, Cheng & Chen 2020; Poopon, Chansanam, Srsawat & Poochanon, 2021). Its inclusion in language teaching and learning has been justified in different studies. Like that of Masri and Najjar (2014) cited in Ike (2021) which reported that student had a better performance when being taught English vocabulary using word games. Gruss' (2016), a researcher who explored how games could be used as a tool for teaching vocabulary to young learners found out that games constitute a crucial element of teaching language to young learners in the classroom.

In addition, Jarrah, Ammari, Al-Talafha and Khalifeh (2021) further expatiate that games enable students to learn in a fun and exciting way that increases their friendly atmosphere and attitude. Singh and Sanatombi (2013) pointed out that students have favourable attitude towards games. This is similar to Namb and Pemir'zxs (2020) explanation that growth in students' attitude in their academics is subject to their experience in digital games. In contrary, a study conducted in mathematics by Carkaya & Aysen (2009) revealed that students' attitude do not change because of their exposure to games. They claimed that students already have positive attitudes towards their Mathematics. It is important to note that students' attitude is more likely to influence achievement than achievement influencing attitude (O'Connel, 2000).

Ultimately, Studies in Yoruba orthography are lopsided in favour of factors like school types, school locations, teachers' content knowledge, teachers' job satisfaction, teachers' competence, teachers' attitude as predictors of learning outcomes of students in Yoruba orthography. Whereas game- based learning has been found to be a reliable approach

yet no study has paid corresponding attention to the use of game-based language learning packages to effectively improve pre-service teachers' learning outcomes in Yoruba orthography. Hence, this study closed such existing gap.

In this study, gender was chosen as moderating variable in this study. Unity and Igbudu, (2015) see gender as the range of physical, biological, mental, and behavioural characteristics pertaining to Masculinity and Femininity. It could be biological sex or sex based on social structure. The fact remains that there have been different studies about gender disparity in students' achievement. Some studies revealed that girls do better in school than boys, while on the other hand, other studies affirm that male students are more significantly better than females (Ajetomobi, 2019).

### Statement of the Problem

A based-line survey conducted in some Colleges of Education in Southwest indicated that students' performance in Yoruba orthography remains worrisome and provocative. The table below shows students' scores from 2018 to 2020.

Colleges (Course/Code)	Pass at Credit Level and Above			% below Credit Level		
	2018	2019	2020	2018	2019	2020
Anonymous Colleges of Education (Akofolele) Yoruba YOR 111)	19.15%	28.13%	24.68%	80.85%	71.88%	75.32%

**Source:** Information obtained from Colleges of Education in Southwest

The table above indicated that students' performance in Yoruba orthography in the colleges where the data were collected was very poor. In 2018, just 19.15% had credit while in 2019 and 2020, students settled with just 28.13% and 24.65% credit passes respectively.

The causes of poor performance of students in Yoruba orthography in Colleges of Education have not been fully established in academic research but Adetokun (2018) insists

that students' performance is poor because they sometimes fail to put the correct tone-marks on words when answering questions in the examination. Similarly, he maintains that they did not write the appropriate spellings in spite writing Yoruba language orthography. He concludes his findings that some selected recommended texts for the course contribute to students' poor performance in Yoruba orthography. These problems according to

Olasunkanmi & Odeleke (2020) have negative effect on students. They pointed out that students' failure to use Yoruba orthography correctly has been a major contributing factor to poor academic achievement in Yoruba language. Equally, Adetokun (2018) and Adeyinka (2019) reveal that these problems have resulted in discouraging learners in having positive attitude towards the study of Yoruba language.

### Hypotheses of the Study

The following hypotheses were formulated for this study and tested at 0.05 alpha level:

- Ho<sub>1</sub>** There is no significant main effect of treatments on students' achievement in Yoruba orthography
- Ho<sub>2</sub>** There is no significant interaction effect of treatments and gender on students' achievement in Yoruba orthography
- Ho<sub>3</sub>** There is no significant interaction effect of treatments and gender on students' achievement in Yoruba orthography

### Methodology

The study adopted a 3X2 pre-test, post-test, control group, quasi experimental design. The study also used a factorial matrix. This design was employed to determine the effect of puzzle game packages at 3 levels (Yoruba Word Paper Puzzle & Yoruba Word Digital Puzzle)

and conventional strategies being crossed with gender at 2 levels (male and female). Three out of the six states that makes up southwest zone were selected using convenient sampling techniques. One school was then purposively selected from each of the three states considering their specific characteristics of some sorts. These schools were assigned to treatment and control groups. **Aiṣeṣe I?? Idánrawò Fuṅ Akeṣe Akotoṣe Eṣe Yorubaì (AIIAAED), and two instructional guides were used to collect data. The data collected were analysed using inferential statistic.**

### Procedure/Data Collection

The three College of Education were grouped into two experimental (experimental 1 and 2) and one control group. The teachers for the experimental group were trained for one week using the instructional guide. All participants were given a pre-test on Yoruba Orthography achievement test on the second week before they were taught for five weeks using the instructional guides. The posttest was administered immediately after making a total of eight weeks.

### Result

- Ho<sub>1</sub>** There is no significant main effect of treatments on students' achievement in Yoruba orthography

**Table 1.1 Summary of ANCOVA of Post-Achievement by Treatment, Gender**

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	1587.630 <sup>a</sup>	15	105.842	41.927	.000	.965
Intercept	354.323	1	354.323	140.357	.000	.859
Pre_achievement	.138	1	.138	.055	.817	.002
Treatment	845.004	2	422.502	167.364	.000	.936
Gender	.016	1	.016	.006	.937	.000
Treatment*gender	2.432	2	1.216	.482	.624	.040
Error	58.062	23	2.524			
Total	24982.00	39				
Corrected Total	1645.692	38				

a. R Squared = .965 (Adjusted R Squared = .942)

Table 1.1 indicates that treatment had a significant main effect on students' achievement in Yoruba orthography ( $F_{(2; 38)} = 167.364$ ;  $p = .000 < 0.05$ ), hence the null hypothesis is hereby rejected. This implies that the treatment applied caused a significant difference in students' achievement in Yoruba orthography. Since the Partial Eta Squared is .936, the effect

size of the treatment is 93.6%. This implies that 93.6% of the total variance in students' post-achievement in Yoruba orthography was accounted for by the treatment applied. The Estimated Marginal Means were computed to determine the magnitude of post-achievement score across the treatment groups and the result is presented in Table 1.2.

**Table 1.2 Estimated Marginal Means of Post-Achievement by Treatment**

Treatment	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Yoruba Word Paper Puzzle	24.872 <sup>a,b</sup>	.551	23.733	26.012
Yoruba Word Digital Puzzle	28.707 <sup>a,b</sup>	.400	27.880	29.533
Conventional strategy	12.819 <sup>a,b</sup>	.688	11.395	14.243

Table 1.2 shows that students taught using Yoruba Word Digital Puzzle had the highest post-achievement mean score (28.707) followed by the mean score of students taught using Yoruba Word Paper Puzzle (24.872) and then conventional strategy (12.819). This implies that

students taught using Yoruba Word Digital Puzzle had the best performance in Yoruba orthography. This could be represented as Yoruba Word Digital Puzzle > Yoruba Word Paper Puzzle > Conventional Strategy.

**Table 1.3 Bonferroni Post-hoc Analysis of Post-Achievement by Treatment**

(I) treatment	(J) treatment	Mean Difference (I-J)	Std. Error	Sig. <sup>d</sup>	95% Confidence Interval for Difference <sup>d</sup>	
					Lower Bound	Upper Bound
Yoruba Word Paper Puzzle	Yoruba Word Digital Puzzle	-3.834 <sup>*,b,c</sup>	.678	.000	-5.584	-2.085
	conventional strategy	12.053 <sup>*,b,c</sup>	.891	.000	9.752	14.355
Yoruba Word Digital Puzzle	Yoruba Word Paper Puzzle	3.834 <sup>*,b,c</sup>	.678	.000	2.085	5.584
	conventional strategy	15.888 <sup>*,b,c</sup>	.832	.000	13.738	18.037
conventional strategy	Yoruba Word Paper Puzzle	-12.053 <sup>*,b,c</sup>	.891	.000	-14.355	-9.752
	Yoruba Word Digital Puzzle	-15.888 <sup>*,b,c</sup>	.832	.000	-18.037	13.738

**Ho<sub>2</sub> There is no significant main effect of gender on pre-service teachers' achievement in Yoruba orthography**

Table 1.1 shows that gender did not have a significant main effect on students' achievement in Yoruba orthography ( $F_{(1; 38)} = .006$ ;  $p = .937 > 0.05$ ), hence the null hypothesis is hereby not rejected. This implies that students'

gender did not cause a significant difference in students' achievement in Yoruba orthography.

From Table 1.3, it is evident that there is a significant difference in the post-achievement of students in Yoruba Word Paper Puzzle and

Yoruba Word Digital Puzzle (Mean Diff=-3.834;  $p<0.05$ ), Yoruba Word Paper Puzzle and conventional strategy (Mean Diff=12.053;  $p<0.05$ ) and, Yoruba Word Digital Puzzle and conventional strategy (Mean Diff=15.888;  $p<0.05$ ). This implies that the source of the significant main effect of treatment on students' achievement in Yoruba orthography is the significant difference that exists across the treatment group.

**Ho<sub>3</sub> There is no significant interaction effect of treatments and gender on students' achievement in Yoruba orthography**

Table 1.1 shows that the interaction effect of treatment and gender was not significant on students' achievement in Yoruba orthography ( $F_{(2, 38)} = .482$ ;  $p = .624 > 0.05$ ), hence the null hypothesis is hereby not rejected. This implies that the interaction of treatment and students' gender did not cause a significant difference in students' achievement in Yoruba orthography.

**Discussion of Findings**

The results gathered from this study revealed that Yoruba Word connects and Yoruba Cross Word puzzle contributed to students' achievement in Yoruba orthography. The result is in line with the outcomes of Elimelech & Aram's (2019) study on digital early spelling game. Their findings indicated that digital game helps preschoolers progress in their spelling skills without the support of an adult. Masri & Najar's (2014) cited in Ike (2021) result showed that the mean score for the experiment group in the post- test was 82.09 while that of the control group was 77.05. This is similar to this study in terms of result in which Yoruba Crossword Connect had the highest post-achievement mean score (28.707) followed by the mean score of students taught using Yoruba Crossword (24.872) and then conventional strategy (12.819).

The study revealed that gender did not have a significant main effect on students' achievement in Yoruba orthography. This

showed that being male or female did not cause a significant difference in students' achievement in Yoruba orthography. The study negated George, Ajayi, Olonade, Olanpekun & Adebayo's (2021) that female students perform well than male students in schools. In furtherance, there position that female students do invest their abilities to get fantastic academic grades which obviously outshines how much seriousness the male students allotted to their academic grade attainments is considered untrue going by the result of this study.

**Conclusion and Recommendations**

The results of the study have shown that Yoruba Word Digital Puzzle and Yoruba Word Paper Puzzle were more effective in enhancing students' achievement in Yoruba orthography than the conventional strategy. Therefore, puzzle games would help students overcome the usual apprehension associated with orthography classes and tasks which in turn would bring about better performance in Yoruba orthography and the Yoruba language generally.

**Based on the findings of the study, the following recommendations were made:**

1. Teachers of Yoruba language should adopt Yoruba Word Digital Puzzle to facilitate students' achievement in Yoruba orthography **as it is the most facilitative of students' achievement in Yoruba orthography in this study.**
2. Periodic workshops, seminars and conferences should be organized for Yoruba language teachers by education authorities such as Universities, Colleges of Education, Ministries of Education Post Primary Schools' Management Board, the Universal Basic Education Commission (UBEC), Nigeria Union of Teachers (NUT), Egbel' Akol'okide' Lele' Yoruba' and other stakeholders to introduce them to the use of novel, **tested, interactive and learner-centred** game-based language learning packages like Yoruba Word Digital Puzzle and Yoruba Word Paper Puzzle.

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