
EFFECT OF PHONOLOGICAL AWARENESS STRATEGY ON PUPILS' LEARNING OUTCOME IN READING IN ADO-EKITI LOCAL GOVERNMENT AREA**Olumuyiwa Ayobami AJAYI**Department of Early Childhood and Primary Education
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adedigba.o@unilorin.edu.ng**Abstract**

This study investigated the effect of phonological awareness strategy on pupils' learning outcome in reading. The study adopted pretest posttest control group quasi-experimental design. The population for the study consisted of all pupils in Ado-Ekiti Local government Area of Ekiti State. The sample size for the study was 87 primary three classes in four schools and multistage sampling techniques was used four schools. Data were collected using Reading Proficiency Test with reliability co-efficient of 0.77 and Phonological Awareness Instructional Guide and Conventional Instructional Guide were used to teach the pupils in the experimental group and control groups and respectively. The data collected were analyzed using Analysis of Covariance, Bonferroni's Poc Hoc Pairwise Comparison and estimated marginal means with the Groups. All hypotheses were tested at 0.05 level of significance. The result showed that there was significant main effect of treatment on pupils' learning outcome in reading ($F_{(1; 79)} = 241.899, P < 0.05$). The study concluded that phonological awareness strategy could be used to effectively improve primary school pupils' proficiency in reading. It was recommended that phonological awareness strategy should be employed in teaching pupils in the classroom to improve pupils' learning outcome in reading.

Keywords: Phonological awareness, Pupils' learning outcomes**Introduction**

Learning to read within the concept of basic education and literacy programs is a global problem. This has consequently attracted the attention of educators and researchers who are making concerted efforts towards tackling the problem of literacy. There are over one billion children who are unable to read in the United States alone, and it was observed that learning to read is a formidable challenge. Also, about 60% of their children are experiencing difficulty reading. Research has further described many Nigerian pupils as poor or struggling readers. The implication is that pupils have deplorably low performance in English as well as other subjects. Learners' reading capability determines to a great extent how they access other subjects, which is why reading is termed "the core of the syllabus." In Ekiti State, reading proficiency is very low

among pupils, therefore affecting their learning outcomes in reading. The previous Ekiti State government made unrelenting efforts to address reading problems among public primary school students in Ekiti State, but the problem appears to persist. Mini laptops were provided to students in a public primary school, but they were found to impair the students' reading abilities. Pupils prefer using the mini-laptops for listening to music, playing games, and watching movies instead of using them to enhance their reading abilities. Various reading programs were designed to improve the reading skills of primary school pupils, such as the "reading parent program" organized by the state Universal Basic Education Board (SUBEB). Most of these reading programs appear ineffective in enhancing the pupils' reading abilities.

Pupils should be able to notice and have a firm grasp of the sounds of speech if they are to understand how to use a written system that records sounds. Pupils who are unaware that words are made up of small sounds would have difficulty learning to read a written system based on sounds. A child's ability to reflect on the sounds of language, especially the phonemes, would support the child's understanding of the logic of the written code. It is pointed out that noticing and being able to manipulate the sounds of spoken language (phonological awareness) may be highly related to later success in reading and spelling, and the developmental origin of this awareness is traceable to the primary school. Young children have a natural propensity to play with language, and the early years are the optimal time to foster and extend their explorations. When surrounded by the sounds of language as they sing, chant, read books, and play games that focus on sound manipulation, they get equipped phonologically (Goswami, 2012). However, this has not received adequate attention at the primary school level because most Nigerian pupils have been said to operate at a very low reading proficiency level (Ajayi, 2013).

Phonological awareness deals with the manipulation of sounds in spoken language, and it may help initiate word recognition development, which in turn may support reading comprehension (Al Otaiba, 2008; Justice, 2008; Nelson, 2008). The pivotal role of phonological awareness in the early stages of learning to read means it may become widely known as a powerful predictor, and it may be a prognostic marker for identifying risk for reading problems in the early school years (Blachman, 2005; Ehri, 2001; and Pressley, 2006). There are factors capable of influencing pupils' learning outcomes in reading, among which is gender. Another variable capable of exerting an effect on pupils' learning outcomes in reading is school type. A school is either privately owned or publicly owned. A public school is owned and financed by the government, while a private school is established, managed, and financed by a private body that conforms to the set minimum standards and may be approved by the government (Knoell, 2012). Ajayi (2013) opined that private school pupils may enjoy a sense of humour, consistent help, and active listening, which may be necessary for the acquisition of phonological awareness. Pupils in public schools appear to dislike their teachers' behaviours and treatment in terms of using various teaching strategies (Knoell, 2012).

This study adopted Jean Piaget's constructivism theory. Constructivism is basically a theory based on observation and scientific study about how people learn. People construct their own understanding and knowledge of the world through experiencing things and reflecting on those experiences. When we encounter something new, we must reconcile it with our previous ideas and experiences, which may require us to change our beliefs or dismiss the new information as irrelevant. For example, a child that drops a particular object on the floor to find out the sound that it makes will keep dropping other objects to make the same sound. If such child drops a paper on the floor and finds out it does not make any sound, such child will learn to assimilate

and accommodate such differences that not everything that drops makes sound. In the classroom, the constructivist view of learning can point towards a number of different teaching practices. In the most general sense, it usually means encouraging pupils to use active techniques (experiments, real-world problem solving) to create more knowledge and then to reflect on and talk about what they are doing and how their understanding is changing. The teacher makes sure he or she understands the pupils' pre-existing conceptions and guides the activity to address them and then build on them. Constructivist teachers encourage pupils to constantly assess how the activity is helping them gain understanding. By questioning themselves and their strategies, pupils in the constructivist classroom ideally become "expert learners." This gives them ever-broadening tools to keep learning. With a well-planned classroom environment, pupils learn how to learn. One might look at it as a hierarchy: when they continuously reflect on their experiences, pupils find their ideas gaining in complexity and power, and they develop increasingly strong abilities to integrate new information. One of the teacher's main roles is to encourage this learning and reflection process.

This research is based on the constructivism theory of assisting students in learning something new and acquiring knowledge from simple to complex in a gradual process. For example, pupils might progress from learning rhyming songs to sentence segmentation to more complex activities like syllable segmentation and blending, onset-rime, and phonemes. This will assist students in developing more complex activities on their level of awareness, thereby increasing knowledge for reading ability and improving learning outcomes. The curriculum should be organized in a spiral manner (from simple to difficult) so that the pupils continually build upon what they have already learned.

Recent data on reading learning outcomes show a sharp decline, which could be attributed to a number of issues, from instructors' ineffective handling of the subject to the usage of antiquated teaching techniques. Also, studies have shown that primary school pupils are not performing well academically because they have difficulty in recognizing words and they have poor comprehension skills. Pupils have difficulty in recognizing words and they are unaware that words are made up of small sounds. Nigerian teachers at basic level have not been focusing on these aspects and that is why learners are not proficient enough and this is adversely affecting pupils reading ability. Basic level teachers in public schools have made efforts in tacking poor reading ability in pupils with the use of different strategies but none is effective. Therefore, this study investigated the effect of phonological awareness strategy on pupils learning outcome in reading.

In addition, the study of gender differences will be fascinating to add to the body of knowledge. According to several academics, the gender gap among learners is reflected in a variety of areas, such as interest, attitude, beliefs, and motivation. Torgesen (2015) studied the effects of four different instructional strategies for improving reading ability. All male and female participants, excluding the control group, were given extensive pretests to assess their reading abilities. The participants in this study were randomly assigned to one of four instructional conditions. 1) Phonological awareness with added synthetic phonics instruction (PASP) 2) embedded phonics (EP) 3) regular classroom support (RCS) and 4) a non-treatment group (NTC) (Torgesen 2015). The findings of this study indicated that gender does not have a significant effect on reading ability in most phonemically explicit groups. Also, studies by Fauto and Friedman (2005) and Robinson and Lubienski (2011) showed no significant difference between male and female readers. However, Zeynali (2012) found that girls outpaced boys in reading

achievement. There is still no consensus regarding the cause, nature, or permanence of such inequalities. Aside from this, further research is needed to resolve the inconsistencies in the literature.

Similar to that, another measured in this study is school type, which could have a big impact on how well pupils learn. Public schools are establishments created by the federal, state, and municipal governments, as opposed to private schools, which are establishments started by a group of individuals or a single person. How well students perform academically in literacy may be significantly impacted by the design, amenities, and location of the school. Ball and Gettinger (2016) claimed that the likelihood of school type having an impact on students' reading learning outcomes is extremely low because students' learning is heavily influenced by their teachers. Additionally, Suggate, Schaughency, and Reese (2013) discovered that children learn to read through experiences and activities in a variety of settings.

The general objective of the study was to examine the main effect of treatment on pupils' learning outcome in reading, the main effect of gender on pupils' learning outcome in reading, the main effect of school type on pupils' learning outcome in reading, the interaction effect of treatment and gender on pupils learning outcome in reading. Also, to investigate the interaction effect of treatment and school type on pupils learning outcome in reading, gender and school type as well as the interaction effect of treatment gender and school type on pupils learning outcome in reading.

Hypotheses

The following seven null hypotheses were tested in the study at $p < 0.05$ level of significance

1. Is there any significance main effect of :
 - a. treatment
 - b. gender
 - c. school type

on pupils' learning outcome in reading

2. Is there any significant interaction effect of:
 - a. treatment and gender
 - b. treatment and school type
 - c. gender and school type
 - d. treatment, gender and school type

on pupils' learning outcome in reading.

Methodology

The study used a quasi-experimental pretest-posttest control group design. The population for the study consisted of all pupils in both public and private schools in Ado-Ekiti Local Government Area of Ekiti State. According to the Ekiti State annual school censuses report project, Ado-Ekiti LGA has 96 public primary schools and 41 private schools, with a total enrollment of 97,334 students and 2,282 students. The sample size for the study was four primary 3 classes. Four intact classes were drawn from the 4 randomly selected primary schools. Multistage techniques were used to select the schools. A stratified random sampling technique was adopted for the study to classify the schools where the research was carried out into public and private schools. Schools were divided into strata (public and private) and four schools were selected using simple random sampling, which includes two private schools and two public

schools. One public and one private school were used as experimental groups and the remaining two schools were used as control groups (one public and one private school). Intact classes were used for the study and pupils in public schools were 61, while pupils in private schools were 26, making a total of 87 participants.

Reading Proficiency Test (RPT) was developed by the researchers and it was used to assess the pupils' reading proficiency before and after the teaching strategies. Reading Proficiency Test was divided into two sections. Section A contained personal data which consisted of the learner's name, gender and age. Section B was purely an achievement test used to assess pupils' reading proficiency. The content covered were consonant sounds, vowel sounds, fill in the gaps, phonemes, short stories, vocabulary, fluency, rhyme, word formation, pronunciation and word substitution and punctuations

Experimental group A and experimental group B were exposed to Phonological Awareness Instruction Guide (PAIG) which consisted of syllable segmentation, rhyme awareness, alliteration awareness, concept of spoken words, phoneme isolation of initial sounds, phoneme isolation of final sounds, phoneme segmentation, phoneme blending, phoneme deletion of initial sounds, phoneme deletion of first sound in consonant blend, phoneme deletion of final sounds, phoneme substitution, rhyme recognition, rhyme production, syllable blending and syllable deletion while the control group were taken through reading in a conventional way using the guide (CIG)

The face and content validity of the RPT, PAIG and CIG were examined by experts in Early childhood Education, English Language and Tests and Measurement to ensure the appropriateness of the instrument to the age of the pupils, and to assess the extent to which it contains essential items that are required to achieve the objectives of the study. A test-retest method was used to establish the reliability of RPT. 20 pupils that were not part of the original study were exposed to Reading Proficiency Test. Based on this, the instrument was administered twice at the interval of two weeks. At the end of the second test, results were subjected to Pearson Product Moment Correlation, to determine the reliability of the instrument. Reading Proficiency Test yielded a correlation co-efficient (r-value) of 0.77. The instrument was adjudged suitable for obtaining the intended information. The data collected were analyzed using Analysis of covariance Bonferroni's Poc Hoc Pairwise Comparison to test the differences in the scores within the two groups and estimated marginal means with the Groups. All hypotheses were tested at 0.05 level of significance.

Results

Ho1: There is no significant main effect of treatment on the learning outcome of pupils in Reading

Table 1: Summary of Analysis of Covariance (ANCOVA) showing the Main Effect of Treatment in Pupils Learning Outcome in Reading

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	1630.604 ^a	7	232.943	146.971	.000
Intercept	653.709	1	653.709	412.446	.000
Pretest	.664	1	.664	.419	.519*
Main Effect					
Treatment	383.399	1	383.399	241.899	.000*
Gender	.184	1	.184	.116	.734
Schooltype	.309	1	.309	.195	.660
Two Way Interaction					
Treatment* gender	.094	1	.094	.059	.809
Treatment *schooltype	.580	1	.580	.366	.547
Gender * schooltype	1.942	1	1.942	1.225	.272
Three Way Interaction					
Treatment * gender* Schooltype	1.298	0	1.298	.911	.491
Error	125.212	79	1.585		
Total	20588.00	87			
Corrected Total	1755.816	86			

a. R Squared = .929 (Adjusted R Squared = .922)

Table 1 shows the effect of treatment on pupils' learning outcome in Reading in Ado-Ekiti. There was significant main effect of treatment on pupils' learning outcome in Reading ($F_{(1; 79)} = 241.899$, $P < 0.05$). The hypothesis is therefore rejected in the light of the result since the significant value (.000) is less than 0.05. This implies that treatment had significant effect on pupils' learning outcome in Reading in Ado-Ekiti.

Table 2: Summary of Bonferroni's Poc Hoc Pairwise Comparison of the scores within the two groups

Treatment	Mean Difference	Experimental	Control Group
Phonological Awareness	19.055	*	
Conventional Method	10.054		*

Table 2 revealed that the significant main effect exposed by table 1 is as a result the significant difference between Phonological Awareness and conventional method. Phonological Awareness refers to experimental group, while conventional method is known as control group. This implies that those exposed to Phonological Awareness (19.055) performed significantly better than those exposed to conventional method (10.054).

Table 3: Summary of estimated marginal means with the Groups

Group	Mean	Std. Error
Experimental	19.055	0.307
Control	10.054	0.306

Table 3 revealed that the significant main effect exposed by table 2 is as a result of the significant difference among:

- i. Phonological awareness
- ii. Conventional method

This implies that those exposed to treatment (Mean = 19.055) performed significantly better than those exposed to conventional method (Mean = 10.054).

Research Hypothesis Two: There is no significant effect of gender on pupils' academic performance in Reading in Ado-Ekiti.

Table 1 also revealed the effect of gender on pupils' learning outcome in Reading in Ado-Ekiti. There was no significant effect of gender on pupils' learning outcome ($F_{(1; 79)} = .116$; $P > 0.05$). The hypothesis is therefore not rejected in the light of the result since the significant value (.734) is greater than 0.05. This implies that gender had no significant effect on pupils' learning outcome in Reading in Ado-Ekiti.

Research Hypothesis Three: There is no significant effect of school type on pupils' learning outcome in Reading in Ado-Ekiti.

Table 1 also revealed the effect of school type on pupils' learning outcome in Reading in Ado-Ekiti. There was no significant effect of school type on pupils' learning outcome in Reading in Ado-Ekiti ($F_{(1; 79)} = .195$; $P > 0.05$). The hypothesis is therefore not rejected in the light of the result since the significant value (.660) is greater than 0.05. This implies that school type had no significant effect on pupils' learning outcome in Reading in Ado-Ekiti.

Research Hypothesis Four: There is no significant interaction effect of treatment and gender on pupils' learning outcome in Reading in Ado-Ekiti

Table 1 also revealed the interaction effect of treatment and gender on pupils' learning outcome in Reading in Ado-Ekiti. There was no significant interaction effect of treatment and gender on pupils' learning outcome in Reading ($F_{(1; 79)} = .059$; $P > 0.05$). The hypothesis is therefore not rejected in the light of the result since the significant value (.809) is greater than 0.05. This implies that interaction of treatment and gender had no significant effect on pupils' learning outcome in Reading.

Research Hypothesis Five: There is no significant interaction effect of treatment and school type on pupils' learning outcome in Reading in Ado-Ekiti.

Table 1 also revealed the interaction effect of treatment and school type on pupils' learning outcome in Reading in Ado-Ekiti. There was no significant interaction effect of treatment and school type on pupils' learning outcome in Reading ($F_{(1; 79)} = .366$; $P > 0.05$). The hypothesis is therefore not rejected in the light of the result since the significant value (.547) is

greater than 0.05. This implies that treatment and school type had no significant effect on pupils' learning outcome in Reading in Ado-Ekiti.

Research Hypothesis Six: There is no significant interaction effect of gender and school type on pupils' learning outcome in Reading in Ado-Ekiti

Table 1 also revealed the interaction effect of gender and school type on pupils' learning outcome in Reading in Ado-Ekiti. There was no significant interaction effect of effect of gender and school type on pupils' learning outcome in Reading ($F_{(1; 79)} = 1.225$; $P > 0.05$). The hypothesis is therefore not rejected in the light of the result since the significant value (.272) is greater than 0.05. This implies that the interaction of gender and school type had no significant effect on pupils' learning outcome in Reading in Ado-Ekiti.

Research Hypothesis Seven: There is no significant interaction effect of treatment gender and school type on pupils' learning outcome in Reading in Ado-Ekiti.

Table 1 also revealed the interaction effect of treatment, gender and school type on pupils' learning outcome in Reading in Ado-Ekiti. There was no significant interaction effect of treatment, gender and school type on pupils' learning outcome in Reading ($F_{(0; 79)} = .911$; $P > 0.05$). The hypothesis is therefore not rejected in the light of the result since the significant value (.491) is greater than 0.05. This implies that treatment, gender and school type had no significant effect on pupils' learning outcome in Reading in Ado-Ekiti.

Discussion of Findings

The findings showed that the use of phonological awareness strategy has significant effect on pupils learning outcomes in reading. This implies that the treatments enhanced pupils reading proficiency significantly. The result is in line with Juel (2014) and Yeh, (2013). They noted that children who were poor readers at the end of first grade had an 88% probability of remaining a poor reader at the end of fourth grade because they are deficient in phonological awareness. Pupils who struggle with emergent reading skills have the potential to have reading deficits beyond the kindergarten school years. Furthermore, after the treatment, phonological awareness strategy was effective in improving pupils' proficiency in reading and it helped the pupils learning outcomes. The findings of this study suggest that phonological and letter-sound deficits that cause reading disabilities can be successfully remediated (Gillon & Dodd, 2017). The data from this investigation also showed that specifically training phonological processing skills had the greatest impact on learning outcome in reading accuracy.

Treatment does not have a significant effect on pupils' learning outcome in reading based on gender. The finding agrees with Torgesen (2015) who studied the effects of four different instructional strategies for improving reading ability. All male and female participants excluding the control group were given extensive pretests to assess their reading abilities. The participants in this study were randomly assigned to one of four instructional conditions 1) phonological awareness with added synthetic phonics instruction (PASP) 2) embedded phonics (EP) 3) regular classroom support (RCS) and 4) a non-treatment group (NTC) (Torgesen 2015). The findings of this study indicated that gender does not have a significant effect on reading ability on most phonemically explicit group. This finding is in line with Fauto and Friedman (2005), who reported that no significant difference between male and female phonological awareness. This is in line with the submission Robinson and Lubienski (2011) which shows that there is no

significance difference based on gender in reading. The finding is not in agreement with Zeynali (2012) who found that girls outpaced boys in reading achievement. This finding negates Ajayi (2017) who found significant gender differences in the academic performance of pupils. Female pupils performed better than their male counterparts.

Also, the study showed that there is no significant effect of school type on pupils' learning outcome in reading. The finding is in line with Ball and Gettinger (2016), they noted that the possibilities of school type influence on pupils' learning outcome in reading is very low because children learn considerably depending on the teacher. The result is not likely to support the finding of Suggate, Schaughency & Reese (2013) who found out that children acquire reading literacy through activities and experiences in various environments. However, pupils develop reading skills and attitudes towards reading literacy in a literacy rich environment, either at home and in school. There are possibilities for literacy activities to enhance the development of children's skills especially activities that include interaction between adults and children during reading, group work and play based.

Conclusion Recommendations

Based on the findings, it can be concluded that phonological awareness strategy has a significant effect on pupils learning outcome in reading. The treatment had no significant effect on gender and school type. Hence, pupils' learning outcomes were enhanced through the use of phonological awareness strategy.

The study recommended using phonological awareness strategies in reading lessons to enhance students' reading learning outcomes. To improve their instruction of reading, primary school teachers, especially those who deal with literacy or the English language, should be exposed to phonological awareness techniques. For the purpose of enhancing teachers' abilities to use the strategy to develop reading skills and thereby improve the students' learning outcomes in reading, curriculum planners should prioritize the use of this strategy in the curriculum and encourage teachers to attend in-service training to keep themselves up to date.

References

- Adesokan, E (2012). Learning disable in the classroom. In c. Abosi (ED). Development of special Education in Nigeria, Ibadan; Fountain Books.
- Ajayi H.O. (2017). The Nigerian child and reading proficiency. *African Journal of historical Science in Education*. Pp. 213.
- Al Otaiba, S., Justice.; Nelson, (2008). Reading first kindergarten classroom instruction and students growth in phonological awareness and letter naming-decoding fluency. *Journal of School Psychology, 46*, 281–314
- Akinrinade E.O. (2010). Learning disability in reading and comprehension. *Journal of Issues in Special Education. Oyo. 2*, (3). 169-76.
- Ayodele S.O. (2011) A study of the effects of the problem of class sizes and location of schools on performance of pupils, Nigeria. *Journal of Curriculum Studies, 1*(2); 145-152
- Ball, C. & Gettinger, M. (2016). Monitoring children's growth in early literacy skills: Effects of feedback on performance and classroom environments. *Education and Treatment of Children, 32*(2), 189–212
- Brown, A.L, Palincsar, A.S. and Purcell, L. (2012). Poor readers: Teach, don't label. In U.

- Neisser (Ed.), *The School Achievement of Minority Children: New perspectives*. Hillsdale, N.J.:Lawrence Earlbaum Associates.
- Blachman, B. (2005). Phonological awareness. In D. Pearson (Ed.), *Handbook of Reading Research* (Vol. 3, pp. 483-496). Mahwah, N. J.: Lawrence Erlbaum. Associates, Inc.
- Ehri, L. C., & Roberts, T. (2001). The roots of learning to read and write: Acquisition of letters and phonemic awareness. In D. K. Dickinson & S. B. Neuman (Eds.), *151 Handbook of Early Literacy Research* (Vol. 2, p. 118). New York, N. Y.: The Guilford Press.
- Fauto and Friedman (2005). Pathways to literacy: A study of invented spelling and its role in learning to read. *Child Development*, 79(4), 899–913
- Federal Republic of Nigeria (2015). National Policy on Education.
- Gillon & Dodd (2017). Effects of gender on student's academic achievement in secondary school social studies. *Journal of Education Practice* 35(5):4, www.jate.org.
- Goswami, U. (2012). Phonological and Lexical Processes. In D. P. Pearson (Ed.) *Handbook of Reading Research* (Vol. 3, pp. 251-258). Mahwah, N. J.: Lawrence Erlbaum Associates, Inc.
- Juel, C. (2014). Learning to read and write: A longitudinal study of 54 children from first through fourth grades. *Journal of Educational Psychology*, 80, 437-447.
- Knoell, G. W. (2012). *New study outlines student achievement in early grades*. Washington, DC: U.S. Department of Education.
- Lubienski (2011). Phonological awareness: the role of reading experience. In P. Bertelson (Ed.), *The onset of literacy: Cognitive processes in reading acquisition* (pp.65-92). Cambridge, MA: MIT Press.
- Lyon, G.R (2015). The nature of phonological processing and its causal role in the acquisition of reading skills. *Reading and Writing*, 2(1), 39–59.
- Pressley, M., & Allington, R. (2006). What should reading instruction research be the research of? *Issues in Education*, 5(1), 1–34.
- Suggate, Schaugency & Reese (2013). Measuring the home literacy environment in a sample of New Zealand primary students. In paper presented at the society for the scientific study of reading Asheville, NC.
- Torgesen, J. K. (2015). Preventing early reading failure. *American Educator*, 28 (3), 6–19.
- Yeh, S. S. (2013). An evaluation of two approaches for teaching phonemic awareness to children in Head Start. *Early Childhood Research Quarterly*, 18, 513–529
- Zeynali, S (2012). Exploring the gender effects on EFL learners. *Learning strategies. Theory and practice in language studies* 2;1614-1620).