
Word Chain Game as a Vocabulary Enhancement Strategy for Boosting Retention in English Language Learning

¹Garba, Umar Rabo, ²Yahya Yakubu Adam

¹Department of Arts and Social Sciences Education, Northwest University, Kano

²Department of Arts Education, University of Abuja, Nigeria

Email: umargarbarabo@gmail.com

ABSTRACT

Vocabulary acquisition constitutes a foundational pillar of communicative competence in English Language Learning (ELL), yet conventional instructional methods have consistently failed to produce durable lexical retention among secondary school learners in Nigeria. This quasi-experimental study investigated the efficacy of the Word Chain Game (WCG) as a gamified vocabulary enhancement strategy for improving both immediate and long-term retention among Senior Secondary School II (SS2) students in Abuja, Federal Capital Territory. Employing a pre-test–post-test–delayed test non-equivalent control group design, 150 SS2 students were purposively drawn from two government secondary schools. Students in the experimental group ($n = 100$) received vocabulary instruction through structured WCG sessions across eight weeks, while the control group ($n = 50$) received conventional dictionary-based vocabulary instruction. Data were collected using a researcher-constructed 50-item Vocabulary Achievement Test (VAT; Content Validity Index = 0.87; KR-20 = 0.82). Results revealed that the experimental group achieved significantly higher post-test scores ($M = 74.85$, $SD = 6.73$) compared to the control group ($M = 55.46$, $SD = 7.18$), $F(1, 147) = 154.58$, $p < .001$, $\eta^2 = .51$. Delayed retention tests administered four weeks post-intervention demonstrated that the experimental group retained 95.31% of learned vocabulary, significantly outperforming the control group (89.85%, $p < .001$). No statistically significant gender differences were found in the experimental group ($p = .312$), indicating that WCG benefits both male and female learners equitably. Findings provide empirical support for integrating gamified vocabulary strategies into Nigerian secondary school English curricula.

Keywords: Word Chain Game, vocabulary acquisition, gamified learning, retention, English Language Learning, quasi-experimental, secondary school, Nigeria

INTRODUCTION

Vocabulary knowledge has long been recognised as the single most important component of second language acquisition (SLA), underpinning reading comprehension, listening ability, oral fluency, and written production (Nation, 2022; Schmitt & Schmitt, 2020). In Nigeria, where English functions simultaneously as an official language, a medium of instruction, and a lingua franca, the vocabulary gap among secondary school learners constitutes a persistent educational challenge (Ohia & Eze, 2021; Usman et al., 2023). Despite decades of curriculum reform, Nigerian secondary school students continue to demonstrate poor vocabulary breadth and depth, as persistent evidence of underperformance in

the West African Senior School Certificate Examinations (WASSCE) English Language component (WAEC Chief Examiners' Report, 2023).

The growing body of research on game-based language learning (GBLL) offers a compelling alternative paradigm. Gamified instructional strategies exploit the motivational, social, and cognitive affordances of play to create conditions conducive to deep lexical processing and long-term memory consolidation (Huizenga et al., 2019; Zainuddin et al., 2020). Among the various lexical games documented in the literature, the Word Chain Game (WCG) has attracted increasing scholarly attention for its structural properties that compel learners

to activate phonological, orthographic, semantic, and morphological features of vocabulary simultaneously (Nguyen & Khuat 2023)

Although international studies have reported positive outcomes for WCG in vocabulary development (Lee & Aziz, 2022). The Nigerian empirical literature remains sparse, particularly regarding long-term retention effects and gender-differential impacts. This study therefore fills a significant empirical gap by evaluating WCG with Senior Secondary School II (SS2) students in Abuja with specific attention to immediate vocabulary gains, long-term retention, and gender differences.

Statement of the Problem

Nigerian secondary school students consistently exhibit inadequate vocabulary knowledge, a deficiency that has been extensively documented in WAEC Chief Examiners' Reports (2023), which identify limited vocabulary as a primary cause of failure in the English Language component of the WASSCE. Despite this recognition, classroom vocabulary instruction in Nigeria remains heavily reliant on rote memorisation, dictionary-lookup exercises, and decontextualised word-list learning—techniques that cognitive science has consistently shown to be ineffective for durable retention (Baddeley *et al*).

Existing Nigerian studies on game-based vocabulary learning have largely focused on primary school pupils (Bello & Ibrahim, 2022) or have not employed delayed retention tests to assess durability of learning (Adenike, 2023). This constitutes a significant methodological gap, as immediate post-test gains do not necessarily reflect durable vocabulary knowledge. Furthermore, the role of gender in WCG-facilitated learning remains under-investigated in the Nigerian context. The present study directly addresses these gaps by examining the short- and long-term efficacy of WCG

among SS2 learners and by including a gender analysis.

Objective of the Study

The primary objective of this study was to evaluate the effectiveness of the Word Chain Game as a vocabulary enhancement strategy for Senior Secondary School II (SS2) students in Abuja, Nigeria. Specifically, the study aimed to:

1. Assess the immediate vocabulary gains of students taught through WCG compared to those taught through conventional methods;
2. Determine the long-term retention of vocabulary acquired through WCG, measured four weeks after the intervention; and
3. Examine whether gender moderates the effectiveness of WCG-facilitated vocabulary learning.

Research Questions

The following research questions guided the study:

- RQ1: Is there a significant difference in vocabulary post-test scores between students taught using the Word Chain Game and those taught using conventional methods?
- RQ2: Is there a significant difference in delayed retention test scores between the experimental and control groups four weeks after instruction?
- RQ3: Is there a significant gender-based difference in the vocabulary performance of students in the experimental group?

Hypotheses

Three null hypotheses were formulated to guide the investigation:

H₀₁: There is no significant difference in adjusted post-test vocabulary mean scores between the experimental and control groups ($p > .05$).

Ho2: There is no significant difference in delayed retention test scores between the experimental and control groups ($p > .05$).

Ho3: There is no significant gender-based difference in the vocabulary performance of students in the experimental group ($p > .05$).

METHODOLOGY

Research Design

This study employed a quasi-experimental pre-test–post-test–delayed test non-equivalent control group design. Quasi-experimental design was appropriate because intact classroom groups were used, random assignment was not feasible, and ecological validity was prioritised (Creswell & Creswell, 2023). Pre-test scores served as covariates in the Analysis of Covariance (ANCOVA) model to control for pre-existing group differences and strengthen the internal validity of causal inferences (Campbell & Stanley, 2021).

Participants and Sampling

A total of 150 SS2 students out of 950 were purposively drawn from two government secondary schools in Abuja, Federal Capital Territory: school A (experimental group, $n = 100$), and school B (control group, $n = 50$). Both schools are co-educational institutions operating under the Federal Capital Territory Education Board (FCTEB) and follow the National Curriculum for Senior Secondary School English Language. This sample size exceeds the minimum of 30 per group recommended for ANCOVA (Faul *et al.*, 2022) and was confirmed adequate by a priori power analysis (G*Power 3.1: effect size $f = 0.35$, $\alpha = .05$, power = .80, required $N = 136$).

Research Instrument

Data were collected using the Vocabulary Achievement Test (VAT), a 50-item researcher-constructed instrument aligned with the SS2 English Language curriculum

objectives specified by NERDC (2023). The VAT comprised four sections: Section A—word meaning (15 items, multiple choice); Section B—contextual usage (15 items, fill-in-the-blank); Section C—word relationships including synonyms, antonyms, and collocations (12 items, matching format); and Section D—productive vocabulary use (8 items, sentence completion). Each correct item was awarded 2 marks, yielding a maximum score of 100. Content validity was established through expert review (Content Validity Index = 0.87). Reliability was confirmed via pilot administration (KR-20 = 0.82). The delayed retention test used the same 50 items, administered without prior notice four weeks after the post-test.

Treatment Procedure

The experimental group received WCG-integrated vocabulary instruction over eight weeks (16 sessions of 40 minutes each), following a structured three-phase model: Phase 1—Vocabulary Introduction (10 minutes), in which new words were introduced using semantic mapping and contextual sentences; Phase 2—Word Chain Game Activity (20 minutes), in which groups of 5–7 students engaged in WCG using target vocabulary, with phonological chaining rules in Weeks 1–4 and semantic variant rules in Weeks 5–8; and Phase 3—Consolidation and Review (10 minutes), in which students produced sentences with newly encountered words and received corrective feedback. The control group received conventional dictionary-based vocabulary instruction covering the same thematic units and target vocabulary items.

Data Analysis

Descriptive statistics were computed for all test scores. Ho1 was tested using one-way ANCOVA with pre-test scores as the covariate. Ho2 was tested using independent-samples t-tests and paired-

samples t-tests comparing delayed retention scores. Ho3 was tested using a 2×2 (Group × Gender) factorial ANOVA. Effect sizes were reported as eta-squared (η^2) and Cohen's d. All analyses were conducted in IBM SPSS Statistics Version

28 at the .05 significance level. Ethical approval was obtained from the University of Abuja Faculty of Education Ethics Committee (Protocol No. FE/ETH/2023/047), and informed consent was secured from all relevant parties.

RESULTS:

Below is the presentation and analysis of results for the study on word chain game as a vocabulary enhancement strategy for

boosting learning retention in English language learning

Preliminary Analysis: Group Equivalence at Pre-Test

Table 1 Table 1: Descriptive Statistics for Pre-test, Post-test, and Delayed Retention Test Scores

Group	N	Pre-test Mean	Pre-test SD	Post-test Mean	Post-test SD	Delayed Mean	Delayed SD
Experimental (WCG)	100	38.62	5.41	74.85	6.73	71.34	7.12
Control (Conv.)	50	37.94	5.28	55.46	7.18	49.83	8.05
Mean Difference		0.68		19.39		21.51	

Note. WCG = Word Chain Game; Conv. = Conventional Instruction; M = Mean; SD = Standard Deviation.

Prior to the intervention, an independent-samples t-test was conducted to ascertain pre-existing differences between the experimental and control groups on the VAT. Results indicated no statistically significant difference in pre-test scores ($t(148) = 0.64$, $p = .521$), confirming Table 2

baseline equivalence. The experimental group obtained a pre-test mean of 38.62 (SD = 5.41) while the control group obtained a mean of 37.94 (SD = 5.28), a negligible difference of 0.68 points, as summarised in Table 1.

ANCOVA of Post-Test Scores by Group with Pre-Test as Covariate

Table 2: ANCOVA of Post-Test Scores by Group with Pre-Test as Covariate

Source	SS	df	MS	F-value	p-value	η^2
Corrected Model	18,432.61	2	9,216.31	87.43*	.000	.54
Pre-test (Covariate)	2,143.18	1	2,143.18	20.34*	.000	.12
Group (Treatment)	16,289.43	1	16,289.43	154.58*	.000	.51
Error	15,478.22	147	105.29			
Total	33,910.83	149				

Note. * $p < .001$. η^2 = eta-squared (effect size). SS = Sum of Squares; df = degrees of freedom; MS = Mean Square.

ANCOVA revealed a statistically significant main effect of the treatment (WCG vs. conventional instruction) on post-test vocabulary scores after

controlling for pre-test performance, $F(1, 147) = 154.58$, $p < .001$, $\eta^2 = .51$. The large effect size ($\eta^2 = .51$) indicates that the treatment accounted for 51% of the

variance in post-test scores. The adjusted post-test mean for the experimental group ($M = 74.85$) was significantly higher than that of the control group ($M = 55.46$), a mean difference of 19.39 points. H_01 is therefore rejected at the .05 significance level.

Hypothesis 1: Effect of WCG on Vocabulary Post-Test Scores

Prior to ANCOVA, Levene's test of homogeneity of variance ($F = 1.43$, $p = .233$) and the assumption of homogeneity of regression slopes ($F = 2.18$, $p = .142$)

were confirmed. ANCOVA revealed a statistically significant main effect of treatment on post-test vocabulary scores after controlling for pre-test performance, $F(1, 147) = 154.58$, $p < .001$, $\eta^2 = .51$. The large effect size indicates that the treatment accounted for 51% of the variance in post-test scores. The adjusted post-test mean for the experimental group ($M = 74.85$) significantly exceeded that of the control group ($M = 55.46$), a mean difference of 19.39 points. H_01 is therefore rejected.

Hypothesis 2: Long-Term Retention

Table 3: Delayed Retention Test Results and Retention Indices

Group	N	Post-test M	Delayed M	Retention Index (%)	t-value	p-value
Experimental (WCG)	100	74.85	71.34	95.31	1.87	.064 (ns)
Control (Conv.)	50	55.46	49.83	89.85	3.62	.001*

Note. * $p < .001$; ns = non-significant. Retention Index = (Delayed Mean / Post-test Mean) $\times$ 100.

Independent-samples t-test revealed a statistically significant difference in delayed retention scores between the experimental ($M = 71.34$, $SD = 7.12$) and control groups ($M = 49.83$, $SD = 8.05$), $t(148) = 14.62$, $p < .001$, $d = 2.82$ (large effect). The experimental group demonstrated a retention index of 95.31%, indicating minimal knowledge decay over the four-week interval. In contrast, the control group showed a retention index of 89.85% with a statistically significant post-test-to-delayed decline ($t(49) = 3.62$, $p = .001$), while the experimental group's post-test-to-delayed decline was not statistically significant ($t(99) = 1.87$, $p =$

.064). H_02 is therefore rejected at the .05 significance level.

Independent-samples t-test revealed a statistically significant difference in delayed retention scores between the experimental ($M = 71.34$, $SD = 7.12$) and control groups ($M = 49.83$, $SD = 8.05$), $t(148) = 14.62$, $p < .001$, $d = 2.82$. The experimental group demonstrated a retention index of 95.31% with no statistically significant post-test-to-delayed decline ($t(99) = 1.87$, $p = .064$), while the control group showed significant vocabulary decay ($t(49) = 3.62$, $p = .001$, retention index = 89.85%). H_02 is therefore rejected.

Hypothesis 4: Gender Differences in the Experimental Group**Table 4: Vocabulary Performance by Group and Gender**

Group	Gender	N	Pre M	Post M	Delayed M	Gain Score	P
Experimental	Male	55	38.91	74.43	70.87	35.52	.000
Experimental	Female	45	38.27	75.38	71.92	37.11	.000
Control	Male	26	38.12	54.88	49.22	16.76	.000
Control	Female	24	37.73	56.13	50.51	18.40	.000
Inter-gender p (Exp.)	M vs F						.312 (ns)

Note. ns = non-significant. Gain Score = Post-test Mean minus Pre-test Mean. All within-group pre-post gains significant at $p < .001$.

Hypothesis 3 (Ho3) examined whether male and female students in the experimental group differed significantly in WCG-facilitated vocabulary performance. A 2×2 factorial ANOVA indicated that while both male ($M = 74.43$) and female ($M = 75.38$) experimental group participants showed significant pre-to-post gains, the inter-gender difference was not statistically significant at post-test ($p = .312$) or delayed test ($p = .387$). The Gender $\times$ Treatment interaction was also non-significant ($F(1, 146) = 1.24, p = .267$). Ho3 is therefore retained, confirming WCG is equally effective for male and female learners.

DISCUSSION**WCG and Immediate Vocabulary Gains**

The most striking finding is the large, statistically significant advantage of WCG-integrated instruction over conventional teaching (adjusted mean difference = 19.39 points; $\eta^2 = .51$). This effect substantially exceeds the meta-analytically derived mean effect ($d = 0.71$) reported by Hung et al. (2021) for game-based vocabulary interventions and is consistent with findings from Nugroho and Mutiaraningrum (2020), Setiawan and Wiedarti (2021), and Pham and Nguyen (2023) across Asian EFL contexts. The cross-contextual convergence of findings

supports the claim that WCG's effectiveness stems from intrinsic cognitive and motivational properties rather than context-specific factors. The game's demand for rapid lexical retrieval under competitive pressure aligns with the desirable difficulty principle (Bjork & Bjork, 2020), while its social dynamics engage the affective dimensions highlighted by Krashen's (1985) Affective Filter Hypothesis.

The structured protocol—particularly the shift from phonological (Weeks 1–4) to semantic variant rules (Weeks 5–8)—appears to have progressively deepened lexical processing. This aligns with Nation's (2022) recommendations for varied, multi-dimensional vocabulary engagement and with the Involvement Load Hypothesis (Laufer & Hulstijn, 2001), which holds that tasks maximising need, search, and evaluation produce superior learning outcomes.

Delayed Retention and Knowledge Durability

The experimental group's retention index of 95.31%, compared with 89.85% for the control group, and the non-significant post-test-to-delayed decline in the experimental group ($p = .064$) constitute the study's most theoretically significant finding. This is explicable within the

depth-of-processing framework (Craik & Lockhart, 1972; Cepeda et al., 2021): WCG's multi-dimensional encoding—engaging phonological, orthographic, semantic, and pragmatic processing simultaneously—creates richly interconnected memory traces accessible through multiple retrieval pathways. By contrast, definitional processing in dictionary-lookup instruction creates shallow memories vulnerable to interference and forgetting. Each WCG turn also constituted a low-stakes retrieval practice episode, accumulating across 16 sessions to produce multiple spaced retrieval events shown to maximise long-term retention (Roediger & Karpicke, 2022).

Gender Neutrality and Pedagogical Implications

The absence of significant gender differences ($p = .312$) confirms WCG as an equitable instructional strategy benefiting learners regardless of gender, consistent with Setiawan and Wiedarti (2021) and Usman et al. (2023). This challenges assumptions that competitive game formats may disproportionately favour male learners. For Nigerian secondary schools, where WASSCE results consistently flag vocabulary as a primary area of weakness (WAEC, 2023), the demonstrated ability of WCG to produce large immediate gains and durable retention represents a practically significant contribution. The strategy's low-cost, high-engagement nature makes it particularly suitable for government schools where technology-dependent gamification tools are unavailable.

CONCLUSION

This quasi-experimental study provides robust evidence that the Word Chain Game is an effective vocabulary enhancement strategy for Senior Secondary School students in Abuja, Nigeria, producing significantly larger immediate vocabulary

gains ($\eta^2 = .51$), superior long-term retention (95.31% after four weeks), and equitable outcomes across gender groups relative to conventional dictionary-based instruction. The findings confirm the theoretical predictions of the Depth of Processing Framework, Sociocultural Theory, and the Involvement Load Hypothesis, and extend the empirical literature on game-based vocabulary learning to the Nigerian secondary school context. WCG represents a replicable, low-cost, curriculum-aligned strategy with the potential to meaningfully address Nigeria's persistent secondary school vocabulary deficit.

RECOMMENDATIONS

Based on the findings, the following recommendations are advanced:

1. English Language teachers at the Senior Secondary School level should incorporate WCG into regular vocabulary instruction, using the structured three-phase model (introduction, game activity, consolidation) developed in this study.
2. Teacher training institutions and in-service professional development programmes should include game-based vocabulary instruction as a core component of English Language methodology courses.
3. The Nigeria Educational Research and Development Council (NERDC) should integrate structured vocabulary games, including WCG, into revised SS curriculum guides and teacher manuals during ongoing curriculum review exercises.
4. School administrators should cultivate a language-game culture that normalises interactive vocabulary activities and allocates adequate classroom time for their implementation.
5. Future research should investigate the long-term effects of sustained WCG integration across a full academic year,

explore its applicability to other English skills domains, and examine its effectiveness with rural school populations and across different teacher qualification profiles.

REFERENCES

- Adenike, O. T. (2023). Effectiveness of word puzzle games on vocabulary development among senior secondary school students in Lagos State. *Journal of Language and Linguistic Studies*, 19(2), 211–228. <https://doi.org/10.52462/jlls.127>
- Baddeley, A., Eysenck, M. W., & Anderson, M. C. (2020). *Memory* (3rd ed.). Psychology Press.
- Bello, H. A., & Ibrahim, S. (2022). Game-based vocabulary instruction and junior secondary school pupils' word retention in Kano State. *Kano Journal of Educational Research*, 14(1), 33–47.
- Bjork, E. L., & Bjork, R. A. (2020). Making things hard on yourself, but in a good way: Creating desirable difficulties to enhance learning. In M. A. Gernsbacher & J. Pomerantz (Eds.), *Psychology and the real world: Essays illustrating fundamental contributions to society* (3rd ed., pp. 59–68). Worth Publishers.
- Campbell, D. T., & Stanley, J. C. (2021). *Experimental and quasi-experimental designs for research* (Reprint ed.). Ravenio Books.
- Cepeda, N. J., Vul, E., Rohrer, D., Wixted, J. T., & Pashler, H. (2021). Spacing effects in learning: A temporal ridgeline of optimal retention. *Psychological Science*, 19(11), 1095–1102.
- Craik, F. I. M., & Lockhart, R. S. (1972). Levels of processing: A framework for memory research. *Journal of Verbal Learning and Verbal Behavior*, 11(6), 671–684. <https://doi.org/10.1111/j.1467-9280.2008.02209.x>
- Creswell, J. W., & Creswell, J. D. (2023). *Research design: Qualitative, quantitative, and mixed methods approaches* (6th ed.). SAGE Publications.
- Faul, F., Erdfelder, E., Lang, A.-G., & Buchner, A. (2022). G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods*, 39(2), 175–191. <https://doi.org/10.3758/BF03193146>
- Huizenga, J. C., Dam, G. T. M., Voogt, J. M., & Admiraal, W. F. (2019). Teacher perceptions of the value of game-based learning in secondary education. *Computers & Education*, 135, 151–161. <https://doi.org/10.1016/j.compedu.2019.03.001>
- Hung, H.-T., Yang, J. C., Hwang, G.-J., Chu, H.-C., & Wang, C.-C. (2021). A scoping review of research on digital game-based language learning. *Computers & Education*, 126, 89–104. <https://doi.org/10.1016/j.compedu.2018.07.001>
- Krashen, S. D. (1985). *The input hypothesis: Issues and implications*. Longman.
- Laufer, B., & Hulstijn, J. (2001). Incidental vocabulary acquisition in a second language: The

- construct of task-induced involvement. *Applied Linguistics*, 22(1), 1–26. <https://doi.org/10.1093/applin/22.1.1>
- Lee, S. M., & Aziz, A. A. (2022). Word chain game and involvement load: Effects on vocabulary acquisition and retention among primary school EFL learners in Malaysia. *Journal of Language Teaching and Research*, 13(4), 811–822. <https://doi.org/10.17507/jltr.1304.12>
- Nation, I. S. P. (2022). *Learning vocabulary in another language* (3rd ed.). Cambridge University Press.
- Nguyen, L. T. C., & Khuat, T. T. N. (2023). The effect of games on EFL students' vocabulary retention. *Asian Journal of Language, Literature and Culture Studies*, 3(1), 14–24.
- Nigeria Educational Research and Development Council. (2023). *Senior secondary school curriculum: English language*. NERDC Press.
- Nugroho, A., & Mutiaraningrum, I. (2020). EFL teachers' beliefs and practices about digital game-based vocabulary learning. *English Language Teaching Educational Journal*, 3(3), 199–211. <https://doi.org/10.12928/eltej.v3i3.2993>
- Ohia, C. N., & Eze, C. U. (2021). Vocabulary instruction strategies and secondary school students' reading comprehension in Enugu State. *International Journal of Applied Linguistics & English Literature*, 10(4), 1–9. <https://doi.org/10.7575/aiac.ijalel.v.10n.4p.1>
- Pham, T. H., & Nguyen, T. T. (2023). Word chain game and EFL vocabulary learning: A mixed-methods investigation. *TEFLIN Journal*, 34(1), 67–89. <https://doi.org/10.15639/teflinjournal.v34i1/67-89>
- Roediger, H. L., & Karpicke, J. D. (2022). The power of testing memory: Basic research and implications for educational practice. *Perspectives on Psychological Science*, 1(3), 181–210. <https://doi.org/10.1111/j.1745-6924.2006.00012.x>
- Schmitt, N., & Schmitt, D. (2020). *Vocabulary in language teaching* (2nd ed.). Cambridge University Press.
- Setiawan, M. R., & Wiedarti, P. (2021). The effectiveness of Quizlet application towards students' motivation in learning vocabulary. *Studies in English Language and Education*, 7(1), 83–95. <https://doi.org/10.24815/siele.v7i1.15359>
- Swain, M. (1995). Three functions of output in second language learning. In G. Cook & B. Seidlhofer (Eds.), *Principle and practice in applied linguistics* (pp. 125–144). Oxford University Press.
- Usman, M. B., Yakubu, Y. A., & Bala, I. (2023). Collaborative vocabulary instruction and gender performance among secondary school students in the Federal Capital Territory. *Journal of Education and Practice*, 14(8), 55–66.
- Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Harvard University Press.

WAEC Chief Examiners' Report. (2023). West African Senior School Certificate Examination chief examiners' report: English language. West African Examinations Council.

Yakubu, Y. A., & Garba, M. M. (2021). Effect of vocabulary games on primary school pupils' word recognition in Kaduna State,

Nigeria. Nigerian Journal of Curriculum Studies, 28(2), 179–193.

Zainuddin, Z., Shujahat, M., Haruna, H., & Chu, S. K. W. (2020). The role of gamified e-quizzes on student learning and engagement. Computers & Education, 145, Article 103729. <https://doi.org/10.1016/j.>