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Effect of Periodic Testing on Academic Performance and Retention in Economics among Senior Secondary School Students in Gombe Education Zone, Gombe State, Nigeria

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Abstract
This study investigated the effect of periodic testing on academic performance and retention in Economics among senior secondary school students in Gombe Education Zone, Gombe State, Nigeria. The study adopted a quasi-experimental design. A sample of 112 students was selected from a population of all 835 SS2 students offering Economics in six public senior secondary schools in Gombe Education Zone. The study involved experimental and control groups. The experimental group was assessed using periodic testing while the control group was exposed to the same concept using conventional testing method. Economics Performance Test (EPT) was the instrument used for data collection. The instrument was validated and had a reliability coefficient of .846. Hypotheses were tested using t-test at 0.05 level of significance. The findings revealed that there was a significant effect of periodic testing on academic performance, and retention. The results also showed that male and female students in the experimental group differed significantly in their performance, and retention level. It was concluded that periodic testing significantly boosted academic performance and retention among secondary school students in Economics. It was therefore recommended among others that secondary school Economics teachers should employ periodic testing in teaching all concepts in Economics.

Keywords: periodic testing, academic performance, retention, economics, secondary school students

Introduction
Economics, as a subject, holds pivotal importance in secondary education in Nigeria, offering practical insights applicable across various domains of life, and equipping learners with decision-making, analytical and problem-solving skills. Effective Economics testing should assess students' knowledge, understanding and application of economic concepts. Well-designed Economics tests help teachers identify areas where students require additional support and provide feedback to improve learning (NCEE, 2019). Consequently, teachers are encouraged to use collaborative, interactive and learner-oriented instructional strategies to enhance students' performance in Economics (FME, 2013).

Periodic testing is an assessment conducted at regular intervals such as daily, weekly or monthly to evaluate students' learning progress. Kling et al. (2017) describe periodic testing as a continuous form of assessment aimed at monitoring students' mastery of learning content in the cognitive domain. Research has shown that periodic testing can have both positive and

negative effects on students' learning outcomes. Roediger and Karpicke (2018) reported that periodic testing enhances students' retention, motivation and engagement. Black and William (2018) also noted that frequent assessments enable students to identify areas of weakness and develop effective test-taking strategies. However, excessive testing may lead to test anxiety, stress and a tendency toward rote memorization rather than deep understanding (Kornell, 2007). Walstad and Allgood (2014) further found that students exposed to periodic testing in Economics performed better and retained learning content longer. In contrast, Myatt and Wanner (2016) warned that excessive testing may encourage memorization rather than critical thinking and problem-solving skills.

Empirical studies have further demonstrated the effectiveness of periodic testing in improving academic performance. Olagunju (2015) investigated the effect of periodic testing on secondary school students' achievement in Mathematics in South-Western Nigeria and found that students exposed to periodic testing performed significantly better than those who were not, although no significant gender difference was observed. Similarly, Ajogbeje et al. (2013) examined the effect of periodic testing with feedback on junior secondary school students' achievement in Mathematics in Ondo State, and reported that periodic testing significantly improved students' academic performance, with no significant gender difference. In terms of retention, Godwin (2015) studied the effects of levels of processing on students' retention of learned materials and found that deep levels of processing produced significantly higher retention than shallow processing. This implies that strategies which promote meaningful engagement and repeated exposure to learning materials enhance long-term retention.

The present study is anchored on the Multi-Store Memory Model proposed by Atkinson and Shiffrin (1968). The model explains that information moves from sensory memory to short-term memory and finally to long-term memory through rehearsal and meaningful processing. Repeated rehearsal and elaborative processing improve retention and facilitate the transfer of information to long-term memory. Periodic testing therefore aligns with this theory, as it promotes repeated rehearsal and deeper processing of learning materials, thereby improving students' retention and academic performance.

Interestingly, Economics at the senior secondary school level has witnessed increasing enrolment; paradoxically, there has been a steady decline in students' performance. This alarming trend is evident in the dwindling pass rates documented by the West African Examinations Council (WAEC, 2016; WAEC, 2018). Poor performance in Economics affects students' chances of pursuing Economics-related courses in tertiary institutions and undermines economic literacy.

This study arose from persistent poor academic performance of students in Economics at the secondary school level. This poor performance may be attributed to ineffective teaching strategies, overcrowded classrooms, lack of interest in the subject and inadequate assessment practices. In order to address this problem, there is a need to explore more effective instructional and assessment strategies that can enhance students' understanding, retention and academic performance in Economics. Periodic testing is therefore considered in this study as a possible strategy for improving students' academic outcomes.

Research questions

The research questions guiding the study are:

1. What is the effect of periodic testing on students' academic performance in Economics?
2. What is the effect of periodic testing on students' retention in Economics?
3. What is the differential effect of periodic testing on academic performance in Economics between male and female students?
4. What is the differential effect of periodic testing on retention in Economics between male and female students?

Hypotheses

Ho1: There is no significant difference in academic performance between students exposed to periodic testing and those in the control group.

Ho2: There is no significant difference in retention between students exposed to periodic testing and those in the control group.

Ho3: There is no significant difference in academic performance between male and female students exposed to periodic testing.

Ho4: There is no significant difference in retention between male and female students exposed to periodic testing.

Methodology

This research employed pre-test post-test quasi-experimental design to investigate the effect of periodic testing on academic performance and retention in Economics. Intact classes were assigned to the experimental and control groups. A pre-test was administered to both groups to assess their entry-level performance and retention before the intervention. The experimental group was exposed to periodic testing (weekly tests), while the control group followed conventional testing methods. After six weeks of treatment, a post-test was administered to both groups to measure academic performance, followed by a post-posttest after two weeks to assess retention.

The design for the study is presented thus:

EG ⟶ O1 ⟶ X1 ⟶ O2 ⟶ O3
CG ⟶ O1 ⟶ XO ⟶ O2 ⟶ O3

Key:

EG =Experimental Group
CG = Control Group
O1= Pretest
O2= Posttest
O3= Post-Posttest
X1= Treatment (Weekly Testing)
Xo= No Treatment

The population for this study consisted of all Economics students across six (6) public Senior Secondary Schools II (SSS 2) classes in Gombe Education zone in Gombe State. The population comprises four hundred and ninety (490) males and three hundred and forty-five (345) females making a total of eight hundred and thirty-five (835) senior secondary school II

students (SSS 2). The study employed a probability sampling technique, specifically simple random sampling to select two schools from a total population of six schools. The sample for this study consists of all SSS II Economics students from the two schools sampled out for the study with intact classes. Simple random sampling techniques using hat and draw was adopted to select first school as experimental group and the second school as control group. The two randomly selected schools were similar in terms of student's gender, teachers' qualification and school population.

The Economics Performance Test (EPT) was adapted by the researcher from the school economics teachers and validated by experts. The test consisted of 30 multiple-choice items covering four topics including Price discrimination/Market Structure, Industry/Agriculture, Public Finance, and budget. This instrument was used to measure the performance of students in the subject, and same instrument was administered for the second time after rearranging the items to determine the retention level of students towards the subject after two weeks of posttest.

A table of specification was developed for EPT. This was constructed to ensure that appropriate consideration was given to the relative weight and time devoted to teaching each of the topics selected for the intervention. The test items were drawn in a blueprint based on the content of senior secondary school certificate economics curriculum in line with topics that were covered during the treatment and the educational objectives of *Bloom*'s Taxonomy (Krathwohl, 2002). The Economics Performance Test (EPT) consists of sections A and B. Section A captured students' personal data such as name of school, gender and class, which enable the researcher differentiate the experimental school from the control school. Section B contained test items that measured the students' academic performance and retention. The test items consist of 30 multiple-choice items with options A-D; students were asked to select the best option as it applies to them.

The validity of EPT was determined using content and face validity. This was to ensure that the instrument measured what it is supposed to measure accurately. The two Economics teachers in the selected schools and four experts in Measurement and Evaluation from Ahmadu Bello University, Zaria helped in rearranging the items to suit the objectives of the research; they also determined the content coverage as well as the appropriateness of the instrument. The experts' observations, corrections and modifications were corrected and the final copy of the instrument was produced.

The reliability of the instrument was determined using test-retest method. The data collected from the pilot testing were used to ascertain the stability and internal consistency of the instrument. The two sets of results were correlated to obtain the coefficient of internal consistency of 0.846. The internal consistency of the same instrument was determined using Kuder-Richardson formula 20 (K-R 21).

The researcher employed the services of two research assistants, who were the normal economics class teachers and were given the pre-test papers to administer before the commencement of the teaching. The pre-test papers were collected and given to the researcher

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to do the marking and the results were kept. The students were tested weekly after teaching. For the period of six (6) weeks, after the real classroom teaching using the periodic testing strategy, the students were tested every week. After two weeks, the same instrument which was restructured numerically was administered and the scripts were collected by the researcher for marking. The results were recorded and tabulated for analysis. Instructions were written at the top of the test scripts for the testees to read through. The duration for the test was one hour, with options A-D available with distracters and only one correct answer for the testees to choose. The test scripts were collected and scored using the marking guide prepared for the test. The multiple-choice objective test items were marked and scored over 30. Each question in the objective test items was scored 1 mark, giving a total of 30 marks for the 30 objective type questions.

The data collected from the study were analyzed with inferential statistics of independent sample t-test using Statistical Package for Social Sciences (SPSS) version 26. This was to determine if there was any significant difference in the academic performance and retention of the experimental and control groups, as well as if there was any gender difference in academic performance and retention of the experimental group. All hypotheses were tested at .05 level of significance.

Presentation of results

Ho1: There is no significant difference between the academic performance of secondary school students exposed to periodic testing and those in the control group.

Table 1: Independent sample t-test on effect of periodic testing on academic performance of students

Groups	N	Mean	SD	Df	T	P
Experimental	57	27.11	1.610	54	52.24	.000
Control	55	14.41	1.019			

The results indicate t = 52.24, and p = .000. The experimental group performed better (mean = 27.11) than the control group (mean = 14.41), and the difference was statistically significant.

Ho2: There is no significant difference between the retention of secondary school students exposed to periodic testing and those in the control group.

Table 2: Independent sample t-test on effect of periodic testing on retention among secondary school students exposed to periodic testing

Groups	N	Mean	SD	Df	T	P
Experimental	57	27.20	1.432	54	54.69	.000
Control	55	13.95	1.33			

According to the results, t = 54.69 and p = .000. The experimental group retained more (mean = 27.20) than the control group (mean = 13.95); and the difference between the two groups was statistically significant.

Ho3: There is no significant difference between the academic performance of male and female students exposed to periodic testing

Table 3: Independent sample t-test on difference between academic performance of male and female students exposed to periodic testing

Groups	N	Mean	SD	Df	T	P
Male	37	26.73	1.74	55	2.67	.010
Female	20	27.85	.933			

The results here indicated t = 2.67, and p = .010. Female students performed better (mean = 27.85) than male students (mean = 26.73), and the difference was statistically significant.

Ho4: There is no significant difference between the retention of male and female students exposed to periodic testing.

Table 4: Independent sample t-test on difference between retention of male and female students exposed to periodic testing

Groups	N	Mean	SD	Df	T	P
Male	37	27.14	1.22	55	2.04	.038
Female	20	27.80	1.05			

For retention based on gender, the results indicated t = 2.04, and p = .038. Female students retained more (mean = 27.80) than male students (mean = 27.14), and the difference between the two is statistically significant.

Discussion of the findings

The findings on the significant effect of periodic testing on academic performance in economics align with the results of a related study by Olagunju (2015) on the effect of periodic testing on students' achievement in secondary school Mathematics. Both studies found significant differences in the mean performance and achievement scores of students exposed to periodic testing. Periodic testing was shown to improve performance in both economics and Mathematics. The current study focused on economics and was carried out in North -Eastern Nigeria, while Olagunju (2015) conducted his study on Mathematics and was carried out in the South Western part of Nigeria. The current study's sample population is 112 while Olagunju (2015) used 120 secondary school students. Although both studies used t-tests, the specific types (paired sample t-test and independent sample t-test) and results (t-values and p-values) differ. Olagunju (2015) found no significant gender difference in Mathematics achievement scores while the current study showed there is a gender difference between scores of male and female students exposed to periodic testing.

The research study finding which shows that periodic testing in economics is significantly effective on retention among secondary school students also corroborate Godwin (2015) who investigated to find out the effects of level of processing on retention of learnt material. Both studies found significant effects of testing on student retention. The current study examined the effect of periodic testing while the second study investigated the effect of level of processing.

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Both studies found significant effects on retention, but Godwin (2015) found that the deep level of processing had the highest level of retention. Both studies used quasi-experimental design with the sample size of 112 for the current study and sample size of 100 students for the second study. Periodic testing as found in the current study is an effective strategy for enhancing retention among students. This is because periodic testing provides students with regular feedback on their performance, helps to identify areas where students need improvement and encourages students to engage more actively with learning material. The other study suggests that strategies such as elaborative rehearsals, where students are encouraged to think critically about the material and make connections to their prior knowledge, should be used.

More so, Ajogbeje et al. (2013) investigated the effect of periodic testing with feedback as an instructional strategy on junior secondary school students' achievement in mathematics in Ondo State. One of the findings shows that there were no significant effects of gender on periodic testing, which is not in line with the current findings which reveals that there was significant difference between academic performance of male and female students exposed to periodic testing in favour of the female students. The current study used independent sample t-test for data analysis, while in the second study data collected were analyzed using analysis of covariance (ANCOVA); the current study was conducted in Gombe State, North East Nigeria with a sample of 112 senior secondary school two (SSS II) students in economics subject, while the second study was conducted in Ondo State, South -Western Nigeria with a sample of 227 junior secondary school two (JSS II) students in mathematics subject.

The findings of this study are in line with the theory of Multi-Store Model whose theory emphasizes the importance of rehearsal in retention and transfer of information from short-term memory to long term memory. Repeating information in short-term memory to maintain it and prevent forgetting, and processing information in short-term memory by making connections to prior knowledge, lead to better retention and transfer to long-term memory.

Conclusion

Based on the findings, it was concluded that periodic testing is significantly effective in enhancing academic performance and retention in Economics among secondary school students in Gombe Education Zone.

Recommendations

Based on the findings, the following recommendations are made:

1. Secondary school Economics teachers should frequently employ periodic testing in teaching difficult and abstract concepts in Economics.
2. School administrators should ensure that periodic testing is a regular feature of the Economics curriculum.
3. Teachers should pay more attention to male students and develop targeted interventions to support them.
4. Periodic testing should be sustained at every level of education to evaluate students' performance regularly.

References

Ajogbeje, O. J., Ojo, A. A. & Olarenwaju, O. A. (2013). Effect of Periodic Testing with Feedback on Students' Achievement in Junior Secondary School Mathematics in Ondo, State Nigeria. *International Education Research,* 1.

Atkinson, R. C. & Shiffrin, R. M. (1968). Human memory: A proposed system and its controlled processes. In K. W. Spence & J. T. Spence (Eds.), *The psychology of learning and motivation: Advances in research and theory* (Vol. 2. Pp.89-19). Academic Press.

Black, P. & William, D. (2018). Assessment of Learning. A review of the literature. *Educational Assessment, Evaluation and Accountability*, 30(2), 147 – 165.

Federal Ministry of Education (FME) (2013). *Economics for senior secondary school*. Abuja.

Godwin, A. (2015). Effects of Level of Processing Information on Retention on Learnt Materials: among Senior Secondary School Students Jalingo Local Government area, Taraba State.

Kling, N., Miller, C. & Reardon, J. (2017). The Impact of testing frequency on student performance in a marketing. *Journal of Education for Business*, 81(2), 67-72.

Kornell, H. (2007). *More Efficiency in multiple kermel learning* IDIAP-RR 07-18 Proceeding of the 24th international conference on machine learning IDIAP Research institute: www.ichiap.ch 1920 Martigny - Switzerland

Krathwohl, D. R. (2002). A revision of Bloom's taxonomy: An overview. *Theory into Practice*, 41(4), 212-218.

Myatt, M. & Wanner, C. (2016). *High challenge, Low Treat: How the Best Leaders Find the Balance*. John Catt Educational.

National Council on Economic Education (NCEE) (2019). Voluntary National Content Standards in Economics.

Olagunju, A. M. (2015). The Effects of Formative Assessment on Students Achievement in Secondary School Mathematics. *International Journal of Education and Research*, 3(10), 482-490.

Roediger, H. L. & Karpicke, S. D. (2018). The power of retrieval practice theory and application of the testing effects: Current Directions in the Testing Effect. *Current Direction in Psychological Science.*, 27(5), 531 – 538.

Walstad, W. & Allgood, S. (2014). Views of Teaching and Research in Economics and other disciplines. *American Economic Review*, 95(2), 177-183.

West African Examinations Council (2016). Chief Examiners report. Lagos: WAEC.

West African Examinations Council (2018). Chief Examiners report. Lagos: WAEC