

Effect of 21st Century Innovative Learning Strategy on Economics Students' Performance in Ilorin Metropolis

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ABSTRACT

The 21st century has brought about a remarkable transformation in how learning is approached, with innovative strategies revolutionizing the education sector. In Economics education, the conventional teaching method has evolved to incorporate technology-enhanced pedagogy, collaborative learning, and project-based evaluations. Nevertheless, the researchers in the 21st century continue to investigate and debate the effectiveness of innovative teaching methods on students' economic performance. The research employed a pre-test, post-test, and control group quasi-experimental design. The population comprised 47,296 Economics students enrolled in 106 Senior Secondary Schools within Ilorin. The study focused on Senior Secondary School Two (SS2) Economics students in Ilorin Metropolis, with a target population of 16,444 students. A sample of 114 SS2 Economics students from two intact classes was selected for the study. The Economics Performance Test (EPT) served as the data collection instrument. To test the research hypotheses, Analysis of Covariance (ANCOVA) was employed at a 0.05 significance level. The finding revealed that there was significant effect of Team-Pair-Solo strategy on students' performance in Economics, $F_{(1, 113)} = 39.579 (0.000)$, $p < 0.05$. The significant was in favour of TPS strategy than convention method with mean score of 35.8361 and 28.3019 respectively. The result also showed that Team-Pair-Solo strategy significantly improved students' retention in Economics ($F_{(1, 111)} = 8.264 (0.005)$, $p < 0.05$ and mean scores was in favour of TPS than CTM 35.9261 and 28.0061 respectively. This study's results reveal that the Team-Pair-Solo (TPS) approach yields significantly better outcomes in Economics performance among secondary school students compared to traditional methods. Based on these findings, educational stakeholders in the 21st century are encouraged to recognize the effectiveness of TPS as an innovative pedagogical strategy worthy of consideration and implementation.

ABSTRAK

Abad ke-21 telah membawa transformasi yang luar biasa dalam cara belajar, dengan strategi inovatif yang merevolusi sektor pendidikan. Dalam pendidikan Ekonomi, metode pengajaran konvensional telah berevolusi untuk menggabungkan pedagogi yang ditingkatkan dengan teknologi, pembelajaran kolaboratif, dan evaluasi berbasis proyek. Namun demikian, para peneliti di abad ke-21 terus menyelidiki dan memperdebatkan efektivitas metode pengajaran yang inovatif terhadap kinerja ekonomi siswa. Penelitian ini menggunakan desain kuasi-eksperimental pre-test, post-test, dan kelompok kontrol. Populasi penelitian terdiri dari 47.296 siswa Ekonomi yang terdaftar di 106 Sekolah Menengah Atas di Ilorin. Penelitian ini difokuskan pada siswa Sekolah Menengah Atas Dua (SS2) Ekonomi di Kota Metropolitan Ilorin, dengan target populasi sebanyak 16.444 siswa. Sampel dari 114 siswa Ekonomi SS2 dari dua kelas yang utuh dipilih untuk penelitian ini. Tes Kinerja Ekonomi (EPT) berfungsi sebagai instrumen pengumpulan data. Untuk menguji hipotesis penelitian, Analisis Kovarians (ANCOVA) digunakan pada tingkat signifikansi 0,05. Hasil penelitian menunjukkan bahwa terdapat pengaruh yang signifikan dari strategi Team-Pair-Solo terhadap kinerja siswa dalam mata pelajaran Ekonomi, $F(1, 113) = 39.579 (0.000)$, $p < 0.05$. Hasil yang signifikan lebih mendukung strategi TPS dibandingkan dengan metode konvensional dengan nilai rata-rata 35,8361 dan 28,3019. Hasil penelitian juga menunjukkan bahwa strategi Team-Pair-Solo secara signifikan meningkatkan retensi siswa dalam mata pelajaran Ekonomi.

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INTRODUCTION

Economics is a non-vocational elective subject included in the curriculum of senior secondary schools across Nigeria from which learners are expected to benefit from. Economics deals with human behaviour on how individuals make decisions on how to earn a living and allocate their limited resources (time and money) to satisfy their numerous wants in the means of several alternations. It focuses on analysing of individuals, businesses and the government whose activities are geared towards the production of commodities for the satisfaction of human unlimited wants. Economics can be seen as a living subject because of its dynamism and constantly evolving field that studies human behaviour, societal trends, and global events which responds to shift in technology, politics and social change in society (Brain, 2015).

The study of Economics is indeed sacrosanct to everyday life because, understanding the subject will enable individuals to navigate various aspects of life such as personal finance, career choice, public finance, business and entrepreneurship and social issues which assist individuals to make more informed decisions and contribute positively to create a better future. The Senior Secondary Economics curriculum in Nigeria focuses on developing graduates' understanding of economic issues and equipping them with vital skills to navigate the challenges of the global economy, with particular emphasis on Nigeria's economic context (NERDC, 2017).

Economics education enables students to develop a strong background for administrative, managerial and other related courses. Consequently, it is a prerequisite or passport for gaining admission to social sciences and management courses with fulfillment of certain other conditions in the Nigerian educational institutions, as it is being spelt out under Unified Tertiary Matriculation Examination (UTME) brochures (UTME, 2022). Despite the relevance of Economics to everyday life, the teaching of the subject in Nigeria at various levels still retain the old conservative and inadequate approach in which the teacher in most cases acts as the repertoire of knowledge and the students are dormant recipients. This approach tends to negatively affect the learners' views of practical involvement in their learning. He expressed further that Nigerian system of education at 21st century should be structured in line with peoples' needs so as to domesticate teaching-learning process and give instructions through effective teaching strategies so that students would be actively participated and retain what they have learnt in the lesson.

The 21st century academic scholars have recommended instructional strategies for pedagogical shift to enable students to show interest or progressively have change in attitude towards teaching-learning process, such as collaborative or cooperative learning (team-pair-solo, inquiry-based learning, think pair share, jigsaw), discussion and dramatization, concept mapping, advance organizer strategies among others (Aladejana, 2018 & National Educational Research Development Council, 2017).

In the 21st century, collaborative learning emerges as a student-centered approach, where diverse groups of students with varying abilities (heterogeneous ability) engage in collective learning activities to enhance their comprehension of complex subjects (Obadiora, 2014). The concept of collaborative leaning strategy is elusive in definitions and challenging to pin down to one direction, as it encompasses a broad range of approaches and techniques, but most cooperative learning strategies involve small, heterogeneous groups of 2-6 students, who work collaboratively towards a common objective, with each member accountable for their part in achieving the overall goal (Sanni, 2015). Geoffery (2010), opined that, students in collaborative settings, must make decisions both independently and collectively, often in face-to-face interactions, to achieve a shared learning objective.

There are several forms of collaborative learning strategy developed and the most common among them are thus: Team-Pair-Solo, Think-Pair-Share, Bound Robin Brainstorming, Three Step Interview, Three-Minute Review, Circle the Stage, Jigsaw and so on. This learner-centered strategy (Team-Pair-Solo) is of interest and focused in this study. This strategy is one of the numerous alternative strategies in teaching which can improve teachers' effectiveness, students' academic Performance and Students attitude to learning.

Researchers have expressed concern over the fluctuating performance of students in Economics at the West African Senior School Certificate Examination (WASSCE) over the past decade. Notably, this trend coincides with a decline in enrollment numbers for Economics classes, despite the subject's popularity among secondary school students. The claim to this is the trend of fluctuating and unstable Economics performance results released by the West African Examination Council (WAEC) between 2011 and 2018. The proportionate of students that obtained credit and above in Economics between the aforementioned years are 56.25%, 59.50%, 56.09%, 66.94%, 51.22%, 46.6%, 44.70%, and 47.20%, respectively. The results show that, on average, 54% of the students passed at credit level, while 46% failed. Additionally, WAEC online report of results analysis between 2018 and 2020 shows that the number of Economics students who passed at credit level were 47.8%, 64.18%, and 65.24%, respectively. In the year 2021, the percentage rose to 71.64% and dropped in the year 2022 to 60.74%. These measures are

insufficient, considering the stringent admission requirements for social sciences students, who must obtain at least a credit in Economics to qualify for university or other higher institutions of learning.

Significant efforts have been made to identify the factors contributing to the inconsistent performance and declining enrollment in Economics, particularly regarding the instructional strategies used. Researches indicate that Economics instruction in many Nigerian secondary schools predominantly relies on conventional methods (verbal instruction) with minimal student participation (Adebayo, 2015; Ahmed, 2015; Balogun, 2016; Idris, 2024, among others). Studies consistently demonstrate that student-centered strategies are most effective for improving performance in various school subjects, including Economics. However, some Economics teachers hesitate to use these methods extensively due to the technicality involved in the subject. Team-Pair-Solo form of collaborative learning strategies recommended for enhancing learning effectiveness in social sciences subjects, showing relative success. The teaching and learning of Economics have remained largely individualistic; limiting the skills students could gain by working collaboratively to achieve shared goals.

Furthermore, a critical examination of the early studies on Team-Pair-Solo collaborative learning strategy shows that most of the researches were conducted both in and outside Nigeria in secondary and higher institutions. For example, studies by Micheal (2011), Ogunleye (2011), Rosita (2011), Ayulimita (2012), Obadiora (2014), Sanni (2015), Hasmyati (2017), Macmillan & Alhamdu (2020) and Funmilayo & Timothy, (2022) among others, were primarily focused on subjects such as Chemistry, English, Social Studies, and Physics rather than Economics.

Furthermore, the few studies that were conducted on the subject (Economics) were not considered retention and gender difference. The focal point of this research is to bridge the knowledge gap by investigating the effect of the Team-Pair-Solo collaborative learning strategy on students' performance in Economics within Ilorin Metropolis, considering its unique complexities. All these, created a gap which this present study tends to fill by examining the effect of Team-Pair-Solo form of collaborative learning strategy on secondary school students' performance in Economics in Ilorin Metropolis, bearing in mind its technicalities, hence this study.

Hypotheses

1. **H₀₁**: Team-Pair-Solo strategy has no significant effect on secondary school students' performance in Economics.
2. **H₀₂**: Team-Pair-Solo strategy has no significant effect on secondary school students' retention ability in Economics.
3. **H₀₃**: Team-Pair-Solo strategy has no significant interactive effect on male and female students' performance in Economics.

METHODS

This research adopted a quasi-experimental design, specifically a non-equivalent pre-test, post-test, and control group design, which does not allow for random assignment.

(Experimental group) O₁ X₁ O₂ O₃

(Control Group) O₄ X O₅ O₆

The study sampled 114 SS2 Economics students from two intact classes, drawn from a population of 47,296 Economics students in 106 Secondary Schools in Ilorin Metropolis. The target population comprised 16,444 SS2 Economics students. Classes were randomly assigned to experimental (Team-Pair-Solo strategy) and control (conventional teaching method) groups. Students in the experimental group were regrouped into heterogeneous teams of six. Instruction covered Theory of Demand and Supply, Elasticity, and Consumer Behaviour over nine weeks, with two periods per week.

Three research instruments were developed and used, namely:

1. Economics Performance Test (EPT)
2. Teaching Guide for Team-Pair-Solo Strategy
3. Teaching Guide on Conventional Teaching Method

The EPT consisted of section A and B. Section A dealt with students' Personal data and section B consisted of 30 Multiple-Choice Items with 4 options each (A-D) to elicit data for pre-test, post-test and retention ability test in the two groups (experimental and control groups). Pre-test was based on previous topics taught while post-test and retention ability test were on the current topics, test items were adapted from West African Senior School Certificate Examination (WASSCE) past questions (2012-2022) aligned with the Senior Secondary School Two (SSII) Economics curriculum. The students' performance in pre-test, post-test and retention ability test EPT was ranked in % as follow: 0 – 30 Poor, 31 – 50 Fair, 51 – 60 Average, 61 – 70 Good, 75 – 80 Very good, and 81 – 100 Excellent. The students' EPT results were categorized into six performance levels, based on percentage scores: Below 30, Unsatisfactory, 31-50 Satisfactory, 51-60 Adequate 61-70 Commendable, 71-80 Outstanding and 81-100 Exceptional.

The teaching packages and materials that were used include Teaching Package on Team-Pair-Solo Strategy (TPS) which serves as a teaching package for implementing collaborative learning strategy in Economics. The TPS approach steps involved: stating lesson objectives, presenting problems, forming teams, problem-solving at team stage, pair and individual levels and teacher intervention. The Teaching Package on Conventional Teaching Method, outlines classroom activities for participating teachers.

To ensure content validity, the Economics Performance Test (EPT) was reviewed by Economics teachers and experts in Educational Research, Measurement, and Evaluation. Recommendations were incorporated into the final draft. For reliability, the EPT was trial-tested using the test-retest method on 20 randomly selected students outside the sampled schools over a two-week interval. Pearson Moment Correlation Statistics yielded reliability coefficients of 0.72 (pre-test) and 0.68 (post-test).

Procedure for Data Collection

Prior to conducting the study, the researcher first seeks permission from the principals of participating schools. The research consisted of three phases: pre-treatment, treatment, and post-treatment within the period of nine weeks. The study's timeline allocated two weeks for the pre-test, four weeks for treatment and post-test, and three weeks for the retention test. In the pre-treatment phase, the researcher conducted school visits for notification and collaboration, engaged with principals to discuss the study and provided training and orientation for Economics teachers and the research assistance on research objectives, purpose, and TPS/CTM methodologies. However, the necessary amendments were made on the school time-table, following the school curriculum. Therefore, EPT (pre-test) was administered and advancement assignment was given to the experimental group on the topics accompany with learning objectives which enable them to contribute effectively within their teams.

The treatment stage lasted for four (4) weeks with double periods of eighty minutes per week. The contents treated were: Theory of demand and supply, Elasticity of demand and supply and Consumer behavior. In group A (experimental) the teacher firstly stated the conditions for effective collaborative learning strategy and classified the objectives of TPS strategy. Secondly, the teacher introduced the concept, gave a brief explanation of the concept, and discussed the basic concept of the topics to the students. Thirdly, the teacher assisted to form the collaborative learning teams of six members. Fourthly, students collaborated in teams to solve the problems or complete the tasks. Subsequently, they divided into pairs to work on the same or similar tasks. Finally, they worked individually to finish the assigned tasks, promoting progressive independence and skill-building. Finally, the teacher summarized the whole lesson of leaning with focuses on the main points, especially on areas where students' efforts were needed. While in group B (control group) students were exposed to conventional teaching method follow normal expository method with the same topics like experimental group with no treatment for the period of four (4) weeks.

Post-treatment, students took the EPT as a post-test (Week 4) and retention test (Week 7). Both Team-Pair-Solo and Conventional Teaching Method groups participated. Researchers collected and analyzed scores using inferential statistics, specifically Analysis of Covariance (ANCOVA) at a 0.05 significance level. Pre-test scores served as covariates to compare post-test outcomes.

RESULTS AND DISCUSSIONS

Hypothesis 1: *Team-Pair-Solo strategy has no significant effect on secondary school students' performance in Economics.*

Table 1: Analysis of Covariance Results on the Effect of Team-Pair-Solo collaborative Strategy on Students' Performance in Economics

Source	Type III Sum of Squares	Df	Mean Squares	F	Sig.	Decision
Corrected Model	1617.726a	2	805.863	20.034	.000	
Intercept	6908.195	1	6908.195	171.101	.000	
Covariate (P-test)	7.923	1	7.923	.196	.659	
Treatment (TPS)	1597.989	1	1597.998	39.579*	.000	Sig
Error	4481.608	111	40.375			
Total	125280.000	114				
Corrected Total	6099.333	113				

R Squared = .265 (Adjusted R Squared = .252)

The table 1 above supports hypothesis 1, revealing a significant main effect of the treatment $F_{(1, 113)} = 39.579(0.000)$, $p < 0.05$ at 0.05 alpha level. Since p-value (0.00) is less than alpha level (0.05), therefore, the null hypothesis 1 is rejected. This implies a significant effect of Team-Pair-Solo strategy on Secondary School Students' performance in Economics in Ilorin Metropolis. Having established a significant effect in the mean performance score, using the treatment there is need therefore to establish the direction of the significant difference.

Table 2: Analysis of Effect of the Team-Pair-Solo on Senior Secondary Students' Performance in Economics

Groups	N	Mean	Mean Diff.	Std. Error	Sig.b	95% Confidence Interval for Differenceb	
						Lower Bound	Upper Bound
Experimental	53	35.8361		.77006	.000	34.2957	37.376
Control	61	28.3019	7.5342	.91733	.000	26.4611	30.143

* the mean difference is significant at 0.05 level

To investigate the source of the significant mean difference, additional analysis was performed. As shown in Table 2, the experimental group, which utilized the Team-Pair-Solo strategy, demonstrated a significantly higher mean score (35.8361) compared to the control group (28.3019). The 7.5342 mean score difference highlights the efficacy of the TPS strategy in enhancing Economics performance among Senior Secondary Students. This finding indicates that the TPS approach yields better outcomes than conventional teaching methods.

Hypothesis 2: *Team-Pair-Solo strategy has no significant effect on secondary school students' retention ability in Economics*

Table 3: Analysis of Covariance Results on the Effect of Team-Pair-Solo Collaborative strategy on Secondary School Students' Retention in Economics.

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Decision
Corrected Model	240.645 ^a	2	120.323	4.169	.018	
Intercept	6076.062	1	6076.062	210.524	.000	
PRETEST	.698	1	.698	.024	.877	
TREATMENT	238.502	1	238.502	8.264	.005	Sig.

Error	3203.636	111	28.862
Total	112132.000	114	
Corrected Total	3444.281	113	

a. R Squared = .070 (Adjusted R Squared = .053)

For hypothesis 2, Table 3 shown that the F-value of 8.264 is obtained with a p-value of .005 calculated at 0.05 alpha level. Since p-value (.005) is lesser than alpha level (0.05), therefore the null hypothesis 2 is rejected and Consequently, there is a significant effect of Team-Pair-Solo on Senior Secondary School Students' Retention in Economics in Kwara Central ($F_{(1, 113)} = 8.264, p < 0.05$). This implied that there is a significant effect of Team-Pair-Solo Strategy on Senior Secondary Students' retention in Economics. In another vein, table 4 below shows where the difference lies with the aid of further test (i.e. the effect of the Team-Pair-Solo on Secondary Students' Retention in Economics).

Table 4: Analysis of Effect of the Team-Pair-Solo on Senior Secondary Students' Retention in Economics Performance

Treatment	N	Mean	Mean Difference	Std. Error	Sig. ^b	95% Confidence Interval for Difference ^b	
						Lower Bound	Upper Bound
Experimental	53	35.9261		.893	.000	34.4171	37.451
Control	61	28.0061	7.92	1.190	.000	26.4762	29.529

* the mean difference is significant at 0.05 level

Following the detection of a substantial difference between the mean scores, additional analysis was conducted to identify the specific sources of this variation. The results presented in Table 4 indicate that students who received instruction via the team-pair-solo strategy in the experimental group achieved a significantly higher mean score (35.9261) compared to their counterparts in the control group, who received traditional instruction (mean score: 28.0061). Thus, the effect of the Team-Pair-Solo on Senior Secondary Students' retention in Economics is shown by the mean score difference of 7.92. This implied that experimental group (Team-Pair-Solo Strategy) had highest contribution to the statistical significance with the mean score of 35.9261.

Hypothesis 3: *Team-Pair-Solo strategy has no significant interactive effect on male and female students' performance in Economics.*

Table 5: Analysis of Covariance Results of interactive effect on Male and Female Students' Exposed to Team-Pair-Solo Strategy in Economics Performance

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Decision
Corrected Model	294.568 ^a	4	73.642	2.548	.043	
Intercept	6129.797	1	6129.797	212.130	.000	
PRETEST	3.349	1	3.349	.116	.734	
Group	214.320	1	214.320	7.417	.008	
Gender	43.624	1	43.624	1.510	.222	
TPS * Gender	7.742	1	7.742	.268	.606	NS
Error	3149.713	109	28.896			
Total	112132.000	114				
Corrected Total	3444.281	113	55			

a. R Squared = .086 (Adjusted R Squared = .052)

The result in Table 5 reveals that the F-value (0.268) obtained with a p-value (0.606) computed at 0.05 alpha level. Since p-value (0.606) is higher than alpha level (0.05), therefore, the null hypothesis 3 is accepted and consequently, there is no significant difference between male and female students exposed to Team-Pair-Solo Strategy on Senior Secondary School Students' Economics Performance based on gender in Ilorin metropolis ($F_{(1, 111)} = .606, p > 0.05$). This implies no significant effect of Team-Pair-Solo on Secondary Students' Economics Performance based on gender ($F_{(1, 111)} = .606, p > 0.05$).

Discussion

This research contributes significantly to the existing body of knowledge on collaborative learning strategies, specifically the Team-Pair-Solo (TPS) approach. The study's findings demonstrate the effectiveness of TPS in teaching Economics at the secondary school level, filling a gap in previous research that focused on other collaborative strategies like jigsaw, team-based, and think-pair-share. Notably, this study explores the impact of TPS on students' retention ability in Economics and examines the influence of gender on performance. The results show that students taught using TPS outperform those taught using conventional methods, likely due to increased student participation and engagement. These findings align with previous studies (Ogunleye, 2011; Rosita, 2011; Ayuliamita, 2012; Sani, 2015; Ajayi, 2017) that reported superior performance among students taught with TPS. This research also supports Ogunleye's (2011) findings on the effectiveness of TPS in Chemistry education, highlighting its potential as an enjoyable and effective teaching strategy. The study's outcomes underscore the significance of TPS in enhancing student achievement and performance, particularly in Economics education.

This study's findings align with Rosita (2011), demonstrating a significant increase in post-test scores compared to pre-test scores, attributed to active student involvement in the experimental group. Similar results were reported by Ayuliamita (2012), showing improved reading comprehension and motivation through TPS. Yusrina (2017) and Muhammed et al. (2017) also found significant improvements in Mathematics learning outcomes and Economics performance using TPS. The study reveals a significant effect of Team-Pair-Solo strategy on senior secondary school students' retention in Economics in Kwara Central, attributed to persistent practices in team-pair-solo learning. However, Micheal (2011) found no significant difference in retention between Team-Games-Tournaments and lecture methods. These findings are consistent with Alebiosu (2008), Naomi (2013), Sanni (2015), and Ajayi (2017), who reported no significant gender differences in performance using collaborative learning strategies. In contrast, Emmanuel et al. (2013) found cooperative learning strategies eliminated gender differences in Biology achievement.

CONCLUSIONS

This study conclusively established that team-pair-solo strategy is significantly effective than the conventional method with regard to students' performance and retention in Economics. In the light of the above results and discussions, the observed improvement in students' leaning in this study attributed to team-pair-solo strategy in Economics. Team-pair-solo strategy is a powerful tool to accomplish academic, social and affective goals, effective use of collaborative learning in Economics can ensure payment of attention to both the social and the studies aspects of Economics. Finally, there is need for paradigm shift from teacher-centered learning strategy to learner-centered learning strategy as a way of ensuring students' active involvement in the pedagogical practice because the old conservative and traditional approach to teaching as become obsolete. It becomes that pedagogy shift is imperative.

Recommendation

In light of the research findings, it is imperative that instructional strategies (Team-Pair-Solo) that strengthen students' performance and retention abilities should be encouraged in this 21st century as an alternative to the conventional method in the classroom setting. It is also recommended that team-pair-solo form of collaborative strategy should be encouraged and embraced for both male and female students.

To enhance teacher capacity, regular professional development opportunities such as seminars, conferences, and workshops should focus on integrating Team-Pair-Solo (TPS) strategy in schools. These training sessions should underscore the significance of collaborative learning and equip teachers with essential skills to implement TPS effectively. School administrators play a crucial role in facilitating collaborative learning by allocating dedicated time within the school schedule. This ensures seamless integration and optimal utilization of TPS, ultimately boosting student academic performance.

All educational stakeholders in the education sector should be made aware the goodness of team-pair-solo strategy as an innovative strategy in the act of pedagogy which called for attention. Curriculum planners ought to

have a clear picture the impacts of team-pair-solo strategy on the students and teachers in the classroom setting. Textbook writers and publishers would need to embraced and incorporate this new strategy in their write-ups for the benefits of both the teachers and students.

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