

Vol. 9, No. 1, June (2026)			
JOURNAL OF ENVIRONMENTAL AND TOURISM EDUCATION			
ISSN: 2659-0794 (PRINT) ISSN:2659-0808(ONLINE)			
Content Available at: https://jeate.k-injo.com/index.php/Jete			
Interactive Teaching Strategies Influence on Negative Effect of Poor Parental Socio-Economic Status on Academic Performance of Student with Learning Disabilities in Biology in Oyo, Nigeria.			
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Keywords		Abstract	
Academic Performance, Interactive Teaching Strategies, Students’ Socioeconomic Status, Learning Disabilities in Biology.	Poor parental socioeconomic status (PSES) negatively influences students’ academic performance, especially for students with learning disabilities (LD). Research has revealed that children from low PSES exhibit slower academic skill development compared with children from high PSES. Interactive teaching strategies as an intervention could reduce this negative influence. Past studies focused on the effect of PSES on students’ performance without considering strategies such as interactive teaching strategies to curb the negative effect of poor PSES on student performance. A quasi-experimental design was employed to determine the influence of interactive teaching strategies on the negative effect of poor PSES on the performance of Biology students with LD in secondary schools in Oyo. The study adopted multistage and random sampling. The sample consisted of 90 SSS1 Biology students with LD. The instruments used were the Delta Screening Scale (r = 0.76), Biology Achievement Test (r = 0.73), and PSES scale (r = 0.74). Data were subjected to ANCOVA and Bonferroni post-hoc test at the 0.05 level of significance. Two hypotheses were tested at the 0.05 level of significance. There was a significant main effect of treatment on students’ performance in Biology (F (2,88) = 13.63, p < .05, \eta^2 = .26). The interaction effects of the teaching strategies and PSES were insignificant on performance. This study revealed that the interactive teaching strategies used are effective and should be adopted by teachers to mitigate the negative effect of poor PSES on the academic skills of students with learning disabilities.		
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Introduction

Research has shown that learners from low parental socioeconomic status (PSES) exhibit slower development of academic skills compared with learners from high PSES. In past studies, attention was majorly given to the effect of PSES on student performance without concentrating on strategies such as interactive teaching strategies to curb the negative effect of poor PSES on student performance. Interactive teaching strategy allows for active participation of students; it is a kind of teaching strategy that promotes student engagement, which could lead to high academic performance. It is an effective teaching strategy that allows students to act on and practise what they are learning. Interactive teaching strategies could go a long way in helping students from poor backgrounds to manifest their hidden academic abilities, which are often suppressed as a result of a poor background that deprives them of the exposure needed to develop these hidden potentials.

Khan (2023) found that interactive teaching stimulates students' attention and improves their academic performance. Ayuba et al. (2021) stated that instructional strategies that foster meaningful learning provide quality education, which is a cornerstone of educational reform. Kamran et al. (2023) found that interactive teaching strategies improve students' academic performance and encourage deeper learning, critical thinking, and higher-order cognitive skills.

Senthamarai (2018) found that interactive teaching encourages learners to learn and quickly commit what is learnt to memory joyfully. Interactive teaching strategies allow students to learn at their own pace, reflect on their learning, and receive timely feedback from peers and instructors. Afzal & Rafiq (2022) noted that interactive teaching strategies encourage students to take ownership of their learning and become self-directed learners, which is a valuable lifelong skill. Jamil & Bhuju (2023) illustrated that interactive teaching methods are gaining recognition for their potential to enhance student engagement and improve learning outcomes.

Consequently, Oyelade (2019) found that a teaching and learning process that allows for students' involvement will easily expose students' areas of weakness to both teacher and student, which will help the student put in more effort and improve through the assistance of the teacher, irrespective of the students' disabilities and family background. Active involvement of students in teaching and learning through effective teaching strategies like interactive strategies is necessary to help students overcome the limitations placed on their performance as a result of disabilities. Interactive teaching strategies allow the effective use of teaching aids, which aid retention.

In addition, interactive teaching strategies allow deeper understanding of teaching content through collaborative learning. Afzal, Rafiq, & Kanwal (2023) found that interactive teaching enhanced critical thinking skills. Interactive teaching strategies might go a long way in helping students with learning difficulties and from poor backgrounds to manifest their hidden academic abilities (Charokar & Dulloo, 2022). Interactive teaching strategies allow students to be actively involved in constructing their knowledge and to develop a deeper understanding of the subject matter. Khan et al. (2019) found that interactive teaching strategies increased engagement and enhanced critical thinking skills.

Parental Socioeconomic Status: Umoessien (2024) stated that parental income and occupation influence students' academic achievement because the ability of parents to provide educational resources such as games, puzzles, and learning pads for their children at home can have a positive influence on their academic achievement, while the inability to provide these resources negatively influences the performance of students. Ukpong (2024) illustrated that an average socioeconomic status classroom atmosphere requires teachers to adjust their style of teaching to suit the type of students in the class. Berkowitz, Moore, Astor, & Benbenishty (2017) maintained that family background factors are a greater source of differences in

students' academic performance than school factors. Research has confirmed that children from homes with low socioeconomic status (SES) have low academic skills compared with their counterparts from homes with high SES.

Aremu & Oloruntoba (2024) asserted that conflicting findings regarding SES and academic achievement can be resolved by identifying moderating factors such as methodology to curb it. Akinsanya, Ajayi, & Salomi (2014) added that the academic enlightenment of parents greatly affects the performance of learners because students from educated parents have a wide range of privileges to study deeply due to their exposure to television, newspapers, and the internet. In contrast, students from illiterate parents lack these privileges. Parental socioeconomic status is one of the contributory factors to deteriorating academic standards (Unachukwu & Anakwe, 2013). Most children from poor families lack the needed financial support and resources to support their academic success. Parental socioeconomic status has a great influence on the academic performance of students, especially students with learning disabilities. In this study, parents of students with low socioeconomic status are petty traders, tailors, mechanics, hairdressers, junior office workers, transporters, and farmers. The educational levels of the parents were primary school certificate and secondary school certificate, while some were illiterates. Most of them live in single-room rented apartments. Most of them have television sets, but none have access to the internet or newspapers because they cannot afford them.

Learning Disability: This refers to difficulty in learning. Students with learning disabilities are learners who have average or above-average intelligence but exhibit significant difficulties with learning and using certain academic skills such as reading, writing, and mathematics (Shah, Sagar, Somaiya, Nagpal, 2019). Students with learning disabilities manifest difficulty in the easy acquisition, organisation, retention, and understanding of verbal and non-verbal information, and their rate of processing information for comprehension is slow. Learning disability can only be recognized in school during academic or cognitive exercises. Gonzalez-Valenzuela & Mortin-Ruiz (2021) illustrated that students with learning disabilities could be recognized by the difficulty they manifest in understanding multiple cognitive activities such as rapid automatic naming. NCRTI (2026) focuses on the continuous assessment of students' performance to qualify their response to instruction and identify potential learning disability traits. If a student has poor performance and struggles to give a quick response to instruction, that is a signal of a potential student with a learning disability. Students with learning disabilities achieve below their expected mental capability.

Avci&Özgenel (2024) suggested that accommodation and support from teachers by adopting an effective teaching strategy and providing guidance for students with learning disabilities can lead to good academic performance. Margolis & Broitman (2023) stated that if a student's Intelligent Quotient is below average with poor academic performance, such students will not meet the discrepancy criteria between ability and achievement and will not be classified as a student with a learning disability or be eligible for educational services, because students with learning disabilities have an Intelligent Quotient that is above average while their academic performance is below their ability or potential. They can achieve academically if given additional educational assistance. The accommodation and support can help students with learning disabilities succeed academically and build confidence in their abilities (Every Student Succeeds Act, 2016).

Biology: This involves the study of life and the interaction of living and non-living things in an environment. It is one of the science subjects made compulsory for most science students in secondary schools (Federal Republic of Nigeria, 2013). Biology's voluminous and abstract content, coupled with the technical vocabularies of botanical and zoological terminologies, leads to general students' low retention and poor performance in school Biology. Students with learning disabilities have low retention and poor

achievement in science subjects such as Biology (Al-Yagon et al., 2013). Students with learning disabilities have low performance in Biology, and the cause of this is attributed to their low retention and slow comprehension of information, which make them struggle to understand and retain the voluminous content and various terminologies in Biology (Winterbottom, 2017). Thus, students with learning disabilities might be more challenged in Biology retention and performance because their rate of processing information for comprehension is slow (Shah, Sagar, Somaiya, Nagpal, 2019). The difficulty they have in easily processing information is an additional challenge for them to process abstract content; their difficulty in easily understanding verbal and non-verbal information makes the voluminous nature of Biology challenging for their retention. Furthermore, students with learning disabilities from poor parental socioeconomic backgrounds might face even greater difficulties in Biology retention and performance.

Benefits of Interactive Teaching Strategies: Interactive teaching strategies help students' retention of facts, enhance critical thinking skills in students, and thereby stimulate students to exercise their hidden potentials. Renniza (2023) observed that the effectiveness of teaching methods significantly influences students' academic performance in Biology. Students with learning disabilities need the kind of interactive teaching strategy that will allow them to learn at their own pace of processing information for comprehension. Ogle's metacognitive strategy helps in developing students' cognition; it assists learners to stimulate background ideas and link new ideas with previous knowledge for deeper understanding. It initiates a reason for reading for better understanding and allows repetitive reasoning on the teaching content, which strengthens learning and retention. Guided Notes strategy helps students to guide their understanding. It assists learners to generate and process information at their own pace. It helps the learner to understand and retain the course content better because of its repetitive nature of involving students in answering questions related to the teaching content at each stage of explanation.

Uniqueness of Guided Notes and Ogle's Metacognitive Strategies: These strategies are chosen for this study above other interactive teaching strategies because they systematically allow students with learning disabilities to learn at their own rate of processing information. Both are best suited to address the slow retention and comprehension ability of students with learning disabilities. Also, both allow the effective use of students' sense organs better than other examples of interactive strategies, which aids retention. Oyelade (2019) found that Guided Notes and Ogle's metacognitive strategies frequently allow students to make use of their sense organs in teaching and learning activities: the hands for writing on Ogle's KWL columns and for filling the blank spaces in Guided Notes outlines, the eyes to view these, the tongue for reading out the outlines in Guided Notes and reading textbooks in Ogle's metacognition, and the ears to listen to the teacher's instruction.

Student Involvement Theory: Interactive teaching strategy is theoretically based on the theory of student involvement propounded by A.W. Astin in 1984. The theory stresses the interactive and active participation of students in the learning process. The theory opined that if students are involved in the process of teaching and learning, they are encouraged to learn and manifest the best in them, especially their abilities that were limited as a result of their poor background, and even improve the students' performance. The core concept of the theory includes student input, which also involves the ability of students to know and state prior knowledge of what they are to learn, this is one of the main attributes of the Ogle's metacognitive strategy used in this study. The two strategies used in this study allow the activation of the students with learning disabilities' thought process to be conscious of the new concepts to learn. As students are allowed to interact in the learning process, their hidden potentials or abilities that were not stimulated due to lack of learning aids from their poor background are stimulated and developed

through interactive teaching strategies, by listening and interacting with their peers and teacher in line with the teaching content.

Student involvement theory illustrated that involvement of students in the learning process provides additional knowledge and also allows for students' quick retention, which indirectly compensates for the limitation of slow retention manifesting in students with learning disabilities, thereby increasing their academic performance. Oyelade (2019) findings support this, stating that Ogle's metacognitive and Guided Notes strategies are interactive teaching strategies in which the sense organs of students are exercised in teaching and learning activities, and this allows for students' active involvement and retention of the subject matter.

The extent of student involvement in academic work has both quantitative and qualitative features. Quantitative measure involves the period the student uses in studying, and qualitative measure refers to the extent to which the student reviews what is learnt by reading the textbook or lesson note and studying the teaching aids provided by the teacher. All these activities are involved in the two teaching strategies used in this study, which are supportive and help to improve the academic performance of students with learning disabilities above the limitation posed on their academic skills and performance.

The theory of student involvement illustrates that curriculum should be arranged to allow for sufficient student effort to facilitate effective teaching and learning, which will bring about student development. This development will be a source of compensation for the academic skill limitations experienced by students with learning disabilities as a result of their poor background and their disability. This is in tandem with what Oyelade (2019) said: that Ogle's metacognitive strategy challenges the thought process of students and, with its continuous use in teaching and learning activities, creativity will be established in students, which will produce innovative students who will invent new things.

The theory of student involvement is very relevant to this study because the two strategies, Guided Notes and Ogle's metacognitive, used in this study are interactive in nature, and this aligns with the theory, which holds that involving student participation in learning helps them to learn and fill the gap in their academics initiated by lack of needed exposure from their poor background. The Guided Notes and Ogle's metacognitive strategies used in this study allow interactive teaching and active involvement of students: they make learners fully engaged in the process of learning. Guided Notes usage helps even passive students to interact in the learning process, through discussion, answering questions, and other activities in the Guided Notes Instructional Strategy. Also, Ogle's metacognition strategy, which is characterized by starting the lesson with the prior knowledge of learners, is in line with this theory, which believes in student input (Giorgdze & Dgebuadze, 2017). Among different interactive teaching strategies, the researchers decided to use the Guided Notes and Ogle's metacognitive strategies in this study because the two versions give the learner more opportunity to work at his/her own pace, thereby increasing the chance for interaction required for students with learning disabilities to compensate for the limitations in their academic skills.

Statement of the Problem

The teaching strategies used in this study is needed to encourage good biology performance of learners, especially learners with learning disabilities, because they have a low level of information processing, and there is a need for an effective learning strategy to aid their slow rate of information processing. The conventional or lecture method commonly used in teaching and learning activities does not enable learners with learning disabilities to effectively assimilate what is taught in Biology. In addition, poor parental socioeconomic status (PSES) also exerts a negative influence on the achievement of students generally, and its effect is even worse for students with learning disabilities. The teaching of Biology to

these students requires selected teaching strategies that may help them to bridge the additional gap that their poor background poses to their academic achievement. Therefore, this study seeks to determine the influence of interactive teaching strategies on the negative effect of poor parental socioeconomic status on the academic performance of students with learning disabilities in Biology in Oyo, Nigeria.

Purpose of the Study

This study set out to determine the:

Influence of interactive teaching strategies on the academic achievement of students with learning disabilities in Biology.

Interaction effect of treatment and socioeconomic status on the academic achievement of students with learning disabilities in Biology.

Hypotheses

H₀₁: There is no significant main effect of treatment on the academic achievement of students with learning disabilities in Biology.

H₀₂: There is no significant interaction effect of treatment and parental socioeconomic status on the academic achievement of students with learning disabilities in Biology.

Methodology

The study adopted a pretest-posttest, control group, quasi-experimental design. The target population comprised senior secondary school students with learning disabilities in Biology. A total of 90 students with learning disabilities in Biology were used in this study. A multistage sampling technique was first adopted. The state has thirty-three local government areas, which were clustered into three in consonance with the three senatorial zones: Oyo Central, Oyo North, and Oyo South. One senatorial zone, Oyo Central (Oyo metropolis), was selected. Then, a purposive sampling technique was employed to select three local government areas from the Oyo senatorial zone in order to identify a sufficient number of students with learning disabilities among the general population of science students in the schools from each local government as the study sample.

Three schools chosen from each local government were randomly allocated to experimental and control groups. The public secondary schools chosen from the local governments are: Olivet Baptist High School, Oba Adeyemi High School, Saint Bernadine Secondary School, Alafin High School, Oranyan High School, School of Science, Ladigbolu High School, Community High School, and Community Commercial High School.

In the selected schools, the researcher screened all the students with learning disabilities, with due consideration of their performance in Biology based on their academic records, which reflected poor performance. Delta Screening Scale is an instrument used to detect learning disabilities in students; it has items that reflect the attributes of students with learning disabilities. It was adapted by the researcher for this study, in which 15 items that contain the attributes manifested by students with learning disabilities were selected. First, the students' low performance in Biology records was used to select them for Delta screening. Those who confirmed, by ticking positively, that they manifested at least fifty percent and above of the attributes of learning disability from the Delta screening record were selected as students with learning disabilities. They were grouped into three: two experimental groups and one control group in each of the three local governments chosen. Those in the experimental groups were exposed to the treatment package. A total of sixty participants were obtained for the experimental groups, while thirty participants were obtained for the control group, which summed up to a total of ninety participants with learning disabilities in Biology used for the study.

Instruments for Data Collection

The following instruments were used: Delta Screener, Biology Achievement Test, and Parental Socio-economic Scale.

Delta screener scale: The instrument used to detect students with learning disability. The Delta Screener was originally developed by learning disability special Interest group of the College Committee on Disability Issue (CCDI), at Cambridge College and Marian Mainland, Conestoga College. It was revised by the Northern Ontario Assessment and Resource Centre (NOARC). This study adapted the Delta Screener by choosing the questions that are applicable to senior secondary school students reflecting the attributes of learning disabilities. Only fifteen items were included in the version of the Delta Screener used for screening senior secondary students with learning disabilities after face validation by two experts in psychology. To ensure the reliability of the instrument, it was trial tested on students in an area different from the area used in the study. The data was collated and subjected to Cronbach Alpha to determine the reliability coefficient of the instrument. It was found to be reliable at $\alpha=0.76$

Biology Achievement Test

Biology Achievement Test was given to students with learning disabilities. It is a teacher made multiple choice of fifty questions test and it was given as pre-test evaluation and post- test assessment to determine the performance of learners with learning disabilities in Biology. The questions are teacher made questions and were developed around Bloom's Taxonomy, in which at least one activity come from each of the first three levels of the taxonomy. Face validity of the instrument was made by an experienced Biology teacher. To ensure the reliability of the instrument, the instrument was trial tested on different students apart from the students used for this study. The data was collated and subjected to Cronbach Alpha to determine the reliability coefficient of the achievement test in order to affirm the relevance of the questions, the reliability coefficient is found to be 0.73.

Parental Socio-Economic Status Scale

Socio-economic status of parents of the participants was measured by Parental Socio-economic Status Scale developed by Salami (2000a). It measured the educational, occupational and social status of the parents of adolescents. The items in the scale requested for personal data of the participants. These items include parents' occupation (10marks), Parents' level of education (12marks) parents' residence (5marks), Parents' possession of necessary and luxury items (29marks) giving a total score of 56. All these were summarized to indicate the participants' family socio-economic background as being high or low. The highest score obtainable is 56 while the least is 6. This instrument was validated by correlating the score on Socio-economic Status Scale using convergent validity correlation coefficient of Pearson's r . The correlation obtained between their scores on the two instruments was 0.64. This is an indication of a fairly high construct validity of the present instrument. The researchers adapted this instrument and revalidated to obtain construct validity of 0.74.

Treatment

Guided-Note Interactive Strategy Treatment

Guided Note strategy is an interactive teaching strategy in which the students use teacher's prepared summary of the lesson with certain critical information left blank for learner to complete during the lesson (Giorgdze & Dgebuadze, 2017). The participants in experimental groups were exposed to treatment interventions sessions of two periods a week for four weeks, this last for eighty minutes. Guided note was

introduced to the students verbally and the teacher gave each student the guided note hand out sheet which contains summary of the teaching content with blank spaces to be filled by the students. The teacher explained the content of teaching, and allowed the students to read through the summary of the content of discussion in the guided note. (After the teacher's explanation) The students were allowed to answer the questions on the Guided note sheets with blank spaces after reading, and the teacher wrote the right answer that suits each blank space on the board. Then the students were given an assignment to read and rehearse the summarized content of discussion given to them. The challenge experienced in the usage of Guided note is that it required a lot of time. The benefit associated with it is that it gives the students with learning disability enough needed time to process the information in the teaching content which gives room to retention.

Ogle's Metacognitive Interactive Teaching Strategy Treatment

Ogle's metacognitive interactive strategy is a teaching strategy that contains three columns called KWL, in which 'K' means Known, that is, the previous knowledge of students; 'W' means What the students Wish to know on the topic to be taught; and 'L' means what the students have Learnt after the teaching process. Ogle's metacognitive interactive strategy was introduced to the students verbally, and the teacher drew the three columns on the board and then asked each of the students to open the back of their Biology notes to draw three columns, and write K in the first column, W in the second column, and L in the third column. The teacher asked the students what they knew about the topic to be taught and asked them to write it in the K column. In cases where the students could not state anything tangible on previous knowledge, the teacher initiated the previous knowledge through explanation. After writing the known by the students, the teacher asked each student to write what they wished to know on the topic to be taught. Then the teacher allowed each of the students to read the topic to be taught from their textbook, after which the teacher explained the topic thoroughly.

After the teacher's explanation, she asked the students to write what they had learnt in the L column. The teacher then asked the students questions verbally on the topic taught. Then the students were given an assignment to read through the topic taught on their own. It was a challenge for the students to write down what they wished to learn in the "W" part of the chart. Nevertheless, this strategy helps the students to read, think deeply and link previous knowledge to new knowledge. In contrast, the control group received the same teaching content using a conventional method of teaching without interactive activities. The treatment session lasted for four weeks, which was sufficient to cover the content for the study. A post-test was administered to the students in both the treatment and control groups at the end of the teaching sessions and scores were collected.

Conventional Methods of Teaching

The conventional teaching method was used in teaching the control group, and that lasted for four weeks, which was sufficient to cover the content for the study. A pre-test was administered before the teaching, and a post-test was administered after the weeks of teaching using the conventional teaching method.

Method of data analysis

The data collected was analyzed using SPSS version 25.0 The hypothesis were tested at 0.05 level of significant with the use of inferential statistics, which include analysis of co-variance (ANCOVA) and Bonferroni pair wise post hoc test was used to determine the source of significant difference among the variables in the study

Ho₁. There is no significant main effect of treatment on the academic achievement of Student with learning disabilities in biology

Table 1: Analysis of covariance (ANCOVA) of the Achievement scores in experimental group of students with learning disabilities in Biology

Source of Variance	Sum of Squares	Df	Mean Square	F	Sig.	η^2
Corrected Strategy	3617.073	12	301.423	14.691	.000	.696
Pretest Achievement in Biology	1292.794	1	1292.794	63.010	.000	.450
<u>Main Effect:</u>						
Treatment group	559.286	2	279.643	13.630	.000	.261
Error	1579.87	77				
Total	5196.900	88				

R Squared = .696 (Adjusted R Squared=.685) S= Significant at P<.05

Table 2: Mean Achievement scores of Students in Experimental and control groups

Treatment Groups	Mean	Std. Error
Guided Note	28.30	.903
Ogle's Metacognitive Strategy	29.40	.861
Control	21.00.	1.386

Table 3: Experimental and Control Groups Bonferroni Pair Wise Post-hoc Comparison of Biology Academic Achievement of Students with Learning Disabilities

Treatment	Treatment Groups	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Ogle's Meta. Strategy	Guided Note	-.7333	1.5330	1.000	-4.4757	3.0091
	Control	9.9333*	1.53330	.000	6.1909	13.6757
Guided Note	Ogle's Meta. Strategy	.7333	1.5330	1.000	-3.0091	4.4757
	Control	10.6667*	1.53330	.000	6.9243	14.4091
Control	Ogle's Meta. Strategy	-9.9333*	1.5330	1.000	-3.6757	-6.1909
	Guided Note	-10.6667*	1.53330	.000	-14.4091	-6.9243

From Table 1 it was shown that:

There was a significant main effect of treatment on achievement of students with learning disabilities in biology ($F(2, 88) = 13.630, p < .05, \eta^2 = .261$). This means that students with learning disabilities, that received treatment with the use of Guided Note and Ogle's metacognitive strategies, reflected improvement in biology achievement. The estimated marginal mean is calculated to determine the mean achievement of the group as presented in the table 2.

Estimated marginal mean revealed the mean score obtained by each of the two instructional groups and the control group. Students with learning disabilities in the Ogle's metacognition strategy group obtained the highest mean score of ($\bar{x} = 29.40$), followed by the students in Guided Note group with the mean score of ($\bar{x} = 28.30$). The control group had the lowest mean score of ($\bar{x} = 21.00$). This shows that the instructional strategies used for the treatment group had a positive effect on the academic achievement of the students with learning disabilities in Biology.

Further, the Bonferroni Pair wise post- hoc test was carried out and the result summarized on Table 3 showed that there were pair-wise significant differences between Ogle's metacognition strategy and Control, Guided Note and Control but no pair-wise significant differences existed between Ogle's metacognition strategy and Guided Note strategy. This is an indication that both strategies had positive effect on the academic achievement of students with learning disabilities in Biology.

Table 4: Mean Achievement score Interaction effect of treatment and Parental Socio-economic Status of participants in Biology

Source of Variance	Sum of Squares	Df	Mean Square	F	Sig.	η^2
<u>2-way Interactions:</u>						
Treatment x SES	8.119	2	4.060	.198	.821	.034

S= significant at $P < .05$ NS= Not Significant at $P > .05$

Table 5: Means Achievement scores of Students with Learning Disabilities in Biology by Socio Economic-Status

Treatment Groups	SocioEconomic Status	Mean	Std. Error
Ogle's metacognition strategy	Low	30.44	1.014
	High	30.87	2.905
Guided Note	Low	34.18	2.108
	High	30.64	1.648
Control Group	Low	20.34	.917
	High	25.19	4.121

From table 4 revealed that there was no significant interaction effect of treatment and parental socio-economic status on academic achievement of students with learning disabilities in biology, ($F(2,88) = .198$, $p > .05$, $\eta^2 = .034$). This implies that the treatment and parental socio-economic status had no interaction influence on academic performance of students with learning disabilities in biology.

The table 5 showed the estimated marginal mean scores of treatments and parental socio- economic status on academic achievement of students with learning disabilities in biology. The table showed that Students with low parental socio –economic status in the Guided note group had the highest mean score ($\bar{x}=34.18$), while the students with high parental socio-economic status in the Guided note treatment group had the mean score of ($\bar{x}=30.64$). Furthermore, the students with high parental socio-economic status in the Ogle's metacognition strategy group had the mean score of ($\bar{x}=30.87$). This score is a bit higher than that obtained by the students with low parental socio-economic status in the group which had the mean score of ($\bar{x}=30.44$). Students in the control group with high parental socio-economic status had higher mean score ($\bar{x}=25.19$), than the students with low parental socio-economic status from the same group with the mean score ($\bar{x}=20.34$).

Discussion of Findings

Main Effect of Treatment on Academic Performance of Students in Biology

The result of this study showed that students with learning disabilities exposed to interactive teaching strategies had improved performance and scored higher than students with learning disabilities exposed to the conventional method. This revealed that Guided Notes and Ogle's metacognitive strategy, as interactive teaching strategies, are effective in improving the academic success of students with learning disabilities in Biology. This corroborates the findings of Bhuju (2023) and Khan (2023) that interactive teaching strategies improve students' academic performance. The result of this study is also in tandem with Kamran et al.'s (2023) finding that interactive teaching strategies improve students' academic performance and encourage deeper learning, critical thinking, and higher-order cognitive skills. All these, made available to the students through the interactive strategies, compensate for the limitations and mitigate the academic gap of low academic skills found in students with learning disabilities from poor backgrounds.

The interactive teaching strategies used helped students with learning disabilities from both poor and good parental socioeconomic status to have better performances in Biology, and this does not corroborate the conclusion of Berkowitz, Moore, Astor, & Benbenishty (2017) that family background factors are the major source of differences in students' academic performance than school factors.

Interaction Effect of Treatment and Parental Socioeconomic Status on Academic Achievement of Students with Learning Disabilities in Biology.

This study revealed that there was no significant interaction effect of the interactive strategy (treatment) and socioeconomic status of parents on the performance of learners with disabilities in learning Biology. This indicates that the teaching strategies utilized in this research had a positive influence on students from low socioeconomic backgrounds, which activated their hidden abilities that were suppressed as a result of their poor background. This is in tandem with Ukpong's (2024) illustration that teachers' teaching strategies should be determined by the type of students and the average socioeconomic status of the students in the class. Afzal & Rafiq's (2022) findings also support this, that interactive teaching strategies help students to learn at their own pace and receive timely feedback from peers and instructors. This was clearly revealed in this study, as the students with learning disabilities were exposed to interactive teaching strategies, they learnt at their own pace and were also exposed to activities that improved their limited skills caused by their poor background. The method of teaching employed, which is interactive, allowed the students to reason and practise, and was effective in suppressing the influence of parental socioeconomic status on students' performance.

This study reveals that, irrespective of parental socioeconomic status, the performance of students with learning disabilities could be positively influenced by interactive teaching. The positive influence of the interactive strategies used in this study make the interaction effect of the parental socio-economic status and the treatment insignificant. Furthermore, this study reveals that the suppressed ability of students by their poor background could be activated by interactive teaching strategies. The fact that interactive teaching strategies activate the suppressed hidden abilities of students as a result of their poor background is confirmed in the findings of Afzal & Rafiq (2022), Jawaid et al. (2020), and Khan et al. (2019) that interactive teaching enhances critical thinking, and critical thinking skill is sufficient to activate suppressed hidden abilities of students because it helps students clarify, identify, question, analyse, evaluate, and create. Charokar & Dulloo's (2022) finding is in line with this, that interactive teaching strategies allow students to be actively involved in constructing their knowledge and develop a deeper understanding of the subject matter. The ability of students to construct their own knowledge through the interactive teaching strategies used in this study is an example of hidden potential activation. Aremu & Oloruntoba's (2024) assertion is in line with this that the issue of low achievement as a result of students' poor background could be resolved by teaching method.

Recommendations

1. Teachers should use these interactive teaching strategies to help students with learning disabilities retain more information and curb the problem of poor academic performance of students with learning disabilities in biology.
2. The interactive teaching strategies should be majorly used in classroom teaching to develop the academic skills of reading, write and computation which were the supposed areas of improvement by adopting interactive teaching strategies in teaching students with learning disabilities in this study.
3. Teachers should adopt the use of Ogle's metacognitive strategy or Guided notes strategy as the best type of interactive strategy that suits teaching biology to develop academic skills in students with learning disabilities.

4. Teachers can attend professional development training in order to be exposed to different types of interactive teaching strategies and the best way to use them in helping students with learning disabilities.
5. Teachers in training programmes should be offered practicum courses on Ogle's metacognitive and Guided notes strategies for the teacher trainees to be adequately prepared to use the effective interactive strategies for improvement on students with learning disabilities academic performance.

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