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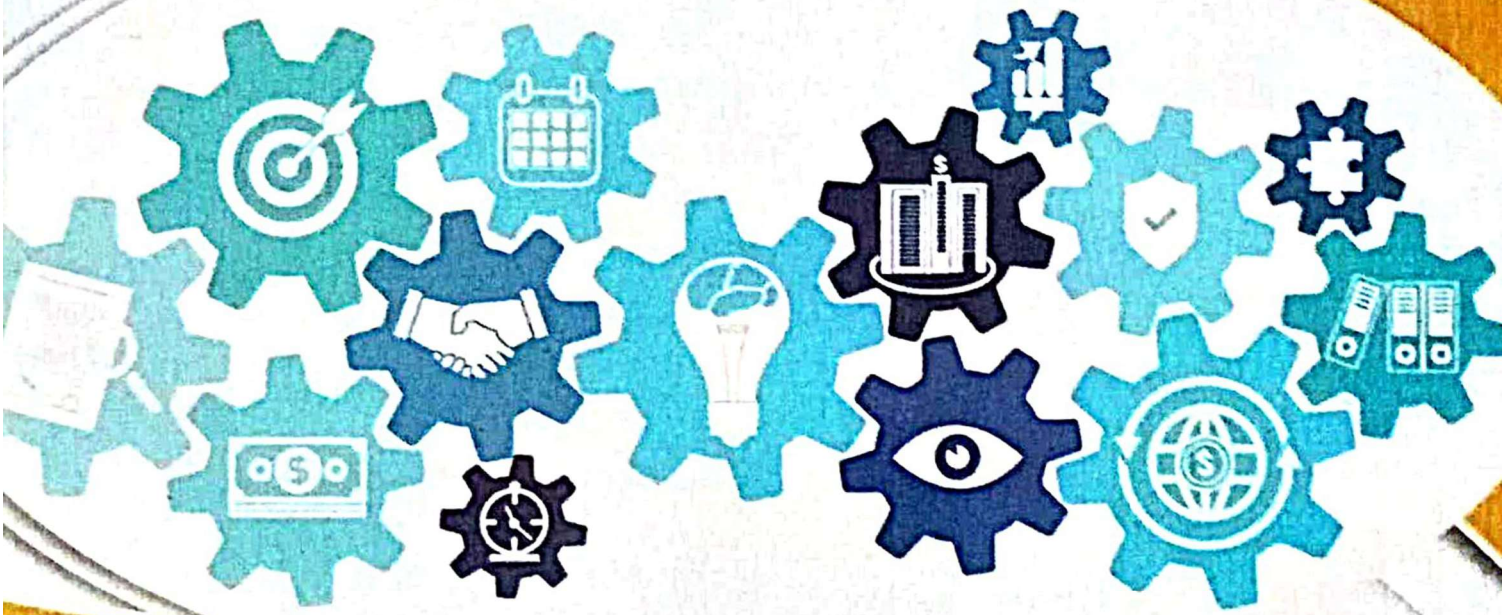

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EDITORIAL

JORISE is the Journal of Research in Science Education, an official publication of the Department of Science Education, Faculty of Education, Ekiti State University. This journal continues its mission to disseminate contemporary scientific research and educational insights. JORISE covers a broad spectrum of science disciplines, pedagogy, curriculum, and instruction, maintaining rigorous standards in publishing articles at both national and international levels.

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Thank you to all contributors, reviewers, and readers for the successful production of this edition. Their engagement strengthens science education globally, while I solicit for continued support for future production.

O. I. Oginni Ph.D

Editor-in-Chief

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CLASSROOM VERBAL INTERACTION AND STUDENTS' ACADEMIC PERFORMANCE IN SECONDARY SCHOOL PHYSICS IN EKITI STATE

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Abstract

The study investigated the classroom verbal interaction (CVI) and students' academic performance in Secondary School Physics in Ekiti State. The study investigated the effectiveness of CVI and conventional teaching methods on the academic performance of Secondary School Students in Physics was examined. The study adopted quasi – experimental pre-test, post-test two groups (one experimental and one control) research design. The sample consisted of 157 SSS 1 students (intact class) drawn from four public senior secondary schools in Ekiti Central Senatorial District of Ekiti State, Who were selected using multistage sampling procedure. A research instrument- "Physics performance Test" (PPT) was used to collect relevant data for the study. The face and content validity of the instrument was ensured while the reliability of the instrument was ascertained using note method; Pearson's Product Moment Correlation Analysis and Spearman Brown Prophecy formula which yielded reliability co-efficient of 0.847. The data were analyzed using descriptive statistics (mean and standard deviation) and inferential statistics of t-test at 0.05 level of significance. The findings of the study showed that the use of Classroom Verbal Interaction enhanced the performance of students in Physics than the conventional strategy, the use of Classroom Verbal Interaction are not gender and location biased. Based on the findings, it was recommended among others that the use of Classroom Verbal Interaction should be encouraged in teaching Physics the teachers should be given adequate orientation through workshops and seminars to update their knowledge in the use of Classroom Verbal Interaction strategy.

Key words: Classroom interaction, conventional strategy, verbal interaction, learning, teaching.

Introduction

Science has been conceptualized as one of the greatest and most influential field of study. As a whole, science helps to gain a better understanding of the universe, our planet, ourselves, and other living things. Depending on the subject matter, science may be broken down into a variety of subfields; Astronomy, Physics, Chemistry, and the Earth Sciences are all fields of physical science that study the inorganic universe. The social and cultural aspects of human conduct are examined in several social sciences. Science has

become a vital part of daily life in modern culture. Aspirations for the next generation could be jeopardized if they do not pay attention to scientific innovations. Therefore, it is important to point out that a country's growth is heavily dependent on the level of scientific literacy in its population.

One of the goals of national education policy is to produce individuals who are well-versed in a wide range of scientific disciplines. The goals and objectives of Nigeria's education policy explicitly state that the learner could acquire basic practical skills for self-reliance and employment. Science students in Nigeria's Senior Secondary Schools must take Physics as part of their curriculum as it is one of the requisite science subjects that must be passed to study science-related courses in higher institutions (Oladejo, Okebukola, Akinola and Amusa 2023). The importance of Physics in scientific and technological endeavours cannot be overemphasized. Bada and Jita (2021), the study of Physics is one of the most important subjects for secondary school science students. Some countries, like China, have become more advanced economically due to their exceptional knowledge of science and technology. For Nigeria as a developing country to be more advance, the developments in Nigerian science and technology are crucial and should not be neglected. Achieving this goal requires the incorporation of scientific curriculum principles, with a concentration on Physics in particular (Chala, 2019).

In Nigeria, Physics is one of the branches of science taught in high schools. The study of matter and its motion through time, as well as concepts like energy and force, are only a few of the numerous facets of physical science. A well-executed Physics curriculum may help students to keep up with the latest developments in the area of Physics. Physics as a scientific field involves studies into the properties of matter and its interactions with energy. The concepts and theories in Physics are important when it comes to comprehending natural phenomena. Many different topics are covered in the study of Physics, which is a major Senior Secondary Science subject. These topics provide the groundwork for further studies in Physics and other related fields. Medical, nursing, pharmacy, food technology, and other areas, all rely on the application of Physics concepts in their skills acquisition.

Stakeholders in Nigeria's education system are very concerned about the low levels of achievement in Physics among the students. There have been many explanations as to why this declining tendency has occurred. Some of the issues found to be responsible for this have been traced to the teachers, which ranges from non-adoption of technology for classroom instruction, use of inappropriate teaching method, inadequate facilities, as well as a high student-to-teacher ratio, lack of confidence in the subject by both students and teachers, approaches used by teachers in teaching the students, low interest in the learning of Physics at all level of education are some of the major causes of this problem (Oginni and Owolabi, 2012; Ayeni, Omotayo & Adedayo, 2016).

Some instructional strategies have been adopted by teachers and researchers in the teaching of Physics which were found not to be yielding the desired results. Most of these strategies are viewed as orthodox or conventional methods by researchers and teachers who follow the trend of development in the pedagogical process (Adedayo, 2015). Most of these strategies are teacher-centered where the teacher dominates the class, making the learners passive, uninvolved, and failing to respect individual differences in the learners and learning characteristics. This makes it difficult to identify the area of weaknesses in the learners which later makes students

view Physics as a difficult subject and thus develop a negative attitude towards the subject which in the long run negatively affects their academic performance. These strategies are not interactive, participatory, and collaborative which may render the objectives unachievable. The traditional approach to education where students receive direct instruction and then practice specific skills is not good enough for critical thinking. (Oyinloye and Popoola, 2013). Teaching could however be meaningfully productive when students are actively involved and responsible for their own learning; this tends to promote positive interaction between both the teacher and the students.

Classroom interaction refers to the series of events that takes place one after the other in classroom, each taking up just a little amount of time. It is also refers to the verbal and non-verbal exchanges between teacher, students and peer in an educational settings. It is a crucial aspect of the learning process, as it fosters academic achievement, social skills and emotional intelligence. Classroom interaction should be a channel for instruction Pujiastuti (2013).

According to Panjaitan, Irma, Sri, and Syarifah (2017), the primary components of verbal interactions are signs and symbols, tone of voice, flushing, while other facial reactions serve as secondary products of the massage that precedes them. It implies that there are several methods to offer a verbal interaction. It is up to the teacher to explain themselves in a manner that allows students to comprehend. Verbal interaction is the use of words and syntax to convey information in a discussion. The process of exchanging information orally is called verbal interaction.

Although, many factors may contribute to a teacher's success in the classroom, student-teacher interaction is likely to be a major factor. The nature and level of teacher-student interaction in the classroom may have a significant impact on the success of instruction and learning. Not only may students' attitudes, interests, and even personalities be shaped by the quality and quantity of classroom interaction, but it may also have a significant impact on how well they learn. Students' personalities and the effectiveness of their education are profoundly influenced by the classroom's psychological climate. Teachers have a great deal of influence over their classroom environment because they have the opportunity to tap into their students' boundless reserves of energy and excitement (Krauss, 2015).

It was stated by Pujiastuti (2013) that students appreciate teachers who make an effort to engage in conversation and empathise with their circumstances in the classroom. Most students feel more at ease and their learning would improve if they are motivated and reinforced equally (evenly), as opposed to classes where teachers do not take into account the weaknesses, emotions, or opinions of students. Cheruiyot (2015) found that verbal interaction has some effects on the performance of the students. In addition to this, he discovered that the ratio of indirect to direct verbal interaction that teachers have with their students is 1:2

Students' performances in secondary school Physics classes have long been thought to be strongly influenced by students' gender while some thought it not to have an influence on students' academic performance. The term "gender" is used to describe the social implications of being a male or a female, such as differences in identity, interests, behaviour, and power (Elejere, 2018). Gender encompasses the full range of male and female characteristics that are either shared by or distinguishable from the general population. The social and cultural differences between males and females are crucial to understanding the

importance of analyzing gender performance. While Ndirika and Agommuoh (2017) reported seeing gender differences in students' thoughts about science and their performance in Physics, Lindner, Makarova, Bernhard, and Brovelli (2022) concluded that there is no substantial difference between male and female students in their thoughts toward Physics and their performance in the subject. Equality and difference in Physics learning outcomes among students have been identified as important study topics for quite some time (Obafemi, 2015).

Students' levels of performance in Physics may also be influenced by other contextual factors, such as their school's geographic location. Learners' thoughts, feelings, and beliefs are susceptible to the surrounding environment. There are schools in both urban and rural regions, and even some schools in urban areas that are so far out of the way that they may as well be seen as rural areas by the untrained individual. Students' academic performance could be significantly affected by their school's geographical location. According to Akinyele (2011), a student's immediate surroundings are crucial to his development as a social being. Hence students' performance in school may be affected by the neighborhood in which their school is situated. Owoleye and Yara (2011) discovered a statistically significant gap in performance between students attending urban and rural schools. However, Yusuf and Adigun (2010) found that students' academic performance was not affected by whether or not they attended a secondary school in a rural or urban setting. Also, Abamba (2021) revealed that secondary school students in both rural and urban areas have similar assertiveness regarding Physics, and as such they are similar in their performance. There was no discernible performance gap between urban and rural school students, as determined by Bosede (2010).

Statement of the Problem

It is important to boost student involvement in classroom activities in order to inspire and push them to study more. There is need to look at the effect of using modern innovative methods to teach Physics. Evidences abound that students' verbal interactions in the classroom could be used to effectively facilitate better performance in Physics. This study is faced with the problem of verifying the effects of Verbal Interaction on students' performance in Physics.

Purpose of the study

The purpose of the study is to examine the effect of Classroom Verbal Interaction (CVI) on the academic performance of Secondary School Students in Physics.

Research Question

Will Classroom Verbal Interaction (CVI) influence Secondary School Students' academic performance in Physics?

Research Hypotheses

1. There is no significant difference in the pre-test performance mean scores of students exposed to Classroom Verbal Interaction (CVI) and conventional method
2. There is no significant difference post-test performance mean scores of students exposed to Classroom Verbal Interaction (CVI) and conventional method

Research Method,

The study adopted pretest, posttest, quasi-experimental two groups (one experimental group and one control group) research design. The targeted population for the study consisted of all the Senior Secondary School (S.S.S.) 1 students in public secondary schools. The sample consisted of 157 S.S.S. 1 students (intact class size) drawn from four public secondary schools. The sample was selected using multistage sampling procedure. The first stage was the selection of a senatorial district from

the three senatorial districts in Ekiti State using simple random sampling technique. The second stage involved the selection of two Local Government Areas from the selected Senatorial District in Ekiti State using simple random sampling technique. The third stage was the selection of two (one rural and one urban) schools from each of the local governments selected, making four (two rural and two urban) mixed schools using stratified sampling technique.

An instrument titled Physics Performance Test (PPT) constructed by the researcher was used for collecting data for the study. The instrument comprised two sections A and B. Section A contained items on the bio-data of the respondents such as school, class, gender and Local Government. Section B contained30 items of multiple-choice questions on topics covered by the study. The instrument (PPT) was validated by experts in Test, Measurement and Evaluation, two experienced secondary school Physics teachers who are NECO and WAEC examiners for both face and content validity. The reliability of the instrument (PPT) was determined using split-half method and a reliability coefficient of 0.847 was obtained

The experimental procedure for the study involved three stages namely: the pre-treatment stage, the treatment stage and post-treatment stage. The data collected were analyzed using descriptive and inferential statistics. The research question was answered using mean, standard deviation while t-test and analysis of covariance (ANCOVA) were used to test the hypotheses and Sheffe post-hoc analysis was used. Hypotheses were tested using t-test at 0.05 level of significance.

Table 1: Mean and standard deviation of pre-test and post-test scores of students in experimental and control groups.

Strategies	Test	N	Mean	S.D	Mean Diff.
Classroom Verbal Interaction	Pre-test	98	44.29	2.47	40.06
	Post-test		84.35	5.29	
Conventional method	Pre-test	59	44.30	2.47	3.90
	Post-test		48.20	2.04	
Total		157			

Table 1 revealed that pre-test performance mean scores of students exposed to Classroom Verbal Interaction was 44.29 while conventional method was 44.30 with their corresponding standard deviations as 2.47 and 2.47 respectively in Physics. The post-test performance mean scores of students exposed to Classroom Verbal Interaction was 84.35 and conventional method was 48.20 with their corresponding standard deviations as 5.29 and 2.04 respectively in Physics. The mean difference in Classroom Verbal Interaction was found to be 40.06 while that of the conventional method group was found to be 3.90. This implied that the use of Classroom Verbal Interaction had significant influence on the academic performance of students in Physics.

Hypothesis 1: There is no significant difference in the pre-test performance mean scores of students exposed to Classroom Verbal Interaction (CVI) and conventional method.

Students' pre-treatment performance was analysed using t-test at the 0.05 level of significance to test the hypothesis. Table 2 displays the final result.

Table 2: t-test analysis for pre-test performance mean scores of students exposed to online learning strategy and conventional method.

Variations	N	Mean	SD	df	t-value
Classroom Verbal Interaction	98	44.29	2.43	155	.982
Conventional method	59	44.30	2.47		

P>0.05

Table 2 showed that the t-value is not significant because the P value (0.982) > 0.05 at 0.05 level of significance. Therefore, the null hypothesis is not rejected. Hence, there is no significant difference in the pre-test performance mean scores of students exposed to Classroom Verbal Interaction (CVI) and conventional methods. By implication, the students in the experimental and control groups were homogeneous at the commencement of the study.

Hypothesis 2: Classroom Verbal Interaction (CVI) and conventional method are not significantly different in their effectiveness on the academic performance of Secondary School Students in Physics.

Students' post-test mean scores were analyzed using t-test at the 0.05 level of significance to test the hypothesis. Table 3 displays the final result.

Table 3: t-test analysis for post-test performance mean scores of students exposed to Classroom Verbal Interaction and conventional method.

Variations	N	Mean	SD	df	t-value
Classroom Verbal Interaction	98	84.35	5.29	155	.000
Conventional method	59	48.20	2.04		

*P<0.05

Table 3 revealed that the t-value is significant because the P value (0.000) < 0.05 at 0.05 level of significance. Therefore, the null hypothesis was rejected. Classroom Verbal Interaction (CVI) and conventional method were significantly different in their effectiveness on the academic performance of Secondary School Students in Physics. Students in the Classroom Verbal Interaction performed better than their counterparts in the control group

Discussion

The finding of this study revealed that the performance of students in both experimental and control groups in pre-test were low and do not differ statistically. This finding established the homogeneity of the two groups involved in the study prior to the treatment. In other words, it could be said that the knowledge baseline for the two groups involved in the study are equal.

A comparison of post-test performance mean scores of students who were taught using the Classroom Verbal Interaction and the Conventional Method showed a statistically significant difference. High grades in Physics were earned by those students who were exposed to the Classroom Verbal Interaction. This is consistent with the claim of Bolarinwa and Okolocha (2016) that students' performance is more influenced by classroom interaction than the teachers' act. This result is possible as the interaction that took place in the classroom during instruction could enhance the effectiveness of the lesson and by implication, students' academic performance. The learning process and curiosity of the students were aroused as they were given the opportunities to relate with themselves, their teachers and have the ample means of surfing

for more knowledge based on the tasks given them by the teachers.

Conclusion

Based on the findings of this study, it could be concluded that, Classroom Verbal Interaction is a virile instruction strategy for improving the students' academic performance in Physics.

Recommendations

1. Teachers of Physics should deploy Classroom Verbal Interaction by developing activities that will give room for learners to be active participants in the teaching and learning process
2. Government should organise seminars and orientations for the teachers on the use of Classroom Verbal Interaction in Physics class in secondary schools so as to enhance better academic performance of students.
3. The curriculum planners should improve on the Physics curriculum

References

Abamba, I. (2021). The effects of school location on students' academic achievement in senior secondary Physics based on the 5e learning cycle in delta state, Nigeria. *Lumat*, 9(1), 56–76.

Adedayo, J.O (2010). *Effect of teacher's qualification on the performance of senior secondary school students in Physics: Implication on technology*. A paper presented at the 6th annual conference of the Nigerian Educational Research Association University of Nigeria, Nsukka; 5th-7th November.

Adeleye, A.M. and Akinnodi, O. D. (2020). Effects of spaced learning and blended learning on Senior Secondary School Students' Performance in Biology in Nigeria. *Advances in Social Sciences Research Journal,* 1(3), 53-65

Akinyele, O.A. (2011). Gender differences and school location factors as correlate of secondary school students' achievement in Physics. The 2011 Maui International Academic Conference, Maui, Hawaii, USA 2011.

Ayeni M. F., Omotayo K.A., and Adedayo J.O. (2016). Teacher's perception of factors affecting effective implementation of Biology curriculum in secondary schools in Nigeria: The way forward for sustainable national development. *Global Journal of Current Research, 6*(2).

Bada, A. A. and Jita, L. C. (2022). Integrating brain-based learning in the science classroom: a systematic review. *International Journal of Pedagogy and Teacher Education*, *6*(1), 24-36.

Bolarinwa, K.O. and Okolocha, C.C. (2016). Influence of classroom interaction and students' attitude on academic achievement in financial accounting. *Nigerian Journal of Business Education (NIGJBED) 3(2). 305 – 316*

Chala, A. A. (2019). Practice and challenges facing practical work implementation in natural science subjects at secondary schools. *Journal of Education and Practice*, *10*(31).

Chrisantus, O. (2019). Classroom interactions and its impact on senior secondary school students' academic performance in government. Retrieved from:*https://www.projecttopics.org/classroom-interactionsand-itsimpact-on-seniorsecondary-school-students-academic-performance-in government.html*

Cheruiyot, D.K (2015). Classroom verbal interaction patterns in relation to students' performance in Physics in Baringo central sub-county, Kenya. M.Ed. Thesis, Kenyatta University.

Elejere, U.C. (2018). Gender based relationship: students' performance in mathematics and Physics in West African Senior Certificate Examination (WASSCE). *Journal of Pristine (14)1; 154 – 162*

Krauss. (2015). Teacher-student interaction in a project-based learning classroom. *Journal of English and Education*, 1(1), 142–153.

Lindner, J., Makarova, E., Bernhard, D., & Brovelli, D. (2022). Toward gender equality in education – teachers' beliefs about gender and math. *Education Sciences*, *12*(6), 373.

Ndirika, M. C., & Agommuoh, P. C. (2017). Investigating factors influencing girl's participation in science and technology education in Nigeria. *IOSR Journal of Research and Method in Education*, *7*(3), 50-54

Obafemi, D.T.A (2015). Bridging Gender Gap in the Physics Classroom: The Instructional Method Perspective. *Journal of Education and Practice. 6(20); 14 – 23.*

Oginni, O.I. & Owolabi, O.T. (2012). Integration of programmed instruction into mathematics and science teaching: a panacea to students dwindling interest in mathematics and science in Nigerian schools. *European Journal of Educational Research, 1(3) 199-209.*

Ojo, O.M. & Owolabi, O.T. (2021). Effects of predict-observe-explain instructional strategy on students' learning outcomes in Physics practical in secondary schools. *European Journal of Education Studies, 8(2) 32 – 44.*

Oladejo, A. I., Okebukola, P. A., Akinola, V. O., Amusa, J. O., Akintoye, H., Owolabi, T., & Olateju, T. T. (2023). Changing the narratives of physics-learning in secondary schools: the role of culture, technology, and vocational context. *Education Sciences*, *13*(2), 146.

Owoeye, J.S. & Yara, P.O. (2011). School location and academic achievement of secondary schools in Ekiti State. *Asia Social Science. Vol. 7*

Owolabi, O. T. & Oginni, O. I. (2013). Assessing the relative effectiveness of three teaching methods in the measurement of students' performance in Physics. *International Journal of Materials, Methods and Technologies, 1(8); 116 – 125*

Oyinloye, G.O & Popoola, A. A (2013). Activating junior secondary school students' prior knowledge for the development of vocabulary, concepts and mathematics performance of senior secondary school physics students: implication on technology in Nigeria. *Canadian Center of Science and Education.5 (6) 72 – 7*

Panjaitan, T.P., Irma, S., Sri, W., and Syarifah, C. (2017). Interaction of verbal communication of the teacher from the Philippines in the teaching activity for nursery II students at the Singapore international school, Medan. *International Journal of Scientific & Technology Research,* 33-40.

Pujiastuti, R. T. (2013). Classroom Interaction: an analysis of teacher talk and student talk in English for Young Learners (EYL). *Journal of English and Education*, 163-172.

Yusuf, M.A. & Adigun, J.T. (2010). The influence of school sex, location and type on students' academic performance. *International Journal of Education Science*, *2*(2).