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Relationship between secondary school science teachers' teaching experience and students' performance in Minna, Niger state

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Abstract

The study was conducted to determine the relationship between Secondary School Science Teachers' Teaching Experience and Students' Performance in Minna, Niger State, Nigeria. Secondary school Science teachers and students used for this study are Biology, Chemistry, Physics and Mathematics teachers and students. The study was guided by one research question and a corresponding hypothesis. Correlational research design was used for the study. A total of one hundred and twenty three (123) Science teachers and three hundred and eighty five (385) Science students made up the sample size of the study. Instrument used for data collection from Science teachers is a Likert type questionnaire designed by the researchers and titled "Questionnaire on Science Teachers' Teaching Experience (QUSTTE)" The instrument was validated by experts and its reliability coefficient was also determined to be 0.72 using Cranach Alpha statistical tool. Data collected from Science teachers was correlated with SSIII Science students' Mock examination result conducted by Niger State Ministry of Education (NSMOE) during 2022/2023 academic session to establish a relationship. Findings of the study revealed a positive relationship between Science teachers' teaching experience and students' performance. Based on this finding, it was recommended that Science teachers' teaching experience should be one of the major criteria to be considered by the government during recruitment of Science teachers. In addition, Government should intermittently expose Science teachers to training and retraining programs through seminars, conferences and workshops so as to improve their mastery of their respective subject areas as well as their teaching experience.

Keywords: Examination; Mock; Performance; Science Students; Science Teachers; Secondary School; Teaching Experience

1. Introduction

Teachers' teaching experience has been defined in many ways by many researchers. Teachers' teaching experience is seen by Suleiman *et al* (2024) simply as the pedagogical experience a teacher acquires over a period of teaching for effective and efficient classroom teaching. In other words, it mean the experience of teaching methodologies as well as classroom management skills a teacher acquires as a result of his or her continuous teaching in a classroom over a period of time. This implies that, teachers' teaching experience has a significant effect on students' performance and that is one of the reasons why teachers' teaching experience is held with high esteem by educational stakeholders. Study by Koroka *et al* (2018) revealed that experienced teachers utilize realia effectively during classroom instruction. Another study by Abdullahi *et al* (2019) revealed that teachers' teaching experience have a significant effect on students' performance especially at secondary school level of education in Nigeria. Therefore, teachers' teaching experience has become an area of great concern to researchers and policymakers. Teachers' teaching experience has become one of the issues of great concern to educational policymakers, because an experienced teacher is more likely to be efficient in classroom teaching and control. An experienced teacher can effectively manage the issue of individual differences in the

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classroom and has ability of improvising instructional material. A newly employed teacher despite the level of training may find the act of teaching to be very difficult in the first few months, but as he or she progresses, he or she gets more confidence and may be able to device different methods to deal with different types of class room problems.

It is important to note that, if teachers' teaching experience is not given the desired attention, students must definitely be at risk of high level of failure at their final standardized examinations. This is because they would be taught by inexperienced teachers. One of the major challenges faced by some secondary schools is that, experienced teachers are always posted to model or unity schools and schools in the towns and cities. Such schools without the needed experienced teachers may have their students end up being taught by inexperienced science teachers. This is because teachers' teaching experience positively or negatively affects students' performance. This implies that students whose teachers had little or none teaching experience will obtain lower scores (performance) as compared to those whose teachers have many years of teaching experience (Peter *et al.*, 2019). This study is therefore interested in determining whether there is relationship between Secondary School Science teachers' teaching experience and students' performance.

1.1. Statement of the Problem

Science subjects perform interdisciplinary functions for the satisfaction of man most especially on the growth and development of an individual and a nation. Because of the importance of the knowledge of Sciences generally, it is now a policy in Nigeria that no candidate can get admission into any higher institution of learning for science related courses without a credit pass in all science subjects. This is one of the reasons why all Science subjects are made a core and compulsory subjects at both primary and secondary schools in Nigeria. This interdisciplinary role of Sciences has made Nigeria government to attach much importance to Science subjects as clearly emphasized in the national policy on education (FRN, 2014). Unfortunately it is disheartening to observe that despite the importance attached to the study of Science subjects by government and mathematics stakeholders, students still records low performance in Sciences especially at SSCE level (Gaudence *et. al*, 2013). The issue of perpetual students' low or poor performance in Science has become so worrisome to many individuals, researchers, government, as well as many organizations. In an attempt to address this challenge, a number of research studies have been conducted and researchers have identified among other factors that could be responsible for students' poor performance in Science subjects to include Science teachers' teaching experience.

In addition, teaching and learning of Science subjects has in most cases been through lecture or conventional method. This method is mostly employed by Secondary School Science teacher that lack the needed teaching experience in teaching their various teaching subjects. Unfortunately, lecture or conventional method always subjects the students to memorization and rote learning of the scientific concepts. This makes teaching and learning of scientific concepts to be very difficult to comprehend, abstract and uninteresting to the students. This therefore implies that, despite the widespread availability of various teaching strategies at various educational levels and Government efforts to improve classroom instruction in Nigeria, most Secondary School Science teachers are not sufficiently experienced to utilize them. This is one of the major causes of mass failure or underperformance of science students especially at Senior School Certificate Examination (SSCE) level. As a step towards addressing this persistent challenge, this study was designed to examine the relationship between Science teachers' teaching experience and Science students' performance in Minna, Niger State. Findings of this study would at the end be used as contribution to the existing knowledge on the relationship between Science teachers' teaching experience and Science students' poor performance in Minna, Niger State.

1.2. Objective of the Study

The aim of this study is to determine the relationship between Secondary School Science Teachers' Teaching Experience Students' Performance in Minna, Niger State, Nigeria. Specifically, the study was carried out to achieve the following one objective by determining the:

- Relationship between Secondary School Science teachers' teaching experience and students' performance in Minna, Niger State

1.3. Research Question

Based on the above objective of the study, the following one corresponding research question was raised and answered using mean, standard deviation and scattered plots.

- What is the relationship between Secondary School Science teachers' teaching experience and students' performance in Minna, Niger State?

1.4. Research Hypothesis

For the purpose of this study, the following null hypothesis was formulated and tested at 0.05 significant level

HO₁ There is no significant relationship between Secondary School Science teachers' teaching experience and students' performance in Minna, Niger State

1.5. Empirical studies

Temitope & Olabanji (2015) investigated the influence of teachers' teaching experience on the academic performance of public secondary school students in Mathematics and English Language in Ado-Odo/Ota and Ifo Local Government Areas in Ogun State. The study adopted descriptive research design. Study population comprised all the 31 Senior Secondary Schools in the selected two local government areas. A sample of 20 Schools was drawn from the population through simple random sampling technique made up of 14 schools in Ado-Odo/Ota, and 6 schools in Ifo Local Government Areas. An inventory schedule was the instrument used for data collection. A total of 400 questionnaires (20 questionnaires per school) were administered. 388 (97%) questionnaires were returned and their responses were analyzed through content analysis. The regression analysis and t-test were used to test hypotheses generated for the study at 0.05 alpha levels. Findings reveal that teachers' teaching experience significantly influenced students' academic performance in Mathematics and English Language as measured by their performance in the SSC examinations and as perceived by the respondents. Schools having more teachers with above 10 years teaching experience achieved better results than schools having more teachers with less than 10 years of teaching experience. The study recommended that teacher with more teaching experience should always be motivated by government and all the stakeholders in education.

Study by Gustafsson *et al* (2018) categorized schools as "successful" schools if the schools have better working conditions and enough infrastructures, qualified teachers, teachers with high teaching experience, as well as instructional materials, like computers, books and technological support. Students' results from different schools were collected and analyzed to establish a relationship. On teacher qualification, a high percentage (91%) of the students who participated had mathematics teachers who had at least a bachelor's degree, for 72% of the students, their teachers majored in mathematics and 49 % of the students had teachers who majored in mathematics education. The average year of experience of the teachers was 16 years (Mullis *et al.*, 2016). The study revealed that in the last thirty years, teachers' teaching experience has been seen to be relevant predictors of students' achievement (Kupari & Nissinen, 2014). Findings of the reviewed study therefore have indicated that teachers' teaching experience is a strong determinant of students' performance.

Schmidt *et al.*, 2015) conducted a research study on the TIMSS 2007 and PISA 2006. The studies was categorized into five (5) aspects of the students family background namely; the language they speak at home, immigration status of students and their parents, home possessions, parents' educational level, teachers' teaching experience and their employment status. They reported strong relationships between teachers' teaching experience and students' achievement. The study further reported that students' attitudes towards learning were positively and significantly related with students' achievement in many countries. Findings showed that, students with positive attitudes were taught by experienced teachers and they tend to achieve higher than those taught by inexperienced teachers (Pinxten *et al.*, 2014; Mutodi & Ngirande 2014). From TIMSS 2011, it was discovered that students taught by experienced teachers had higher achievement than those taught by inexperienced teachers (Pinxten *et al.*, 2014). In addition, the findings revealed that, most of the successful schools had students that were taught by experienced teachers. Result of the reviewed study has shown clearly that teacher's teaching experience is one of the major variables that negatively or positively influence students' performance.

2. Methodology

This research study employed the use of correlational research design, where Senior Secondary three (SS III) Science students' Mock examination result conducted by Niger State Ministry of Education NSMOE during 2022/2023 academic session was correlated with the data collected on the Science teachers' teaching experience to establish a relationship. Science teachers and students used for this study are Biology, Chemistry Physic and Mathematics teachers and students. Total target population for this study comprises of three hundred and seventy five (375) Science teachers and one thousand, seven hundred and nineteen (1,719) students respectively in Minna, Niger State during 2022/2023 academic session. Simple random sampling technique was employed for this study and a total of six (6) public secondary schools in Minna were randomly selected and used for the study. The study used all the Science teachers teaching in all the selected schools and all the SS III Science students of the same selected schools that sat for Mock examination conducted by NSMOE (during 2022/2023 academic session).

To obtain the Science teachers' sample size, all the one hundred and twenty three (123) Science teachers (71 males and 52 females) from the six (6) sampled schools were used. In addition, all the three hundred and eighty five (385) Science students that sat for the promotion examination (in 2022/2023 academic session) in all the six sampled schools formed the sample size of the students. SSIII students' promotion examination result was used because it was conducted by Niger State Ministry of Education (NSMOE) hence, it is already a standardized examination result. The already an existing promotion examination result of all the three hundred and eighty five (385) SS III students was used (ex-post facto). By implication, the Science students' promotion examination result was compared with Science teachers' response on teaching experience questionnaire to establish the relationship between Science teachers' teaching experience and students' performance.

Research instrument used for this study is a Likert type questionnaire designed by the researchers for the purpose of this study. The questionnaire was titled "Questionnaire on Science Teachers' Teaching Experience (QUSTTE)". The questionnaire consists of two sections (A and B). Section A is about the Science teachers (respondents) bio-data while section B contained fifteen (15) items question items on Science teachers' teaching experience. In this section, the teachers were expected to express their opinions or views about Science teachers' teaching experience. The questionnaire was based on a 5 - points scale with responses ranging from Extremely Influential (EI), Influential (I), Neutral (N), Not Influential (NI) and Completely Not Influential (CNT). The weighing are Extremely Influential (EI) = 5, Influential (I) = 4, Neutral (N) = 3, Not Influential (NI) = 2 and Completely Not Influential (CNI) = 1. The decision mean of 3.00 was used. The questionnaire was validated by three (3) experts in the areas of Science Education as well as Test and Measurement. The experts made some corrections, suggestions and observation about the instrument which were used by the researcher to produce the final copy of this instrument.

A pilot test was carried out to determine the reliability of the instrument using 20 Science teachers. The data collected was splitted into two equal halve to produce two sets of data used for analysis using SPSS 23 software. Cranach's Alpha statistical tool used and reliability coefficient of 0.72 was obtained. During data collection, the researcher visited the authorities of the sampled schools to seek for permission to use their schools for research study. Permission was granted and the researchers were introduced to staff and specifically, the Science teachers. The researcher then gave an orientation to the Science teachers, selected the research assistants and thereafter, trained the research assistants about the research study.

3. Result and Discussion

Mean rating, Standard Deviation and scattered plot with decision level of 3.00 cut off mark were used to answer the research question. Null hypotheses was tested at 0.05 significant level and regression analysis was used to establish the relationship between Science Teachers' teaching experience and students' performance.

3.1. Research Question

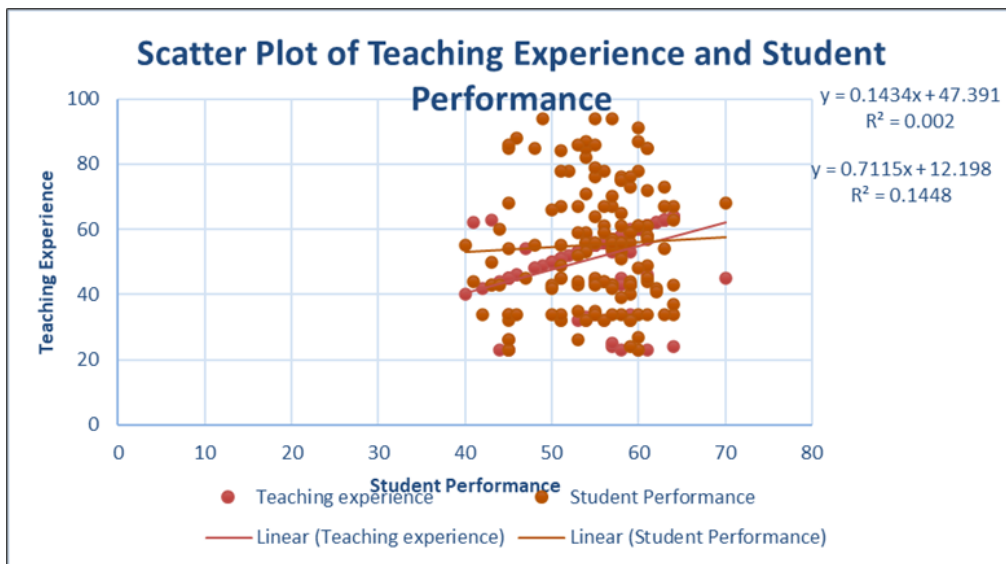


Figure 1 Scattered Plot of the Relationship between Science teachers' teaching experience and students' performance

What is the relationship between Science teachers' teaching experience and students' performance? To answer research question scattered plot was used and the analysis is presented in Figure 1

Figure 1 is a scattered plot of the relationship between Science teachers' teaching experience and students' performance. The scattered plot indicates a positive relationship between the two construct.

3.2. Research Hypothesis

HO₂: There is no significant relationship between Science teachers' teaching experience and students' performance. A point biserial correlation was used to test the hypothesis formulated and the result is presented in Table 1

Table 1 Relationship between Science teachers' teaching experience and students' performance

		Student Performance	Teaching experience
Student Performance	Pearson Correlation	1	0.378
	Sig. (2-tailed)		0.017
	N	140	140
Teaching experience	Pearson Correlation	0.378	1
	Sig. (2-tailed)	0.017	
	N	140	140

Table 1 showed that $r = 0.378$, p - value = 0.017, which means $p < 0.05$, therefore the null hypothesis was rejected. This means that the correlation coefficient ($r = 0.378$) further shows that there was a positive relationship between Science teachers' teaching experience and students' performance. Hence, there was a significant relationship between Science teachers' teaching experience and students' performance.

3.3. Summary of Findings

- Result of the research question revealed a relationship between Science teachers' teaching experience and students' performance.
- Hypothesis tested also revealed a relationship between Science teachers' teaching experience and students' performance.

Finding of the study showed a significant relationship between Science teachers' teaching experience and students' performance. This finding is in line with the findings of Koroka *et al* (2018) who reported that experienced teachers utilize realia effectively during classroom instruction. The finding also corroborate with the finding of Mullis *et al*. (2016) who reported that teachers teaching experience have significant relationship with students' performance in most schools especially with respect to gender across different nations. The finding is in line with that of Temitope & Olabanji (2015) who reported that teachers' teaching experience significantly influenced students' academic performance in Mathematics and English Language as measured by their performance in the SSC examinations and as perceived by the respondents. In addition, the finding is also in line with the finding of Pinxten *et al*. (2014) who reported that those students, who had adequate resources for learning at home, well experienced teachers and high expectations from their parents had higher achievement than their peers who do not have such opportunities.

4. Conclusion

Based on the finding of the study, it is concluded that Science teachers' teaching experience has a direct and positive relationship with the students' performance.

Recommendation

It is on the basis of this finding that it is recommended that Science teachers' teaching experience should be one of the major criterions to be adopted by the government during recruitment of Science teachers. In addition, Government should intermittently expose Science teachers to training and retraining programs like seminars, conferences and workshops so as to improve their mastery of their respective subject areas as well as their teaching experience.

Compliance with ethical standards

Disclosure of conflict of interest

The authors Mahesh Arvind, Jayanth D.R, Eesha Prasad, Saleem Ahmed, and Sumukh Srinath show no conflict of interest.

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