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Teachers' Characteristics, School Factors as Correlates of Students Achievement in Basic Science in Secondary School in Oyo State

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Several factors can influence learning process and the overall students' performance but it seems that few studies had made attempt to investigate the influence of teachers and school factors on students' achievement especially in a technological-driven world where Basic Science performance is low. The study investigated teachers' characteristics and school factors as correlates of students' achievement in Basic Science in Oyo State. The survey research was anchored on constructivism and theory of learning. Multi-stage sampling procedures were employed to select all the 33 Local Government Areas of Oyo State. Two schools each, 66 teachers and 1,980 students participated in the study. Three validated instruments used to gather information are: Teachers' Characteristics and School Factors Questionnaire with r = 0.84, Teachers' Observational Sheet with r = 0.87, and Basic Science Achievement Test with r =0.87. Data were analyzed using descriptive and inferential statistics at 0.05 level of significance. Significant relationship was found between teachers' experience (r = 0.77, 0.003, P < .05), teachers' subject mastery (r = 0.66, 0.019, P < .05), school location (r = 0.62, 0.031, P < .05), and students' achievement. School facilities (β = 1.244; t = 2.487; p < 0.05) contributed significantly to the prediction. The variables jointly explained 82% of the variance observed in students' achievement in Basic Science. There is a strong correlation of variables on students' achievement. Teachers should improve on their subject mastery skill while enabling environment should be provided by the government.

Keywords: teachers' qualification, teachers' experience, school location, subject mastery, basic science

Introduction

Education is a purposeful activity directed at achieving certain aim such as transmitting knowledge or fostering skills and character trait. It is a process by which abilities and capabilities of individuals are developed. These abilities might be physical abilities, emotional abilities, social abilities, and intellectual abilities. Education is taken as a process of development that consists the passage of human personality from infancy to maturity by adopting various ways of getting physical, mental, emotional as well as social development (Adesoji & Olatubosun, 2008). Education is very important in any given society. It is the actualizing of human potential so that individual can become something more than what he was before. According to Adeyemo (2005), education is the process by which society assists the young people to learn and understand the heritage of the past, participate productively in the society and contribute meaningfully to the development of the

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society. Little wonder why it is widely regarded as a basic human right, a key to enlightenment, and a source of wealth and power. Education is critical to industrial and technological development with the history of developed nations bearing records of this while developing nations aspiring to realize the same status have to put a premium. Emeka (2008) citing Ferguson (1991) saw education as a process by which any society through schools, colleges, universities and other institutions deliberately transmits knowledge, values and skills from one person to another.

Knowledge holds key to the attainment of the millennium development goals, which include, food security, eradication of child mortality, and reduction of the spread of HIV and AIDS among others. Teacher characteristics influence the knowledge acquired by their students in the classrooms and therefore there might be a relationship between teachers characteristics and pupils performance. The explanations for good or poor student's academic performance have been quite exhaustive; yet, controversy still exists among scholars as to what contribute singly or jointly to students' poor performance (Darling-Hammond, 1998). Teacher characteristics found to be dominant in cross-country studies are related to: qualification, experience, attitude and personality. Scholars and researchers generally are in agreement that the school variables, which include teacher administration, perform a critical role in educational achievement than other variables (Ashton, 1996).

Experience seems to be highly valued in the teaching profession more than in many other professions. With experience playing such a major role in secondary schools complex cost-benefit considerations, it makes sense to consider how teacher experience influences student achievement. Experienced teachers have a richer background of understanding to draw from and can contribute insight and ideas to the course of teaching and learning. Students taught by more experienced teachers achieve at a higher level because their teachers have mastered the content and acquired classroom management skills to deal with different types of classroom problems.

School location on the other hand can also be considered as the second teacher since space has the power to organize and promote pleasant relationships between people of different ages to provide changes, to promote choices of activities and for its potential for sparking different types of social and affective learning (Ali, 2009). It has been generally accepted that location and heredity can hardly be separated from education in influencing performance, hence a child's life and ability is affected by nature and nurture. Differences in location and the differences in the quality of instruction from one school to another can create variances in the level of knowledge acquisition of the students. School location includes the school building and the surrounding grounds such as noise, temperature and lighting as well as physical, biological or chemical agent within and around where the school is sited.

It is evident that enthusiasm and demand for quality education is high in Oyo State and the country at large but, supply of facilities in schools seems to be grossly inadequate. It is also unclear whether education in schools is under-funded and neglected as schools are characterized by infrastructural decay, shortage of classrooms and toilet facilities, inadequate space, lack of instructional materials, absence of ICT aided facilities which have lowered the performance of both students and teachers as a result of lack of motivation due to unfriendly environment. It is now certain that most secondary school students cannot gain admission into federal universities or university of their choice due to poor performance in the placement examination into these schools. This poor performance may be attributed to poor school factors principally in areas such as school structure, library services, school location and school facilities which impact on learning and performance in Basic Science.

Basic Science is a term that refers to any one of the scientific disciplines that provide a fundamental understanding of natural phenomena and the processes by which natural resources are transformed. These disciplines include Mathematics, Physics, Chemistry, Biology, and others to describe and explain the physical world and its phenomena. It also involves a pursuit of knowledge covering general truths and the operations of fundamental laws. Its principles are used to build more specialized knowledge in fields such as medical science and engineering. Basic Science is essential for understanding how the world works and developing new technologies. Science is a combined effort of mankind to understand the universe by observing nature and natural phenomena.

As important as this subject is, students' performance is still very low which contributed to failure of secondary school leavers to gain admission into the tertiary institutions in Nigeria. Parents also complained about poor performance which is not commensurate with the huge investment made on their children education. Researchers have been investigating students on various subjects but it seems that there is dearth of literatures relating to teachers' characteristics and school factors on student's achievement particularly in Basic Science. This study therefore investigated teachers' characteristics and school factors as correlates of secondary school students' achievement in Basic Science in Oyo State.

Research Questions

Four research questions that guided the study are:

1. What is the relationship between teachers' characteristics (teachers' qualification, teachers' experience, and teachers' subject mastery) and students' achievement in Basic Science?

2. What is the relationship between school factors (school location and school facilities) and students' achievement in Basic Science?

3. To what extent will teachers' characteristics (teachers' qualification, teachers' experience, and teachers' subject mastery) and school factors (school location and school facilities) when taken together predict students' achievement in Basic Science?

4. What are the relative contributions of teachers' characteristics (teachers' qualification, teachers' experience, and teachers' subject mastery) and school factors (school location and school facilities) in the prediction of students' achievement in Basic Science in Ibadan, Oyo State?

Methodology

This study adopted survey research design. The study population comprised all students in the Junior Secondary School (JSS) 2 class and their teachers from the 33 Local Government Areas of Oyo State. Multi-stage sampling technique was employed to arrive at the sample. First, Oyo State has been clustered along thirty-three (33) local governments. Simple random sampling technique was used to select two (2) schools from each local government comprising urban and rural school making a total of sixty-six (66) schools. From each of the sampled schools, systematic random sampling technique was employed to select thirty (30) students which give a total of one thousand, nine hundred and eighty (1,980) participants while purposive sampling technique was used to sample sixty-six (66) Basic Science teachers from the State. The independent variables of the study are teachers' characteristics (teachers' qualification, teachers' experience, and teachers' subject mastery) while the dependent variable is students' achievement in Basic Science. Three validated instruments used to collect data are: Teachers' Characteristics and School Factors Questionnaire (TCSFQ) with r = 0.84, Teachers'

Observational Sheet (TOS) with r = 0.87, and Basic Science Achievement Test (BSAT) with r =0.87. Data collected were analyzed using descriptive statistics of frequency counts, percentages and inferential statistic using Pearson moment correlation coefficient and ANOVA at 0.05 level of significance.

Results

Table 1

Distribution of Participants by Teaching Experience

Teaching experience	Frequency	Valid percent (%)
1-5 years	10	15.2
6-10 years	23	34.8
11-15 years	23	34.8
16-20 years	5	7.6
20 years & above	5	7.6
Total	66	100.0

From Table 1 and the pie chart in Figure 1, it could be observed that majority of the teachers teaching Basic Science in junior secondary schools in Oyo State has between 6 and 20 (84.8%) years and above of teaching experience, followed by those with maximum of 5 (15.2%) years of teaching experience. This implies that most of the teachers teaching the subject have the experience it requires to facilitate learning for optimum performance in the subject which could guarantee the future of the learners in gaining admission into higher institutions or choose a career in the sciences.

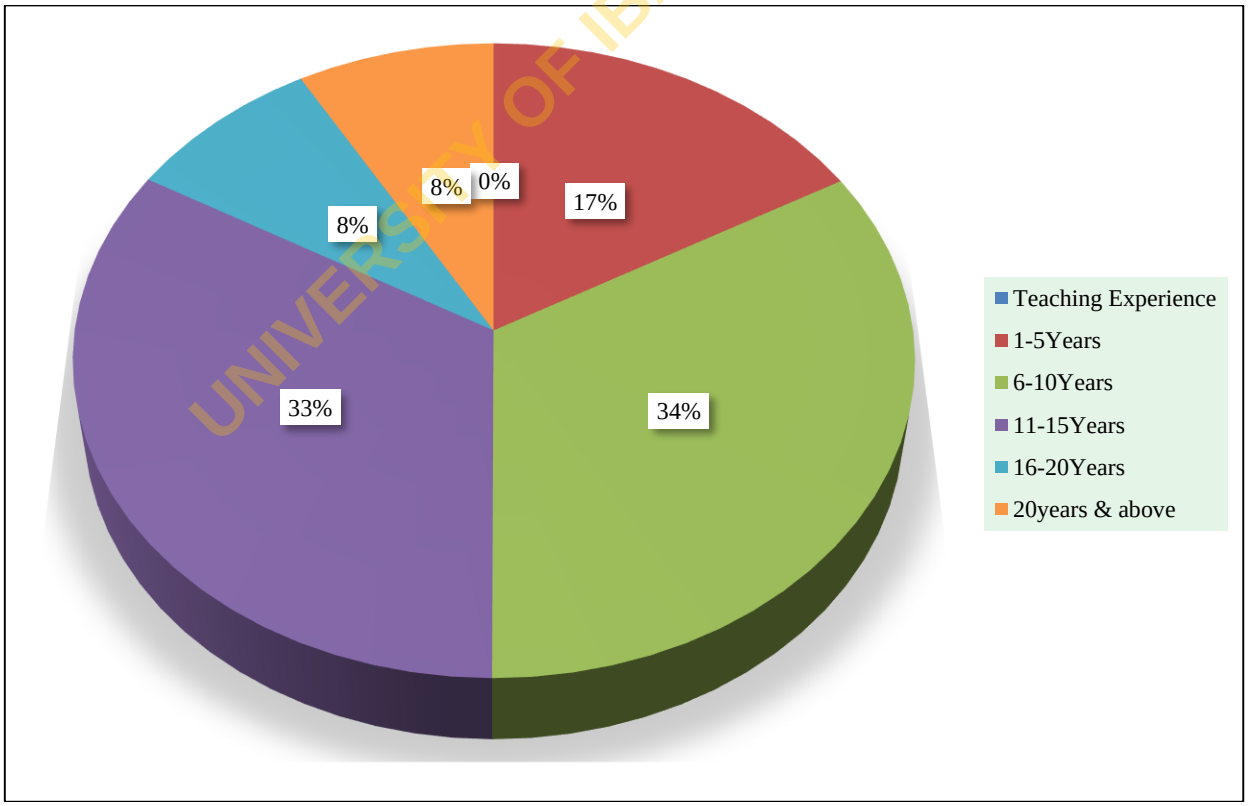

Figure 1. Participants distribution by teaching experience.

Table 2

Participants Distribution by Educational Qualification

Educational qualification	Frequency	Percentage (%)
NCE	5	7.6
B.ED	38	57.6
B.SC/B.A	23	34.8
Total	66	100.0

Figure 2 and Table 2 reveal the descriptive analysis of the educational qualification of the respondents. It is observed from the table and figure that 5 (7.6%) of the teachers that participated are NCE holders, 38 (57.6%) are first degree holders in education while 23 (34.8%) are holders of first degree in other disciplines apart from education. Deducing from the findings, it is obvious that majority (65.2%) of the teachers possess education background and are well informed with adequate educational qualification to deliver positive outcome in Basic Science. Not only that, it is obvious that majority of the sampled teachers have acquired pedagogical training that will help them in facilitating teaching and learning process to improve students' performance in Basic Science.

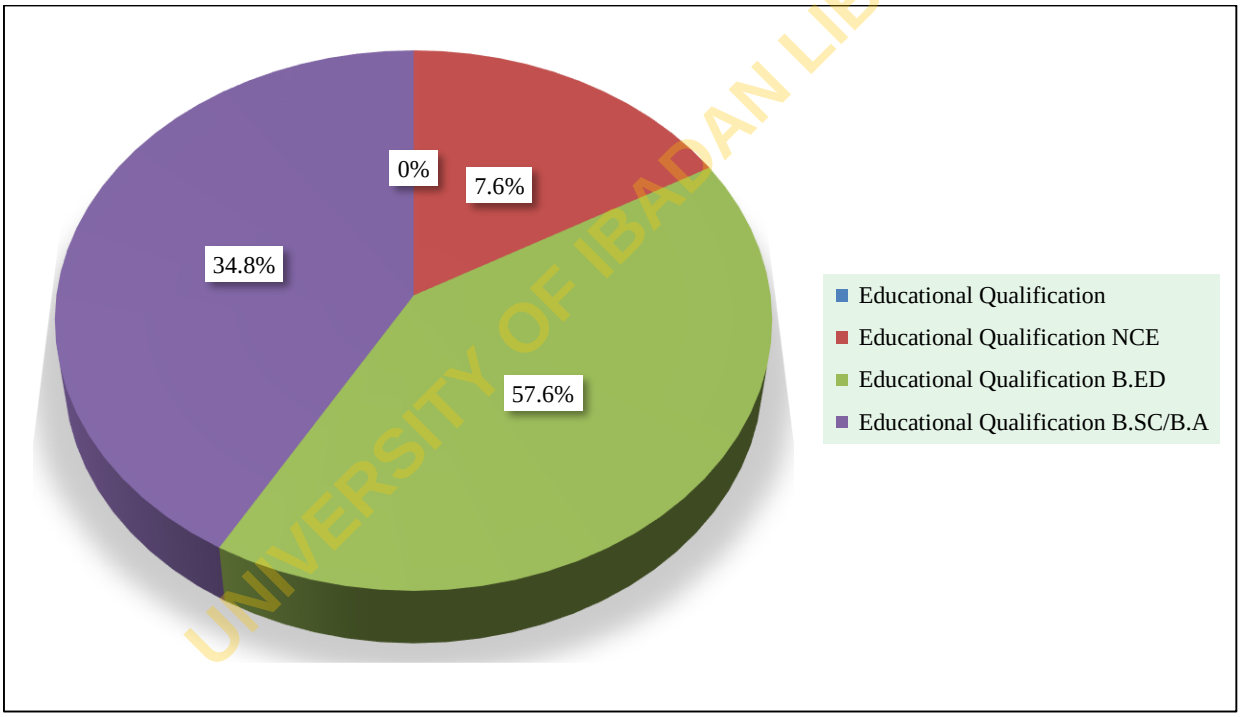

Figure 2. Participants distribution by educational qualification.

Table 3

Correlation Matrix Table of Teachers' Characteristics and Students' Achievement in Basic Science

Variables	Teachers' qualification	Teachers' experience	Teachers' subject mastery	Students' achievement in basic science
Teachers' qualification	1			
Teachers' experience	0.46	1		
Teachers' subject mastery	0.51	0.69*	1	
Students' achievement in basic science	0.47	0.77**	0.66**	1

Note. Significant at $p < .05$.

The result from Table 3 shows the relationship among teachers' characteristics (teachers' qualification, teachers' experience, and teachers' subject mastery) and students' achievement in Basic Science. From the table, there is significant high positive correlation between teachers' experience and students' achievement in Basic Science (r = 0.77, 0.003, P < .05). Similarly, there is significant high correlation between teachers' subject mastery and students' achievement in Basic Science (r = 0.66, 0.019, P < .05). However, the finding reveals an insignificant moderate correlation between teachers' qualification and students' achievement in Basic Science (r = 0.47, 0.126, P > .05). This finding reveals that there is significant relationship among teachers' characteristics (teachers' experience and teachers' subject mastery) and students' achievement in Basic Science.

Table 4

Correlation Matrix Table of School Factors and Students' Achievement in Basic Science

Variables	School location	School facilities	Students' achievement in basic science
School location	1		
School facilities	0.90** (.000)	1	
Students' achievement in basic science	0.62** (.031)	0.35	1

Note. Significant at p < .05.

The result from Table 4 shows the relationship among school factors (school location and school facilities) and students' achievement in Basic Science. From the table, there is significant high positive correlation between school location and students' achievement in Basic Science (r = 0.62, 0.031, P < .05). However, the finding reveals an insignificant moderate correlation between school facilities and students' achievement in Basic Science (r = 0.35, 0.265, P > .05). The finding implies that there is a significant relationship between school location and students' achievement in Basic Science.

Table 5

Regression Summary and ANOVA

Multiple R = 0.904 R square = 0.817 Adjusted R square = 0.664 Standard error = 0.813					
Analysis of variance					
Source of variance	Sum of square	df	Mean square	F	Sig.
Regression	17.701	5	3.540		
Residual	3.965	6	0.661	5.357	.032
Total	21.667	11			

Note. Significant at p < .05.

Table 5 indicates that there is joint influence between the independent variables: teachers' characteristics (teachers' qualification, teachers' experience, and teachers' subject mastery) and school factors (school location and school facilities) and the dependent variable (students' achievement in Basic Science) [F (3, 357) = 56.98; R = 0.56, R^2 = 0.313; p < .05). This implies that when teachers' characteristics (teachers' qualification, teachers' experience, and teachers' subject mastery) and school factors (school location and school facilities) are taken together, they jointly influence students' achievement in Basic Science. Table 5 further reveals a multiple regression R^2 = 0.817. This shows that independent variables accounted for 81.7% or by approximation 82% of

the total influence on students' achievement in Basic Science while the remaining 18% may be due to other factors and residuals not investigated in the study model. The finding implies that there is a joint influence of teachers' characteristics (teachers' qualification, teachers' experience, and teachers' subject mastery) and school factors (school location and school facilities) on students' achievement in Basic Science.

Table 6
Relative Contributions of Teachers' Characteristics and School Factors in the Prediction of Students' Achievement in Basic Science

Variables	Unstandardized coefficients		Standardized coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	30.444	7.027		4.332	0.005
Teachers' qualification	0.037	0.274	0.029	0.137	0.896
Teachers' experience	0.290	0.344	0.241	0.843	0.432
Teachers' subject mastery	0.056	0.037	0.732	1.509	0.182
School location	2.468	1.442	0.918	1.712	0.138
School facilities	0.504	0.203	1.244	2.487	0.047

Note. Significant at $p < .05$.

Table 6 indicates that there were significant relative contributions of teachers' characteristics (teachers' qualification, teachers' experience, and teachers' subject mastery) and school factors (school location and school facilities) in predicting students' achievement in Basic Science. For instance, school facilities ($\beta = 1.244$; $t = 2.487$; $p < .05$) when considered with students' achievement in Basic Science, indicates that school facilities independently relate with students' achievement in Basic Science. However, teachers' qualification ($\beta = 0.029$; $t = 0.137$; $p > .05$), teachers' experience ($\beta = 0.241$; $t = 0.843$; $p > .05$), teachers' subject mastery ($\beta = 0.732$; $t = 1.509$; $p > .05$) and school location ($\beta = 0.918$; $t = 1.712$; $p > .05$) do not independently predict students achievement in Basic Science. The result implies that school facilities are the most influential variable in the prediction of students' achievement in Basic Science.

Discussion of Results

From this study, it was observed that there was a significant relationship between teachers' experience as a component of teachers' characteristics and students' achievement in Basic Science. The finding supports Ijaiya (2000) who opined that teacher experience improves teaching skills and makes students learn better in the hand of a teacher. It is a known fact that a professional teacher becomes more efficient and more effective as he stays longer on the profession by learning more on the job and learns more about the difficulties students encounter while learning. The result is in consonance with Apata (2007) and Ogunkunle (2007), who stated that experience serves to furnish teachers through exposure to training, rearing and upbringing and socializing them into the teaching cultures that metamorphose into good pedagogic technique and problem solving strategies required of physics students. This finding indicates that teacher's years of experience is a measure of quality and thus becomes vitally imperative in the achievement of students' academic performance.

Moreover, the finding supports Clotfelter, Ladd, and Vigdor (2007) that suggested small or negative effects associated with a teacher having a graduate degree. They stated, "most of these degrees are master's degrees that generate higher salaries for teachers". Their findings suggested that a graduate degree does not produce higher student achievement. However, it is in agreement with Akinsolu (2010) who asserted that

availability of qualified and experienced teachers determined the performance of students in schools. The finding did not support Adeogun (2003) who found that the quality of the educational system depends on the quality of its staff and that a school without human resources may not be able to achieve the goal and objectives of the educational system. The result is in agreement with the conclusion of the authors like Goldhaber and Brewer (2000) who opined that the explanations for good or poor student's academic performance have been quite exhaustive yet controversy still exists among scholars as to what contribute singly or jointly to students' poor performance. The outcome of this study aligns with Adu and Olatundun (2007) that teachers' characteristics are strong determinants of students' performance in secondary schools as evidenced in this study while it also agreed with Darling-Hammond, Chung, and Frelow (2002) that there was relationship between teachers' characteristics and pupils' performance.

The implication of this to teachers is that they must thoroughly understand the content of what they teach. The teacher whose understanding of a topic is thorough will use clearer language and provide better explanation than those whose background is weaker. Additionally, the result from this study also reveals that there was a significant relationship between school location and students' achievement in Basic Science. This outcome was in line with Darling-Hammond, Berry, and Thoreson (2001) that school location as the second teacher has a great influence in achievement. The findings of this study was in tandem with the conclusion of Abe and Adu (2013) and Ajayi (2002) who opined that location enrichment regarding physical facilities is a major factor in students' academic performance but does not support Ayodele (2004) as shown that school resources aid students' academic achievement in this study. Moreover, the result was in support of Ekundayo (2012) that school facilities play a vital role in the actualization of educational goals and objectives by satisfying the physical and emotional needs of the staff and students of the school just as it is in consonance with Witzling, Childress, and Lackney (1994) who revealed that students in classrooms with large windows, natural lightening and well-designed skylight perform better than their peers in classrooms without proper facilities. However, the result did not agree with the contribution of Olugbenga (2019) that students' achievement depended upon the physical school facilities, its age, the design and the conditions of the school. The implication is that school facilities have a profound impact on both teachers' and students' outcome as it affects teachers' recruitment, retention, commitment and effort as it also impacts on students' health behavior, engagement, learning and growth in achievement as found in this study.

Conclusions and Recommendations

Conclusively, there was significant relationship among teachers' characteristics (teachers' experience and teachers' subject mastery) and school factors (school location) and students' achievement in Basic Science. These findings necessitate further investigation into the determinants of students' achievement in Basic Science, since the variables considered in this study accounted for only 82%. In view of the findings therefore, teachers should improve on their characteristics such as qualification and subject mastery while government creates an enabling environment as these will enhance students' assimilation and greatly increase achievement not only in Basic Science but also in other subjects.

References

Abe, T. O., & Adu, E. I. (2013). Influence of qualification on development and assessment of computer programmed instructional package on energy concept in upper basic technology in Ekiti State. *ARPN Journal of Science and Technology, 3*(6), 611-618.

Adeogun, A. A. (2003). *Economics of education*. Lagos: Frank Unity.

Adesoji, F. A., & Olatunbosun, S. M. (2008). Student, teacher and school environment factors as determinants of achievement in senior secondary school chemistry in Oyo State, Nigeria. *The Journal of International Social Research, 1*(2), 13-34.

Adeyemo, D. A. (2005). Parental involvement, interest in schooling and school environment as predictors of academic self-efficacy among fresh secondary school students in Oyo State, Nigeria. *Electronic Journal of Research in Educational Psychology, 5*(3), 163-180.

Adu, E. O., & Olatundun, S. O. (2007). Teachers' perception of teaching as correlates of students' academic performance in Oyo State, Nigeria. *Essays in Education, 20*(1), 57-63.

Ajayi, I. A. (2002). Resource factors as correlates of secondary school effectiveness in Ekiti State. *Nigerian Journal of Counselling and Applied Psychology, 1*(1), 109-115.

Akinsolu, A. O. (2010). Teachers and students' academic performance in Nigerian secondary schools: Implications for planning. *Florida Journal of Educational Administration and Policy, 3*(2), 86-103.

Ali, A. A. (2009). The impact of teacher wages on the performance of students: Evidence from PISA. MPRA Paper No. 18252.

Apata, F. S. (2007). Influence of teachers' academic qualification and experience on students' performance in senior secondary school physics in Nigeria (Unpublished M.Ed. Research Project, Science Education Department, University of Ilorin, Ilorin).

Ashton, P. T. (1996). Improving the preparation of teachers. *Educational Researcher, 25*(9), 21-22+35.

Ayodele, J. B. (2004). The role of head teachers in school plant management and maintenance. In E. O. Fagbamiye, J. B. Babalola, M. Fabunmi, and A. O. Ayeni (Eds.), *Management of primary and secondary education in Nigeria* (pp. 93-100). Ibadan: NAEAP.

Clotfelter, C. T., Ladd, H. F., & Vigdor, J. L. (2007). Teacher credentials and student achievement in high school: A cross-subject analysis with student fixed effects. NBER Working Paper 13617.

Darling-Hammond, L. (1998). Teachers and teaching: Testing policy hypotheses from a national commission report. *Educational Researcher, 27*(1), 5-15.

Darling-Hammond, L., Berry, B., & Thoreson, A. (2001). Does teacher certification matter? Evaluating the evidence. *Educational Evaluation and Policy Analysis, 23*(1), 57-77.

Darling-Hammond, L., Chung, R., & Frelow, F. (2002). Variation in teacher preparation: How well do different pathways prepare teachers to teach? *Journal of Teacher Education, 53*(4), 286-302.

Ekundayo, H. T. (2012). School facilities as correlates of students' achievement in the affective and psychomotor domains of learning. *European Scientific Journal, 8*(6), 208-215.

Ferguson, R. F. (1991). Paying for public education: New evidence on how and why money matters. *Harvard Journal on Legislation, 28*, 465-498.

Gibbons, S., Kimmel, H., & O'Shea, M. (1997). Changing teacher behaviour through staff development: Implementing the teaching and content standards in science. *School Science and Mathematics, 97*(6), 302-310.

Goldhaber, D. D., & Brewer, D. J. (2000). Does teacher certification matter? High school teacher certification status and student achievement. *Educational Evaluation and Policy Analysis, 22*(2), 129-145.

Ijaiya, N. Y. (2000). Failing schools and national development: Time for reappraisal of school effectiveness in Nigeria. *Nigerian Journal of Educational Research and Evaluation, 2*(2), 42.

Ogunkunle, R. A. (2007). Effects of gender on the mathematics achievement of students in constructivist and non-constructivist groups in secondary schools. *Journal of Mathematical Association of Nigeria, 32*(1), 41-50.

Olugbenga, M. (2019). Impact of school facilities on the academic performance of secondary school students in Kaduna State, Nigeria. *International Journal of Social Science and Humanities Research, 7*(3), 497-507.

Witzling, L. P., Childress, H., & Lackney, J. A. (1994). The nature of environmental quality in the workplace. A Johnson Controls Institute Position Paper.