

## **TEACHERS' CHARACTERISTICS: ITS' INFLUENCE ON BIOLOGY STUDENTS' ACADEMIC ACHIEVEMENT IN NSUKKA LOCAL GOVERNMENT AREA, ENUGU STATE.**

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**Abstract** - The study investigated the influence of teachers' characteristics on secondary school students' academic achievement in Biology. The study was guided by three research questions and three hypotheses. The study employed ex-post facto research design. The study was conducted in Nsukka Local Government Area of Enugu state with a population of 1,564 comprising 59 teachers and 1505 SS2 Biology students in Senior Secondary Class Two (SS 2). The sample size of 310 (10 teachers and 300 Senior Secondary Two Students) was drawn using multistage sampling procedure. The instrument for data collection is a Profoma which was used to import students' academic achievement from the teachers' record of the students' annual results. No reliability was assessed. The collected data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 25. The research questions were answered using mean and standard deviation. Hypothesis one was tested using analysis of variance while t-test statistics was used to test hypothesis two and three. The findings of the study revealed that teachers' qualification and years of teaching experience had a significant influence on secondary school students' academic achievement in Biology. However, the findings indicated that teachers' gender was not a significant factor on secondary school students' academic achievement in Biology. Based on the findings, it was recommended that Government should sponsor teachers with less academic qualifications by giving them grants and time to enroll into part-time programmes among others.

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**Keywords:** Biology, achievement, teachers' qualification, teaching experience, gender

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### **Introduction**

Biology is the study of living things and natural phenomena. It is a science subject that equips students with appropriate scientific skills and scientific knowledge required to solve everyday problems. Abu (2023) states that Biology is one of the science subjects that a student needs to pass, so as to study courses relevant to general biology, medicine, nursing, agriculture, bio-chemistry and biology education in tertiary level of education. Yilshik, et. al. (2020) posited that the subject Biology excites intellectual curiosity, increases awareness of our natural environment and stimulates critical thinking in individuals. According to Umoke, et.al. (2014), Biology is defined as the study of the inter-relationship between the living organisms and their natural environment. The knowledge of biology prepares students to apply basic scientific concepts in dealing with and understanding the natural world. Through the learning of biology, students will become aware of the interconnections between science, technology and society therefore enabling them to acquire relevant procedural and conceptual knowledge to help understand many of today's contemporary issues and solve their own problems. Despite the relevance of Biology, students' achievement has not been encouraging.

Achievement is extent of students' academic outcomes attained by a person in a particular area or subject which can be achieved with special effort and skill. Hence, academic achievement is the extent to which a student has attained their short or long-term educational goals. Academic achievement is an indicator of adjustment of students' learning and also serves as an important variable in school system as it provides the yardstick for measuring academic progress (Yilshik, et al, 2020). Completion of educational benchmarks such as primary, secondary, tertiary schools degrees represent academic achievement. Therefore, academic achievement refers to the realization of the goals of academics to be attained by students. Academic achievement is measured using the annual result at the end of the session which can be either high or poor. High academic achievement could imply performance significantly above average while poor academic achievement is when scores obtained by students are below average. Regardless of the numerous factors that most researchers have identified as the causes of the poor achievement of students in Biology, a key factor that they have failed to consider is the issue of teacher characteristics and how they affect the students' achievement in Biology. Some research studies have been carried out to address the issue of influence of teacher characteristics on student's achievement but they show conflicting results. For instance, the study of Ukah, et.al. (2024) and Anita, et.al. (2012) found out no significant relationship between teachers' qualification and students' performance while the study of Ogbonna (2015) which was carried out in tertiary institution found out that there is significant relationship between teacher qualification and students' academic performance in science education. Due to the inconsistency in report of studies conducted, this study, intends to find out the influence of teachers' qualifications, years of teaching experience and gender on students academic achievement in biology.

Teachers' qualification is an important factor to consider as it concerns the students' achievement in Biology. Teachers' qualification is the skill or knowledge a teacher possesses to make him or her suitable to teach. According to Yakubu, (2023), teacher qualification refers to academic and professional qualifications that enables a person to become a registered teacher at all levels of education. It is the acquisition of relevant knowledge, skill and competence needed for quality and productive engagement in the teaching profession. A person might have a teaching certificate at hand but lacks adequate knowledge of subject matter. Teachers' qualifications are more than just holding a certificate of any institution; it includes possessing adequate knowledge of the subject matter and the required pedagogy. Nwigwe et. al. (2019) viewed teacher academic qualification as a fundamental tool to students' academic achievement. Teachers' qualification therefore, means all the skills a teacher requires to teach effectively which can go a long way to determine the students' academic achievement in Biology. For this study, teachers with NCE, B.Sc/B.Ed, and M.Ed/M.Sc./Ph.D will be used to investigate influence of students' achievement in biology. In addition to teacher qualification, years of teaching experience is another important teacher variable that may be a determinant of the students' academic achievement in Biology.

Teaching experience refers to how long one has been employed and working as a teacher. Ukah, et.al. (2024) described experienced teachers as teachers who have taught for many years and by virtue of their experience are able to motivate students and hold their attention, knowing how to manage their classroom effectively and unforeseen opportunities to enhance students learning. According to Etiubon, et.al. (2014), teacher's experience has to do

with the increased awareness of diversifying search for new ideas, new commitments and new challenges. Studies by Ukah, et.al. (2024) and Ojukwu (2016) emphasizes that experienced teachers are more effective than the inexperienced teachers because students taught by the experienced teacher performed better than those taught by inexperienced teachers in Chemistry. It is therefore imperative to find out influence of teachers' years of experience on students' academic achievement in Biology. Thus, teacher's years of teaching experience, irrespective of the gender, may influence students' academic achievement. Gender refers to the characteristics of women, men, girls and boys that are socially constructed. Gender is a socially oriented concept that categorizes individuals into males and females with the associated roles and emotions that are expected of both males and females in the society (Nzeadibe, 2016). Research reports are not conclusive on the effect of gender on teacher effectiveness and students' academic achievement. For example, Opara (2015) and Obeka (2016) noted that females showed greater competency in Biology teaching than males, while Nasr and Asghar (2013) were of a contrary view. Furthermore, Ogbu, et. al. (2018) observed that gender did not influence teachers' mastery of new content in the mathematics. The present study will contribute to the debate by determining the influence of teachers' gender on the students' academic achievement in Biology.

### **Methodology**

The study employed ex-post facto research design because it aims to investigate relationships between variables after the events have occurred and without manipulating the independent variable. The study was guided by three research questions and three hypotheses. The study was conducted in Nsukka Local Government Area of Enugu state with a population of 1,564 comprising 59 teachers and 1505 SS2 Biology students in Senior Secondary Class Two (SS 2). The sample size was 310 (10 teachers and 300 Senior Secondary Two Students) drawn using multistage sampling procedure. Firstly, Nsukka Local Government Area was randomly selected from the three Local Government area in Nsukka Education zone. Secondly, purposive sampling was used to draw five schools out of 32 public co-educational schools in Nsukka L.G.A because teachers with the different educational qualification were considered. Thirdly, Simple random sampling technique (balloting without replacement) was used to draw two intact classes of SS2 students and two teachers drawn from each of the five public co-educational schools each were used. The instrument for data collection was a Proforma which contained demographic information of the teachers such as teachers' qualification, years of teaching experience and gender was validated by three experts. Teachers' years of experience was categorized into less experienced (0-3 years) while more experienced (3 years and above). The collected data were analyzed using mean and standard deviation for the research questions and Hypothesis one was tested using analysis of variance while t-test statistics was used to test hypothesis two and three.

### **Results**

**Table 1: Mean and Standard Deviation Achievement Scores of Secondary School Biology Students Based on their Teachers' Qualifications**

<b>Teachers' Qualification</b>	<b>N</b>	<b><math>\bar{x}</math></b>	<b>SD</b>
Students taught by NCE Teachers	100	49.40	15.79

Students taught by B.Sc./B.Ed. Teachers	85	57.68	7.76
Student taught by M.Ed./M.Sc./Ph.D Teachers	115	59.17	18.41

Table 1 shows that students under NCE teachers had mean achievement score ( $\bar{x}$ =49.40, SD=15.79). Students under B.Sc./B.Ed. teachers had mean achievement score ( $\bar{x}$ =57.68, SD=7.76). Students under M.Ed./M.Sc./Ph.D teachers had the mean achievement score ( $\bar{x}$ =59.17, SD=18.41). Students under M.Ed./M.Sc./Ph.D teachers had the highest mean achievement score while the B.Sc./B.Ed. teachers had least mean achievement score. To determine whether qualification significantly influence students' academic achievement in Biology, ANOVA was further performed.

**Table 2: ANOVA showing Significant Influence of Qualification on Secondary School Achievement in Biology.**

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2959.509	2	1479.754	7.145	.001
Within Groups	30445.451	297	207.112		
Total	33404.960	299			

Table 2 shows that teachers' qualification significantly influenced secondary school Biology students' academic achievement ( $F(297,2)=7.145$ ,  $P=0.001<0.05$ ). The associated p-value of 0.001 was less than the 0.05 level of significance stated for testing of the null hypothesis. Therefore, the null hypothesis that no significant influence of teachers' qualification on students' achievement in Biology is rejected, which implies that teachers' qualification exerts significant influence on students' academic achievement. To determine the pattern of the difference in the means, a post hoc test was performed.

**Table 3: Post Hoc Test for the Difference in the Means Achievement Scores of Secondary School Biology Students Based on their Teachers' Qualifications**

(I) Qual.	(J) Qual.	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
NCE	B.Sc./B.Ed.	-8.28*	2.71	0.003	-13.63	-2.93
	M.Ed./M.Sc./Ph.D	-9.77*	3.02	0.001	-15.73	-3.81
B.Sc./B.Ed.	NCE	8.28*	2.71	0.003	2.93	13.63
	M.Ed./M.Sc./Ph.D	-1.49	3.17	0.639	-7.76	4.78
M.Ed./M.Sc./Ph.D	NCE	9.77*	3.02	0.001	3.81	15.73
	B.Sc./B.Ed.	1.49	3.17	0.639	-4.78	7.76

\*. The mean difference is significant at the 0.05 level.

Table 3 shows that mean difference (-8.28000) between NCE and B.Sc./B.Ed. was significant ( $p > .003$ ). The mean difference (-9.77) between NCE and B.Sc./B.Ed. was significant ( $p > .001$ ). However, there is no significant difference ( $p < .639$ ) between the mean achievement scores of students taught by B.Sc./B.Ed. and those taught by M.Ed./M.Sc./Ph.D. This implies that qualification up to M.Ed./M.Sc./Ph.D. has greater impact on students' academic achievement as compared to B.Sc./B.Ed. and NCE.

**Table 4: Mean and Standard Deviation Achievement Scores of Secondary School Biology Students Based on their Teachers' Years of Teaching Experience.**

Teaching Experience	N	$\bar{x}$	SD
Students taught by Less Experienced Teacher	163	51.68	14.40
Students taught by More Experienced Teacher	137	58.35	15.00

Table 4 shows that the mean and standard deviation achievement scores of students taught by less experienced teachers were 51.68 and 14.40 respectively while the mean and standard deviation achievement scores of students taught by more experienced teachers are 58.35 and 15.00 respectively. The differences in the mean shows that students taught by more experienced teachers achieved better than those taught by less experienced teacher.

**Table 5: A t-test showing Significant Influence of Teachers' Years of Teaching Experience on Secondary School Students' Achievement in Biology.**

Teaching Experience	N	X	SD	T	df	Sig.
Students taught by less Experienced Teachers	163	51.68	14.40	-2.73	298	0.01
Students taught by more Experienced Teachers	137	58.35	15.00			

Table 5 shows that mean achievement score of secondary school Biology students under more experience teachers ( $\bar{x}=58.35$ ,  $SD=15.00$ ) was significant ( $t(298,1) = -2.73$ ) higher than those under less experienced teachers ( $\bar{x}=51.68$ ,  $SD=14.40$ ). Since the associated probability level of 0.01 was less than the 0.05 level of significance stated for testing of the null hypothesis, the null hypothesis that no significant influence of teachers' years of teaching experience on secondary school students' achievement in Biology was rejected. This implies that teachers' years of teaching experience influenced students' academic achievement in Biology.

**Research Question Three:** What is the influence of teachers' gender on students' academic achievement in Biology?

**Table 6: Mean and Standard Deviation Achievement Scores of Secondary School Biology Students Based on their Teachers' Gender.**

Gender	N	$\bar{x}$	SD
Male	166	52.78	13.11
Female	134	53.28	14.01



Table 6 shows that Biology students taught by male teachers had mean score ( $\bar{x}$ =52.78,  $SD$ =13.11) below their counterparts taught Biology by female who had mean achievement score ( $\bar{x}$ =53.28,  $SD$ =14.01). This implies that students' taught by female teachers seems to be favoured in terms of their academic achievement in the subject.

**Table 7: A t-test showing Significant Influence of Teachers' Gender on Secondary School Students' Achievement in Biology.**

Gender	N	$\bar{x}$	SD	t	df	Sig.
Male	166	52.78	13.11	-0.22	298	0.83
Female	134	53.28	14.01			

Table 7 shows that mean achievement score of secondary school Biology students taught by female teachers ( $\bar{X}$ =53.28,  $SD$ =14.01) with ( $t$  (298,1)= -0.22) slightly higher than those under male teachers ( $\bar{X}$ =52.78,  $SD$ =13.11). Since the associated probability level of 0.83 was greater than the 0.05 level of significance, this means that it is not statistically significant. This implies that teachers' gender had no significant influence on students' academic achievement in Biology.

## Discussions

The findings of the study indicated that teachers' qualification had significant impact on secondary school students' academic achievement in Biology. The findings further revealed that students under teachers with higher qualification (M.Sc/M.Ed./Ph.D) achieved significantly higher than those with NCE and B.Sc./B.Ed. The finding of the study corroborated Obeka (2024) Ogbonna (2015) who found positive significant impact of teachers' qualification on students' academic achievement. This finding of this study is not surprising due to the fact that teachers who have higher qualification are expected to be exposed to more advanced contents in their subject areas. However, because of government inability to employ qualified teachers, NCE holders are sometimes allowed to teach at secondary school level. The importance of qualified teachers cannot be overstated as these teachers are likely to have more pedagogical content and knowledge when compared to less qualified teachers.

The finding of the study also revealed that teachers' teaching experience had significant impact on secondary school students' academic achievement in Biology. In other words, the achievement of students' in Biology is a function of the teaching experience of their teachers. The finding align with Ukah, et.al. (2024) and Mageka and Ogochi (2020) who detected positive influence of teachers' experience on students achievement. The reason for the positive impact of teacher' experience on student' academic achievement could be because teachers with more teaching experience have better mastery of the contents they teach given that they have taught the content for every long time which may not be the case with less experience teachers. Teachers with more experience may have more confidence in their teaching ability as compare to those with less experienced which could manifest in students' academic achievement. Furthermore, the findings of this study revealed that teachers' gender had no significant influence on secondary school academic achievement in Biology. In other words, the students' academic achievement is independent of the teachers' gender. The finding agreed with Ogbu and Anyaegbu (2018) who also noted that one of the factors that

have no effect on students' academic achievement is the teachers' gender. This finding could be as a result of the fact that both male and female teachers attended similar educational institutions, workshops and conference on the best approach to enhance students' achievement in which they acquired similar experience and qualification.

### Conclusion

The study investigated the influence of teachers' characteristics on secondary school students' academic achievement in Biology. From the findings, it can be concluded that teachers with higher academic qualification and knowledge of the subject matter acquired through years of teaching experiences, tend to be well positioned to apply various methodologies in teaching that could impact students' academic achievement positively irrespective of the teachers' gender. This highlights the importance of employing well-qualified and experienced teachers who are likely to possess deeper content knowledge, stronger pedagogical skills and long-term engagement with the curriculum. Hence, teachers tend to have stronger content mastery and classroom management skills, leading to improved student achievement. Finally, both male and female teachers are equally effective, likely due to similar training, qualifications and access to professional development which leads to overall academic success of students.

### Recommendations

1. Government should sponsor teachers with less academic qualifications by giving them grants and time to enrol in part-time programmes in their area of specialization.
2. School managers should strive to recruit more qualified and experienced teachers.
3. School management should not discriminate in terms male or female teachers while recruiting, placing and assigning roles to teachers.

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