

## The Effect of a Teacher's Qualifications and Work Experience on Learners' Achievement in Biology

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**Abstract:** The study tried to ascertain the impact of instructors' credentials and professional expertise on students' biology achievement in Birim Central Municipality, Eastern Region, Ghana. The study used survey design. The respondents were chosen using simple and selective probability sampling. 80 biology teachers and four head teachers gave us the 84-sample size. A questionnaire served as the main research tool, and the data analysis was accomplished with the help of the Statistical Package for Social Sciences (SPSS). Many respondents (60.7%) firmly agreed that teachers who possess superior knowledge and skills are better able to instruct students. Majority of those surveyed strongly agreed that experienced teachers are more understanding whenever it involves dealing with behavioral issues of children. This study was intended to considerably add to knowledge in order to enhance students' biology performance and comprehension.

**Keywords:** Teacher qualification, Achievement, Experience, Performance

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### Introduction

The convergence of numerous resources leads to education. Among these resources, teachers stand out as being particularly crucial for reaching the good standards that are being stressed in schools and educational institutions across the globe (Rice, 2003). According to Jones (2007), teachers play the most essential role in boosting pupils' academic achievement. This appears to back up previous research by (Rice 2003; Zuzovsky & Libman, 2003).

These studies showed a correlation between teacher education and improved student achievement. Khurshid (2008) conducted a study in Multan, Pakistan to ascertain the association between teachers' socioeconomic qualifications and their pupils' academic achievement at the secondary school level. These studies showed that

instructors' degrees had a favourable effect on student achievement because it was found that students taught by untrained teachers with B.A./B.Sc credentials did better than students taught by certified teachers with professional qualifications like B.Ed and M.Ed.

On the other hand, Zuzovsky (2009) performed study in Israel to reassess the correlation between higher levels of performance and greater levels of education, teaching experience, and active engagement in professional development activities. These features of a teacher's qualification were discovered to be positively correlated with math and science student achievement. Numerous studies have found a strong correlation between teachers' training and expertise in mathematics and students' mathematical achievement (Martin, Mullis, Gregory, Hoyle & Shen, 2000; Hill, Rowan & Ball, 2005; Mogari, Kriek, Stols & Iheanachor, 2009).

According to the Ghana Education Service (GES), teacher qualifications frequently play a direct role in students' inconsistent performance in Senior High School Biology classes, even though there seem not to be any conclusive studies on the topic (GES, 2007). Numerous administrations in Ghana have started various efforts targeted at maintaining academically and professionally prepared teachers in the classroom. Obasi (2010) further asserted that a teacher's professional and academic training and certification can enhance a student's chances of academic success.

This signifies that inexperienced teacher candidates may affect how students are taught and learn because the intellectual ability of those recruited to teach has an impact on the quality of education (Fullan & Stiegelbauer, 2000). To analyse student achievement, Koedel and Betts (2007) used the value-added gains technique. According to them, the qualifications of an instructor—including their experience, the prominence of their undergraduate institution, their degree, and their major—have no bearing on students' academic progress. According to Koedel and Betts' findings, Buddin and Zamarro (2009) came to the conclusion that teacher experience is only tangentially related to student achievement and that teachers' levels of education had little bearing on the learning outcomes of their students. In addition, Buddin and Zamarro (2009) argue that even though instructors with more education, training, or experience may be naturally better teachers (as determined by licencing exams), they may not always perform at their very best in the classroom.

Studies show that less experienced teachers frequently have less success than more experienced ones. The academic development of the pupils in their care will be insufficient if the teacher is inept. According to Yala and Wanjohi (2011) and Adeyemi (2010), the most crucial factors affecting students' academic achievement were the teachers' experience and educational background.

As a result, whether or not pupils perform well on exams, the qualifications of teachers are frequently questioned. Teachers in Ghana have the option of earning certificates, bachelor's degrees, or master's degrees, enabling them to work in secondary education. This investigation will examine how students' biology performance in Birim Central Municipality in the Eastern Region is influenced by teachers' training and experience.

## Methodology

This study employed the survey research design. The respondents included four (4) head teachers and eighty (80) biology teachers. While the teachers in the study were chosen at random, the head teachers were specifically chosen from the studied schools. Questionnaires were distributed to teachers and head teachers of the participating schools as the study's instrument. The statistical package for social sciences (SPSS) version 20.0 was used to edit, encode, and analyse the data that was obtained. My supervisor assessed the instruments to improve their content validity. Following the inspection of the instruments, they provided feedback and suggested improvements, which were adopted. Testing on the instrument's face validity was also conducted. The reliability test was conducted using the Cronbach's alpha. Cronbach's alpha was employed to conduct a reliability test, and the results showed that the coefficient of dependability was 0.982.

## Results And Discussion

**Table 1. Respondents' Sexes**

Sex	Frequency	Percent	Valid Percent
MALE	50	59.5	59.5
FEMALE	34	40.5	40.5
Total	84	100.0	100.0

Source: Field work 2016

Table above depict that 59.5% (50) of the responses were male and 40.5%(34) were female. Gender issues must be taken into account in both men's and women's education due to traditional beliefs and prejudices about women's responsibilities, employment opportunities, and social participation (UNESCO, 2006). This could strengthen the widespread idea that particular academic areas, such as science, are frequently perceived as'male' courses (FAWE, 2004). (FAWE, 2004). Against this setting, the gender distribution of the participants sample was the subject of this study. Table 2 shows the age groups that the respondents were asked to fill

**Table 2. The respondents' Ages**

Age Range	Frequency	Percent
23-30years	10	11.9
31-40years	50	59.5
41-50years	15	17.9
above 50years	9	10.7
<b>Total</b>	<b>84</b>	<b>100.0</b>

Source: Field work, 2016

Table illustrates that out of the 84 responses, 10.7% (9) were over 50, 17.9% (15) were between 41 and 50,

59.5% (50) were between 31 and 40, and 11.9% (10) were between 23 and 30. This reveals that the age distribution, especially in the studied schools, indicates that a sizable majority of the teachers were young (between the ages of 31 and 40), which might lead to effective productivity. Because of this, it was expected that there wouldn't be a lack of responses as a result of teacher retirement in the two municipalities—especially among biology teachers. When respondents' marital status was questioned, individuals between the ages of 41 and 50 had a greater understanding of the ways in which teacher-related factors affected students' performance. Table 3 illustrates this.

**Table 3. Marital Status of the Participants**

Marital Status	Frequency	Percent
Married	69	82.1
Single	11	13.1
Widowed	4	4.8
<b>Total</b>	<b>84</b>	<b>100.0</b>

Source: Field work, 2016

82.1%(69) of the total 84 responses were married; 13.1% (11), were single; and 4.8% (4) were widowed. This suggests that persons who were single were thought to be less responsible, mature, and well-adjusted than those who were married, especially those who were not deeply engaged. The aforementioned suggests that single people can experience prejudice in the workplace because they are thought to be less dedicated to their careers and less likely to succeed as employees. Respondents had the choice to say how much education they have. This is shown in Table 4.

**Table 4. Responses to a Survey on Respondents' Educational Levels**

Qualifications	Frequency	Percent
Diploma	8	9.5
Bachelor's degree	70	83.3
Master's degree	6	7.2
<b>Total</b>	<b>84</b>	<b>100.0</b>

Source: Field work, 2016

Of the 84 survey participants, 9.5% (8), 83.3% (70), and 7.2% (6) had a diploma, bachelor's degree, or post graduate degree(masters), respectively. Each participant has finished a formal higher education programme of some kind. Because of their credentials, the respondents were able to understand and properly complete the questionnaire. Students in senior high school perform better academically when instructed by teachers with more than 10 years of experience, according to Tremblay, Ross, and Berthelot (2001). According to Table 5's findings, there was a range of one to more than fifteen years of teaching experience. In Table 5, it is indicated that the researcher gave the respondents the chance to discuss their former career histories. Of the 84 survey

participants, 9.5% (8), 83.3% (70), and 7.2% (6) had a diploma, bachelor's degree, or master's degree, respectively. Each participant has finished a formal higher education programme of some kind. Because of their credentials, the respondents were able to understand and properly complete the questionnaire. Students in senior high school perform better academically when instructed by teachers with more than 10 years of experience, according to Tremblay, Ross, and Berthelot (2001). According to Table 5's findings, there was a range of one to more than fifteen years of teaching experience. The researcher gave the respondents the chance to discuss their former employment experience, as seen in Table 5, which is displayed.

**Table 5. Working history of the respondents**

Years of experience	Frequency	Percent
1-5years	4	4.8
6-10years	15	17.9
11-15years	50	59.5
above 15years	15	17.8
<b>Total</b>	<b>84</b>	<b>100.0</b>

Source: Field work, 2016

According to Table 5, 4.8%(4) of the respondents answered that they had been teachers for one to five years, 17.9%(15) for six to ten years, 59.5%(50) for eleven to fifteen years, and 17.8%(15) for more than fifteen years. It is reasonable to assume that most respondents have relevant professional experience and knowledge of their schools, making them qualified to offer reliable information about the institutions. Bandura (1997) came to the conclusion that teachers with more experience are more self-assured and self-sufficient in handling students' learning difficulties. The majority of respondents had between eleven and fifteen years of work experience, which puts them in a better position to speak with the researcher about their views and experiences relating to teacher-related topics.

What do teacher credentials affect how well learners perform in biology?

The study's biology instructors and the school head teachers provided responses to this question. The amount to which teacher qualifications affect educational outcomes was a question that the respondents were asked to comment on. The responses of the respondents are shown in Table 6.

**Table 6. Extent to which Teachers' Qualifications Affect Learners' Achievement**

Statement	SA	AA	UC	DA	SD
i. Possibilities for teachers to grow professionally and in their knowledge.	0	8	0	30	46
ii. First-degree holders and higher teachers have strong subject-matter competence.	34	50	0	0	0

iii. My school's headmaster pays for me to go to subject-specific lectures, workshops, and training.	2	48	0	25	9
iv. The professional credentials of teachers have an impact on student progress.	46	38	0	0	0
v. Better instruction is provided to students by teachers having teaching credentials.	51	33	0	0	0

Source: Field work, 2016; SA= Strongly Agree; AA = Agree; UC =Undecided; DA = Disagree; SD = Strongly Disagree

### **Biology instructors and school heads' views on the impact of teacher credentials on learners' achievement**

On the extent to which teacher credentials affect student achievement, the head teachers and the biology instructors were asked for their opinions. Opportunities for teachers to increase their expertise and advance their careers will promote student accomplishment, according to 9.52% (8), 35.71% (30), and 54.76% (46) strongly disagree responses. According to 40.48%(34) and 59.52%, teachers with a first degree or higher exhibit strong topic knowledge at the S.H.S level (50). According to the following percentages: 2.5%(2) greatly agree, 57.14% (48), agree, 29.76% (25) disagree, and 10.71%(9) severely disagree, my head of school funds subject workshops, training, and seminars. The professional credentials of instructors influence pupils' achievement, claim 54.76% (46), and 45.24%. (38). 39.29%(33) disagree, whereas 60.71%(51) strongly agree that teachers with teaching degrees are superior at instructing students.

The level of instruction delivered by schools in every country is directly influenced by the knowledge, intelligence, and academic competence of teachers (UNESCO, 1991). The level of science anxiety among students is influenced either favourably or unfavourably by a biology teacher's professional attributes (Nyongesa, 2010). Teacher quality, according to Buddin and Zamarro (2009), is an essential component in student academic progress. Ruthland and Bremer (2002) make a distinction between conventional and non-conventional teacher preparation programmes. After completing an undergraduate or graduate programme in education, traditional certification is earned. Alternative certification pathways are based on training in pedagogy and subject matter for those without a bachelor's degree in education.

Hardy and Smith (2006) list brief activities including peer reviews, seminars, and mentorship as alternatives to formal qualifications for better teaching. If they are unable to obtain employment right after, a graduate teacher with a first degree is more likely to continue teaching. Despite frequently being paid less than a fully educated teacher, they choose not to participate in the one-year post-graduate professional training, and as a result, lack the principles of teaching. According to Richardson's (2008) research, urban students performed better than those in rural areas. The study concluded that one factor affecting students' achievement must have been the availability of enough qualified teachers. However, in Kenya, several rural schools outperformed their urban

counterparts in terms of academic performance (Owoeye & Yara, 2011). Obasi (2010) asserts that a teacher's training, experience, and qualifications can improve a student's academic performance and accomplishments. This demonstrates that a certified teacher should be well-versed in the subject matter before the students because dealing with biology students' attitudes and science anxiety demands expert expertise. The biology instructors' replies to the topic of whether teacher credentials affect academic achievement are shown in Table 7.

**Table 7. Effect of Teacher Qualifications on Learners' Biology Competency**

explanations from teachers	Frequency	Percent
competent teachers use effective teaching strategies	80	100.0

Source: Field work, 2016

80 Of the biology teachers surveyed concurred that adopting efficient teaching methods by knowledgeable instructors enhances student achievement. Ruthland and Bremer (2002) make a distinction between conventional and non-conventional teacher preparation programmes. After completing an undergraduate or graduate programme in education, traditional certification is earned. Alternative certification courses are based on training in pedagogy and subject matter for those without a bachelor's degree in education. Hardy and Smith (2006) list brief activities including peer reviews, seminars, and mentorship as alternatives to formal qualifications for better teaching.

The first strand of the framework for assessing teacher quality, or teacher inputs, according to Goe and Stickler (2008), concentrated on teacher certifications. They believed that one of the most important resources instructors provided in the classroom was their training. The dependence on paper degrees as indicators of teacher quality appears to be holding sway in modern educational institutions (Goe & Stickler, 2008). (2008) Goe and Stickler. As a result, whether or not pupils perform well on exams, the qualifications of teachers are frequently questioned. In Ghana, secondary school teachers are required to hold a diploma, a bachelor's degree, or a master's degree.

Although there appear to have been no studies on the impact of teachers' highest/lowest qualifications on students' performance/achievement in Ghanaian SHS, this could explain the students' inconsistent output in SHS biology. Instructors enter the teaching profession with a variety of academic credentials. The majority of past research discovered a positive relationship between teachers' levels of certification and pupils' achievement, notably in math and science (Goldhaber & Brewer, 2002; Wayne & Youngs, 2003). Rice (2003) found that there were significant differences in the relationships between instructor characteristics and student achievement across grades and courses.

How does a teacher's professional background affect the biological performance of their students?

Participants in the study, including biology instructors and school heads, provided responses to this question. The respondents were questioned about how much teacher professional experience affects how well pupils achieve in biology. The responses of the respondents are shown in Table 8.

**Table 8. How much teachers' professional experience affects students' effectiveness**

Statement	SA	AA	UC	DA	SD
i. In the WASSCE, students with experienced teachers do well.	29	55	0	0	0
ii. Good teachers have experience.	26	53	0	5	0
iii. Competent teachers appropriately evaluate the students.	27	57	0	0	0
iv. Teachers with more competence are more patient when dealing with student-related issues.	41	43	0	0	0
v. Teachers with more experience are more effective educators	32	52	0	0	0

Source: Field work, 2016

34.52% (29) of the 84 responses strongly agree, 65.48% (55) agree, 30.95% (26) strongly agree, 63.10% (53), and agree—believe that students with experienced teachers perform better on the WASSCE. The remaining respondents—32.14% (27), strongly agree, 67.86% (57), agree, and 48.81% (41) disagree—also hold this belief. This is shown in Table 8. This implies that seasoned educators are capable of handling challenging circumstances and devoting a large amount of time to teaching their students to improve achievement. A teacher's quality is determined by the experience they accumulate over more years of teaching. As a result, it has been discovered that an experienced instructor can increase pupils' performance more successfully than a rookie teacher. Numerous empirical studies that demonstrate a significant and favourable correlation between the amount of years and students' achievement corroborate this (Rice, 2003). As shown in Table 9, the respondents (biology teachers) were given the chance to share their opinions on how the professional backgrounds of teachers affect how well their pupils succeed in biology.

**Table 9. Impact of Teachers' Professional Experience on Learners' Biology Achievement**

Teachers' Views	Frequency	Percent
I. Teaching is improved by experience.	44	55.0
II. Improved teacher evaluations come with experience	36	45.0
<b>Total</b>	<b>80</b>	<b>100.0</b>

Source: Field work, 2016

Out of 80 responses, 55% (44 respondents) thought that more experienced teachers are better educators, which has an impact on students' academic progress. 30 people, or 45%, agreed that teachers with more experience are better at evaluating students.

The aforementioned points to a campaign to promote the idea that an experienced teacher will be more effective



in his instruction and that his students will be more likely to perform academically compared to pupils taught by a teacher with less expertise, these students performed wonderfully in both internal and external school exams.

### **Recommendation**

1. Ghana Education Service should hire biology teachers who have both professional credentials and great subject expertise.
2. In order to increase the effectiveness of biology teachers' pedagogical and subject-matter expertise and their students' performance, senior high school heads must offer on-the-job training for them.

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