

IMPACT OF TEACHERS' EDUCATIONAL QUALIFICATION ON ACADEMIC
PERFORMANCE OF COMPUTER SCIENCE STUDENTS IN NIGER STATE
COLLEGE OF EDUCATION, MINNA

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Abstract

The teacher is an indispensable asset in the business of education of any community, society, and the nation. The functions of teachers span skills development, modification of behaviours, guidance of the actions and thoughts of individuals through the instrumentality of learning activities and environment. The teacher is expected to be qualified, trained and professional in the act of sharing and impacting of knowledge to learners. These attributes have come into focus through the learners' performances and successes in different learning subjects. This paper examines the impact of teachers' educational qualification on performance of students of computer science in Niger State College of Education, Minna (NSCOE). Data was collected through survey research design drawn on a population size of 230 respondents from the Computer Science Department, (NSCOE). However, 200 questionnaires were returned and analyzed. The research instrument was validated using the Cronbach Alpha, obtaining a value of 0.78. Five research questions and two null hypotheses were formulated to guide the study. The null hypotheses were tested using the chi-square statistics. The paper found that, there is a significant effect of teachers' qualification and the lack of qualified teachers on the students' academic performance. Furthermore, relationship between teachers' educational qualification to students' academic performance was obtained as 0.5 for Spearman correlation coefficient; which implies that teachers' educational qualifications determine or precedes students' academic performance. It was recommended that, the students will experience improved learning situations, outcomes and aptitudes whenever there are qualified teachers available to mentor and guide the curriculum and instructional designs.

Keywords: Impact, Teacher, Computer Science, Performance Learning Outcomes, Teachers Qualification

Introduction

The learning environment, along with social and cultural events define the roles of a teacher. This is because they have an impact on the variations in teacher duties that exist among cultures, societies, and even the geographic setting. In course of teaching, the efforts of teachers are laborious leading to the modification of the behaviour of learners and their expected actions, as

well as the expectation of others (school leaders, society, parents and colleagues). These roles are determined by internal (perception of teachers of their roles) and external (expectations and views of the stakeholders, professional identity and society) factors (Makovec, 2018). The expectation about teachers in turning out learners with fully developed skills for the world of work further puts pressure on them. To this end, industry-school partnership is flourishing at the moment in developing training skills, learning experiences and on-job training for classroom, laboratories, and instructional materials usages (Isaac, Enyiche, & Obed, 2019).

Teaching became a desirable career after being deemed an essential occupation. The role of pedagogical teachers is described as a constant process of interpersonal escort to accompany and steer learners in the right direction. The degree of direction is crucial for achieving the determined national development goals. The pre-service teachers receive training to assist them in creating their professional personas and sense of self as educators. (Donitsa-Schmidt & Ramot, 2020). Interestingly, the new European educational policies at the commencement of 21st century started to focus on students' achievements as prelude to the advancement of national educational policies. This emphasized on duties of teachers in instructional planning and ultimate learning outcomes. Accordingly, Teachers are supposed to transform the broad, abstract learning outcomes found in policy papers into tangible, meaningful outputs that can be measured. These must select resources, activities, and teaching strategies that are in line with those objectives (Bremholm & Skott, 2019).

Statement of the Problem

There is generally low performance of students in their academic endeavours. This is attributed to poor infrastructure, a lack of educational resources, the high expense of private schools, insufficient teacher professional development, and a lack of resources to assist people with physical disabilities are all factors. (Oyelere & Suhonen, 2016). Furthermore, Filgona & Sakiyo (2020) submitted that the recruitment of unqualified teachers significantly impacted on the academic performance of students in Adamawa State. More so, Oludipe and Oludipe (2020) reported that teachers' qualification has an impact on students' academic performance. Elegbede (2022) opined that having an even spread of highly qualified teachers gave rise to a non-significant difference in academic performance of the students. However, their study was conducted among secondary school students in Ogun State. Therefore, there is a need to further investigate this problem in the context of other subjects, tertiary institutions and a different geographical location which can be predicated by the educational environment and find possible solutions.

Objectives of the Study

This research work was geared towards achieving the following objectives;

- i. To investigate the facilities available for the study of computer science in NSCOE Minna
- ii. To investigate the effects of teachers with higher educational qualifications on the students' academic performance
- iii. To find out the students' perception towards computer science and its teaching methods

- iv. To investigate if teachers make out time to teach theory and practical aspects of computer science
- v. To investigate if the lack of experienced teachers affects the learning of computer science

Research Questions

The following are the research question for this study;

- i. What are the facilities available in teaching and learning Computer Science?
- ii. What are the effects of teachers with higher educational qualification on the students' academic performance?
- iii. What is the students' perception towards Computer Science and its methods of teaching?
- iv. Do teachers make out time to teach both theory and practical?
- v. Does lack of experienced teachers affect the learning of the Computer Science?

Literature Review

Education remains a vital instrument for any form of development whether economic, social or political, adaptation and survival which emanate from teaching and learning for the purpose of actualizing goals of curriculum (Okekeokosisi, Anaekwe & Okigbo, 2016). Education regulates the state of prosperity, substance of welfare and security of people. The yearnings, needs, aspirations, cultural heritage and environment of any society influenced greatly by the knowledge and skills acquired (Charles & Uzoma, 2022).

The goal of enhancing the educational process in higher education is to increase the creative capacity of students' academic activities. The foundation for ensuring high quality education is the use of efficient educational technologies, the integration of the educational process with scientific activities and students' involvement in it, the individualization of teaching and upbringing, the creation of a trusted environment of creative cooperation in a higher educational institution, and ongoing self-development and self-realization of students in the educational process. (Saidjajalova, 2022).

A solid foundation of competent, effective instructors is necessary for a high-quality educational system. However, excellent instructors choose working in metropolitan settings, which presents significant difficulties for educational authorities. Education authorities must make significant investments to solve the issue of hiring qualified good instructors in remote schools by offering financial incentives to such individuals. (Du Plessis & Mestry, 2019) Teachers also need to know how to modify lessons based on evidence of student learning. (Gemed, Getachew, & Kune, 2021). Programs for the professional development of teachers should address topics such as the audience (the type of teaching environment), content (what should be included in the curriculum), and the manner of instruction delivery (the most appropriate means of engaging learners) (McGill, Heikkila, & Lazarowicz, 2020).

The teacher must be courageous, persistent, and perseverant with tasks planned in manner as to make efforts to accomplish initial objectives when the conditions runs to the contrary in the reality (Ruiz-Montero, Chiva-Bartoll, Salvador-Garc, & González-García, 2020). Educators have formal pedagogical education and varying professional upbringings, which influence their

capabilities to organize materials and content for students at various of levels of education (Rohs, Bolten, & Kohl, 2020).

Teachers have a crucial and strategic role in education, making them an integral part of it and the primary force behind achieving its objectives. The character of pupils and the quality of instruction in schools are both enhanced by this educational component. By leading and establishing good examples, the teacher works closely with children to promote science, technology, and positive values. (Dirsa, Anggreni, Diananseri, & Setiawan, 2022). The teacher can be summed into two points according to (Arnon & Reichel, 2007): (a) The personality of teacher endears him into attentive and empathic person through personal attributes. He serves as a leader, positively disposed towards the profession, having continuum of knowledge and skills in selected subject or field. (b) The teacher has full professional and academic training of the teaching subjects including: educational methods, knowledge of didactic, and specific knowledge on child-up bringing and needs with wide range of other competences.

Teacher education is expected to continually modify its strategies to accommodate the wealth of information available and revisiting the standards of the profession. The process of teacher training must considerably adopt needs of various learners whether technology-enthusiast or not (Jones, 1990). One frank suggestion was provided by (Megyeri, 1996) that, the process of change as a strategy for teacher-training must seek to commence at the level of the teachers. Educators should strive to extend the technological capability to support teaching and learning of all kinds of learners.

The classrooms activities and curriculum implementation are the sole responsibilities of the teachers, which entails tasks and content performed by students in achieving the learning objectives and goals (Choppin et al., 2020). Furthermore, Habley (1986) mentioned three components of academic advising (teaching) competencies including conceptual, informational and relational. The conceptual deals with the policies, laws, resources, and procedures. The relational entails communication and interpersonal skills to foster active relationships with learners. Robbin (2012) argued that, much attention is focused on informational part rather than the conceptual and relational competencies of teaching or academic advising.

The teacher has special role in educational process of learners by deciphering unusual learning problems, and recognize students requiring special support during learning (Telikani, Gandomi, & Shahbahrami, 2020). The capacity of the teachers to implement instruction in schools in accordance with the procedural criteria established in order to attain the quality of educational outcomes in schools is referred to as teacher performance in this study. is someone who should be respected and emulated; in a similar vein, a teacher is someone with charm or authority who should be modeled after. (Rostini, Zaeni, Syam, & Achmad, 2022). A teacher is a professional who runs lessons and determines the quality of learning. Effective learning depends on the instructors' capacity and involvement in the classroom learning process in order to be of high quality. The effectiveness of the teacher's teaching methods will have a significant impact on the level of learning outcomes that pupils will achieve. The effectiveness of the procedure and the caliber of the results of learning are what really determine the quality of learning. (Hadis & Nurhayati, 2010).

Quality teachers' shortages are most noticeable in early childhood education and elementary-year schooling, which further compounded by ageing teacher population, and premature exit from service. The demand for teachers will rise in 10 years' time (Casely-hayford, Bergstrom, Bjorklund, Lindqvist, & Kwak, 2022). The roles of teachers were deeply investigated by (Grammens, Voet, Vanderlinde, Declercq, & De Wever, 2022) that involves providing feedback, motivating learners, arranging learning process, stimulating active learning, performing assessment, addressing personal needs of students, designing and recreating learning materials and tasks. These offers directions for teacher training and preparation.

Research Methodology

Research Design

This paper adopts the descriptive survey method research design in order to investigate the extent to which teachers' educational qualifications influences students' academic achievement in Computer Science in NSCOE, Minna. It enables collection and analysis of relevant data in a systematic way.

Area of the Study

The research work is limited to the computer science department, NSCOE, Minna

Population of the Study

The researcher only considered the lecturers and students of NSCOE, Minna A population size of 230 respondents drawn randomly from the Departments of computer science.

Sample and Sampling Method

The study uses a simple random sampling technique. The semi-structured questionnaire was prepared and administered on students in Niger State College of Education, Minna.

Data Collection Techniques

The paper utilized the following methods in the collection of data:

- i. Questionnaire: this instrument was administered to the area of study.
- ii. Interview: The researchers personally interviewed five (5) Computer Science teachers in the area of study using the questionnaire items.

Data Analysis

The test of hypothesis used is Chi square (X^2). Chi square (X^2) permits us to assess whether or not the observed and predicted numbers of instances differ significantly. as expressed in Equation 1.

$$\frac{(O_i - E_i)^2}{E_i} \quad 1$$

Where;

O_i = observed value,

E_i = expected value,

C = number of columns,

R = number of rows

DF = degree of freedom = $DF = (C - 1)(R - 1)$.

Decision Rule: We reject the null hypothesis if the estimated Chi square (X^2) value exceeds the crucial value.

Results

The data collected on this research work is analyzed and presented in a tabular form in order to test of the hypothesis. In order to obtain a research result about impact of teachers' education qualification on students' academic performance in Niger State College of Education, Minna, a total of 230 (two hundred and thirty) questionnaires were distributed to computer science students in Niger State College of Education, Minna but only 200 responses were completed and returned, the analysis of the responses is presented in Tables 1-5.

Research Question One: Are facilities available in teaching and learning of Computer Science?

Table 1: Responses of respondents to the availability of facilities for teaching and learning of Computer Science.

Responses	No of responses	Percentage (%)
YES	128	64%
NO	72	36%
TOTAL	200	100%

Source: Field study, 2022.

From Table 1, it can be seen that 128 respondents which represents 64% of the total respondents consented to the fact that facilities are available in teaching and learning computer science in Niger State College of Education, Minna while the remaining 72 respondents which represents 36% of the total respondents did not consent to the availability of facilities for teaching and learning of Computer Science.

Research Question Two: Are there positive effects of teachers with higher educational qualification on students' academic performance?

Table 2: Responses of respondents to presence of positive effects of teachers with higher educational qualification on students' academic performance.

Responses	No of responses	Percentage (%)
YES	154	77%
NO	46	23%
TOTAL	200	100%

Source: Field study, 2022.

From Table 2, it can be seen that 154 respondents which represents 77% of the total respondents alluded that, teachers with higher educational qualification have positive impact on the performance of students while 46 respondents which represents 23% of the total respondents detest that teachers with higher education qualification have positive impact on the performance of students.

Research Question Three: Are the students' perception towards Computer Science and its method of teaching positive?

Table 3: Responses of respondents on positive perception of students towards Computer Science and its method of teaching.

Responses	No of Responses	Percentage (%)
YES	132	66%
NO	68	34%
TOTAL	200	100%

Source: Field study, 2022.

From Table 3, it is obvious that, 132 respondents which represents 66% of the total respondents have positive perception towards Computer Science and its method of teaching in Niger State college of education, Minna while the remaining 68 respondents which represents 34% of the total respondents have negative perception towards Computer Science and its method of teaching and learning.

Research Question Four: Do teachers make out time to teach theory and conduct practical?

Table 4: Responses of respondents on whether teachers make out time to teach theory and conduct practical.

Responses	No of responses	Percentage (%)
YES	160	80%
NO	40	20%
TOTAL	200	100%

Source: Field study, 2022.

From Table 4, It was found that 160 respondents, or 80% of respondents, agreed that teachers schedule time to conduct practical lessons and teach theory, but the other 40 respondents, or 20% of the total respondents, disagreed with this statement.

Research Question Five: Does lack of experienced Computer Science teachers affect the learning and teaching?

Table 5: Responses of respondents on whether lack of experienced Computer Science teachers affect the learning and teaching.

Responses	No of responses	Percentage (%)
YES	180	90%
NO	20	10%
TOTAL	200	100%

Source: Field study, 2022.

From Table 5, it was ascertained that 180 respondents which represents 90% of the total respondents agreed that lack of experienced computer science teachers affect the leaning of the subject while the remaining 20% respondents which represents 10% of the total respondents disagreed.

Hypotheses Testing and Outcomes

Tests of hypotheses/ test of significance procedure enables researchers decide whether or not to accept hypothesis. The statistical hypotheses considered include: the null (H_0) and alternative hypothesis (H_1).

Hypothesis 1:

Null Hypothesis (H_{01}): States that there is no significant effect of teachers with higher educational qualifications on students' academic performanc in Computer Science.

Alternative Hypothesis (H_1): states that there is significant effect of teachers with higher educational qualification o students' academic performance

To test this hypothesis, the chi-square (X^2) would be used as stated in Equation 1.

Computation: To get expected value, the responses were used, which are observed values earlier given in Research Question Two as presented in Table 6.

Table 6: Observed and expected responses for question two.

Responses	Observed	Expected
Yes	132	100
No	68	100
TOTAL	200	200

The X^2 is computed based on the observed and expected values in Table 6 as follows:

$$YES = \frac{(132 - 100)}{100} = \frac{(32)^2}{100} = \frac{1024}{100} = 10.24$$

$$NO = \frac{(68 - 100)}{100} = \frac{(-32)^2}{100} = \frac{1024}{100} = 10.24$$

These computation for X^2 are presented in the Table 7.

Table 7: The computation outcomes of X^2 for question two

O	E	$O - E$	$(O - E)^2$	$\frac{(O - E)^2}{E}$
132	100	32	1024	10.24
68	100	32	1024	10.24

The level of significant is 5% = 0.05, $n = 2$ (number of items)

$$\text{Table } X^2 = X^2 (n - 1)$$

$$= X^2 (2 - 1), 0.05$$

$$= X^2 1, 0.05 = 3.841$$

To determine the statistical significance of the observed X^2 value = 20.48, we compare it with the X^2 table value which is 3.841. The observed $X^2 = 20.48$ is greater than the table value of $X^2 = 3.841$, level of significance = 0.05.

DECISION: Reject null hypothesis that, there is no significant effect of teachers with higher educational qualification on students 'academic performance.

Hypothesis 2:

Null Hypothesis (H_{02}): Lack of experienced Computer Science teachers does not affect the learning of the subject.

Alternative Hypothesis (H_2): Lack of experienced Computer Science teachers affects the learning of the subject.

The computation for the expected values, we make use of the responses which are the observed values earlier given in question five is presented in Table 8.

Table 8: Observed and Expected Response for Question Five.

Responses	Observed	Expected
Yes	180	100
No	20	100
TOTAL	200	200

The X^2 is computed based on the observed and expected values in Table 8 as follows:

$$YES = \frac{(180 - 100)^2}{100} = \frac{(80)^2}{100} = \frac{6400}{100} = 64.00$$

$$NO = \frac{(20 - 100)^2}{100} = \frac{(-80)^2}{100} = \frac{6400}{100} = 64.00$$

These computation for X^2 are presented in the Table 9.

Table 9: The computation outcomes of X^2 for question five.

O	E	$O - E$	$(O - E)^2$	$\frac{(O - E)^2}{E}$
180	100	80	6400	64
20	100	80	6400	64

To determine the statistical significance of the observed X^2 values = 128, we compare it with the X^2 Table value = 3.841. The observed X^2 = 128 is greater than the table value of X^2 = 3.841 at DF (0.05)

DECISION: Reject the null hypothesis that, lack of experienced computer science teachers does not affect the learning of the subject.

Relationships between Students' Academic Performance and Teachers' Qualification

Correlation coefficients can be used to analyze the link between teachers' educational qualification and students' academic achievement based on students'.. this is achieved by using the students' results. Table 10 shows the student results in three Computer Science subjects including: CSC 216, CSC 212 and CSC 213.

Table 10: 1st Semester NCE 2 Students Assessment Scores in Computer Science 2016/2017 Session.

Student Score	Class	Csc 216		Csc 212		Csc 213	
		F	FX	F	FX	F	FX
10 – 19	14.5	0	0	2	29	29	29
20 – 29	24.5	0	0	2	49	98	98
30 – 39	34.5	1	34.5	77	241.5	103.5	103.5
40 – 49	44.5	1	44.5	4	178	4	178
50 – 59	54.5	2	109	8	436	3	163.5
60 – 69	64.5	10	645	11	709.5	8	516
70 – 79	74.5	14	1043	3	223.5	2	149
80 – 89	84.5	6	507	2	169	3	253.5
90 - 99	94.5	3	283.5	0	0	2	189
		$\sum F=37$	$\sum FX=2666.5$	$\sum F=39$	$\sum FX=2035.5$	$\sum F=31$	$\sum FX=1679.5$

$$\text{Arithmetic Mean } (\bar{X}) = \frac{\sum FX}{\sum F}$$

$$\text{The mean score for CSC 216, } \bar{X} = \frac{2666.5}{37} = 72$$

$$\text{The mean score for CSC 212, } \bar{X} = \frac{2035.5}{39} = 52$$

$$\text{The mean score for CSC 213, } \bar{X} = \frac{1679.5}{31} = 54$$

Therefore, the mean student assessment score for CSC 216 is 72, CSC 212 is 52 and CSC 213 is 54. Then, the grades of the student teachers' qualifications are given by:

Degrees (M.sc./M.ed) or (Bsc./B.ed) = 3, NCE/OND = 2, and SSCE = 1.

Again, the academic qualification of CSC 216 teacher is B.Sc./B.Ed which is 3, CSC212 and CSC 213 teachers are M.Sc. holders. Therefore, to find the relationship between teachers' educational qualification to students' academic achievement, Spearman Rank – order correlation method is used as given by Equation 3:

$$P = 1 - \frac{6 (\sum D^2)}{N (N^2 - 1)} \quad 3$$

Where d= difference in the ranks of the same person in the subject been correlated.

N=the number of the paired cases.

P = the statistics representing the values of spearman correlation co-efficient.

The computation of parameters for Spearman Rank order correlation formula expressed in Equation 3 is presented in Table 11.

Table 11: Spearman Rank – Order of Correlation Method Computation.

COURSE	Student mean score (\bar{X})	Teachers' qualification (Y)	RX	RY	D	D^2
CSC 216	72	3	1	2	-1	1
CSC 212	52	3	3	2	1	1
CSC 213	54	3	2	2	0	0
						$\sum D^2=2$

$$\sum D^2 = 2,$$

$$N = 3,$$

$$P = 1 - \frac{6(2)}{3(9-1)} = 1 - \frac{12}{3(8)} = 1 - \frac{12}{24} = 1 - 0.5 = 0.5$$

From the computed values of P , it can be concluded that, the value 0.5 is the medium. This implies academic achievements actually show a positive, average relationship with teachers' qualification. Therefore, the teachers' educational qualification influences students' academic achievements. Therefore, as the teachers' qualification increases, the academic performance of the students will also increase.

Discussion of Findings

The study's conclusions demonstrated that teachers' educational qualifications had a considerable influence on computer science students' academic performance. This emanated from the analysis of the responses from the collected data. This demonstrates that students do better academically based on the more qualified the teachers are.. This result is supported by earlier studies by Oludipe & Oludipe (2021) and Filgona & Sakiyo (2020) who opined that teachers qualification affects students academic performance. Furthermore, Filgona & Sakiyo (2020) submits that teacher's academic qualification could serve as a predictor for determining the academic performance of students. This is a further implication for the study.

Furthermore, the findings of this study showed that the lack of experienced computer teachers affects the learning of the subject in Niger State College of Education, Minna. Consequently, it was discovered that there is a need for experienced and qualified teachers. This assertion is strengthened by the works of Podolsky, Kini & Darlig-Hammond (2019) who reported that as a teachers grows in experience, so does that academic achievements of the learners grow. As teachers gain more experience, the learners perform better even beyond test scores. Similarly,

Conclusion

Based on the research and discussions, it was discovered that the students struggle with not understanding the concepts of the subjects without the use of teaching aids and teachers as a matter of urgency need to go for further studies. The paper revealed that students in NSCOE, Minna have good perception towards Computer Science and its method of teaching and would like to pursue higher education in Computer Science. Since the syllabus in Computer science Curriculum is easy for them to understand.

Furthermore, the relationship between teachers' educational qualification to students' academic performance was obtained to be 0.5, that is, students' academic performance actually shows an average relationship with teachers' qualification. It implies that teachers' educational qualifications determine or precedes students' academic performance.

Recommendations

The paper recommends the following:

- i. Government should make serious effort to employ high-quality teachers in Computer Science subjects in NSCOE, Minna so as to increase the performance of students.
- ii. The college management should provide adequate training and retraining programme for teachers of Computer Science as this will increase their skills in teaching and learning.
- iii. The school authority should ensure that practical sessions are done effectively and students should be allowed to have maximum access to computer so as to enable them get acquainted with its operation.
- iv. Teachers should endeavor to use teaching aids in teaching the concepts of the subject because students learn faster and easier with visual experience.

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