

Impact of Teachers' Qualification on Teaching and Learning of Integrated Science in Junior Secondary Schools, Port Harcourt, Rivers State, Nigeria

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Abstract

This paper investigated the impact of teachers' qualifications on implementation Integrated Science curriculum for teaching and learning in Junior Secondary School, Port Harcourt. The purpose of this paper is to examine the impacts of teachers' qualifications on Teaching and Learning of Integrated Science at Junior Secondary Schools level in the state. The study adopted a descriptive survey design. A total of 130 respondents were randomly selected. Data was collected using a well-structured questionnaire, Statistical Package for the Social Sciences (SPSS), IBM version 26 was used for analysis. Analytical procedures included descriptive statistics, frequencies, percentages, along with inferential statistics consisting of Kruskal-Wallis H test and Chi-square procedures. Test of significance was fixed at alpha value of 0.05 ($P \leq 0.05$). Findings from the study revealed that qualifications of teachers have significant impact on implementation of Integrated Science curriculum at the Junior Secondary School level in the state. The found that professional qualification of teachers play a significant role in terms of teaching and learning implementation of the Integrated Science curriculum. Based on the findings of this study, the following recommends were made. That appointment of teachers for the subject should be based on professional qualification of personnel. That there is a need for continuous in-house training of teachers through seminars and workshops along with provision of in-service training, where teachers could be given the opportunity to go for a formal training towards enhancing their performances.

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1.0 Introduction

Teachers' qualifications have been known to have a major impact on teaching and learning of Integrated Science at the Junior Secondary School level (Bamidele and Adekola, 2017). The fact that teachers' qualifications have major impact in teaching and learning of Integrated Science at the Junior Secondary School has been investigated with positive result with improvement in learners' performance, pedagogical competence, and conceptual knowledge. The reverse has been the case with teachers of poor qualifications. Curriculum development and planning is usually based on certain assumption that there would be qualified teachers for the implementation at the Junior Secondary School level. The competency of teachers in term of qualification is therefore an integral part of curriculum development and planning (Ohiare-Udebu, 2021). Curriculum implementation is instrumental to improved quality of education in any society (Fofana and Fortune, 2020). Curriculum development and planning aim at utilizing better teaching methods, improving scientific skills with a view that there would be adequate number of teachers competent enough to follow instructions specified in the curriculum for effective teaching and better learning outcome of the learners. Unqualified teachers would lack the professional requirement for implementing such instructions. Bamidele and Adekola, (2017) reported a significant positive relationship between teacher qualifications and students' academic achievement in basic science. Teachers' qualification has been reported to have major effect on teachers pedagogical skills which allow them to effectively simplify and teach complex integrated science concepts. Studies revealed that trained teachers were more likely to use active, hands-on teaching methods like, experiments that enhances scientific skill development, better equipped to handle the multifaceted nature of the integrated science curriculum, motivate student attitude towards teaching and learning and constantly update their skills through professional seminars and workshops than would be obtained among less qualified teachers teaching the subject at the Junior Secondary School (Fofana and Fortune 2020, King, 2017, Voogt, Nieveen, Sligte, and Lemmens, 2016).

In a study on the challenges facing the teaching and learning of Integrated Science at the Junior Secondary Schools, Ohiare-Udebu (2021), identified inadequate funding, inadequate professional teachers, inadequate infrastructural facilities, inadequate instructional materials, poor supervision, corruption, and ineffective capacity development programme and insecurity problem as the problems preventing effective implementation of Junior Secondary School curriculum in Nigeria. Among other challenges, Bamidele and Adekola (2017) emphasized the role of teacher's qualifications and teaching experience, their findings were significantly associated with students' academic achievement in Basic Science at the Junior Secondary School. With the advancement in digital education, one noticeable problem is the lack of proficiency in computer literacy which made many unable to explore the environment for the purpose of identifying and using resources for teaching integrated science thereby resorting to lecture methods which tended to overload students with notes and assignments at the expense of adequate exposure to practical approaches. Professional qualification of teachers is also associated with effective communication during teaching and learning of the subject. It has been reported that some teachers of the subject it is observed that many science teachers cannot speak fluently or loud enough, some cannot express themselves clearly, while some cannot guide their students to apply what they learned in the classroom to real life situation (Ali, Maigari, Saleh and Saleh, 2025). Among the findings were that some teachers lack training in instrumentation to enable them detect and repair faulty instruments which tended confuses some students leading consequently to dislike the subject (Ogunleye, 1999). The purpose of curriculum development entails the need to improve educational outcomes, teachers' quality and classroom experience. The challenges facing the teaching and learning of Integrated Science have been identified as: lack of practical experience, shortage of science equipment and facilities, poor teaching methods, limited time allotted to integrated science on Schools' time table and lack of competent science instructors. This study was therefore undertaken to examine the impact of teachers' qualification on the implementation of the Integrated Science curriculum in the junior secondary schools, Port Harcourt towards improved effectiveness of teaching and learning of the subjects along with better learning outcome of the learners.

Research Objectives

The purpose of the study is to ascertain the impact of curriculum development and planning on teaching and learning of Integrated Science in Port Harcourt's Junior Secondary Schools. The specific objectives were structured as follows:

1. To examine the adequacy of methods and techniques used by Integrated Science teachers for lesson delivery towards curriculum implementation in the Junior Secondary Schools.
2. To examine the impact of teachers' qualification on the implementation of Integrated Science curriculum at the Junior Secondary Schools.

Research Questions

The following are the research questions that will guide the research work.

1. How adequate are the methods and techniques used by Integrated Science teachers for lesson delivery in Junior Secondary Schools of Port Harcourt, Rivers State?
2. What is the relationship between teacher's qualification and the level of development of Integrated Science curriculum implementation in Junior Secondary Schools in Port Harcourt, Rivers State?

Research Hypotheses

The following null hypotheses were tested:

- H_{0i}: There is no significant difference in the adequacy of teaching methods techniques used by teachers of different educational qualifications on Integrated Science curriculum implementation and lesson delivery in Junior Secondary Schools of Port Harcourt, Rivers State.
- H_{0ii}: There is no significant relationship between teacher's qualification and the level of development of Integrated Science curriculum implementation in Junior Secondary Schools of Port Harcourt, Rivers State.

Methodology

The study adopted a cross-sectional survey design Singh to facilitates extraction of data from teachers across the twenty one public junior secondary schools and forty-eight private Junior Secondary Schools in Port Harcourt involved in the teaching and learning of basic Science.

A total of 155 respondents were selected using a researcher structured questionnaire. But 25 of the teachers were not able to complete the copies administered to them. The 130 or 83.9% who completed their copies with full information were used for the study. The collected data were statistically analysed using the Statistical Package for the Social Sciences (SPSS), IBM version 26. Analytical procedures adopted included descriptive statistics, frequencies, percentages, along with inferential statistics consisting of Kruskal-Wallis H test and Chi-square procedures used in the test of stated hypotheses because of the non-parametric nature of the responses' assessment. Test of significance was fixed at alpha value of 0.05 ($p \leq 0.05$).

Result and Discussions

Of the total (130) respondents who completed the questionnaire administrations made up of 76.0% female and 24.0% males. By implication, most of the female teachers teaching Integrated Science in the Junior Secondary Schools involved in the study were females. In terms of school location, 69.2% were from Junior Secondary Schools located in urban setting while 30.8% were from rural areas of the study location. Though first degree was the dominant certificate but teachers with the National Certificate in Education (NCE) were more and accounted for 46.2% of the highest observed qualification. Others with B. ED were 23.1% while 30.8% had B. SC. By their years of experience on the job, 15.4% had between 1 and three years while 15.4% had between 4 and 7years of experience on the job. Those with between 8 and 12years of experience were 3.08% and 3.9% had between 34.6 13 and 17years. But 34.6 had above 17years of teaching experience on the job. A distribution that clearly indicated that the teachers had adequate years of experience to provide valid information for the subject of investigation.

Adequacy of methods and techniques used by Integrated Science teachers for lesson delivery towards curriculum implementation

The opinions of the teachers on the adequacy of the teaching methods and techniques used for the implementation of Integrated Science curriculum in the selected Junior Secondary Schools are tabulated in frequencies and percentages in Table 1.

Table 1: Teachers' opinions on adequacy of teaching method/technique of implementing the curriculum

Sn	Adequacy of methods and techniques used in teaching Integrated Science by teachers	Qual.	SA(%)	A(%)	D(%)	SD(%)
1	Teacher's views of Integrated Science influence his/her choice of strategy to be used when teaching	NCE	5(8.3)	10(16.7)	21(35.0)	24(40.0)
		B. ED	23(76.7)	0(0.0)	4(13.3)	3(10.0)
		B. SC	37(92.5)	0(0.0)	0(0.0)	3(7.5)
2	It is important for the teacher to change his/her techniques and methods as the topic changes for acquisition of more knowledge	NCE	8(13.3)	2(3.3)	22(36.7)	28(46.7)
		B. ED	23(76.7)	0(0.0)	3(10.0)	4(13.3)
		B. SC	37(92.5)	0(0.0)	0(0.0)	3(7.5)
3	To transmit knowledge, concepts, skills, values and attitudes for integrated science, different strategies are suitable	NCE	4(6.7)	11(18.3)	21(35.0)	24(40.0)
		B. ED	10(33.3)	13(43.3)	4(13.3)	3(10.0)
		B. SC	36(90.0)	1(2.5)	0(0.0)	3(7.5)
4	For the teacher to adopt appropriate method of teaching Integrated Science he/she should be conversant with intended goals and objectives	NCE	30(50.0)	6(10.0)	5(8.3)	19(31.7)
		B. ED	23(76.7)	4(13.3)	0(0.0)	3(10.0)
		B. SC	37(92.5)	0(0.0)	0(0.0)	3(7.5)
5	Values and attitudes of learning Integrated Science appear generally difficult to measure due to negative views by teacher	NCE	0(0.0)	4(6.7)	6(10.0)	50(83.3)
		B. ED	0(0.0)	10(33.3)	13(43.3)	7(23.3)
		B. SC	35(87.5)	1(2.5)	1(2.5)	3(7.5)

Table 1 showed that qualifications of teachers play a major role in the ways they view the choice of strategies for teaching and learning of the subject towards implementation of the curriculum. For example, teachers with B Sc degree had the highest (92.5%) of this perception along with 76.7% of those with B. Ed who had 76.7%. Teachers who were with the NCE had the least perception of this approach to teaching and learning of the subject in the implementation of the curriculum. In the same vein, teachers with the NCE did not agree (36.7% disagreed and 46.7% strongly disagreed) that it was important to change technique and methods as the topic changes for better comprehension of the learners. Those who had B. Ed (76.7%) and B, Sc (92.5%) agreed with the changes. On the need to use different strategies where suitable, to transmit knowledge, concepts, skills, values and attitudes for integrated science comprehension by the learners, 40.0% and 35.0% of the NCE holders strongly disagreed and disagreed with such need for changes. But 33.3% and 43.3% of the B. Ed holders along with 90.0% and 2.5% of the B Sc holders strongly agreed and agreed with such changes. However, the NCE holder (50.0% for strongly agreed and 10.0% for agree) agreed that teachers should be conversant with intended goals and objectives of Integrated Science for them to be able to adopt appropriate method of teaching the subject. For teachers with the B Ed and B Sc qualifications the agreement was unanimous as indicated in the table. There was no consensus among the teachers on the measurement of values and attitudes of learning Integrated Science. While 10.0% and 83.3% of the NCE holder along with 43.3% and 23.3% of the B Ed holder disagreed and strongly disagreed with the suggestion, 87.5% and 2.5% of the B Sc holders strongly and agreed and agreed respectively with the suggestion. The clear observation here is that qualification plays a major role on the methods and techniques adopted by teachers in the implementation of the Integrated Science curriculum with regards to teaching and learning of the subject in the selected Junior Secondary Schools.

Impact of teachers' qualification on levels of Integrated Science curriculum implementation in the Junior Secondary Schools

The opinions of the respondents regarding impacts of teachers' qualification on implementation of the Integrated Science curriculum in terms of teaching and learning of the subject among the selected Junior Secondary Schools are shown in Table 2 with percentages enclosed in brackets.

Table 2: Opinions of respondents with regards teachers' qualification on Integrated Science curriculum implementation in the Junior Secondary Schools

Sn	Impacts teachers' qualifications on implementation of Integrated Science curriculum	Qual.	SA	A	D	SD
1	Teachers of Integrated Science who are opportune to attend training and workshops perform better in class teaching	NCE	30(50.0)	6(10.0)	2(3.3)	22(36.7)
		B. ED	23(76.7)	4(13.3)	0(0.0)	3(10.0)
		B. SC	37(92.5)	0(0.0)	0(0.0)	3(7.5)
2	Well qualified teachers are normally recruited to teach Integrated Science in Junior Secondary School	NCE	20(33.3)	5(8.3)	11(18.3)	24(40.0)
		B. ED	23(76.7)	0(0.0)	4(13.3)	3(10.0)
		B. SC	37(92.5)	0(0.0)	0(0.0)	3(7.5)
3	Some teachers cannot improvise instructional materials due to lack of professional competence in Integrated Science	NCE	10(16.7)	10(16.7)	16(26.7)	24(40.0)
		B. ED	23(76.7)	0(0.0)	4(13.3)	3(10.0)
		B. SC	37(92.5)	0(0.0)	0(0.0)	3(7.5)
4	Most of the teachers in Integrated Science are not qualified to implement the curriculum in JSS	NCE	4(6.7)	16(26.7)	16(26.7)	24(40.0)
		B. ED	21(70.0)	2(6.7)	4(13.3)	3(10.0)
		B. SC	36(90.0)	1(2.5)	0(0.0)	3(7.5)

The teachers were unanimous in their agreement that those who were opportune to attend training and workshops perform better in class during teaching and learning of the subject. In the table most of the teachers either strongly agreed or agreed with the suggestion. It was only among the NCE holders that percentage of disagreement exceeded 36%. On issues relating to level of qualification and recruitment of teachers for teaching and learning of the subject, respondents with B. Ed and those with B. Sc strongly agreed that only qualified teachers that were normally recruited to teach Integrated Science in the Junior Secondary School. But 40.0% and 13.3% of NCE holders strongly disagreed and disagreed with the suggestion. In the same vein, teachers with B. ED and B Sc strongly agreed that some teachers cannot improvise instructional materials for teaching and learning of the subjects because they lack professional competence. But 26.7% and 40.0% of the NCE holders disagreed and strongly disagreed with the opinion. In a similar scenario, teachers with B. Ed and those with B Sc strongly agreed that most of the teachers involved in the implementation of the Integrated Science curriculum were not qualified. But 26.7% and 40.0% of those with NCE disagreed and strongly disagreed with the opinion. The observation here implied that qualifications of teachers play a major role in the implementation of the Integrated Science curriculum among the selected Junior Secondary Schools.

Hypotheses

The hypotheses formulated along the objectives and research questions of the study were tested as follows:

H01 There is no significant difference in the adequacy of teaching methods /techniques used by teachers of different educational qualifications on Integrated Science curriculum implementation and lesson delivery in Junior Secondary Schools of Port Harcourt, Rivers State.

The rated opinions of the teachers with different qualifications on the adequacy of teaching methods /techniques used for teaching and learning of the subject towards implementation of the curriculum were tested with the Kruskal-Wallis H test procedure because of the more than two groups involved and the non-parametric nature of the data is summarized in Table 3.

Table 3: Kruskal-Wallis H test on adequacy of teaching methods /techniques by teachers' qualifications for Integrated Science curriculum implementation

Qualification	N	Mean Rank	Kruskal-Wallis H	Df	p-value
NCE	60	39.08	73.375	2	0.000
B. ED	30	67.17			
B. SC	40	103.88			
Total	130				

The result revealed that the teachers differed significantly by their qualifications on adequacy of teaching methods /techniques used for Integrated Science curriculum implementation with respect to teaching and learning in the selected Junior Secondary Schools. The observed Kruskal-Wallis H was 73.375 with a p-value of 0.000 ($p < 0.05$) obtained at 2, degree of freedom. These observations provided enough evidence to reject the null hypothesis. In other words, the implementation of the curriculum differed significantly in terms of teaching and learning by teachers with different educational attainment.

H02. There is no significant relationship between teacher's qualification and development of Integrated Science curriculum implementation in Junior Secondary Schools of Port Harcourt, Rivers State.

The Chi-square procedure was used to test the relationship between teacher's qualification and the perceived development of Integrated Science curriculum implementation in the Junior Secondary Schools. Opinions on each of the items relating qualifications to the implementation of the curriculum were tested independently. In Table 4, the expected frequencies are enclosed in bracket along the observed count.

Table 4: Chi-square test on relationship between teacher's qualification and development of Integrated Science curriculum implementation in the Junior Secondary Schools

Qualifications and curriculum							
Sn	implementation	Qual.	SA	A	D	SD	χ^2 p-value
1	Teachers of Integrated Science who are opportune to attend training and workshops perform better in class teaching in JSS	NCE	30(41.5)	6(4.6)	2(0.9)	22(12.9)	25.530 0.000
		B. ED	23(20.8)	4(2.3)	0(0.5)	3(6.5)	
		B. SC	37(27.7)	0(3.1)	0(0.6)	3(8.6)	
2	Well qualified teachers are normally recruited to teach Integrated Science in Junior Secondary School	NCE	20(36.9)	5(2.3)	11(6.9)	24(13.8)	41.911 0.000
		B. ED	23(18.5)	0(1.2)	4(3.5)	3(6.9)	
		B. SC	37(24.6)	0(1.5)	0(4.6)	3(9.2)	
3	Some teachers cannot improvise instructional materials due to lack of professional competence in Integrated Science	NCE	10(32.3)	10(4.6)	16(9.2)	24(13.8)	66.14 ^a 0.000
		B. ED	23(16.2)	0(2.3)	4(4.6)	3(6.9))	
		B. SC	37(21.5)	0(3.1)	0(6.2)	3(9.2)	
4	Most of the teachers in Integrated Science are not qualified to implement the curriculum in JSS	NCE	4(28.2)	16(8.8)	16(9.2)	24(13.8)	76.297 0.000
		B. ED	21(14.1)	2(4.4)	4(4.6)	3(6.9)	
		B. SC	36(18.8)	1(5.8)	0(6.2)	3(9.2)	

Table 4 revealed that expressed opinions of the respondents were significantly associated with the qualifications. The effect of qualification on impact of training through seminar and workshops was significantly associated with the questions. The observed chi-square was 25.530 with a p-value of 0.000 ($p < 0.05$). The same level of association was observed with suggestion that well qualified teachers were normally recruited to teach the subject with chi-square value of 41.911 and a p-value of 0.000 ($p < 0.05$). Following the same pattern the response on the suggestion that some teachers cannot improvise instructional materials due to lack of professional competence in Integrated Science was closely associated with the qualification of the respondents. The observed chi-square was 66.14 with a p-value of 0.000. This pattern was repeated in the last item where it was suggested that most teachers implementing the curriculum

through teaching and learning of the subject in the selected Junior Secondary School were not qualified. The chi-square observed was 76.297 with a p-value of 0.000 ($p < 0.05$). These observations provided sufficient evidence to reject the null hypothesis. In other words, there is a significant relationship between teacher's qualification and development of Integrated Science curriculum implementation in the selected Junior Secondary Schools.

Discussion of the Findings

This paper examined impact of teachers' qualification on Integrated Science Curriculum implementation in terms of teaching and learning of the subject Port Harcourt with teachers of the subject as the target respondents. Findings of the study revealed that Integrated Science effective curriculum implementation was significantly correlated with the qualification of teachers responsible for teaching the subject. The study revealed that qualification of teachers impacted on their perceptions of adequacy relating to the teaching methods and techniques used for implementing the curriculum. The findings revealed that teachers who were with the NCE had the least perception of adequacy of the method/techniques, the need for change with change in topic, the need to use different strategies where suitable, to transmit knowledge, concepts, skills, values and attitudes towards motivating the learners along with the need for teachers to be conversant with intended goals and objectives of Integrated Science curriculum to be able to adopt appropriate method of teaching the subject. The study revealed that teachers' qualification plays a significant role on the methods and techniques adopted for implementation of the Integrated Science curriculum with regards to teaching and learning of the subject in the selected Junior Secondary Schools.

Findings of the study revealed that teachers were unanimous in their agreement that those who were opportune to attend training and workshops perform better in class during teaching and learning of the subject which was a clear indication of the close relationship between qualification and effective implementation of the curriculum. The study revealed higher and more professional qualifications significantly improves the perceptions of the teachers on issues relating to effective implementation of the integrated curriculum. The study revealed qualifications of teachers play a significant role in the implementation of the Integrated Science curriculum among the selected Junior Secondary Schools. The relationship was found to be significant.

Conclusion

Integrated science is known to be the bedrock for all science subjects in Secondary School. Teachers' qualification was observed to play a significant role in the effective implementation of the subject curriculum in this study. Teachers' qualification impacts their perceptions of the methods/technique for teaching and learning of the subjects as well as the need for change along with different topics, adopt different strategies where suitable, transmit knowledge, concepts, skills, values and attitudes towards motivating the learners along the need to be conversant with intended goals and objectives of Integrated Science curriculum. Teachers with higher professional qualifications were found to be more adapted to the required changes needed for effective implementation of the teaching and learning processes of the subjects in the selected Junior Secondary Schools involved in the study.

Recommendations

Based on the observations and findings of this paper, the researcher makes the following recommendations;

- i. There is need for meritocracy in the employment of teachers for effective implementation of Integrated Science curriculum in the Junior Secondary Schools.
- ii. Teachers of Integrated Science in junior secondary schools should be exposed to constant training and retraining programme through seminars, workshops and in-service training.
- iii. There is need for improvement recruitment for teachers to be adequate for the task of effective implementation of the curriculum through teaching and learning of the subject.

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