

Availability of Laboratory Facilities on Students' Performance in Upper Basic Schools in Kwara State, Nigeria

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Article
Received 16.12.2021
Received in revised form 27.07.2022
Accepted
Available online 01.10.2022

History:

The study was carried out on the availability of laboratory facilities in teaching of Basic Science on the Students' academic performance in Upper Basic Schools, Kwara State, Nigeria. This target population for the study was all Basic Science Teachers in Kwara State, Nigeria, four hundred and sixty-nine (469) Public Upper Basic Schools and three hundred and sixty two (362) private schools are available in the study area. The researcher designed teachers' questionnaire and was administered to two hundred and thirty six (236) Basic science teachers that were selected from forty-seven Upper Basic Schools (47) from both public and private schools in Kwara State. Researcher-designed validated questionnaire was used to extract data from the respondents on the teachers' influence on the performance of students in Upper Basic Schools. Three research questions were raised with two hypotheses which were tested. Percentage and t-test statistics were used to analyze the facts collected. The finding showed that influence of Basic science teachers on the performance of students in Upper Basic Schools in Kwara State, Nigeria was significantly. It was also significant based on gender and on year teaching experience of Basic science teachers. According to the findings, it is suggested that; the educational authorities and the school system should encourage the use of available resources by providing for them, the necessary materials that will influence Basic Science performance and enhance students learning. Basic Science teachers should re-assess their classroom instructional practice because there is a need for them to shift from instructional practice that will give the male and female teachers' equal opportunities to excel in instructional activities. The less-experienced Basic Science teachers should be allowed for cognate experience and help encourage the experience to acquire more experience.

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Keywords: Availability of Laboratory Facilities, Teaching, Basic Science, Students Performance, Upper Basic Schools

INTRODUCTION

Science is the study of the nature and behavior of natural things and the knowledge gained about them. Science is very important in the development of any nation. One of the ways of appreciating science teaching and learning is through effective laboratory instruction. The laboratory has long been a distinctive feature in science education. Its introduction has proved successful because students will go out from the laboratories able to "see and do" (Hoftein and Lunetta (1992). Basic science serves as foundation for meaningful understanding of advanced scientific theories and principles because the bulk of content of the basic science curricular is descriptive, where the student is meant to learn many basic concepts like energy, matter, force and measurement. Previous studies have revealed that science teaching has been facing problems from different angles ranging from the learner, the teacher, the school, the government and even the parents. Elechi and Eya (2015) investigated the availability and utilization of basic science laboratory facilities in junior secondary schools as a panacea for reform in STEM Education. Three research questions were posed to guide the study. The data were collected using a checklist and a teacher questionnaire and the data obtained were analysed using frequencies and percentages. The result showed that most junior secondary schools do not have laboratory equipments and materials needed for teaching basic science and moreover, there were no existing basic science laboratories. It was also found that most basic science teachers do not utilize even the few available facilities in teaching. Some of the teachers' reasons for not using the equipments and materials include lack of adequate laboratory facilities, lack of teachers' guide and practical manuals. The implications of this non availability and low utilization of basic science laboratory facilities were discussed. It was then concluded that for the objectives of the new reform in basic science education to be achieved, basic science laboratory facilities be made available and should be always utilized by our basic science teachers.

Basic science, just as the name implies is the foundational part of science education that has to do the impartation of the basic knowledge needed to understand science. Basic science is taught at the elementary or Basic schools which comprises of classes from Basic one (primary one to Basic nine). It is obvious that Basic science is the major determinant of performance of study and practice of science but unfortunately, the learning of Basic Science as a subject in Nigerian is not elective because of the poor performance of the students resulting from various problems associated with the teaching of Basic science (Amoo, 2019).

Omiko (2015) investigated on laboratory teaching: implication on students' achievement In Chemistry in Secondary Schools and the results showed that the use of the laboratory helps to: develop scientific attitudes in the students towards the learning of chemistry especially practicals, develop scientific skills for problem solving in students among others. It also confirmed significant difference on the performance of students.

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Abudu and Banjoko (2013) assessed the availability of laboratory resources and students performance in Chemistry High School. The participants in the selected Ijebu Ode Government Local in Ogun State were 120 students and five chemistry teachers. Participants completed the availability and use of the inventory type (questionnaire). The correlation research design was adopted for the study. The data were analyzed based on two hypotheses using Pearson product moment correlation. The result shows that there is a significant relationship between the use of laboratory resources and students, achievement in chemistry.

Adigun, Onihunwa, Irunokhai, Sada, and Adesina (2015) investigated the effect of students' gender on academic performance in computer science. The finding shows though the male students had slightly better performance compared to the female students, it was not significant. Abidoye (2018) investigated the effect of Biology teachers on the performance of students in secondary schools in Osun State, Nigeria. The findings confirmed that a significant relationship existed on the basis of gender. Oladipupo (2005) conducted a study on the impact of gender and school environment on access to Biology students in primary schools in Kwara State. The findings of the study revealed that male students performed better than female students. Nnamani and Oyibe (2016) observed the sexual orientation in social studies and the study of high school students. The result found that there was a significant difference in the average achievement of high school students in social studies on the basis of gender

Ewetan and Ewetan (2015) investigated the impact of teacher's teaching experience on high school students' academic performance in mathematics and English. The findings indicated that years of teaching experience has a significant impact on students' performance in mathematics and the English language as their performance in the SSCE exam has been measured and observed by respondents. Schools with more teachers with more than 10 years of teaching experience achieved better results than schools with 10 years of experience and more teachers with less teaching experience.

Yusuf and Dada (2016) examined the impact of teachers' qualification and experience on students' performance in Colleges of Education in Kaduna State, Nigeria. The results revealed that a significant difference existed in the performance of students taught English language by years of teaching experience teachers. The availability of laboratory facilities in teaching of Basic Science on the Students' academic performance in Upper Basic Schools availabilities is the predicted by moderating variables such as teachers' gender and years of teaching experience of basic science teachers.

Purpose of the Study

The study investigated on the availability of laboratory facilities on teaching of basic sciences on students' performance in Upper Basic Schools of in Kwara State, Nigeria.

Specifically, the study determined:

1. Availability of laboratory facilities in teaching of basic sciences on students' performance in Upper Basic Schools in Kwara State, Nigeria.
2. Whether the gender of Basic Science teachers influence the availability of laboratory facilities of Basic Science on the Students' performance in Upper Basic Schools
3. Whether the years of teaching experience of Basic Science teachers influence the availability of laboratory facilities of Basic Science on the Students' performance in Upper Basic Schools

Research Questions

In this study, the following research questions were answered.

1. What are the factors affecting the availability of Basic Science laboratory facilities on the performance of students in Upper Basic Schools?
2. Does the gender of Basic Science teachers influence the availability of laboratory facilities of Basic Science on the Students' performance in Upper Basic Schools?
3. Do years of teaching experience of Basic Science teachers influence the availability of laboratory facilities of Basic Science on the Students' performance in Upper Basic Schools?

Research hypothesis

The following hypotheses were tested in this study.

- Ho1: There is no significant difference in the influence of gender of basic science teachers on the availability of laboratory facilities on the performance of students in secondary schools of upper primary schools.
- Ho2: There is no significant difference in the influence of years of teaching experience of basic science teachers on the availability of laboratory facilities on the performance of students in secondary schools of upper primary schools.

METHOD

This study is a survey type, using the descriptive method. The population of this study consists of basic science teachers in junior secondary schools in Kwara State, Nigeria. Kwara State has 469 Public Upper Basic Schools and 362 Private Upper Basic Schools. Forty-seven government and private secondary schools across the state were randomly sampled for the study. The total numbers of respondents were 236 Basic Science teachers.

The main instrument for this study was a researcher's designed questionnaire titled "Basic Science Teachers Assessment Questionnaire" (BSTAQ). This is contained in Appendix I. The schedule consist of two sections, A and B. Section A contains Basic Science teachers' demographic information while section B contains Questionnaire items on Basic Science teachers' variables such as Basic Science gender and teaching experience. The instrument is a close-ended questionnaire. Four (4) point is based on a Likert-type scale ranging from strongly agree, agree, disagree, strongly disagree.

The devices were subjected to both content and face validation by three experts' lecturer from University of Ilorin, Ilorin Kwaraa State. The reliability of the instrument was tested using the Pearson Product Moment Correlation (PPMC) to ascertain the reliability index at 0.082. The instruments were administered to the respondents and they were encouraged to fill the questionnaire immediately. The questionnaire was collected immediately after response for analysis.

The research questions were answered using the frequency count and mean statistics. The null hypotheses 1 and 2 were tested using t-test statistics at 0.05 significant levels.

RESULTS

This data analysis and results is presented here. The purpose of this is to present and analyze the data collected during the survey and to reflect on the findings of the data collected. The details are listed in the tables and the relationships of the items in the table are checked to verify their authenticity or otherwise. A total of 236 copies of the questionnaire were distributed to the respondents in the study area. Research questions related to psychological testing were analyzed.

Research Question One:

What are the factors that influence the availability of laboratory facilities of Basic Science on the Students' performance in Upper Basic Schools?

Table 1 revealed that of the 236 respondents participating in the study, 131 (56%) were male, while 101 (44%) were female. This indicates that there are more male respondents than female respondents who participated in the study. 158 (67%) were less-experienced while 78 (33%) were experienced basic science teachers

Table 1: Distribution of the Respondents on availability of laboratory facilities of Basic Science on the Students performance in junior school

Variable	Group	Frequency	Percentage (%)
Gender	Male	131	56
	Female	105	44
	Total	236	100
Year of Teaching Experience	Less-experienced	158	67
	Experienced	78	33
	Total	236	100

Research Question Two:

Does the gender of Basic Science teachers influence the availability of laboratory facilities of Basic Science on the Students' performance in Upper Basic Schools?

H₀₁: There is no significant difference in the influence of gender of Basic Science teachers on availability of laboratory facilities on the Students' performance in Upper Basic Schools.

Table 2, indicated that the male perception mean score was 71.82 while the female teachers had 67.21 which is less than that of the male teachers. The table also reveals that the availability of laboratory facilities on the Basic Science student's performance in Upper Basic Schools Students between the male and female teachers was significant ($t, (234) = 2.764, P < 0.05$). Thus, hypothesis one (**H₀₁**) which stated that that there was no significant difference in the influence of gender of Basic Science teachers on availability of laboratory facilities on the students' performance in Upper Basic Schools Students was rejected. It shows that the

availability of laboratory facilities on the performance of Basic Science students in Upper Basic Schools based on gender is not equal.

Table 2: Mean scores and t-test for testing Basic Science teachers on the availability of laboratory facilities on the performance of students

Gender	N	Mean	Std. Dev.	Std. Error	T	Df	p-value	Remark
Male	131	71.82	13.61	1.189				
Female	105	67.21	11.57	1.129	2.764	234	0.006	S

N = Significant at P<0.05

Research Question Three:

Do years of teaching experience of Basic Science teachers influence the availability of laboratory facilities of Basic Science on the Students' performance in Upper Basic Schools?

H₀₂ There is no significant difference in the influence of years of teaching experience of Basic Science teachers on availability of laboratory facilities on the Students' performance in Upper Basic Schools Students'.

Table 4 shows that the less-experienced mean score was 67.42 while experienced had 74.54 which is greater than that of less-experience. The table also reveals that the availability of laboratory facilities on the Basic Science student's performance in Upper Basic Schools Students between teachers with less-experienced years of teaching experience and those with experienced was significant (t, (234) = -4.114, P< 0.05). The hypothesis that stated that there was no significant difference in the influence of years of teaching experience of Basic Science teachers on availability of laboratory facilities on the students' performance in Upper Basic Schools Students was rejected. It shows that the availability of laboratory facilities on the performance of Basic Science students in Upper Basic Schools based on years of teaching experience is not equal.

Table 3: Mean scores and t-test for testing Basic Science teachers' years of teaching experience on the availability of laboratory facilities on the performance of students

Yearsof Experience	N	Mean	Std. Dev	Std. Error	t	Df	p-value	Remark
Less-experienced	158	67.42	13.42	1.068				
Experienced					-4.114	234	0.001	S

S= Significant at P<0.05

Summary of Major Findings

1. The availability of laboratory facilities on the teaching of Basic Science on the Students' performance in Upper Basic Schools in Kwara State, Nigeria was significant.
2. The gender of Basic Science teachers' influences the availability of laboratory facilities of Basic Science on the Students' performance in Upper Basic Schools was significant.
3. Years of teaching experience of Basic Science teachers influence the availability of laboratory facilities of Basic Science on the Students' performance in Upper Basic Schools was significant

DISCUSSION

It was found that Basic Science teachers contributed to the availability of laboratory facilities in the performance of students at the Upper Basic Schools in Kwara State, Nigeria, which were significant based on their feedback. This may be as a result of a good way of presenting and caring for the knowledge of learners and teachers on the subject and being recognized as a role model. This is in line with the findings of Abudu and Banjoko (2013) who examined the availability of laboratory resources and the success of students in high school chemistry in high schools. The result shows that there was a significant relationship between the use of laboratory resources and students, success in chemistry.

In this study it was established that there is a significant difference on the influence of gender of Basic Science teachers on the availability of laboratory resources on Students performance in Upper Basic Schools. This may be as a result of the knowledge of the basic Science teacher having. These findings are consistent with the findings of Nnamani and Oyibe (2016), which focused on sexual orientation in social studies and the study of high school students. The result found that there was a significant difference in the average achievement of high school students in social studies on the basis of gender

It was discovered that years of teaching experience of Basic science teachers had a significant influence on the availability of laboratory facilities on the performance of students in high basic schools in Kwara State,

Nigeria. This may be due to the fact that experienced Basic teachers have a better ways in handle the resources when teaching the students. This finding is in line with the findings of Ewetan and Ewetan (2015), investigating the impact of teachers' teaching experience on the educational performance of public secondary school students in mathematics and English language in the Ado-Odo / Ota and Ifo local government areas in Ogun State. The shows that there is a significant difference in the year teaching experience of the teachers.

The study concluded that basic science teachers had a significant influence on the availability of laboratory facilities on students' performance in Upper Basic Schools in Kwara State, Nigeria based on their responses based on gender and years of teaching experience

Based on the findings and conclusions of the study, the following recommendations were made; Educational authorities and the school system should encourage the use of available resources by providing them with the necessary materials that affect basic science performance and enhance students' learning. Basic science teachers should re-evaluate their classroom teaching practice as they need to move away from instructional practice which will give male and female teachers' equal opportunities to excel in instructional activities. The less-experienced Basic Science Teachers should be allowed to have cognate experience and help encourage the experienced teachers to acquire more. The following limitations can be seen in relation to the study: The study was originally on the influence of basic science teachers on the availability of laboratory facilities on the performance of students in high basic schools in Kwara State, Nigeria. The respondents comprised of Basic Science teachers' schools; thus, the findings may not be generalized to Basic Science teachers in senior secondary schools on the performance of students. All the findings derived in this study may not be widespread to Basic Science teachers and other science teachers in Kwara State. However, despite these limitations, the study still fulfills its purpose by establishing the factors that influence students' performance in Basic Science. For further researchers in this area, the following were thereby made: Further studies should be carried on influence of that affect teachers' teaching of Basic Science and their level of confidence in teaching this subject. Further studies should evaluate students' level of competency or skills in attempting the factors that affect learning. Further studies should focus on the availability and usability of learning resources in schools.

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APPENDIX I

DEPARTMENT OF SCIENCE EDUCATION
 FACULTY OF EDUCATION
 NATIONAL OPEN UNIVERSITY
 AVAILABILITY OF LABORATORY FACILITIES ON THE TEACHING OF BASIC SCIENCE ON STUDENTS' PERFORMANCE IN UPPER BASIC SCHOOLS IN KWARA STATE, NIGERIA

Dear Sir/Ma,

I am conducting a research on the "Available of laboratory facilities on the teaching of Basic Science Students Performance in Upper Basic Schools in Kwara State, Nigeria." This questionnaire is designed to elicit responses and views on the above subject matter. All information given will be treated with utmost confidentiality and will be used strictly for research purpose only.

Please tick this box to indicate your consent and voluntarily participation in this study.

Thanks

SECTION I: Bio-Data

Name of School.....

Gender: Male () Female ()

Years of teaching Experience: 0-5 years () 6 and above

SECTION II: Available of laboratory facilities on the teaching of Basic Science Students Performance in Upper Basic Schools in Kwara State, Nigeria

Instruction: Please read each statement and tick () the column that best reveals your decision.

SA = Strongly Agree; A = Agree; D = Disagree; SD = Strongly Disagree

S/N	Statements	SA	A	D	SD
	Availability of laboratory facilities				
1	Basic Science laboratory affects Basic Science students' performance in Upper Basic Schools				
2	Wall charts affects Basic Science students' performance in Upper Basic Schools				
3	Cognitive ability of students affects Basic Science students' performance in Upper Basic Schools				
4	Measuring cylinders influence Basic Science students' performance in Upper Basic Schools				
5	Thermometers affects Basic Science students' performance in Upper Basic Schools				
6	Models affects Basic Science students' performance in Upper Basic Schools				
7	Retort stand and clamp affects Basic Science students' performance in Upper Basic Schools				
	Basic Science Teachers Gender				
8	Students taught by male Basic Science teachers perform better than those taught by female teachers.				
9	Students find classes taught by female Basic Science teachers more interesting than those of male.				
10	Gender of Basic Science teachers does not have effect on students' performance in chemistry.				
11	There are more female Basic Science teachers than male in Kwara State.				
12	Female Basic Science teachers have better classroom control than male teachers.				
13	Female Basic Science teachers do not normally complete the syllabus due to going on maternity leave.				
	Basic Science Teacher's YEARS OF TEACHING EXPERIENCE				
14	Experience Basic Science teachers affects students' performance in Laboratory work Upper Basic Schools				
15	Only few Basic Science teachers in Kwara State (Upper Basic Schools). Effects have teaching experience				
16	Students taught by experienced basic science teachers perform better than students taught by less experienced teachers in the laboratory				
17	Teachers' experience of years of teaching does not affect students' performance in basic sciences in the laboratory				
18	Less experienced teachers are more hard working than experienced teachers in Basic Science in the laboratory				
19	Experience teachers manage large class size in the laboratory better than less experience teachers in laboratory class.				
20	Less experienced but qualified teachers produce better Basic Science students than those with more year of teaching experience, but have no teaching qualification.				
21	Lack of laboratory affects Basic Science students' performance in Upper Basic Schools				
22	Students in schools with good science laboratory perform better than other students				
	Basic Science TEACHERS' ACADEMIC QUALIFICATION				
23	Activities in science laboratory by qualified Basic Science teachers influences students' academic performance				
24	Student taught by qualified teachers perform better than those taught by unqualified teachers in the Laboratory.				
25	Most of the Basic Science teachers in Kwara State secondary schools are qualified.				
26	Only female Basic Science teachers have required teaching qualification				
27	There are more qualified male Basic Science teachers than female				
28	Teachers' academic qualification do not have effect on students' performance in Basic Science				
29	Qualified but less experienced Basic Science teachers teach better in the Laboratory than unqualified teachers with more years of teaching experience.				
	Basic Science TEACHERS SCHOOL TYPE				
30	School type have positive influence on Basic Science students' performance in Upper Basic Schools has				
31	Private School is considered as a disadvantage in improving academic performance in Upper Basic Schools has				
32	School type affects Basic Science students' performance in Upper Basic Schools has				
33	Lack of Laboratory affects Basic Science students' performance in Senior Secondary schools				
34	School Laboratory influence the students' performance in Upper Basic Schools has				
35	Lack of laboratory affects Basic Science students' performance in Upper Basic Schools				
36	Schools with good Laboratory students perform better than other students in Upper Basic Schools				
37	Activities in Science laboratory influences students' academic performance in Basic Science				
38	School type influences Basic Science students' performance				