The Impact of Utilizing Learning Resources on Junior Secondary School Students' Performance in Basic Science

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Abstract: **This study investigated the impact of utilizing learning resources on junior secondary school students' performance in Basic Science. The descriptive survey research design was adopted with a population and sample size of 16,077 and 385 students respectively. Simple random technique was used to select the sample. Learning Resources Utilization Questionnaire (LRUQ) and Basic Science Performance Test (BSPT) were the instruments validated and used for data collection. The reliability indices of LRUQ and BSPT obtained by test and re-test methods were 0.78 and 0.74 respectively. Data collected using the instruments were analyzed. Mean and standard deviation were used to answer the three research questions while analysis of variance was used to test the two hypothesis formulated to guide the study. Findings of the study revealed that the extent of utilizing learning resources in teaching Basic Science was high. The difference between the performance of students taught Basic Science with and without learning resources was significant. However gender difference was not significant. The use of learning resources to teach Basic Science was highly recommended to enhance the performance of students' in the subject.**

Key words: **Impact, utilizing, learning resources, performance, Basic Science**

I. INTRODUCTION

Science is rapidly driving the socio-economic and technological development in most countries of the world today. Scientific development is now the yardstick for assessing national development. Purposeful science education is responsible for national development Ajayi, (2019), Enemarie, Ogbeba & Ajayi, (2019). In Nigeria, Basic Science is one of the compulsory subjects taught at the lower and upper basic education levels in recognition of the position of science in technological development (FRN, 2014). The inclusion of Basic Science in the basic education curriculum is to provide a strong scientific foundation for the Nigerian child. Having a solid foundation in Science entails making students have keen interest in Science, right from their basic level of education (Mba, 2013).

Science is the knowledge obtained through the scientific method of observation, hypothesizing and experimentation. Ajayi and Ogbeba (2017) defined Science as the knowledge obtained from the systematic study of the structure and behavior of the physical world, especially by observing, measuring and experimenting and the development of theories to describe the result of these activities. Nwala (2018) sees Science as knowledge or experience gained through practical activities which involves the sense organs: sight (eye), sound (ear), smell (nose), touch (hand), and taste (tongue) ($s^3 t^2$) and for scientific work to be performed with the availability of the materials, the sense organs must be involved. Cuthbert, (2017) warned further that for learning to take place, the teacher must communicate effectively with the learners. All available materials and devices which appeal to all the body senses and feelings are known to aid teaching and learning should be utilized. Hence, these materials help teachers communicate effectively to the students so that learning is facilitated. Note should be taken that the utilization of learning resources serves as palm oil use in eating yam, serves as a grease that lubricates the won and when a teacher utilizes the learning resource, it accelerates retention, makes the job easier for the teachers and learners at the same time (Nwala, 2018). Science is the bedrock of technological development (Mba, 2013). It is the foundation upon which the bulk of present day technological breakthrough is built Onasanya & Omosewo (2011), Ogunieye (2010) as cited in Mba (2013) defined Science as the dynamic human activities concerned with understanding the working of our world today. Countries all over the world are striving to improve their technological know-how and this can only be achieved through a solid foundation in Science and technology studies (Mba, 2013).

Basic Science is a compulsory subject designed to introduce the learner to the Science process skills, materials and products of the industries. Basic Science is a subject taught at the primary and junior secondary levels of Education, the subject is concerned with the process of interpretation, manipulation and control of pupils' environment Ishaya, (2016). According to Ishaya (2016), the teaching of Basic Science at the basic levels of education is intending to: inculcate in the learners the spirit of inquiring and creativity through exploration of nature and local environment by observation; lay sound basic foundation, for scientific innovation and reflective thinking; develop in the child the ability to adapt to the changing environment through basic science process skills such as: observation, manipulation, classification, communication inference, hypothesis,

interpretation of data and model formulation. Functional knowledge of scientific concepts and principles are required to explain simple and natural phenomena and to provide the child with educational tools for further educational advancement including preparation for trades and craft of the locality. Basic Science is designed to develop in the learner self-confidence and self- reliance through problem solving activities in science. The subject of Basic Science is to be taught beginning with the understanding of the meaning of science and how scientists' work, since it is an activity-oriented subject Ishaya, (2016).

Basic Science according to Ishaya (2016) has been offered to enhance laboratory activity, providing concrete experience, stimulate interactions in schools and increase scientific literacy. This practical oriented subject will require participatory, exploratory, experimental and child – centered approach of instruction and adequate learning resources. According to the National Policy on Education, it is the responsibility of government to provide the following educational resource and service for effective teaching and learning at the basic education level: School libraries, school health services, guidance and counseling services, educational resource centers, laboratories and workshops with the teacher – student ratio of one is to thirty-five (FRN, 2014). The availability, accessibility and utilization of these learning resource and services are necessary for the effective teaching and learning of Basic Science at the junior secondary schools. According to Nwagbo (2008) as cited in Ishaya (2016), a good deal of expected learning outcomes cannot be realized, in Basic Science at upper basic schools as a result of non - availability of instructional materials as well as lack of effective utilization of appropriate instructional materials or resources. Science teaching is resource intensive, and so it may be very difficult to find some of the instructional resources for the teaching of sciences in schools adequately, Omebe & Akani, (2015).

Resources are human and material input. Maduabu, (1989) as cited in Omebe and Akani (2015) defined resources as equipment which the teachers can use to help in the achievement of lesson objectives. Learning or interactional resources are educational inputs which are of vital importance to the teaching of all science subjects in secondary school (Omebe & Akani, 2015). Iwundu (2005) stated that learning or instructional resources are human and material resources that are used as instrument of impacting knowledge, skills and attitude to learners. Learning resources are material things that facilitate the teaching and learning process by appealing to the learner's senses of hearing, (audio), seeing (visual), testing, touching and smelling. Onwa (2002) as cited in Omeba and Akani (2015) opined that different instructional resources of the teachers are necessitated by the fact that the learners have their differences and on the fact that learning is more effective if it takes place through the five senses of hearing, seeing tasting, touching and smelling. He maintains that these learning resources include school buildings such as classrooms, assembly halls, laboratories, workshops and libraries, teaching aids and other devices such as modern educational hard ware and their software in the form of magnetic tapes, films and transparencies.

In teaching Basic Science at the basic level of education, the following learning resources are vital: qualified basic science teacher, laboratory attendants, Liberians, well equipped science laboratory with standard materials such as laboratory reagents, glass –wares, Bunsen burners, tripod stands, microscopes, beakers, test-tubes, spring balance, chemical balance etc., library equipped with text books, boards, audio visual materials, overhead projectors, computers, science practical kits, laboratory equipment's, electricity, water, toilet, science resource center, duplicator, sport field, gate equipment and many. Investigating the impact of utilizing these learning resources on junior secondary school students' performance in Basic Science in Degema Local Government Area of Rivers State is the focus of this study. Learning resources play vital role in enhancing the performance of students' in Science.

Several authors have emphasized the importance of learning resources in the teaching and learning process. Brown (2000) as cited in Arop, Umanah and Effiong (2015) summarized the role of learning resources as follows:

1. It promotes meaningful communication, hence effective learning.
2. It ensures retention, thus making learning more permanent.
3. It helps to overcome the limitation of classroom by making the inaccessible accessible especially through films and filmstrip.
4. They provide a common experience upon which other learning can be developed.
5. They stimulate and motivate students to learn.
6. They encourage participation especially if students are allowed to manipulate materials used.

Bukoye (2019) reported that learning resources plays a very important role in the teaching learning processes which include:

1. Enhancement of the memory level of the students.
2. Facilitates the teaching learning process.
3. Improvement of students' rate of accumulation.
4. Serve as tools used by the teacher to correct wrong impression and illustrating things that learners cannot forget easily.
5. Assist in given sense of reality to the body of knowledge under discussion.
6. It gives lessons a personal look and encourages teacher's creativity.
7. Permit the students and teachers to experience in concrete terms the learning activities that can promote the ideal of self–evaluation.

Statements of the problem

There have been reports of poor performance of Basic Science students in junior secondary school certificate examination.

Chief examiners reports have indicated a steady decline in candidates' performance in Basic Science at the junior secondary certificate examination (WAEC, 2013). The statistics below revealed the abysmal performance of students in Basic Science in junior secondary certificate examination organized by the West African Examination Council.

Table 1: Performance of Students in Basic Science in JSCE

Year	Total no. of Students that sat for exams	Total no. that passed (%)	Total no that fail (%)
2010	54,852	38.2	61.8
2011	62,277	40.3	59.7
2012	72,304	42.96	57.04
2013	85,904	35.14	64.86
Average		39.15	60.85

source: Ishaya (2016)

Data in table I revealed that 60.85% of the student who sat for Basic Science examination in the junior secondary certificate examination failed. This poor performance of students in basic has been attributed to many factors such as poor teaching methods, poor laboratory facilities, poor retention ability of students, and many more it is the researcher's view that non-availability and non-utilization of learning resources may also be responsible for students' poor performance in Basic Science. Hence, this study shall answer the question: what is the impact of utilizing learning resources' on junior secondary school students' performance in Basic Science?

Aim and objectives of the Study

The aim of this study was to investigate the impact of utilizing learning resources on junior secondary students' performance in Basic Science Degema Local Government Area of Rivers State. The objectives of the study are to:

1. Determine the extent of utilizing learning resources in teaching Basic Science
2. Investigate the difference in the performance of students taught in Basic Science with and without learning resources.
3. Ascertain the difference in the performance of the male and the female students taught Basic Science with learning resources.

Research Questions

Three research questions guided the study:

1. What is the extent of utilizing learning resources in teaching Basic Science?
2. What is the difference in the performance of students taught Basic Science with and without learning resources?
3. What is the difference in the performance of the male and female students taught Basic Science with learning resources?

Hypotheses

Two null hypotheses were formulated and tested at 0.05 level of significance as follows:

1. There is no significant difference between the performance of students taught Basic Science with and without learning resources.
2. There is no significant difference between the performance of the male and female students taught Basic Science with learning resources.

II. METHODOLOGY

The study adopted the descriptive survey research design with a population of 16, 077 junior secondary school students from the thirteen public junior secondary schools in Degema Local Government of Rivers State. A sample size of 385 junior secondary school class three students obtained from the population using Taro Yamane formula was selected by simple random sampling technique from five mixed public schools purposively selected for the study. 77 students were randomly selected from each school. Two researcher made instruments: Learning Resources Utilization Questionnaire (LRUQ) and Basic Science Performance Test (BSPT) were validated by four experts in measurement and evaluation and used for data collection. LRUQ consisted of 12 items questionnaire designed to retrieve information from students on the extent to which they agree that Basic Science teachers utilize learning resources in teaching them. LRUQ was structured after four-point Likert scale of strongly Agree (SA) – 4 points, Agree (A) -3points, Disagree (D) -2points and Strongly Disagree (SD) 1 point. A mean criterion cut-off point of 2.50 was used to determine students who agree (x $\geq$ 2.50) that they were taught with learning resources and students who disagreed (x$\leq$ 2.50). LRUQ was therefore used to categorize students into two groups: those taught Basic Science with learning resources and those taught Basic Science without learning resources. The second instrument, BSPT consisted of 20-items multiple choice objective test designed to measure students' performance in Basic Science. BSPT had four options for each item with each correct option scoring five and zero mark for each wrong option. BSPT had a total of 100 marks. The reliabilities of LRUQ and BSPT were obtained by the test–retest method using 30 students who were not part of the sample of the study the test and re-test scores for each instrument were correlated using the Pearson's Product Moment Correlation (PPMC) and the correlation coefficients of 0.78 and 0.74 were obtained for LRUQ and BSPT respectively. LRUQ and BSPT were administered to the students by the researcher with the support of the Basic Science teachers in the five schools used for the study. The instruments were retrieved the same day for analysis. Mean and Standard deviation were used to answer all the research questions while Analysis of Variance (ANOVA) was used to test the two hypotheses formulated at 0.05 level of significance.

III. RESULTS

Researcher question one: What is the extent of utilizing learning resources in teaching Basic Science?

Table 2: Mean (M) and Standard Deviation (SD) on the extent of utilizing learning resources in teaching Basic Science

S/N	Item	SA	A	D	SD	M	SD	DECISION
1	We have a Basic Science Teacher in our school	136	171	65	13	3.12	0.8	A
2	Our Basic Science teacher use learning resources to teach us	113	129	106	37	2.83	0.96	A
3	We learn Basic Science with instructional materials	121	178	63	23	3.03	0.85	A
4	We do Basic Science practical with our teacher in the Science laboratory	110	144	73	582	79	1.02	A
5	We do Basic Science practicals with standard science materials such as laboratory reagents glass-wares, Bunsen burners tripod stands microscopes, beakers test tubes, balance balance.and weighingchemical	110	177	72	26	2.96	0.86	A
6	Our school has a well equipped library where we go to read.	112	157	92	24	2.93	0.88	A
7	We have a computer laboratory where we learn Basic Science using computers and projectors	121	185	614	15	3.07	0.88	A
8	We learn Basic Science in a ventilated classroom with enough desk and sits for all students	128	178	70	9	3.1	0.77	A
9	Our Basic Science teachers have well furnished staffrooms	127	163	76	19	3.09	0.85	A
10	Our school has toilet facilities for students and staff.	133	162	73	17	3.07	0.74	A
11	Our school has a science resource center to enhance our Basic Science learning.	129	179	72	5	3.12	0.75	A
12	Instructional materials such as white/black stands, chalk/marker, science practical kits scientific games text books, water, electricity are available for our teacher's use in Basic Science instruction	134	172	72	7	3.12	0.77	A
	Grand mean					3.01	0.84	A

Key: Agree (A); Disagree (D)

Data in table 2 revealed that the extent of utilizing learning resources in teaching Basic Science was high (M =3.01; SD = 0.84).

Research question two: What is the difference in the performance of students taught Basic Science with and without learning resources?

Table 3: Mean (M) Standard Deviation (SD) of the performance of students taught Basic Science with and without learning resources

Difference Instructional mode	n	Mean	SD	Mean	SD
With learning resources	311	81.67	13.84	10.66	0.45
Without learning Resources	74	71.01	14.29		
Total	385	76.34	14.07		

Data in table 3 show that the difference in the performance of students taught Basic Science with (M= 81.67; SD =13.84) and without (M= 71.01;SD =14.29) learning resources was M= 10.66; SD = 0.45 in favour of the group taught with learning resources.

Research question three: What is the difference in the performance of the male and female students taught Basic Science with learning resources?

Table 4: Mean and standard deviation of the performance of the male and the female students taught Basic Science with learning resources

Gender Difference	n	Mean	SD	Mean	SD
Male	136	78.09	16.63	6.37	6.2
Female	175	84.46	10.43		
Total	311	81.28	13.53		

Data in table 4 showed that the difference in the performance of the male (M= 78.09; SD=16.63) and the female (M = 84.46; SD=10.43) students taught Basic Science with learning resource was M=6.37; SD =6.20 in favour of the female students.

*Hypothesis one***:** There is no significant difference between the performance of students taught Basic Science with and without learning resources.

Table 5: Summary of one-way ANOVA on the performance of students taught Basic Science with and without learning resources.

	Sum of square	df	Mean square	F	Sig.
Between groups	6790.86	1	6790.86	35.02	0
Within groups	74279.53	383	193.94		
Total	81070.39	384			

Data in table 5 indicated that there is significant difference between the performance of students taught Basic Science with and without learning resources ($F_{(1, 383)} = 35.02$, $p < 0.05$). Therefore the null hypothesis one is rejected and the alternate hypothesis retained.

Hypothesis two: There is no significant different between the performance of the male and female students taught Basic Science with learning resources.

Table 6: Summary of one-way ANOVA on the performance of the male and the female students taught Basic Science with learning resources.

	Sum of square	df	Mean square	F	Sig.
Between groups	96.53	1	96.53	0.52	0.472
Within groups	70906.11	309	193.94		
Total	71005.64	310			

Data in table 6 showed that there is no significant difference between the performance of the male and the female students taught Basic Science with learning resources ($F_{(1,309)} = 0.53$, $p > 0.05$). Therefore, the null hypothesis two is retained and the alternate hypothesis rejected.

III. DISCUSSION OF FINDINGS

Assessing the extent of utilizing learning resources in teaching Basic Science

Data in table two revealed that the extent of utilizing learning resources in teaching Basic Science was high (M=3.01 SD = 0.84). This finding is consistent with those of Adebayo and Adigun (2018) and Akungu (2014) who reported that teaching and learning materials were available and are utilized in schools for classroom instruction. Contrary to the finding of this study, Bukoye (2019) reported inadequate use of instructional materials in most schools, stating that the majority of the teachers do not take cognizance of the importance derived from the use of instructional materials while teaching. The differences in the findings discussed could be due to the differences in the area of study.

The performance of students taught with and without learning resources

The data in table 3 showed that the difference in the performance of students taught Basic Science with learning resources (M=81.6; SD= 13.84) and without learning resources (M = 71.01; SD=14.29) was (M =10.66; SD=0.45) in favour of the group taught with learning resources. Data in table 5 showed that there is significant difference between the

performance of students taught Basic Science with and without learning resources ($F_{(1,383)} = 35.02$, $p < 0.05$). Similar findings were obtained by Omebe and Akani (2015); Ishaya (2016); Nja, Cornelius-Ukpepi, Edoho and Neji (2020); Effiong and Igiri (2015); Adalikwu and Iorkpiglgh (2013).

Gender and the performance of students taught with learning resources

Data in table 4 showed that the difference in the performance of the male (M= 98.09; SD= 16.63) and the female (M= 84.46; SD = 10.43) students taught Basic Science with learning resources was (M= 637; SD = 6.20) in favour of the female students. Data in table 6 showed that there is no significant difference between the performance of the male and the female students taught Basic Science with learning resources ($F_{(1,309)} = 0.53$, $p > 0.05$). The finding is inconsistent with that of Arop, Umanah and Effiong (2015) but consistent with that of Omebe and Akani (2015) and Ishaya (2016).

IV. CONCLUSION

This study which investigated the impact of utilizing learning resources on junior secondary students' performance in Basic Science found out that the extent of utilizing learning resources for instructional delivery was high. Also, utilizing learning resources in Basic Science instruction was found to significant improve the performance of students when compared. With the performance of students taught without learning resources. The use of learning resources for Basic Science instruction was found to discourage gender parity among Science students. The study concluded by stressing the need for teachers to utilize available learning resources in schools for improved Basic Science teaching and learning.

V. RECOMMENDATIONS

The following recommendations were made on the basis of finding of this study:

1. The government should ensure adequate provision and effective utilization of learning resources in school where these resources are inadequately available and poor utilized.
2. Teachers in public secondary schools should be encouraged to utilize available standard and improvised learning resources to enhance students' performance in Basic Science.
3. The use of learning resources by Basic Science teachers should be encouraged to promote gender equity among science students.

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