

IMPROVISATION OF ELECTRIC FAN USING RUBBER BOTTLE IN THE TEACHING OF BASIC TECHNOLOGY IN SELECTED SECONDARY SCHOOLS IN OGBA/EGBEMA/NDONI LOCAL GOVERNMENT AREA OF RIVERS STATE

ISAAC, Udoka C. N. PhD; AGBO, Okechukwu C. & AHIKWO, C. C.

Department of Electrical/Electronics,
School of Industrial Technology,
Federal College of Education (Technical), Omoku, Rivers State, Nigeria
Corresponding Email: isaac.udoka@fctomoku.edu.6032

Abstract

This study was designed to determine the importance of improvisation of instructional materials in the teaching of Basic technology in selected secondary schools in Ogba/Egbema/Ndoni Local Government Area (ONELGA) of Rivers State. The study examined the effects of improvised materials on secondary school students' retention and academic achievements in Basic technology concepts. Three purposes, three research questions and three hypotheses guided the study; the study adopted a survey research design. Population of the study comprises of one hundred and seventy five respondents comprising 150 students and 25 teachers drawn from the selected secondary schools. The population was manageable, hence, the entire population was used for the study, and there was no sampling. A structured questionnaire was used for data collection. Data was analyzed using mean score average to determine the upper and lower limit boundaries for either accepting or rejecting a decision. The study discovered inadequacy of instructional materials for teaching of Basic technology in secondary schools in ONELGA. The study also discovered a low level of exposure of teachers' and students' to improvisation of instructional materials in teaching and learning of Basic technology. Based on the findings, the study recommended amongst others that government and school administrators should ensure the provision of facilities and instructional materials for teaching Basic technology in their various schools to enhance effective teaching and learning process.

Key Words: Basic Technology, Improvisation, Instructional Materials, Secondary Schools.

Introduction

Improvisation is imperative in the teaching and learning process. Improvisation in schools has long been a subject of concern to both educators and curriculum developers. The effective execution of education curriculum assumes the availability of adequate instructional materials, regrettably, a recurring problem besieging technical education since its origin has been the lack of adequate facilities (Odu, 2013). Improvisation of instructional materials is the preparation and the provision of alternatives to real materials as teaching aids. And where the materials are to be improvised, emphasis ought to be laid on using contemptible and locally available materials (Ibe, 1992).

Cite this article as

Isaac, U.C.N., Agbo, O.C., & Ahiakwo, C.C. (2019). Improvisation Of Electric Fan Using Rubber Bottle In The Teaching Of Basic Technology In Selected Secondary Schools In Ogba/Egbema/Ndoni Local Government Area Of Rivers State. *THE COLLOQUIUM*, 7(1),76-83

Majorie and Brown in Odu (2013) posited that teachers should not use inadequate facilities and equipment as a justification for resorting to poor teaching; instead they should learn to improvise.

Foluke (2017) stated that the pitiable academic achievement in Basic technology can be ascribed to several factors amongst which teacher's approach was considered imperative. This suggests that the mastery of Basic technology concepts cannot be totally achieved devoid of the use of instructional resources. The teaching and learning of Basic technology without instructional materials may perhaps result in poor academic achievement. Lots of troubles are encountered by students due to the incapability of Basic Technology teachers to employ instructional materials to complement their teaching. Ajewole in Adu and Adu (2014) defined improvisation as improvement and design of alternative instructional material (s) as alternate to the manufactured ones. Improvisation enables learners to have mental picture of the subject matter and to preserve the message in their memory for a long time. Education has a significant part in all facet of life; Education is intended to impart knowledge. Consequently, educators must rethink the basic precept to develop the instruction in an ingenious and useful way to make learning more interesting and encourage a permanent change in behavior, Instructional resources are human and non-human material that are available to teachers and learners and can improve and develop the quality of instruction. A good teacher is probable to the knowledge and criteria for the selection of instructional materials from available materials for specific instructional purpose. Nevertheless, alternatives for teaching an electric fan in basic technology are:

Table 1: Improvised Alternatives for Electric Fan for Teaching Basic Technology as Against Standard Equipment

S/No	Standard Equipment	Improvised Alternative Item
1.	Fan blade	Plastic bottle
2.	Electric motor	Permanent magnet single phase (DC) motor (torque motor)
3.	Regulator	Switch
4.	Wire	1mm flexible Wire
5.	Power source	Battery (9V)
6.	Glue	Screws and nuts
7.	Stand	Floater or Straw
8.	Base	Plastic bottle or Floater

Improvisation will meet the demand of various schools and at the same time answer countless questions raised by scholars on what, and how to use the instructional materials successfully. Improvised materials can only be suitable when the material provides the expected results and improves the efficiency of the lesson and decrease the risks associated with the usage of the equipment to a minimum. Many concepts in Basic Technology are abstract in nature and the equipment for the learning of these concepts in secondary schools are really not there, therefore making practical teaching of such concepts hard, complicated, and infrequent. This study therefore was designed to fill these gaps. It will also examine the effects of improvisation of instructional materials on students learning, student achievement, and retention of concepts. Azzara in Adu and

Cite this article as

Isaac, U.C.N., Agbo, O.C., & Ahiakwo, C.C. (2019). Improvisation Of Electric Fan Using Rubber Bottle In The Teaching Of Basic Technology In Selected Secondary Schools In Ogba/Egbema/Ndoni Local Government Area Of Rivers State. *THE COLLOQUIUM*, 7(1),76-83

Adu (2014) opined that improvisation and inventiveness have been an essential task in teaching Basic Technology. It shows that improvisation ensues when an individual has adopted and internalized a Basic Technology concept and is able to understand and convey Basic Technology ideas impulsively. They added that there are significant factors to consider in defining improvisation, such as: the process of expressing Basic Technology thoughts and emotions, creating Basic Technology within certain structures previously learned, and initiating Basic Technology conversations. In studying the use of improvisation within the context of Basic Technology, Azzara in Adu and Adu (2014) stated that improvisation allows lucidity, develops higher order thinking skills, and possesses a more inclusive and near relationship with Basic Technology. Eze in Foluke (2017) stated that improvisation is an alternate for readymade or imported material. Okeke in Foluke (2017) charged teachers to develop their personal aids in order to teach effectively. In addition he stated that teachers, learners, parents, and all stakeholders in education can be involved in the development of these alternatives. The locally made improvisation is usually produced to meet the local challenges at little or no cost. When teachers and learners are concerned with improvising teaching and learning materials, it gives students and teachers the prospect to concretize their creativity, ingenuity and imaginative skills (Anyakoha in Foluke, 2017).

Improvisational strategies are regularly seen as an alternative to the ready-made instructional resources and it has taken on varieties of creative genres, including pantomime, storytelling, music poetry and comedy (Adu & Adu, 2014). Improvisation embraces teaching techniques, materials, gadgets and aids (visual, audio and audio-visual) for proficient and effective teaching learning process (Foluke, 2017). Onwuka in Odu (2013) posited that there is a recurrent explosion of technology and hence, it becomes crucial that people must continue to attain new skills and methods of doing things. Given that basic technology forms a foundation for technological and industrial development of Nigeria, it became very crucial to improvise the required instructional materials for efficient and proficient teaching and learning of the subject. He further asserted that improvisation of instructional materials improves the ingenuity and creativity of basic technology teacher. As the teacher improvises, he forms the habit of converting what would have been regarded as waste materials into useful forms. The teacher has the prospect to be involved in more appraisal and other academic findings (Odu, 2013). Consequently, the teacher improves his knowledge in the basic technology subjects as enshrined in the National Policy on Education (FRN, 2004). Akpan (1994) stated that there's a dearth in improvisation of teaching and learning materials in technical education. This could be ascribed to the lop-sided treatment of the problem by diverse organizations in the country. He maintained that the Federal Science Equipment Centre at Yaba and Product Development Institute at Enugu, have been established for the production, maintenance, and repair of science equipment for the schools. And Nigerian Educational Research Council has been organizing workshops to develop the effectiveness of science teachers towards improvisation. Technical education is yet to profit from any of these projects, particularly in basic technology. The need to improvise instructional materials that could be made and arranged from available local materials at lesser costs becomes crucial as basic technology equipment are now inadequate and costly in the fast-declining worth of the Naira in the world market (Odu, 2013).

Cite this article as

Isaac, U.C.N., Agbo, O.C., & Ahiakwo, C.C. (2019). Improvisation Of Electric Fan Using Rubber Bottle In The Teaching Of Basic Technology In Selected Secondary Schools In Ogba/Egbema/Ndoni Local Government Area Of Rivers State. *THE COLLOQUIUM*, 7(1),76-83

Awolaju (2016) opined that the use of instructional materials increases the rate of learning, saves time and effort for the teacher, increases learners' interest, and at the same time facilitates retention of what is learned. He further stated that the use of instructional materials in the teaching and learning process is less demanding for both teachers and students. Improvised instructional materials can also veer related role of simplifying and decreasing explanations given by teachers. Improvisation of instructional materials needs the effort of Basic Technology teacher for its realization. The significance of instructional materials in teaching and learning cannot be overemphasized as authors have written to prove the indispensable role of instructional materials in curricular implementation. Akanbi in Awolaju (2016) defined instructional materials as planned instructional aide to enhance the teaching and learning processes and contribute to better learning.

Effiong and Igiri (2015) described instructional materials as print and non-print items that are rested to impart information to students in the educational process. Instructional materials according to them comprises of: kits, textbooks, magazines, newspapers, pictures, recording videos etc. They maintained that an instructional material has a significant role in the teaching and learning process as it improves the memory level of the students. Verbal or oral teaching maybe ineffective and unsuccessful pedagogy at this time as education is completely common. Therefore, the teacher has to use instructional materials to make the teaching and learning process more remarkable (Effiong & Igiri, 2015). National Teachers Institute (NTI) in Onasanya and Omosewo (2011) stated that Physics as a science subject is activity-oriented, hence the recommended method for teaching it, is the guided discovery method which is a resource base. Which means that the mastery of Physics concepts as part of Basic technology cannot be totally achieved without employing instructional learning materials, the teaching of Basic technology without instructional learning materials will undoubtedly breed poor performance in the course. Franzer, et al., in Onasanya and Omosewo (2011) opined that a qualified Basic technology teacher no matter how talented or intelligent may not be capable of putting his or her ideas into practice if the school setting lacks the necessary equipment and materials for him to translate his competence into reality. Bassey in Onasanya and Omosewo (2011) stated that Basic technology demands and requires resource. Hence, in an economic recession period, it will be difficult to adequately find some of the electronic gadgets and equipment for Basic technology in secondary schools. A situation further compounded by the galloping inflation in the country and often distinct to some of the imported sophisticated materials and equipment. Thus, the need to produce instructional materials locally. Ogunleye et al., and Obioha in Onasanya and Omosewo (2011) recognized the inadequacy of instructional facilities for teaching of Basic technology in secondary schools in Nigeria. They further stated that the few resources available in many cases were not in good state, while the few that were in good condition were not sufficient to go round those who need them. Thus, there is need for improvisation.

Statement of the Problem

There are lots of impediments and problems hindering the effective teaching of basic technology in secondary schools in Ogba/Egbema/Ndoni Local Government Area of Rivers State. Despite the

Cite this article as

Isaac, U.C.N., Agbo, O.C., & Ahiakwo, C.C. (2019). Improvisation Of Electric Fan Using Rubber Bottle In The Teaching Of Basic Technology In Selected Secondary Schools In Ogba/Egbema/Ndoni Local Government Area Of Rivers State. *THE COLLOQUIUM*, 7(1),76-83

significance of the subject, there is no secondary school in Ogba/Egbema/Ndoni Local Government Area of Rivers State where the array of resources available for teaching basic technology can be described as being adequate. It was observed that most students criticized and complained of being taught principles that appear theoretical and abstract in nature. And teachers on the other hand complained of inadequate teaching facilities. The lack of ability of teachers to improvise instructional materials is the major factor responsible for poor performance of learners, especially in our secondary schools. The utilization of real-life situations as teaching materials facilitates simple communication which leads to better retention of what is learned. Hence, the study is designed to examine the improvisation skills of Basic technology teachers by making use of local available materials in the instructional process and involving them in the lesson in order to stimulate and encourage effective teaching and learning of Basic technology in secondary schools. The study will also consider the extent to which improvisation aids students' retention of concepts and improve their academic achievement in basic technology.

Purpose of the Study

The general purpose of this study is to examine the improvisation skills of Basic Technology teacher in Selected Secondary Schools in Ogba/Egbema/Ndoni Local Government Area of Rivers.

Specifically the study examined the:

- ❖ Improvisation of instructional materials by using locally available materials to stimulate and encourage effective teaching and learning of Basic technology in secondary schools.
- ❖ Effectiveness of improvised materials on secondary school student's retention of concepts in Basic technology.
- ❖ Effectiveness of improvised materials on the secondary school student's academic achievement in Basic technology.

Research Questions

1. What is the perception of Basic technology teachers towards improvisation of instructional materials by using locally available materials to stimulate and encourage effective teaching and learning of Basic technology in secondary schools?
2. To what extent are the effects of improvised materials on secondary school student's retention of concepts in Basic technology?
3. To what extent are the effects of improvised materials on secondary school student's academic achievement in Basic technology?

Research Hypotheses

The following hypotheses were formulated and tested at 0.05 levels of significance.

H₀₁: There is no significant difference between the mean responses of teachers who taught with improvised materials and those who taught without improvised materials.

H₀₂: There is no significant difference between the mean responses of students taught with improvised materials and students taught without improvised materials.

H₀₃: There is no significant difference between the mean achievement responses of students taught with improvised materials and students taught without improvised materials.

Cite this article as

Isaac, U.C.N., Agbo, O.C., & Ahiakwo, C.C. (2019). Improvisation Of Electric Fan Using Rubber Bottle In The Teaching Of Basic Technology In Selected Secondary Schools In Ogba/Egbema/Ndoni Local Government Area Of Rivers State. *THE COLLOQUIUM*, 7(1),76-83

Scope of the Study

This study was carried out in selected secondary schools in Ogba/Egbema/Ndoni Local Government Area of Rivers State. The study focused on improvisation of instructional materials by using locally available materials and the effects of improvised materials on secondary school students' retention and academic achievement in Basic technology.

Significance of the Study

The findings of this study will educate teachers on the use of locally available instructional materials instead of imported and expensive ones. Teachers, educators, policy makers, curriculum developers, and those concerned with teachers training programme will benefit from this study. The study will serve as an eye opener to teachers in terms of solving the problem of rote learning encountered by learners. Learners will become active participants in instruction through improvisation and accessibility of materials for teaching and proper observation and discovery of new ideas.

Methodology

A survey research design was adopted for this study. This is because this design enabled the researcher to obtain data from respondents in a wide range of sample sizes. According to Uzoagulu (2011), in descriptive research, data are usually collected, organized, analyzed, and described as they exist (natural setting) without interfering with them. This is also preferred because it determines the impact of teacher's effectiveness on the academic achievement of Basic technology students in selected secondary schools in Ogba/Egbema/Ndoni Local Government Area of Rivers State. The population of this study comprised of one hundred and seventy-five (175) teachers and students (150 students and twenty-five (25) teachers) of Basic technology in selected secondary schools in Ogba/Egbema/Ndoni Local Government Area of Rivers State. Due to the manageable size of the population, the entire population for the study was used and the sample.

Table 2: Number of students and teachers selected from each of the sampled schools.

S/N	Name of schools	No. of students	No. of teachers
1.	Community Secondary School, Obigwe	30	5
2.	Community Secondary School, Erema	30	5
3.	Santa Maria High School, Omoku	30	5
4.	Community Secondary School, Aggah	30	5
5.	Community Secondary School, Obor	30	5
	Total	150	25

The instrument for data collection was a self-structured questionnaire designed to furnish information on the study. The questionnaire was structured in a four-point modified scale of Strongly Agree (4), Agree (3), Disagree (2), and Strongly Disagree (1). Respondents were made select appropriate option by ticking. To ensure the validation of the instrument, the instrument was subjected to face and content validity test by experts in measurement and evaluation, criticisms and corrections made by the experts were affected, reliability of the instrument was established by

Cite this article as

Isaac, U.C.N., Agbo, O.C., & Ahiakwo, C.C. (2019). Improvisation Of Electric Fan Using Rubber Bottle In The Teaching Of Basic Technology In Selected Secondary Schools In Ogba/Egbema/Ndoni Local Government Area Of Rivers State. *THE COLLOQUIUM*, 7(1),76-83

subjecting the instrument to test retest where copies of the instrument was administered to twenty (20) respondents drawn out the study area, The same instrument was administered on the same respondents two weeks later as retest, The coefficient of reliability for their responses was established using Pearson product moment correlation coefficient formula and a reliability coefficient of 0.82 was obtained and it was considered high and reliable. The instrument was administered to the respondents and duly collected by the researcher with the help of one research assistants. Data was analyzed using descriptive statistics such as frequency counts and mean score, while the inferential statistics used was the t-test statistics. All hypotheses formulated were tested at 0.05 level of significance. Decision rule: mean score was interpreted in relation to upper and lower limits values, whereby the upper and lower boundary is 2.50. Therefore, a mean score with the value of 2.50 and above was accepted, while those from 2.49 below were rejected.

Results and Discussion

Three purposes, three research questions and three null hypotheses were formulated and tested to provide answers to the research questions. It was revealed that there was a great significant difference in the perception, retention, and achievement of students taught with improvised materials and students taught without improvised materials. The use of improvised instructional materials assists the teachers economically and at the same time allows students interface. The intellectual ability of students are been used during the learning and teaching processes. Aguisiobo in Onasanya and Omosewo (2011) noted that learning is an action that takes place in contact and not in a vacuum. The findings of the study exposed the inadequacy of instructional facilities for teaching Basic technology in secondary schools in Ogba/Egbema/Ndoni Local Government Area. The study also discovered the low level of exposure of teachers' and students' to improvisation of instructional facilities in teaching and learning Basic technology. Improvisation tends to eliminate generalization in learning theories because the products of improvisation are tangible, handy, and concrete. Improvised instructional materials must be safe to use during demonstrations and experiments. It must be hazard-free or danger free. The product must not be capable of inflicting injuries on the user or person operating it. Improvised instructional materials should be used effectively in teaching Basic technology and other science subjects at all levels of education. The use of instructional materials imparts the teaching and learning of students in Basic technology. The use of teaching aids makes learning real and permanent. Basic technology teachers do not always make use of available teaching aids during instruction. Teaching aids available for the teaching of Basic technology is grossly inadequate and this negatively affects effective teaching and learning in secondary schools. The use of instructional materials promotes retention. The use of teaching aids influences the academic achievement of students in Basic technology. It was established that instructional materials has a vital role in students' academic achievements in secondary school. Proper presentation of good instructional materials and pedagogy employed by the teacher enhances understanding of the subject matter and concretizes learning. Based on the above findings, the study recommends thus:

- ❖ Government and school administrators should ensure the availability of instructional facilities for teaching Basic technology in their various schools to improve teaching and learning process.

Cite this article as

Isaac, U.C.N., Agbo, O.C., & Ahiakwo, C.C. (2019). Improvisation Of Electric Fan Using Rubber Bottle In The Teaching Of Basic Technology In Selected Secondary Schools In Ogba/Egbema/Ndoni Local Government Area Of Rivers State. *THE COLLOQUIUM*, 7(1),76-83

- ❖ Teachers should develop skills for usage of instructional materials as long as they are relevant to the content of their lesson.
- ❖ Government should ensure proper funding of secondary schools and ensure that workshops /laboratories are provided for teaching Basic technology.
- ❖ Basic technology teachers should be supervised and assessed periodically in order to check and know their student's performances in the subject.
- ❖ Workshops, seminars, and conferences should be organized by the government for teachers to enable them update their knowledge on new developments in the use of instructional facilities.

References

- Adu, F. O., & Adu, E. I. (2014). Improvisation as a tool for improving the teachers' knowledge in Basic Technology. *IOSER Journal of Research & Method in Education*, 4(1), 14-18.
- Akpan, G. A. (1994). Improvisation of teaching Materials by Technical Teachers in Akwa Ibom State. *Nigeria Vocational Journal*. 7, 207-214.
- Awolaju, B. A. (2016). Instructional materials as correlates of students' academic performance in Biology in senior secondary schools in Osun State. *International Journal of Information and Education Technology*, 6(9), 705-708.
- Effiong, O. E., & Igiri, C. E. (2015). Impact of instructional materials in teaching and learning Biology in secondary schools in Yakurr Local Government Area. *International Letters of Social and Humanistic Sciences*, 62, 27-33.
- Federal Republic of Nigeria (2004). *National Policy on Education* (4th edition), NERDC Press.
- Foluke, A. A. (2017). Improvisation of drawing instruments for teaching basic technology in junior secondary schools, Oyo State. *World Wide Journal of Multidisciplinary Research and Development*, 3(3), 71-77.
- Ibe, B. O. (1992). Improvisation of instructional materials for the teaching of Introductory Technology in Nigerian secondary schools. Paper presented at College of Education, Ekiadolor, Benin City.
- Odu, O. K. (2013). Improvisation of instructional materials for Introductory Technology: The Delta State experience. *Journal of Research in Education and Society*, 4(2), 9-16
- Onasanya, S. A., & Omosewo, E. O. (2011). Effect of improvised and standard instructional materials on secondary school students' academic performance in Physics in Ilorin, Nigeria. *Singapore Journal of Scientific Research*, 1(1), 68-76
- Uzoagulu, A. E. (2011). Practical guide to writing research reports in tertiary institutions. Cheston Ltd.

Cite this article as

Isaac, U.C.N., Agbo, O.C., & Ahiakwo, C.C. (2019). Improvisation Of Electric Fan Using Rubber Bottle In The Teaching Of Basic Technology In Selected Secondary Schools In Ogba/Egbema/Ndoni Local Government Area Of Rivers State. *THE COLLOQUIUM*, 7(1),76-83