

Effect of Improvisation of Instructional Materials on Computer Science Education and Learning in Junior Secondary Schools in Bauchi Metropolis

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ABSTRACT

The study aims to assess the impact of improvisational instructional materials on computer studies teaching and learning in junior secondary schools in Bauchi Metropolis, involving 615 students from four selected schools. The research utilizes the CSAT (Computer Studies Achievement Test) and Students' Interest Inventory (SII) for data collection. The t-test is employed to analyze the data, with the anticipated outcome highlighting the effectiveness of using instructional materials in computer education. The findings reveal a significant relationship between the use of instructional materials and students' achievement in computer studies, showing a notable difference between male and female students. The study concludes that instructional materials can serve as an alternative and more effective method for teaching computer topics. Recommendations include encouraging teachers to use instructional aids, updating their knowledge in this regard, introducing students to instructional materials, and suggesting further research with larger sample sizes and across different educational levels. The study emphasizes the positive impact of instructional materials on making learning easier, enhancing content retention, and facilitating subject lesson assimilation.

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INTRODUCTION

Many years ago, teacher's effectiveness rested on his knowledge of the subject matter, the knowledge of how to organize and present content meaningfully, and his ability to understand those being taught. At this present time; there is much emphasis concerning the use of instructional materials. This has developed through a recognition that student learn through improvised instructional materials through the interaction of mass media and people. The performance of selected secondary school student within Bauchi Metropolis particularly in computer studies had not been encouraging which was attributed to various major factors that include method of teaching and learning; teacher's qualification and effective utilization of improved

instructional materials. According to Ngwu (1997) the effective purpose of improvised instructional materials is a major step in successful curriculum implantation. He stated that as the important things concerning instructional materials to teacher is the center figure.

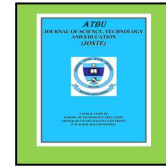
In his view, that improved instructional materials, when well used, help in complementing and supplementing the teacher's verbal efforts. He also stated that they arouse the interest of the learner when appropriately used. Samba and Eriba (2011) see improvisation as the act of using alternative materials and resources to facilitate interactions whenever there is lack or shortage of specific first hand teaching aids. The authors see improvisation as the choice of the best instructional materials which enables the teacher

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to achieve some carefully specified educational objectives. Improvisation according to Imogie (1988) refers to the act of making a suitable substitute for the real thing. Oguranti (1981), defined improvisation in education as the production of instructional materials when ready-made ones are not available or not within reach. It is also the act of designing a replica of something to make it function or play the role of the real thing (Akinmoyewa, 1992). Improvisation tends to remove abstraction in learning by providing something that is concrete. It also increases the involvement of the learners in the lesson. Different areas in the community may be combined, in order to secure materials needed for improvisation. Among these areas are our homes, workshops in the community, our surroundings, museums, gardens, ponds, industrial organizations, etc.

Instructional materials are said to be all those materials needed in the classroom to be used by the teacher for the purpose of facilitating teaching and learning, according to Kay (2008), instructional materials stimulate the student desire to learn, it assist learning process by making assimilations and memorizing of the learned topic easy for student. Agun (2008) refers to them as learning materials, the proper use which helps learners to learn faster and better. Offering computer studies, the computer itself serves as an instructional material because the subject is more of concrete object that can be seen and touched by both the teacher and learners (Ituma, 2010). According to Benson (2011) instructional materials are materials or tools locally made or imported that could make tremendous enhancement of lessons impact if intelligently used. In most cases learner has the difficulty in understanding some certain concepts as a result of their cognitive operation and ability, hence the need for teachers to employ materials and methods that will facilitate student understanding of the concepts as in the case of computer studies. It is against this background that Jean Piaget postulated human beings to be classified along sensory motor, pre operational, concrete and abstract cognitive level.

In a real sense, a teacher is someone who combines materials and interpret concepts in

other to have a desired change or outcome in the learners. The teacher's play a vital role is occupationally or professionally in the classroom or outside the classroom which can be carried out by teaching knowledge, building worm classroom environment, role modeling, mentoring, listening and looking for signs of trouble. Education has instrumentally impacted positively to the survival of the society at large, this sole reason is why modifications are required in the educational field in other to induce and facilitate teaching and learning. And to meet up with latest changes and trends education of olden days relied few or no instructional materials in trying to impact knowledge in learners, their assumptions was that knowledge can be forced on student regardless of the individual differences that is found in the classroom. The subject computer studies was introduced into the secondary school curriculum to develop and input in learners the right knowledge and skills about computer as and also to empower the youth through entrepreneurship since computer center are current moving trend in the society, (Adebayo 2013).

According to Abu Jabber (2004), the importance of computer device in our society cannot be over-emphasized and that is the reason why the teaching of the computer studies should not be toyed with and should be handled with proper instructional materials. Instructional material is a major determinant that controls the pace of teaching and learning in the classrooms. Okereke (2009) stressed that many school in the state level cannot boost of instructional materials and contend that every government should make education a top priority to help improve the standard of education by providing instructional materials. Instructional material is an aid of teaching and learning. It helps to raise learning from verbalization to practical aspect of teaching and learning, instructional materials make teaching and learning interesting, easy and amusing, makes learning effective.

Otu (2007) stressed out that the computer studies is a "tool"; it is real and should be treated as such, the inability to produce the right teaching instructional materials possess a big threat in student academic achievement and

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performance in the subject, For computer studies to be learned properly there must be a computer device, due to the fact that the subject present a level of abstract concepts that need to be visualized by student so as to induce their understanding and to remedy the issue of individual differences. Therefore, for the effective understanding of the subject matter in computer studies and for student to perform better in Bauchi Metropolis, there is great need to examine the effect of improvised/instructional materials on teaching and learning of computer studies with the aim of stimulating the interest of the student.

The junior secondary school is the first part of the secondary school level of education according to the national policy on education (NPE, 2013), which means that proper attention is needed to ensure that student perform well academically, this will not be possible without the application of instructional material in the classroom. The teachers' level of resourcefulness, creativity and imagination is credited to the achievement of quality of education, these are expressed on how well the teacher is able to perceive, create and use important information that can enhance and promote effective teaching and learning activities.

In Bauchi Metropolis, there is a fair use of improvised/instructional materials which makes teaching a learning activities mere theoretical, abstract ineffective. (www.batleby.com2013). The Nigerian government, at all levels over the years placed enormous emphasis on instructional materials in shaping efforts and strategies aimed at improving student's standard of learning in the country both theoretical and empirical literature failed to capture the real factors as to why the standard of education in the country still remain very low.

Purpose of the study

The purpose of conducting this study is;

1. To compare specifically the academic performance of student taught using improvised instructional materials and those taught without the aid of improvised instructional materials.

2. To determine the mean score of male and female student taught computer studies using improvised instructional materials.
3. To determine the effect of interaction between genders of student in achieving computer studies.

Research Questions

The following set of questions was designed to guide the study for better comprehension:

1. What is difference between achievement of student taught using improvised/instructional materials and student taught without the use of improvised/instructional materials?
2. What is the difference between achievement of male student and that of female student in the experimental group?
3. What is the effect of interaction between genders of student in the achievement of computer studies?

METHODOLOGY

This study adopted a quasi-experimental design. Specifically, the two-group protest post-test nonequivalent control group design was adopted in conducting this study. The study involved two groups of students' namely experimental group and control group. The design was chosen because intact classes which could not permit random assignment of research subjects were used. The research was conducted in Bauchi state, Nigeria. The researcher is familiar with the area and could adequately supervise and monitor the experiment. The population of this study consisted JSS 3 student in all Junior Secondary School in Bauchi metropolis; there 22 junior secondary schools within Bauchi metropolis. At the time of the study, the number of JSS 3 student both male and female is 15,791. Computer is a general science subject that is offered at all junior secondary school. The sample for this study was drawn for co-educational school only. This is because of the gender variable in the study. Two schools were drawn from the co-educational schools in the metropolis through simple random sampling.

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Two schools were drawn from the stage metropolis by simple random sampling techniques out of 22 secondary schools in the metropolis. These are government secondary school Sa'adu Zungur and government day secondary school Army Barrack, Bauchi, Bauchi state. These two schools were assigned to the experimental group and control group by paper balloting. In each school drawn for both experimental and control; one intact class was drawn through simple random sampling techniques. The instrument for data collection is a Computer Studies Achievement Test (CSAT). It consists of twenty-five multiple choice/objective choice items. The items were drawn from the following topics that were taught during the experiment: introduction to computer system; meaning and types of computer; identification of the parts of the hardware; the functions of the different parts; and features of the mother board.

The instrument was subjected to both face and content validation. Two specialists in measurement and evaluations of science education in Bauchi state university, Bauchi. The face validations scrutinized the items in terms of relevance, general test format, suitability and clarity. After the face validation and modification in line with recommendations of the specialists the instrument was further subjected to content validation using the test blueprint as shown in appendix. The reliability coefficient of the CSAT was determined with Kuder Richardson formula, (KR-20) technique. The procedure helped to establish the internal consistency of test items that was obtain by the researcher. The final stage of the test was administered to 90 JSS1 students in one of the secondary school that was not used for the main study. These student s scores were used to compute the coefficient of internal consistency of the CSAT, which was found to be 0.83 (See appendix 11). Establishing this form of reliability for the CSAT was considered necessary in order to ensure that the items were equivalent and homogenous.

The two groups (experimental and control) were subjected to the CSAT as pre-test prior to the study. The students in the experimental group were exposed to computer improvised instructional materials under teacher's supervision. In addition, there were encouraged to take enough notes on the topics that will be useful. The control group student was exposed to the conventional teaching method on the same content used for experimental group, there were taught using conventional classroom format. The classroom contains the chalkboard, charts which were used for instruction. The treatment of all groups lasted for two weeks.

At the onset of the experiment, the researcher administered the pre-test to the students. Scores of the students on the pre-test was recorded and kept behind for use after the experiment. At the end of the experiment, the post-test will be administered to the entire members of the class. Although all the classes will receive equal treatment in terms of receiving the pre-test and being taught along with others, data for the study was restricted to the intact classes that were drawn for the study. For each of the groups, data for the pre-test and post-test were recorded separately. Mean and standard deviation were used to answer research questions.

RESULTS

The analyses of the data collected from the study are presented in accordance with three research questions that guided the study. The three research questions that guided the study were answered using mean and standard deviation.

Research Question 1: What is the difference between the achievements of students taught with instructional materials and the students taught without instructional materials?



Table 1: Mean achievement scores of students of the students taught using instructional materials and those taught without instructional materials.

Group	N	Sum	Mean	Std. Deviation
Experimental	50	840	16.80	4.472
Control	40	390	9.75	2.950
Total	90			

From table 1 above, the experimental group obtained a mean score of 16.80 with a standard deviation of 4.472, while the control group obtained a mean score of 9.75 with a standard deviation of 2.950. Comparing the two results, it is found that the students in the experimental group that were taught using

instructional materials achieved better than their counterparts in the control group that were taught without instructional materials.

Research Question 2: What is the difference between the achievements of male and female students taught with instructional materials?

Table 2: Mean achievement scores of male and female students taught in the experimental group

Gender (Experimental Group)	N	Sum	Mean	Std. Deviation
Male Students	30	494	16.47	4.674
Female Students	20	336	16.80	4.467
Total	50			

From table 2 above, the male students in the experimental group obtained a mean score of 16.47 with a standard deviation of 4.674, while the female students in the same experimental group obtained a mean score of 16.80 with a standard deviation of 4.467. Comparing the two results, it is found that the female students achieved better than their male counterparts when

taught Computer Studies using instructional materials.

Research Question 3: What is the effect of interaction between treatment and gender on students' achievements in Computer Studies?

Table 3: Effect of interaction between treatment and gender on students' achievements.

2-way interaction	N	Sum	Mean	Std. Deviation
Experimental (Males)	30	504	16.80	4.552
Experimental (Females)	20	336	16.80	4.467
Control (Males)	16	158	9.88	2.778
Control (Females)	24	233	9.71	3.169
Total	90			

From table 3 above, it is observed that the male and female students in the experimental group achieved better than their male and female counterparts in the control group. This shows that that there was no interaction between treatment and gender on the students' academic

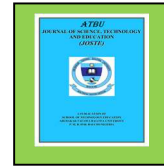
achievements in Computer Studies. This result simply indicates that the use of instructional materials in teaching enhances students' understanding and facilitates their achievements in Computer Studies.

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SUMMARY OF FINDINGS

The following are the findings made from the study:

1. The students taught Computer Studies using instructional materials achieved better in CSAT (16.80 ± 4.472) than their counterparts who were taught without the use of instructional materials (9.75 ± 2.950).
2. The female students achieved better in CSAT (16.80 ± 4.467) than their male counterparts (16.47 ± 4.674), when taught Computer Studies using instructional materials
3. There was no effect of interaction between treatment and gender on students' achievements in Computer Studies. The male and female students in the experimental group achieved better than their male and female counterparts in the control group.

DISCUSSION OF THE FINDINGS

The purpose of this study is to investigate the effect of the use of instructional materials in teaching and learning of computer in the junior secondary schools of Bauchi state. The results are presented in tables in accordance with the research questions. The result of the analysis of covariance on the performance of students taught computer using instructional materials and those taught with conventional classroom instruction indicated a significant difference in favors of the students in the experimental groups, the students achieved very much better than those taught conventionally and this goes with the findings of Samule N, Nwuba, (2016) who unanimously agreed that instructional materials are very important and useful in education because, the normal learner is so far as the functions of his preceptor mechanisms are concerned, gains understanding in terms of multiple impression recorded through the eye, ear, touch and other series.

The influence of gender on the academic achievement of students when taught with instructional material was examined using research question. Showed significant gender difference for learners exposed to instructional material. These findings showed that gender had influence on the performance of students in computer. Thus, it can be deduced that the use of

instructional material enhanced the achievement of both male and female students but the males achieved better. The interaction between gender and method on students' mean achievement in computer education was examined using research question three, the result of the analysis showed no significant interaction between gender and method on students mean achievement in computer education. The male students exposed to instructional materials obtained a mean score of 16.80, while the female students also exposed to instructional materials obtained a mean score of 16.80, they have a mean difference of 0.00.

From the control group, those exposed to the Conventional Teaching Method, the male students obtained a mean of 9.88 and the female students obtained a mean of 9.71, with a mean difference of 0.17, Comparing the two results from method (instructional materials and conventional method of teaching), it is observed that those exposed to instructional materials for Computer Studies Instruction achieved better than those exposed to the Conventional Teaching Method. The males from the experimental group also showed a remarkable measure of understanding, likewise the females. Their mean differences in gender is also evident, the male students from the experimental group obtained a mean score of 16.80 while their male counterparts in the control group obtained a mean score of 9.88 with their mean difference summing up to 6.92, showing that the males exposed to instructional materials achieved better than the males exposed to CTM. Comparing the mean difference of the females as well from the experimental group and control, the females from the experimental had a mean of 16.80 while the females from the control group had a mean of 9.71 with their mean difference summing up to 7.09, the females increase in achievement was evident but not as much as that of the males.

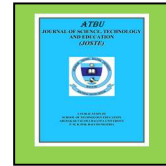
The result of this study has some implications for the students, teachers and education at large. The study has shown that instructional aids are very effective in teaching and learning of computer studies. In general, the study revealed that instructional materials enhanced students' achievement in computer. This implies

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that instructional materials are effective in increasing students' motivation for learning. With the use of instructional materials, all the senses of the learner are brought together. By using instructional materials, procedural, methodical and abstract things can be brought home to the understanding of the students and make learning very interesting and easy. Hence, the ministry of education should think in the direction of making instructional materials available for classroom instruction. The ministry of education in Nigeria should organize seminars, workshops and conferences for computer teachers on how to use and possibly improvise instructional materials in teaching computer so that the teachers of computer studies in junior secondary Schools can use the audio-visual aids effectively in the teaching of computer. The study was conducted using only JSS1 students, which is not the only class in the junior secondary school, therefore the results might not apply in other classes.

The study was designed to focus on learning of computer by junior secondary students drawn from junior secondary schools in Bauchi State alone. Thus, the findings may not be general to other public and private educational institutions around Nigeria. The curriculum content was limited to four computer topics of the entire computer curriculum. It was difficult to get a computer studies instructional material for the study. Despite these limitations the findings are significant, particularly in the use of instructional materials in the teaching and learning of computer in junior secondary schools.

Following the discussion of these findings, the educational implications of these findings were pointed out. The limitations of the study were also highlighted and suggestions for further areas of research made. Based on the findings of the study, it was concluded that the use of instructional technique or method should be employed and made effective in computer teaching as a means of improving academic achievement of students.

CONCLUSION

The results of this study demonstrated that instructional materials were an effective instructional technique for teaching computer. The

results were also in consonance with results of many studies demonstrating the effectiveness of instructional materials for better student's achievement, in science and mathematics as done by (Okeke john, 2015); Vivian (2014). It can therefore be concluded that a relationship exists between the use of instructional materials and achievement of students in computer. Results of the study showed that there was a significant difference between male and female students' achievement in computer when exposed to the treatment. Furthermore, instructional materials can be used as an alternative instructional method to the conventional method of teaching the various topics in computer since it proved to be more effective. It can be concluded that this study has provided strong evidence of the usefulness of instructional materials in teaching and learning of computer; it will therefore be very helpful if attention is paid to this study. By using instructional materials, learning is made easy and content retention high and easy assimilations of subject lesson contents.

RECOMMENDATIONS

Based on the findings, the following recommendations were made in the study;

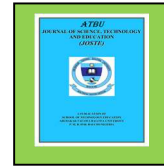
1. Instructional materials are not always readily available for the teachers to use, even though they can manipulate it effectively, so they should be encouraged to use the aids. It is not necessarily that they should only go for the electronic types; they can equally devise local improvised types. Teachers, on their own should up-date their knowledge in the use of the instructional materials in teaching computer studies.
2. Computer students should be introduced to instructional materials as a tool for meaningful learning. Computer education researchers may replicate and improve upon this study by conducting it among larger sample size and at other educational levels in the nation's education system.
3. Computer is seen as a very important subject because of its wide application or use in our world today, nearly every nation depends on computer for nearly everything. This explains why some science and technology and

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education researchers, among others, have in recent times concentrated their research efforts on finding teaching strategies that promote teaching of science so as to increase achievements and elements in science. Consequent upon the foregoing, this study sought to examine the effect of the use of instructional materials on students' academic achievement in Computer.

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