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IMPROVISATION OF INSTRUCTIONAL MATERIALS FOR EFFECTIVE TEACHING AND LEARNING OF COMPUTER IN JUNIOR SECONDARY SHOOLS IN EBONYI STATE

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ABSTRACT
The study investigated Extent of Improvisation of Instructional Materials for Effective Teaching and Learning of Computer Education in Junior Secondary Schools in Enugu North Local Government Area. The survey research design was adopted. 18 computer science teachers only in Junior Secondary Schools in Enugu North constituted the population of the study and were used as the sample. The questionnaire contained 7 items for teachers only which was designed for the purpose of the study. The research questions were answered using Mean. The major findings show that software components of the computer are being improvised at a low extent. Also, the hardware components of the computer are being improvised partially at a great extent and at a low extent. More so, the basic computer accessories are being improvised partially at a great extent and at a low extent. When there is no instructional material, there will be lack of interest of students towards computer Education, retention and transfer of learning in computer Education will no longer take place in the Junior Secondary school. The basic components can be improvised by the teacher, students or Local carpenters with the resources within the learners' environment. The improvised material provides opportunity for development of science attitudinal skills and practical skills needed to function effectively in the society. The study therefore, recommends among others, that Government should organize seminars, workshops, and conferences on improvisation to make the teachers resourceful enough to improvise the instructional materials needed for Computer Education when the standard equipment is not readily available for effective teaching.

Keywords: Improvisation, Rationale for Improvisation Role of Improvisation of Instructional Materials in Instruction and The place of Computer in Education

Introduction
Improvisation is an act of using alternative materials locally made by the teacher, students or Educational agency in a state of emergency as a substitute and supplement to standard equipment (Omiko, 2015). According to Enaiaiyeyu (2016), Improvisation in science teaching refers to the act of using alterative materials and resources to facilitate instruction whenever there is lack or shortage of some specific first-hand teaching aids. Education is a very important instrument for harnessing the socio-economic and political resources of any Nation. The world has witnessed in the past, two major socio-economic revolutions; the agricultural revolution and the industrial revolution. Presently, there is another socio-economic shift, which is the arrival of computer is being witnessed. This stage of revolution in the society emphasized the production, storage and distribution of information in various forms (Akume, 2017). According to Obiakor (2010); Computer is an electronic drive or machine that is capable of accepting inputs or data through input devices, processes the inputs and generates appropriate results which are displayed through the output devices. Computer is an electronic machine used to record, store, process and recall data or information (Ezeliora, 2014). According to Mbam (2016); computer is a fast and accurate electronic machine, which is capable of accepting data as input, processes data and

produces outputs under the influence of a stored program or instruction.

Computer Education can be seen as learning experiences with computer for the aim of achieving the set objectives of computer Education (Nwaibe, 2016).Consequently, Computer Education is aimed at making the learner computer literate. In Enugu North L.G.A, Computer Education is a welcomed development whereby the teaching of computer is being administered to all students regardless of the class they belong to in secondary schools but the problems faced here is that, they don't have all the necessary requirements needed for effective and successful teaching and learning of computer. These requirements includes; Computer Laboratories and Libraries, Enough computer systems, Electricity supply and instructional materials for Computer Education. According to Igwe (2017), Instructional materials are those materials that are being used by teachers to facilitate teaching and learning processes. Some of these instructional materials are; printed and non- printed materials. Printed materials are any written materials that can aid the teacher in teaching; a typical example is a textbook. Non-printed materials are those materials that the student can see; it includes pictures, posters, chalkboard, and the use of computer. In Computer Education, instructional materials are used in teaching and learning processes to bring novelty to the lessons by making the topics being taught interesting. (Nwaibe, 2014). In Enugu North L.G.A, the instructional materials are not readily available at the reach of the teachers, thereby not making the teachers knowledgeable and resourceful enough to teach.
Thus; arise, the need for improvisation.

Basically, the Computer system is made up of two main components namely; hardware components and software components. Then we have the basic computer accessories that enable them function properly. The hardware component refers to the physical part of the computer that can be seen and touched which includes the input and output devices. Examples include; monitor, keyboard, Central Processing Unit (C.P.U), mouse, printer, scanner and diskette (Ezeliora, 2014). The software component is a step-by-step instruction given to a computer in order to perform a specific task. Examples are programs and application packages (Alo, 2010). Computer Accessories are other equipment attached to the computer system to enable it carry out its task effectively (Ogeh, 2017). Examples include: batteries, cables and connectors, cleaning suppliers, keyboard drivers, monitor stand, power cord, uninterrupted power supply, mouse pad. In computer Education, the hardware, software and basic computer accessories can be improvised. (Igwe, 2017). The teacher should look for resources or materials beyond the classroom, for the sole reliance on the inadequate instructional materials of the school will create undesirable class participation. According to Igwe (2017), the following components can be improvised for effective Computer Education in our schools:

Monitor: A monitor can be substituted using a carton-squared shaped with the face of the carton covered with nylon material to represent the screen of the monitor, or by using a television.
Keyboard: The keyboard can be substituted using carton, plywood, foam, small squared pieces of carton sheet or cardboard paper to produce improvised keyboards.
Printer: it can be substituted with the use of plywood or carton to produce a look alike with a standard printer.

Charts: this can be improvised by drawing on the chalkboard or on a cardboard sheet with the aid of using the pencil or marker to make the drawing of the components of computer clearer to the students. All the component of computer can be drawn on the white or black board to enhance better understanding of the concepts in Computer Education to the students as well as improve their performance in computer Examinations. Judging from the above improvisation act, one can conclude that lack of standard equipment is no excuse for not

providing a suitable learning environment for Computer Education.

Statement of the Problem

During my teaching practice at one public Secondary school in Abakaliki, I observed that the Junior Secondary classes are highly populated. I taught the J.S.S.1 class that was populated with sixty-five (65) students and, no computer system was provided by the school to undergo the teaching and learning process of computer. Consequently, students' performance in their previous years' exams was very poor. This is in line with Igwe (2011), when he said that Computer Education cannot be effectively taught and learnt without the use of relevant Instructional materials. During the teaching task, it was tedious and enormous one because I made sure that each of the student experienced the computer by going to classes with my laptop in order to meet with the specific objectives made me to use more than the required time to teach the students.

Research Question

The following research question guided the study;

To what extent does improvisation of hardware components of the computer improvised in Junior Secondary Schools in Ebonyi State?

Review of Related Literature

Meaning of Improvisation

Improvisation is an act of using alternative materials locally made by the teacher, students or educational agency in a state of emergency as a substitute and supplement to standard equipment (Ogeh, 2017).

Improvisation has also been defined according to Akusoba (2013) as the "choice of the best instructional materials which enables the teacher to achieve some carefully specific educational objectives". Osuagwu (2011) also defines improvisation as the provision of materials locally made by the teachers, students or an educational agency to represent the original material or equipment. According to Enaiayeyu (2015), "Improvisation in science teaching refers to the act of using alternative materials and resources to facilitate instruction whenever there is lack or shortage of some specific first hand teaching aids". Generally, improvisation could be regarded as the act of using alternative materials or equipments obtainable from the local environment or constructed by the teacher or with the help of local personnel to facilitate instruction. In this content, the term "local materials" refers to those materials easily obtainable from the immediate environment irrespective of where they are produced.

Types of Improvisation

Basically, two forms of improvisation can be identified.

According to Igwe (2011); the first is described as "Role substitution". Role substitution is when the original item generally requires little or no modification before it can be used to fulfill the new functions in an experimental setting, examples are; kerosene stove as a burner, a glass tumbler as a beaker, and such will reduce the cost for production. Computer monitor and central processing unit of a computer can be substituted using carton and polythene sheets. The second type of improvisation is described as "Role stimulation". In this case, actual construction of the apparatus or equipment is undertaken as an emergency measure either because the needed equipment is too expensive or not really available. An example is the use of local carpenter to construct computer keyboard. Other instructional materials that can be improvised include; imported charts, it can be substituted using cardboard sheet to draw the diagrams of the equipment not available with the aid of pencil or markers (colored). With specific reference to Nigeria, science curriculum

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emphasizes activity-based learning and student-centered learning.

Raw materials that are available in the locality are explored and modified to produce instructional materials, by so doing we make science teaching more meaningful and lovely to both teachers and students (Omiko, 2010).

Rationale for Improvisation

The need to improvise some materials or substitute for other is as old, as experimental science itself. According to Ogeh (2017); rationales for improvisation include the following:

1. It contributes to the achievement of our education objectives by providing opportunity to develop necessary science skills, attitudinal and practical skills needed to function effectively in the society as professional scientists, technologists or generalists.
2. Improvisation undertaken by the teacher enables him to rethink and research for cheaper, better and fosters methods of making the teaching or learning process easier for the students. This implies that it promotes creativity and self-reliance.
3. To some extent, improvisation fills the vacuum created by lack of shortage of science equipments by providing a frame of reference in which students can key their attention during classroom activities.
4. Improvisation provides a cognitive bridge to lead students from abstraction and its attendant "mental indigestion" to a nodding acquaintance with reality, other writers refers to this as giving students the "bread of living" experience rather than the stone of abstract theory.
5. Situations where equipment are available but not affordable and/or where technical expertise for saving or repairing equipment is lacking, or spare parts and replacement items are not readily obtainable, clearly score the need for improvisation.

Based on the above rationale, the educational benefits of improvisation of instructional materials for computer education cannot be farfetched. Ideally, no effective science education program can exist without instructional materials. Improvisation provides a framework of references on which pupils key their attention during classroom activities.

Role of Improvisation of Instructional Materials in Instruction

Though improvisation of teaching materials by teacher has been a long standing problem, yet works done in this area has been fragmentary. (Njoku, 2012). The proper use of instructional materials in the classroom requires more than a simple knowledge of general teaching methods and skills. It rather calls for teachers' proper orientation into the production of instructional materials. Furthermore, adequate educational curriculum as the current society trends now demands, cannot be effective if the implementers (the teachers) are lacking skills and methodology with which to teach the students. For instance, Abba (2013) revealed that there is a strong positive relationship between the use of improvised instructional materials and achievement in education. He further stressed that schools where more teachers employ instructional materials or aids in teaching get better result than schools that do not do so. He recommended that teachers should make extensive use of teaching aids and where these aids are not available; the teacher should try to improvise, with the use of local raw materials, which provides stimulation or motivation to the students.

Anochie (2012), stated that science subjects are better learnt by doing and not by talking. Effective teaching and learning can only be possible through the use of adequate equipment or instructional materials. Unachukwu (2010), in his study into the extent to which teachers improvise teaching aids in colleges of education

found out that, generally apart from the chalkboard, most of the teachers in the schools do not make adequate improvisation of instructional materials for teaching subjects in their various schools. Also, Onyejemezi (2013), quoting a Chinese saying said. "A look is worth a thousand words". This statement illustrates the value of teaching and learning materials enhances effective learning, she also said that; these materials do not achieve any of the attitude values on their own. Rather, that their usefulness depends on what the teachers make out of them. Intelligent handling of the improvised instructional materials in the classroom is necessary (Igwe, 2011).

Meaning of Computer

Computer is from the verb "to compute" meaning to calculate (advanced dictionary). A computer is an electronic automatic machine used to record, store, process and recall data or information. The computer presents the processed data in the form of information on the screen of the computer (Ezeliora, 2011). Mbam (2016) defined computer as an electronic and automatic device which is capable of accepting data as input, process the data according to predefined instructions and produces end reports as results. Igboke (2012) states that computer is a fast and accurate electronic symbol manipulating device that will accept and store input data, process them, and produce outputs under the influence of a stored program of instructions. A computer is a machine that recovers or stores or processes data very quickly according to stored program. It is also seen as a device for executing precisely stated rules with accuracy rapidly and with great reliability (Abonyi, 2014). According to Alo (2010); computer is an electronic device or machine that is capable of accepting inputs or data through input devices, processes the inputs and generates appropriate results which are displayed through output devices. Computers are used in almost all the areas of human endeavor. For example, computers are applied in schools, industries and companies, hospitals, governments, courts, homes, etc (Mbam, 2016). Education can be defined as an aggregate of all the processes by which children and young adults develop their ability and other forms of behavior, which are of positive value to the society in which they live. Nwafor (2012).

Importance of Computers

According to Alo (2010); there is a wide spread in the use of computers due to the numerous benefits derivable from it. These benefits include the following:

Speed of operation: When compared to humans, computers perform complex tasks in a much reduced time interval.

Accuracy of result: With computers the accuracy of results is assured and depends greatly on the data with which results are generated.

Storage/retrieval of information: Information can easily be stored and retrieved at will provided that the storage path is known.

Application in hazardous environment: Computers are employed in hazardous environment which are dangerous to human health. They could be employed as expert systems mimic human intelligence.

Reduction in time wastages: They reduce to a great extent the amount of time that is supposedly needed to perform a given task.

Multipurpose function: They are now used for a wide range of operation like multimedia for video and music, digital cameras for photographs, telephone lines for communication, scanners for document duplication, etc.

Portability: The sizes of today's laptops and notebooks are so small that they are easily moved from place to place reducing the use of external storage devices.

Hardware Components of the Computer

According to Mbam (2016) computer system is generally made up of three basic hardware units, namely; input unit, system unit, and output unit.

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The three basic hardware units of a computer system:

a) The input unit: The input unit is a set of electronic devices that accept data and programs that people can read and convert them to a form the computer can process. It consists of devices that translate data, which may be characters, words, or statements (sentences) into a form (0's and 1's or off and ON of electrical signals), which the computer can process.

Nwafor (2012) says input is the part of the computer hardware through which the computer user (I or you) can send data, information or instructions to the computer. This means that the input unit is used in feeding data into the computer. An input unit is normally attached to the system unit. Basically, there are three types of input unit devices, namely: keyboards, pointing devices, and source data-entry devices (Mbam, 2016).

The keyboard is a device that converts letters, numbers and other characters into electrical signals (0's and 1's) that are readable by the computer processor. The keyboard is the commonest input device of the computer. It is the primary input unit of the computer.

Pointing devices are input devices that control the position of the cursor or pointer on the computer screen. Examples of pointing devices include the mouse, trackball, light pen, etc. Source data-entry devices are input devices that are neither the keyboard nor pointing devices. They include, among others, the following: scanners, sensors, audio-input devices, voice-recognition systems, video-input devices, electronic cameras, and human-biology input devices. Data can be captured from these devices into the computer system for processing.

(b) The system unit: This is also called the Central Processing Unit (CPU) box. It is a box that houses the major components of the computer. The system unit is made up of the motherboard (system board), the processor (CPU), the power supply unit, memory, ports, PC cards and disk drives. The following paragraphs describe some of the components of the system unit. The processor or Central Processing Unit (CPU): The Central Processing Unit serves the "brain" of the computer. It is where the central operations of the computer are based. The CPU follows the instructions of the software to manipulate data into information. It consists of two sub-units, namely the Control Unit (CU) and the Arithmetic/Logic Unit (ALU). The Control Unit controls and coordinates the operations of the computer. The ALU performs arithmetic and logic operations such as addition, subtraction, multiplication, division and comparison.

Disk Drives: They are devices that allow disks such as floppy diskettes and compact disks to be inserted into the system unit so that data, information, or instructions can be stored and retrieved from such disks.

The output unit: this is the part of the computer system that translates information processed by the computer into a form, which the users can understand (Ezeliora, 2014). According to Mbam (2016), the computer talks to the user through the output unit. Technically, the output unit is used to print out information from the computer system. Output unit devices include the video display unit (monitor), printer, plotter, diskette, sound speaker, voice device, video devices, multifunction devices and robots.

The place of Computer in Education

In schools, computers are used to teach students in various subjects, to test them and grade them. Computer serves as an instructional material for computer education. The following are the place of computer in education.

1. Students' Grading: Especially in the objective questions, can be done using the computer, especially those utilizing optical mark readers.
2. Computer Assisted Instruction (CAI): In this aspect, the computer acts as a teacher (i.e. replaces the teacher) in providing instruction to the learners. It involves the use of computers for direct Instruction of students.

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The students use application packages known as Computer Aided Learning (CAL) to learn most of their major subjects. The students follow set of Instructions as being displayed on the computer. Thereafter, the computer will drill the students with reasonable exercises in which they will be graded accordingly.

3. Computer-Managed Instruction (CMI): Here, the computer is used as an assistant to the teacher in managing the educational process by assessing the students' capabilities and prescribing a course of Instruction. Teachers employ (CMI) to plan effective educational programs. In studies of C.M.I, the computer evaluates students' performance, diagnoses weakness and guides students to appropriate instructional resources.
4. Time-tabling: Computer can help with time-table preparation. They are useful tools for re-allocation of rooms and facilities in emergencies. They help in preventing time clashes especially in large schools.
5. Payroll and Accounts: In large schools, general purpose accounts and payroll of teachers can be kept using computers.
6. Publishing: Computers can be used to prepare books, school magazines, report cards and other materials for printing or publishing.
7. Electronic mail: This allows schools in a particular network to send message to one another i.e. another school. It is cheaper than telephone calls.
8. Educational Gaming: Students can participate in computer games. During such games, students apply skills, which will enable them to strive to win.
9. Counseling: A computer can serve the counseling needs of all students in a school. With a rich database, the computer can counsel a student on academic and non-academic problem.
10. Planning: Spreadsheet programs can help plan admission to fit available or anticipated school resources. The computer can thus assist on making projections for the number of teachers, classrooms, textbooks, and science equipments.
11. School secretarial duties: The computer can be used as an electronic typewriter with an added advantage of a vast memory. The mail merge facility of word processing packages can enable standard letters to be printed to individual, parents of the students without having to re-type each letter. For example, typing of letters to be given to parents for Parent Teachers Association (P.T.A).
12. Record keeping: The computer can be used as an electronic filing cabinet. Using a database program, the principal or teacher can store and quickly retrieve Information on students' records, test/examination results, staff record, equipment inventory, item bank for test and full biographical data of students.

Research Method

The research design adopted for the study was descriptive survey research design. Descriptive survey studies are mainly concerned with describing events as they are without any manipulation being observed. The population of the study was randomly selected from the secondary school teachers which comprised of thirty six (36) teachers in the nine (9) public secondary schools. The whole thirty six (36) teachers were used for the study. Four (4) teachers each were used in the nine (9) secondary schools visited. The instrument used was questionnaire, which contains a section for the teachers only. Three experts validated the instrument; two from educational foundation and one from Measurement and Evaluation department. They were to find whether the instrument actually tested what it intends to test. They were requested to examine the instrument to ensure that the questionnaire relates to the purpose of the study and the research questions. After critical examination of the instrument, the comments and corrections helped a lot in the improvement of the final draft of the instrument. To ensure the reliability of the instrument, a trial testing was conducted, Alpha test of reliability was used to establish the reliability of the

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instrument. This technique was used because it measures the consistency of the items. Cronbach Alpha was used to calculate the internal consistence of the instrument which gave co-efficient scores of 0.60, 0.64 and 0.71 for questions A, B and C respectively. These scores confirmed that the instrument is reliable. Data was collected personally by the researcher using questionnaire. Where the respondents could not complete it immediately, the researcher waited behind to collect the complete questionnaire. The data collected were analyzed using mean scores. Based on the four (4) point scale, the acceptance level for the mean score was 2.50 and above and anything below 2.50 was rejected. The null hypothesis used for the formulation of the study was 0.05 level of significant.

Presentation of Results

This chapter presents the results of the study in the table according to the research questions.

Research Question 1 To what extent are the hardware components of the computer improvised in Junior Secondary Schools in Ebonyi State?

Table: Mean responses of respondents on the extent teachers improvise hardware components of computer for Computer Education in Junior Secondary Schools Ebonyi State. N = 36

S/N	ITEM DISCRIPTION	VGE 4	GE 3	LE2	NE1	X	DECISION RULE
1.	Monitor is usually improvised	80	36	8	0	3.4	G.E
2.	Keyboard is always improvised	32	30	28	4	2.6	G.E
3.	Central processing unit is always improvised	16	24	32	8	2.2	L.E
4.	Mouse is normally improvised	24	12	8	20	1.8	L.E
5.	Printer is always improvised	0	0	8	32	1.1	L.E
6.	Scanner is always improvised	0	0	0	36	1.0	L.E
7.	Diskette is usually improvised	48	18	4	16	2.4	L.E

From the table 1 above, it is observed from items 1, 2 that hardware components such as monitor and keyboard are being improvised at a great extent but hardware components in items 3, 4, 5, 6, 7 are improvised at a low extent.

Summary of the Findings

The summary of the findings are:-

The Hardware Components of computer for Computer Education are partially improvised at a Great Extent, the hardware component that are improvised at a Great Extent are; monitor and keyboard while other hardware component that are improvised at a Low

Conclusion

It is concluded from this findings of the study that, Junior Secondary Schools in Ebonyi State improvise instructional materials for Computer Education at a low extent and partially at a great extent on the part of the hardware components and the basic computer accessories.

Recommendations

The following recommendations have been made based on the findings of the study:

1. The government of Enugu North Local Government Area should organize seminars, workshops, and conferences on improvisation to make the teachers resourceful enough to improvise the instructional materials needed for Computer Education when the standard equipment is not readily available for effective teaching. The instructional material includes the hardware

component, software component and basic accessories of the computer.

2. Teachers should be encouraged to improvise by making resources available. Laboratories, storage areas should be built in schools i.e. the government should make money available for any school that toned want to set up resource center for improvisation in their premises.
3. The State Education Board should always inspect and supervise the teachers to ensure that they improvise instructional materials when the standard ones are not available during the teaching and learning process of computer.
4. The curriculum planners should include the act of improvisation of instructional materials in the curriculum.

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