DEVELOPMENT OF E-SLATE SYSTEM FOR ENHANCING READING AND LEARNING

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ABSTRACT

The need for increasing reading and learning ability in the developing countries as necessitated the introduction of methods such as Universal Basic Education (UBE) Scheme. Despite the success of the introduced scheme shortage of manpower seems to hinder the progress of the scheme. This shortage has greatly affected the reading and learning ability of many. Thus, this work presents the development of a device for improving the basic reading ability of the rural communities in Nigeria. Review of note taking techniques in Nigeria higher institutions have been presented in this work. Also, the design and fabrication of an E-slate for aiding learning and reading has been developed in this work. The design of the handheld version incorporate the use of microcontroller based system and logic circuitry with memory system in determining correct answers to a particular question. The developed system has been tested and was found appropriate for rural communities in the developing nations taking Nigeria communities as case studies.

Keywords: Multimedia, Multimedia application, Learning, Teaching

1. INTRODUCTION

Recently, the Federal Government of Nigeria introduced the Universal Basic Education Scheme as a way of improving the basic educational level of its citizen (Chukwunke & Chikwenze, 2012). One of the objectives of this scheme is to provide free and compulsory universal basic education for every Nigerian child of school age (Edho, 2009). Despite the fact that the scheme has proved effective in most of the Nigeria cities, it still faces lots of challenges in the rural areas, hence, making it difficult in actualizing the primary goal of the scheme. These challenges among others include the unwillingness of qualified teachers to work in the rural areas and lack of modern teaching facilities (Chukwunke & Chikwenze, 2012).

Schools in the rural areas are the worst hit by lack of teaching and learning materials (Edho, 2009). Also, most teachers posted to rural areas do reject their posting for lack of conducive environment for teaching, inadequate provision of basic amenities that may facilitate effective teaching and productivity of teachers among other things (Edho, 2009). In tackling this challenge, it was suggested in (Edho, 2009) that rural teachers should be employed to work in their vicinity. However, the lack of capable and qualified teachers in most rural areas makes it impracticable.

Reading and writing are the basic essential needs to become an effective and productive member of any literate society. In a bid to improve these basic skills, a study was carried out on the use of ICT in developing reading and writing skills in children with hearing impairment (Bano & Abdulhameed, 2007).

This paper is targeted towards improving the reading ability of rural communities by the use of embedded device called E-Slate (Electronic Slate). It particularly focuses on providing a learning aid for the Nigeria citizens especially those in the rural areas. The device apart from being a learning aid, can also be regarded as part of effort to achieve better writing and reading ability for rural dwellers in Nigeria.

The remainder of this paper is organized as follow: Section II provides review of learning devices used in aiding reading and teaching in Nigeria while section III provides a detailed explanation of design and development of the E-slate. Conclusion ends this paper in section IV.

2.0 REVIEW OF SPECIAL LEARNING DEVICES IN NIGERIA

In (Bano & Abdulhameed, 2007), the objective of the study was to see how effective the use of video clipping

will be in developing reading and writing skills of children with hearing impairment. Their findings show that video-clipping proves effective in teaching writing skills among children with hearing impairment. However, a major drawback in the approach was its ineffectiveness in teaching reading skills.

Information and communication technologies (ICT) are often associated with high-technological devices such as computers and software, but ICT encompasses more "conventional" technologies such as radio television and telephone technology (UNESCO, 2006). ICT has been used as a way to transmit, store, create and share or exchange information. The five key ways in which ICT can be used to support literacy as highlighted by UNESCO includes: development of professional teachers, creating local content, broadening access to literacy education (UNESCO, 2006). This could be achieved through the use of radio for radio lessons, learning via television, reading tutor software, multimedia software for enhancing reading skills, audio books, electronic books and online texts (UNESCO, 2006).

As part of effort towards improving literacy education, a simple inexpensive, multilingual people's computer (SIMPUTER) was developed in (Duveskog, et al, 2004). It is a small hand-held computer designed by the Simputer Trust, a non-profiting organization. It was aimed at enabling the widespread use of computers in India and other developing countries. A programming tutorial was developed on the Simputer platform and the learning environment was tested in Tanzanian context. An analysis of the students' feedback shows the feasibility of Simputer as a learning platform. However, the need to have a basic knowledge of computer usage is a major drawback.

The inadequate access to updated information in rural areas is a disturbing challenge which has contributed greatly in the poor effective teaching and learning in such environments (Nwaji, 2011).

An important aspect of learning process that is often overlooked by researchers is the skills or technique for effective note taking among students particularly in Nigeria, despite the fact that it makes or mar the success of the students. There are numerous techniques that are used in taking notes with the goals of aiding student understanding of topic or subject, enhancing their capability of recalling essential information and assisting the students in revising for test and exam. Some of the technique of note taking among students of higher institution in Nigeria includes the Cornell method. This method entails dividing the notebook page into different part, with each part performing different function. Keywords are recorded on the left merging, notes or content are recorded on the right column while summary is recorded at the bottom of page. A similar method is the Two Column method where the page of the notebook is divided into two columns with keywords recorded on the left column with the corresponding description presented on the right column. Other methods include the mapping, outlining, charting, tape recording and the sentence methods with each of the methods having their strength and weaknesses as discussed in Section III.

2.1 REVIEW OF NOTE TAKING TECHNIQUES IN HIGHER INSTITUTION IN NIGERIA

This section examines the specific techniques of notes taking in higher institutions in Nigeria including their strengths and weaknesses.

2.1.1 Cornell Method

This is one of the most popular notes taking method in the world though rarely used among Nigeria higher institution students. This approach involve dividing the page of the note into two, with a margin of about 2.5 inches drawn to the left, which is used to record key points that will aid in recalling the actual point made during the lecture (Pauk & Owens, 2013). The notes or content was written down at the other right margin of the page, which is the largest space as shown in Figure 1. A summary space is usually at the bottom of the page where the students summarize the note taking after lecture. This method helps in organizing, understanding, recalling of key points using some few sentences and serves as a quick study guide for exams. However, it requires good listening and writing skills by the student.
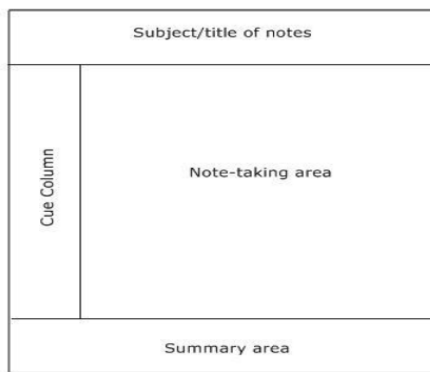
Figure 1: Cornell System of Note Taking

2.1.2 Two Column Method

This is another popular method of note taking in Nigeria which is similar to the Cornell method. In this method the page of the notebook is divided into two columns with keywords or ideas recorded on the left column while the corresponding explanation or discussion of the keyword is presented in the right-hand column (Chukwunke & Chikwenze, 2012). This approach enables easy scanning of note in locating specific information. Nevertheless, the student must be attentive throughout the lecture to enable capture essential information.

2.1.3 Outlining Method

This method is popular among students in Nigeria. It entails taking note with short sentences comprising of many heading and sub-headings as may deem fit by the students (Unit, 2009). These short sentences help to organize the students understanding of the lectures and ideas in an indent format structure in such a way that the general idea on a topic is captured in the first sentence or indent, followed by supporting information in the second level indent. Other indents may also be included to further provide supporting information that will aid the student understanding after the lecture. It has the merit of easing review process by converting main points into questions as well as minimizing editing of notes. However it requires more thought in class for accurate organization and difficult to used when the lecturer talk fast.

2.1.4 Charting Method

This is another popular notes taking method among students though rarely used by students in Nigeria higher institution. this method entail the student dividing the page of the note into rows and columns that is taking note in a tabular form with each column carrying different headings pertaining to the topic that will be covered by the lecturer (Bano & Abdulhameed, 2007). This approach has the merit of assisting the students to extract the most relevant information from the lecture, minimize the amount of writing necessary by the student during lecture, providing easy way of examining comparison and relationships that exist between certain topics or ideas as well as aiding review and facts memorization by students. However, it can be a hard system of note taking to learn and used. More so, there is need for the students to know the content that will be covered by the course lecturer before the class begins.

2.1.5 Mapping Method

This is a popular note taking approach that is commonly used among students of higher learning in Nigeria. It entails the student using various minds mapping approach or spider diagram with the intent of recalling all important points in the lecture delivered. Usually, the main theme is at the centre while all other ideas are linked as branches around the theme (Meleisea, 2009). It has the advantages of enabling the students to visually keep track of the lecture by maximizing active participation, it also minimize the level of thinking needed by the students to establish relationships between ideas and also ease the process of note editing and probably adding colours if necessary. Nevertheless, it is difficult for the students to be able to track changes in the content of the lecture from major points to facts.

2.1.6 Sentence Method

This is the most popular method of note taking in Nigeria higher institution. It involves noting every new thought, topic or fact on separate lines numbering each point as you progress (Bano & Abdulhameed, 2007). It provides a more organized way of recording most of the information in the lecture, and also helps when there is a lot of information to be recorded by the students without knowing how each idea fit together. However, it is difficult to edit note and differentiate between major and minor points.

2.1.7 Tape Recording Method

This approach of note taking is gradually becoming popular among Nigerian higher institution students as it enables students to record the lecture directly as it is being delivered using phones, Laptops and other tape recorder (Unit, 2009). It enables the student to concentrate on listening during classes as they can form their note afterwards by listening to the recorded lecture, it also helps record a more complete and accurate notes and facilitate effective reviewing of the materials. However, student may be bored and lose concentration during lecture.

The Cornell method helps organized notes, aids in identifying key word, concepts and serves as a quick study guide for exams. However, it requires good listening and writing skills by the student. The two column method enables easy scanning of note in locating specific information. It has a disadvantage of requiring the user to have good listening and writing skills by the student. In the case of the outlining method, Ease review process by converting main points into questions as well as minimizing editing of notes. This method requires more thought in class for accurate organization and difficult to used when the lecturer talk fast. Charting method minimize the amount of writing necessary, provide easy way of examining comparison and relationships that exist between certain topics or ideas as well as aiding review and facts memorization by students. However, it can be a hard system of note taking to learn and use. Also, there is need for the students to know the content that will be covered by the course lecturer before the class begins. The mapping method enables the students to visually keep track of the lecture by maximizing active participation, minimize the level of thinking needed by the students to establish relationships between ideas and also ease the process of note editing. It is difficult for students to be able to track changes in the content of the lecture from major points to facts. Sentence method provides a more organized way of recording most of the information in the lecture, and also helps when there is a lot of information to be recorded by the students without knowing how each idea fit together. In this method, it is difficult to edit note and differentiate between major and minor points. The tape recording method assists the student to concentrate on listening during classes as they can form their note afterwards by listening to the recorded lecture. It also helps record a more complete and accurate notes and facilitate effective reviewing of the materials. However, student may be bored and lose concentration during lecture.

3.0 METHODOLOGY

The methodology adopted in the design and implementation of the e-slate is presented herewith.

3.1 DESIGN OF THE E-SLATE DATABASE SYSTEM

The overall system consists of a remotely located database system connected via GSM modem. The database was developed to contain all the training materials including e-class in different languages, e-resources that enhance reading ability. The database was linked to the internet for access in the targeted communities. The block diagram is as shown in Figure 2.
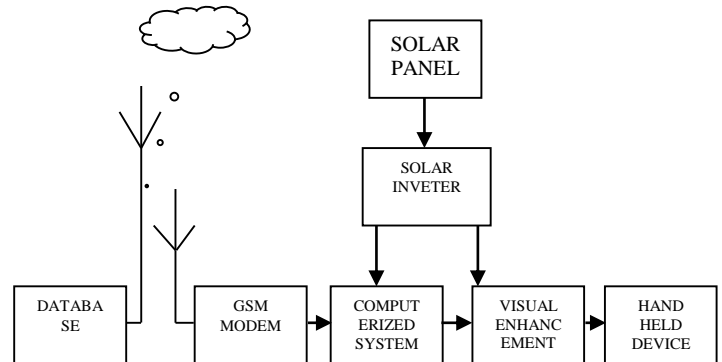

Figure 2: Block diagram of the overall system.

3.2 IMPLEMENTATION

The handheld version of electronic circuits was designed and programmed to have the capability of connecting to the internet.

In essence, the E-slate has books that contain some set of questions that needs correct answers. When the book is placed on the logic sensors, the logic sensors represent the options to the questions in the slate book.

The circuit diagram for the electronic part of the system is shown in Figure 3.
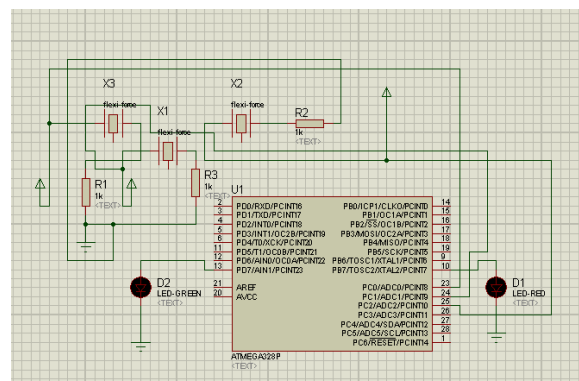

Figure 3: Electronics circuit diagram for E-Slate

By placing the questions in the slate book on the sensors and E-slate shown in Figure 3, the students could made their answer choices as either A, B or C, and hence the corresponding sensors is been pressed. The micro-controller however, has a SD –card on, it where there correct answers are been stored. So when a correct answer is chosen, the E-slate displays the green LED, which signifies the right answer choice, but when the wrong answer choice is been chosen, the Red LED is been displayed to signifies that the choice of answer was wrong. So the process could be repeated for any subject of multiple choices. The whole system is shown in Figure 4.
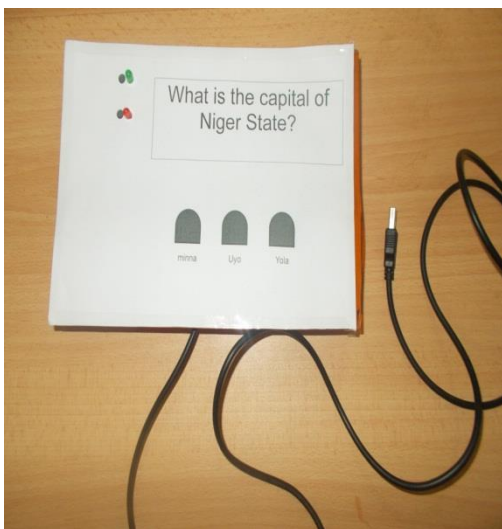
Figure 4a: E-Slate system

Figure 4b: Question placed on E-Slate

4.0 CONCLUSION

Multimedia is very vital tool to teach in the society. There is need for Nigerian education system to incorporate teaching with aid of multimedia and curriculum should have such element. In this work, the development of E-Slate for learning and reading in Nigeria has been presented. The device is a low cost device that can be adopted around the world for teaching in remote locations.

5.0 REFERENCES

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