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A study on the significance of computer aided lesson planning in education

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Abstract

This research work was carried out to develop and validate a computer instructional package on secondary schools. The package was produced in an html format using Macromedia Dreamweaver as the overall platform. Other computer programs utilized during the development process are: CorelDraw suit 12, Microsoft Word 2003, Macromedia Fireworks 8, and Macromedia Flash 8. The validation of the package was carried out in accordance with the recommendations of Dick, Carey, & Carey (2005). In the end, the package was found to produce a very good performance level in the students when used for instruction.

The computer has witnessed a wide range of applications in virtually all human endeavours. It has also found its way into the classroom and educators now look in its way as a panacea to prevalent pedagogical challenges. Researches have indicated that appropriate use of the computer for science instruction facilitates teaching and learning.

Keywords: Computer; CALP; Education System

1. Introduction

The use of computers has dominated human activities especially in last two decades. Its use is complemented for a whole lot of teaching practices, all of which are now collectively regarded as Information and Communication Technology (CALP). Consequently, the first item that comes to mind when CALP is mentioned is the computer. Simply defined, the computer is an electronic device used for storing, processing, and retrieving information at high speed and accuracy. The global adoption of the computer has been the landmark of the educational scene for the last two decades. The adoption of the computer into education has often been premised on the potential of this 'new' technological tool to revolutionize an outmoded educational system and as such better prepare students and the average citizen for the information age, and or accelerate national development efforts (Albirini, 2006).

According to Harvey (2003), the effectiveness of the use of the computer in education is an important factor in determining which countries will succeed in the future, and central to this vision is the powerful metaphor of the 'information age' where media, business and industry become increasingly computer-reliant. The computer has not only witnessed a wide range of application in virtually all human endeavours, it has also actually transformed the world into a global village in such a manner that its contribution to human development over the years can not be overemphasized. The computer plays a central role in information data collection, processing and dissemination. It is so much involved in CALP such that its exclusion may give another meaning to the acronym 'CALP'. Thus, the use of the computer is invading the educational system in a way unparalleled in previous education history (Onasanya & Adegbija, 2007). However, the digital divide existing between Africa and other continents of the world is responsible for the low level of computer utilization in education in the continent.

Jager and Lokman (2009) listed the general functions of the use of CALP in education to include the use of CALP as a tool for organization and management in schools. Also, Ojo (2005) listed the potential benefits of CALP in Sub-Saharan Africa to include the use of CALP for educational purposes. Further still, Yusuf (2005) stated that CALP provides opportunities for schools to communicate with one another through e-mail, mailing lists, chat rooms while at the same time providing a quicker and easier access to more extensive and current information.

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Besides, it can also be used to do complex mathematical calculations. Yoshimura, Sagakami, Fujikami, and Newbold (2004) asserted that Computer Aided Lesson Planning (CALP) when used to complement the conventional teaching method, would encourage teaching and learning. They concluded by stating that teaching should be advantageously innovated by the use of the computer in association with practical experiment. According to them, CALP can be used to run beforehand learning for practical experiments in teaching and it has been found to be educationally effective. Efforts made so far by the government towards CALP development include the launching of the National Telecommunication Policy, development of a comprehensive science and technology policy, the development and launching of the National IT policy, the establishment of the National Information Technology Development Agency (NITDA).

Other efforts made are: the granting of license to mobile telephone network operators beginning with MTN, development of a ministerial initiative on e-education and the organisation of computer training for teachers across the country by Educational Trust Fund (ETF).

The Provision of an appropriate framework for the full integration of CALP into the education system of a developing nation. One would have expected education to be treated distinctively like the other sectors therein, so that there are clear cut policy statements to guide stakeholders. It is to be noted that the document does not give any emphasis on the development of indigenous software that are in tune with the educational needs of Indians, neither does it address issues of its incorporation into teacher training, classroom instruction and evaluation. The policy listed nine major strategies for realizing the objectives of applying IT in human resources development, one of which is 'making the use of IT mandatory at all levels of educational institutions through adequate financial provision for tools and resources'. While these noble strategies are applauded, the implication of the inadequacies in the document is that the National IT policy cannot adequately take care of the need of the Indian education system (Yusuf, 2005). Perhaps it would not be out of place to say that India is yet to actually have a national policy on the integrations of CALP into her education system'. This document was an approval in principle for e-education project for the education system. It did not take the place of a national policy on CALP in education. The document listed the major objectives of e-education as follows: 1. To enhance access to quality education. 2. To improve the education delivery system. 3. To ensure optimal utilization of existing CALP resource. 4. To ensure a globally competitive education system, and 5. To reduce / eliminate social vices in the school system.

The document appraised e-education worldwide and made a case for the education system to adopt e-education. It however rationalized the need for e-education while at the same time highlighting the strategies for its adoption. The strategies proposed are: policy enactment, capacity building, advocacy, and curriculum review. It was reported that there was a considerable increase in the percentage of schools connected to the internet, and there was an increase in the percentage of teachers that feel confident on the use of the computer.

Purpose of the study

The main purpose of the research was to transform the content of the secondary school curriculum into a computer software, and then package it into a CD-ROM which could be used for teaching and learning at that level. The package has been termed Computer Aided Lesson Planning (CALP). Validation of the software was done to ensure its suitability and effectiveness in enhancing the teaching and students' learning of computer. Specifically, this study sought to find out: 1. whether the subject matter content of the developed Computer Aided Lesson Planning (CALP) sufficiently covered the required areas of teaching in appropriate and sequential manner. 2. whether the design and development of the CALP conformed with acceptable standards of educational technology. 3. the performance level of students in when taught using the CALP.

Methodology

This study is based on the theoretical foundations of instructional design as provided by the Dick *et al.* model (2005), and the social constructivist learning theory. Both approaches represent a range of diverse interests and methods but also general assumptions about learning designs (Richards, 2005).

An important branch of cognitive psychology that impacts very much on the Dick *et al.* model which was adapted for this study is constructivism. According to the trio, constructivism has had a major impact on the thinking of many instructional designers. A central point in constructivism is that learning is always a unique product "constructed" as each individual learner combines new information with existing knowledge and experiences. Individuals have learned when they have constructed new interpretations of the social, cultural, physical and intellectual environments in which they live. A primary role of the teacher therefore is to create appropriate learning environments in which students' learning experiences are authentic representations of real practices in applied settings (Dick *et al.* 2005).

Bearing in mind the basic principles of constructivism, attempt has been made in this study to create appropriate learning experiences for the students through the CALP that has been produced. In other words, the interactive property of the CALP, coupled with the simulations provided in it were aimed at providing learning experiences that would enhance memory retention and improve students' performance in examinations.

Consultant (Expert) validation:

The original copy of the instructional package CALP was given to two computer experts, and two educational technology experts all of whom were purposively selected, to go through for their appraisal and criticism. Their responses were qualitatively analysed and necessary corrections as recommended by them were taken into consideration in producing the final version of the instructional package.

One-to-one validation:

This validation was carried out to provide the researchers with a first hand glimpse of the feasibility of using the CALP for instruction. Five randomly selected Senior Secondary School II (SII) science students formed the subjects for this stage of validation. The subjects were guided to navigate through the entire package, after which they were taught

selected sub-topics using the CALP. The entire process was carried out during a double class period which lasted one hour, forty minutes. The researchers looked out for evaluation criteria such as sentence complexity; illustrations and demonstrations, how easy or difficult the students learned using the CALP, how satisfied the students were and the ease with which they operated the software program. An oral interview was conducted for the students at the end of this stage using Students' Interview protocol. A report of the outcome of the one-to-one trial validation was made through the researchers' observations and the oral interview that was conducted at the end of the trial. Conspicuous pitfalls in the CALP, as revealed by this stage of validation were addressed by revising the CALP, in accordance with the researchers' report from the one-to-one trial. For instance, the software and hardware requirements for operating the package were made the first page of the package.

Small group validation:

This stage of validation was aimed at determining the effectiveness of the changes made to the CALP after the preceding one-to-one validation. The school was purposively selected based on the fact that the facilities for which the study could be carried out were available there. The permission of the principal was sought to conduct the study. Ten (10) randomly selected Senior Secondary School II (SSII) science students participated in this stage, which was conducted in the school's computer room. The students were guided to navigate through the entire package, after which they were taught the same selected sub-topics as in the one-to-one validation stage, with CALP as the instructional tool. The instruction was done over a period of two hours but there was a ten minutes break at the end of the first one hour. The researchers took note of problems encountered during the lesson, as well as the impact the CALP made during and after the instruction.

After the instruction, Students' Response was administered to the students who were to respond in writing. The questionnaire was retrieved from them immediately they finished with it. The qualitative data obtained from the students was critically analysed. Percentage was used to analyse the quantitative data obtained from the students in their responses.

Expert validation

Two categories of experts were involved in the validation of the CALP. They were: computer, and educational technology experts. Validation by computer experts was based on the following criteria: typography, legibility, navigation, interface, simulations, functionality, packaging and durability. Two computer experts were involved and they were of the opinion that the typography of the instructional package was good enough. They recommended that some of the font sizes should be increased but also noted that the legibility of the content of the package was good. They also stated that the navigation was good. While one of the experts emphasized that the overall interface of the design was very good, the second expert stated that it was user friendly.

They both claimed that the simulations were good, and that the links worked well in terms of functionality. The packaging was judged to be excellent by one of the experts, while the other said it was good. They also both emphasized that the package was durable considering the storage media that was used.

Validation by educational technology experts was based on the following criteria: simplicity, unity among illustrations, emphasis on key concepts, colour use, and text. Written responses and verbal contributions were obtained from the two experts. The two of them stated that the concept of teaching has been very well simplified even though one of them suggested the inclusion of audio explanations in some cases to further enhance individualistic learning. They both expressed that there was unity among the illustrations. However, while one of the experts believed that key concepts were sufficiently brought to the fore with simulations of the movement of ions within the electrolytes, the other expert recommended more emphasis on key concepts. Furthermore, one of them agreed that the colour use was appropriate while the other suggested a change in some of the background colours.

One of the experts also said that appropriate texts were used, while the other recommended that the font size of some texts should be increased. In an overall judgement on the package, one of the experts stated that it was an innovative development in the design and validation of instructional packages. The other expert stated that the package could enhance learning especially if the little details he had expressed concern about were appropriately implemented. On the basis of the comments and suggestions of the experts, some text fonts were increased, while some background colours were also changed. During the review of the package after expert validation, some text fonts were increased, and some background colours were changed as recommended by the experts.

Conclusion

The results obtained from the analyses of the data gathered in this research indicated that the content of the Computer Aided Lesson Planning (CALP) as developed covered the aspect of the secondary school adequately and that it was also sequentially arranged. The result further showed that the package conformed with acceptable standards of educational technology.

Besides, the performance level of students when taught using CALP was very good. It is hoped that the utilization of this package for instruction in our secondary schools will enhance the understanding of the topic, and hence improve students' performance in their Senior School Certificate Examination. Based on the findings of this research work, it is recommended that computer instructional packages such as the CALP should be produced for all the other topics in the secondary school curriculum, especially the difficult ones. This could be cooperatively done by teachers, researchers, students, or educational technologists.

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