ENHANCING LEARNING IN TERTIARY INSTITUTIONS THROUGH MULTIMEDIA BASED COURSEWARE

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ABSTRACT

The use of multimedia courseware in conducting classroom teaching in our tertiary institutions is imperative. Using a powerful combination of audio, full-motion video, text and colorful graphics, courses from the Interactive compact disk read-only memory (CD-ROM) makes students take more proactive role in acquiring; analyzing and synthesizing information. This mode of learning will bring about better students' performance. This paper discusses multimedia courseware on compact disk read-only memory as one of the most convenient and cost-effective courseware re-engineering methodology of our age. A brief summary of the steps required to produce a multimedia courseware is also provided. Also discussed are the reasons for converting classroom courses to e-learning format. The general advantages and disadvantages of this approach to learning is also discussed. Students will have the liberty to go through the same lecture as many times as they wish and also at their individual pace. Lecturers on their own will have more time to attend to student problems.

KEYWORDS: Courseware, e-learning, enhancement, institution, multimedia

1.0   INTRODUCTION

Advancement/affordability of computer and communication devices, during the past decade, have had major effects on our everyday life. This technological advancement has made our present day society to become highly interactive and has also brought a new dawn to information transfer; a system that is gradually taking over the traditional method of doing things in all aspects of human endeavor. This has also made it possible to see, speak to, or exchange information in full multimedia (text, audio, and video) in real time. Although, computers and their applications have enhanced the quality of many aspects of life but, their impact has been minimal in classroom lectures. The integration of new technologies into classroom teaching has not been very prominent in our country. This may be because some educational administrators will want to know if these technologies are legitimate teaching tools and if used in teaching can produce better output. This study helps to answer such questions and also reveals how these technologies will help generate higher learning results. An interactive multimedia tutorial package could be of tremendous benefit to students. The use of magic boards is a very good multimedia teaching method. Magic boards aims at augmenting a perfectly ordinary whiteboard-like surface with electronic capabilities, via a video projector and a pan / tilt / zoom camera (Mynatt, E. D. and Igarashi, 1999). The user works on the board as in the usual way, drawing or writing with ordinary marker pens. Whenever she chooses, the user can "grab" an electronic copy of the things that have been drawn or written with the marker pen. This copy is projected back onto the board, precisely overlaying the original markings with the appropriate color. The multimedia courseware could also be used as an effective learning tool for independent/long distance education. It is also believed

that to complement the traditional learning methods with e-learning will be of immense benefits to our students and teachers in general.

2.0   Existing system

The existing system is the traditional approach to learning. In the traditional approach, students learn new knowledge and skills by attending classroom lectures and practical lessons. It also involves reading related materials in the Internet developed by teachers and students. The traditional approach to learning fosters immediate feedback through instant response by the teacher in the classroom since such a method is synchronous in nature. Teachers also stand on a better ground to make immediate contributions to student's problems. Students on their own feel more at home since the teacher is standing face-to-face with them.

2.1   Limitations of the Existing System

The existing system though good is not without some limitations and deficiencies, the traditional classroom method of teaching gives room for corruption. This approach fosters academic commercials whereby students must buy often at exorbitant prices, perhaps ill-prepared textbooks or handouts or fail the affected course no matter what one writes in the examination hall, in this way only a few are favoured. Alternative methods of learning are not provided for the others. Again, in this approach, everybody in the classroom is being forced to learn at the same pace which of course is not the best in most situations. The web-based approach seems to have some advantages over the conventional textbooks and lecture notes, but it also has some deficiencies. Courseware being presented on the web does not adapt automatically to individual students (Lewis and Erin, 2007). Access to courseware materials

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on the web is relatively slow. For web based courseware, interactivity must be programmed using computer graphics interface for easy interactions. Furthermore, features of web processing (caching and client side information hiding) interfere with collection of student performance data (Lewis and Erin, 2007).

2.2 Learning through Self-Paced Multimedia Courseware

The rapid pace of technological advancement in the area of information and communication technology has brought a change to the way people think, work, and do business. E-learning has become a platform that information and communication technology employs to enhance teaching and learning in the educational sector. The Internet and the web, compact disk read only memory courseware, and other forms of online content uses e-learning to enhance learning. Each of these forms of e-learning is achieved by developing good and workable courseware.

2.3 Definition

By definition "Courseware" is a term that combines the word "course" with "software" (Judiette and Geraldine, 2007). Its meaning was used to describe additional educational materials intended as kits for teachers or trainers or as tutorial for students usually packaged for use with a computer. These days, courseware refers to the entire course and any additional materials. Courseware may contain one "class" or could bundle together the various lessons, test and other materials needed.
Re-engineering on the other hand could be defined as " the examination and alteration of a subject (courseware) to reconstitute it in a new form and the subsequent implementation of the new form" to make for more efficiency in the subject matter.

2.4 Reasons for Converting Classroom Courses to multimedia courseware

There are some reasons for converting classroom courses to e-learning materials.

- **Visualization and Modeling**: Online learning appeals to different learning methods because, it is easier to understand complex subjects using visual representations. There is that possibility of seeing different things because of the different perspective that graphics brings them (Inyiama and Mmue , 2008)
- **Resources:** Access to the Internet gives a wide range of topics and media which facilitates different learning styles. Use of computers and the Internet enable learners to become researchers more easily because learners can have direct access to the resources and data.
- **Communication**: Online learning builds in the learner the ability to link people with minimum delay while studying, because there is a global dissemination of information (Inyiama, H. and Mmue, F., 2008) .

- **Convenience in learning:** E-learning enables students to learn at their own pace and at the time more convenient to them.
- **Profitability**: It costs less to produce and distribute a compact disk read only memory or discrete versatile disk than to print and sell textbooks.

2.5 Factors that must be considered in Designing multimedia courseware

On a general note, some key points need to be considered in the design process. The most important requirements are that the product should be user friendly, and interactive. This means that one needs to give special attention to the design of the information icons in a courseware package so that almost no familiarity with multimedia software is assumed and at the same time provide an interactive environment. Other requirements are the size of the page and the text, text colors, product resolution and graphics quality. Page size and text fonts are important consideration as the package will be used as lecture resource. (Boling, E and Kirkley, S, 1995)
Furthermore, In order to come up with a good courseware, Faradouly suggested that there are some questions one needs to ask which are:

- Who are the learners? What do they need to learn? In what environment are they and what do they already know.
- What are the goals set by the teacher to achieve with the instruction? The teacher should clearly define the goals and objectives.
- What skills, attitude and knowledge are you trying to develop?
- How will content of the courseware be structured?
- What strategies might be used in the development

Research has shown that answers to these questions help a courseware developer to come up with a good courseware.

2.6 The rationale for using compact disk read only memory (Cd-rom)

Nowadays most e-learning is full multimedia. Multimedia frequently offers multiple elements simultaneously; it embraces text, animation, video, sound, hyperlinks and so on.

- By using a multimedia devices (e.g compact disk read only memory), audio and visual representations are captured clearly. Information containing audio and visual representation of the targeted concept helps students to understand the subject matter or a topic. With the help of animated graphics and visual demonstration carefully programmed in the compact disk read only memory, it will help students to grasp the idea conveyed by the respective concepts. (Julutte, D. G and

Geradine, T. S 2001).

- By using verbal words accompanied by visual simulations, students would not have to imagine the concepts based on scarcity since additional and helpful resource would be available in the courseware with the click of a button. A step by step guidance in the courseware can help the students learn systematically and apply it accordingly. (Hartley J.R et al, 1999).

- Since compact disk read only memory will be owned individually, each student can learn according to his or her own pace as they can choose to go further whenever they prefer to by clicking forward or even go back to the previous page for revision purpose or to reestablish their understanding of the concept (Boling, E and Kirkley, S. ,1995).

- Since compact disk read only memory is not expensive and will be owned by individual students, teachers will save more time as they would not have to always be in the classroom or constantly supervise the students during exercise session. In a way, this courseware would help lessen the teachers' burden whilst teaching the course since the course may include numerous theories and concepts that the teacher would have spent a lot of time explaining, thus using the courseware will enable teachers to reinforce the educating process. (Brown T., 1997)

- compact disk read only memory also has huge capacity that allows the developer to insert huge numbers of files including animations and other multimedia files so that it can be integrated to produce a high quality and effective teaching aid. (Grant, S. G and Vansledright , B. 2001).

- The use of compact disk read only memory enables courseware developers to develop courseware that adapt automatically to individual students unlike the Internet which the students must struggle on their own to sieve out the class of information that are relevant to

them. (Torrisi and Davis, 2000)

- It has also been established that compact disk read only memory is easy to use, more durable than some other secondary storage media and is also easy to store. (Grant, S. G and Vansledright , B. 2001)

2.7   The Changing Role of a Teacher

Based on the fact that e-learning is becoming prominent in our educational system, the role of teachers is fast changing.   Innovation of multimedia also offered a helping hand in determining the present role of teachers. Application of constructivist theory to the design of courseware multimedia now aims at engaging the learners in the active exploration and construction of their own knowledge (Juliette and Geraldine, 2007). Nowadays, most interactive multimedia materials forces focus on the characteristics of the learners rather than the teacher's role (Biggs, 1999).   The teacher's role within the multimedia arena may be seen then, as managers of knowledge, a facilitator who provides advice in exploration, a guide, a helper and an assistant (Prosser and Trigwell, 1999). Goldman and Hocking (1999) found that in their sample, nearly all teachers who used web-based materials and multimedia courseware on compact disk read only memory believes its usage motivates students in their learning and since using it, nearly half of the teachers had changed their teaching techniques.

3.0   Methodology and System Design

Each lecturer prepares his lecture materials just like in the traditional classroom methodology and the lecture is customized and recorded on compact disk read only memory using a pre-formatted template. The system is usually designed using top-down design methodology. Each course is divided into lessons. Each lesson in turn is divided into sections. Sections are also divided into modules. The structure of a typical courseware on a topic is illustrated in figure 1
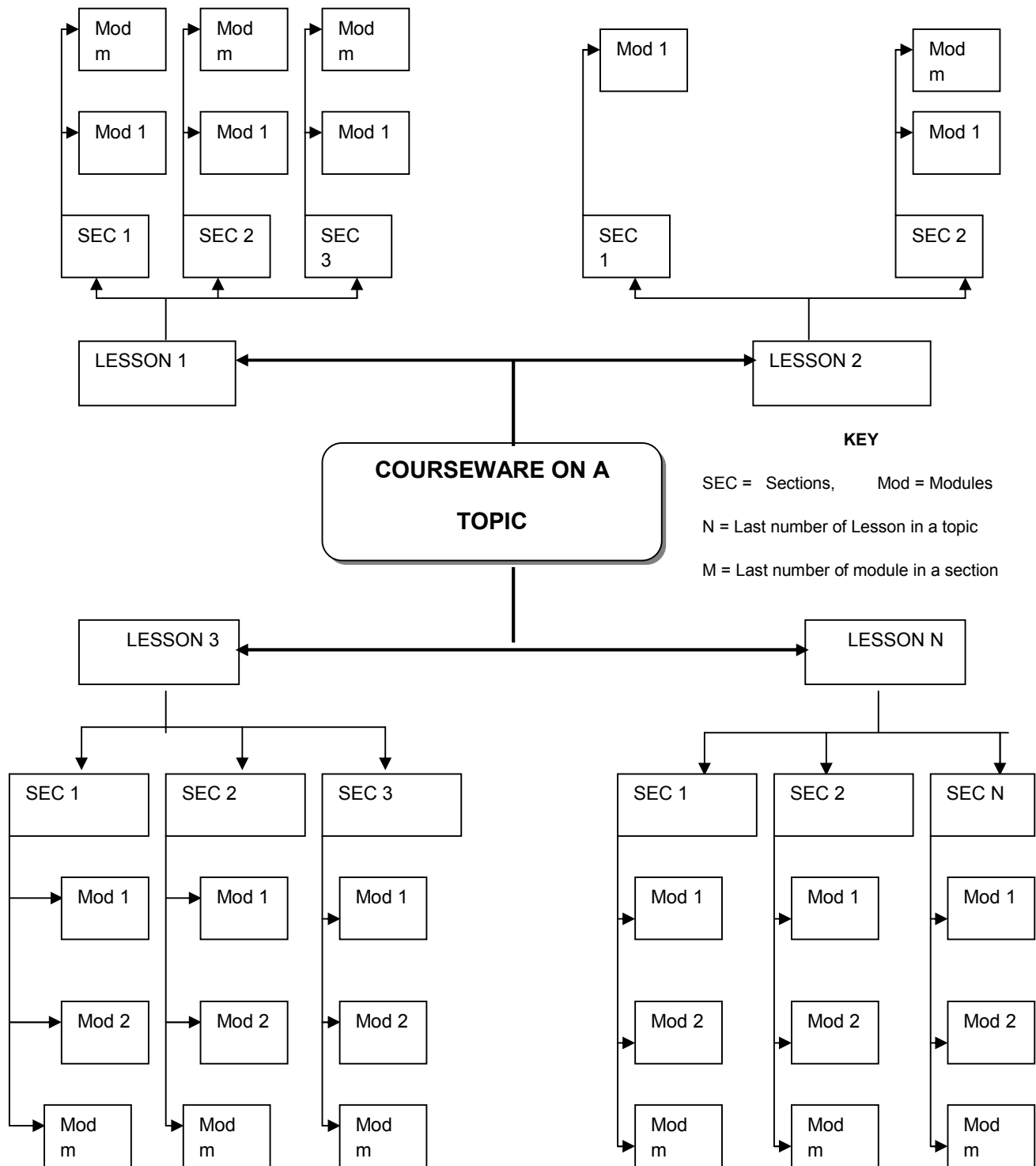
Figure 1: A Typical Courseware Structure on a topic

Figure 1 above illustrates a typical courseware structure on a topic using the top-down design methodology. A particular topic in a subject matter is broken down into several lessons. The number of lessons depends on the nature of the topic. Each of these lessons is in turn broken down into smaller units known as sections. A section teaches a particular aspect of the topic. For better understanding, some sections are again structured into yet smaller units called modules. The topic, lessons, sections and modules are made to connect one another in hyperlinks such that a user can easily navigate through them without much difficulty.

3.1   System Design Specification

The design of the multimedia was done using the theory of constructivism. This theory engages the learners in active exploration of knowledge. Compact disk read only

memory (CD-ROM) was used to record the courseware. The CD-ROM covers appropriate content, objectives, goal strategies, resources, concepts and skills relevant to the subject matter. Each subject on the CD-ROM is estimated to take students about 48 hours to complete. This is equivalent to a semester of face-to-face teaching of 16 * 3 hours. The scripting of each of this subject is estimated to take 1,000 hours and design took about 1,000 hours. Each subject includes a reasonable number of modules, each containing a varying number of sub-modules.   Students are required to proceed through this courseware on CD-ROM at their own pace, and respond to the variety of questions attached.

4.0   Analysis of CD-Rom based courseware

The proposed system is a full multimedia courseware in CD-ROM. The CD-ROM should include two semester-long subjects for undergraduate students. Each subject on the CD-ROM is estimated to take students about 48 hours to complete. This is equivalent to face-to-face teaching (i.e. 16 weeks * 3 hours). The scripting/customization will take about 600 hours. The CD-ROM includes an object oriented languages (with particular reference to visual basic.net) curriculum for 300/400 undergraduate students undertaking a bachelor of science in computer science department of Ebonyi State University, Abakaliki. In addition, the course lecturer organizes 2 or 3 lectures per semester. This is usually a period when the lecturer proffers solution to student's problems which they could not solve on their own. The courseware is customized such that they are self-test assignment attached to each lesson. These assessments are such that they are computer-marked. The total number of marks gained by each student will at the completion of the 12 modules, be converted by the computer to a percentage and delivered to the course lecturer. On the other hand, at the end of the semester, online exam based on the courseware will be organized centrally which is coordinated by the course lecturer.

4.1   Usage/Implementation

This multimedia courseware approach to learning is not meant first to replace classroom lecturers. Initially, the teacher would use about two face-to-face contact sessions to summarize the course module and then each student is allowed to progress through the ITS courseware after the face-to-face teaching. Assessment may be organized and carried out by the lecturer at the end of the semester in one face-to-face contact session. When students are used to the computer-mediated approach, the face-to-face approach can be dropped totally. At present, multimedia courseware approach is meant to enhance classroom lectures. Lectures will be put together by lecturers from different departments and faculties and the courseware will be portable in a way that they can be accessed by the students at the computer laboratories and used at the state-of-the-art classrooms (Oakley, B. and Roy E., 1994). A typical courseware lecture will include topic, scanned pictures that are related to the topic, a short video scene or slide show, simulation results of the theoretical concepts or

examples that are being discussed, bibliography of the new concepts, and interactive examples on which students can perform calculations and/or simulations. This approach will allow us to develop courses that have a richer and more exciting learning environment than before. The outcome should be a user friendly portable multimedia package of lectures enriched with information and excitement. Huston and Heimeke noted that a typical courseware package is software independent, meaning that the students need not have access to multimedia or simulation software to use the package. The package will be a series of executable (*.EXE) files that can be run under Microsoft Windows environment

4.2   Advantages of CD-ROM based courseware

The advantages of CD-ROM based courseware include among others the following:
1.   Individual students learn at their own pace. This makes for better performance since speed of learning differs.
2.   The multimedia technologies effectively empower students to take more pro-active role in acquiring, analyzing and synthesizing information.
3.   Multimedia courseware also has the potential to foster high level interactivity that distinguishes it from older technologies such as projectors, radio and television.
4.   Multimedia courseware adapts automatically to individual students.
5.   Access to courseware materials is faster. This is because unnecessary network delays are avoided.
6.   Lecturers will have more time for the student and for research, since they must not have to be in the classroom everyday.
7.   Self-evaluation gives students a sense of accomplishment and further instills responsibility for learning.
8.   Students develop a more in-depth understanding of the subject matter.
9.   Due to the multimedia nature of the courseware package; short video scenes, scanned pictures or connection to other software packages; it will produce a dynamic learning atmosphere.
10 Moreover, the combination of such communication tools and courseware lecture packages can be used to establish an effective long distance educational system.

4.3   Disadvantages of CD-ROM based courseware

CD-ROM based courseware is not a perfect system. There are some deficiencies and disadvantages:
1.   The multimedia courseware in CD-ROM when used alone to learn, lacks the dynamics of face-to-face human engagement, during which the teacher can respond to learner's need on the fly as learning unfolds.

2. Learners now have the responsibility to digest and assimilate the subject matter with just little help from the course lecturer.

3. Another great portion of the disadvantages that are associated with a courseware is in the production part. Basically, producing a multimedia courseware is a time consuming and an expensive project.

5.0   CONCLUSION

Re-engineering the learning process by developing multimedia courseware on CD-ROM will help make students not only to acquire the knowledge but also to develop information handling, planning, supervising, and scheduling and management skills. This approach to learning will help students to master their subjects beyond the level of mere recitation. The multimedia courseware approach to teaching and learning will also help to shift control for learning to the learners, enhance motivation, and increase expectations of what students can learn. It will also help to build interdisciplinary connections. Another implication of this approach to learning is that it has the potential to enhance individual growth to a level of quality as learning becomes an activity. This level of individual growth is rarely experienced in the traditional approach. We therefore recommend that all lecturers in tertiary institutions should try this methodology.

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