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Design and Implementation of Web-Based Courses for Distance Learning Programme in Nigeria

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Abstract

Open education has come to stay as a sandwich or satellite campuses programs in tertiary institutions. This open education kicked off with the use of text, radio, television as tools for implementing it. Advancement is made because of progress in technology so the use of internet and video conferencing. To implement distance education (DE) is our institutions, there are three options. According to Keegan (2000), these options are:

- *Renting a kernel from any of the leading providers*
- *Adaptation of the existing kernel for use*
- *Developing of one's system.*

With the first option, an institution that wants to deploy and deliver courses on the web within a minimal delay gets a system with generalized and non-modifiable functionality. In the second option, the kernel is customized and adapted to meet an institution's requirements but most a times the kernel may not be able to cover all requirements. This paper concentrates on the third option, which is more reliable. Here an institution wants to include certain features that are peculiar to their environment as far as course delivery is concerned, as opposed to the other two options when an institution want to follow an already established course delivery pattern. This option is also, desirable when an institution wants to address more than 10,000 students.

Keywords: E-learning, Web, Server, Implementation

Introduction

The influx of people in quest for higher education is growing on daily basis. Each year it has been observed that only 20% of the applicants applying for admission in our higher education are offered places in such institution. The remaining 80% are now denied opportunity to have access to higher education. These remaining candidates are left idle and may eventually turn to armed robbery in order to make ends meet. Also owing to this high demand for higher education, admission operators in the country are perpetuating fraud. These frauds are perpetuated using so many styles. At times, people do sit qualifying examinations for others. Some candidates do connive with officers at various admission offices in order to falsify their marks and hence their results. All these activities do culminate in making our

educational system faulty in that most at times wrong people are offered admissions. Also, the continuous adherence to our traditional form of educational methods had created situation where students do not give their best in that they are stressed while travelling to receive their lectures. The problems enumerated above thus call for an alternative form of educational system delivery, which can take care of this demand, hence comes the distance learning. There are two major types of learning namely asynchronous where the learner learns at his convenience while the instructor is not available and synchronous where learning is on-line with learner(s) and instructors interacting simultaneously.

Distance education is known by various names that include home study', off-campus', correspondence study", extra-mural studies", Electronic Learning (E-learning), etc but over time distance education has the same goal. The goal is ability to pass instruction to a learner in a situation that does not require face-to-face meeting between the instructor and the learner. E-learning techniques are increasingly being employed by a growing number of higher institutions in Africa. while most of the on-going distance education initiatives on the continent have been used to upgrade the quality of basic curriculum, some countries are taking bold steps in piloting inter–based and satellite-linked distance educational programs in selected courses(Akanbi and Adegunodo, 2003).

There are many definitions given to distance education. Some of these definitions are given below. The distance education at Capella University in the U.S.A. is defined as the use of technology and innovative curriculum design to create virtual campus that is accessed whenever and wherever it is convenient to the user. Adekoya A,Bada A, Bai X,,Fide M, Ola A (2003), explained that distance education is a web- enabled system that makes knowledge accessible to those who need it, when they need it, anytime, anywhere. At WorldWide Learn Company also in U.S.A. distance education is used as an umbrella term that describes learning done at a computer usually connected to a network, giving the user opportunity to learn almost at anytime and anywhere.

Distance education is also defined as a type of education in which the learner is separated from the teacher (Rumble,, 1986). Holmberg (1986) in his own definition defined distance education as where the learner has a planned and guided learning experience.

Internet and World Wide Web

Internet is the world largest network. Internet is a collection of interconnected networks all freely exchanging information (Stair and Reynolds, 1998). Internet is fully international in scope with users on every continent. However U.S.A. has the most usage so far. As of September 1995, over 80,000 networks were part of the Internet, with 180,000 networks expected by 1996. At least 50 million computers worldwide are connected to it, with a number growing at the rate of over 3 million per month. Internet transmits data from one computer called the **host to another**. If the receiving computer is on the same network to which the first computer is connected, it can send the data directly otherwise the sending computer sends the message to another computer that can forward it. Data are passed in chunks called packets, each of which carries an address of its sender and its receiver. Te set of convention used to pass these packets is known as **Internet Protocol (IP**). Another protocol called **Transport Control Protocol (TCP)** is used in combination with IP for most Internet applications. Any computer that adheres to the above standards is allowed to be a part of the Internet. Each computer on the Internet has an assigned address to identify it from other hosts. This address is in four parts e.g. 124.49.51.33. Most hosts have names, which are easier to remember. The names have multiple parts separated by dots e.g. Common biochip.com can be decoded as follows. The right most component com is the zone which is a commercial site, other zones include

- edu for education sites
- mil for military sites
- gov for government sites
- net for network organizations
- org for organization
- firm for business firms
- au for Australia
- ca for Canada
- ng for Nigeria
- uk for United Kingdom
- us for United States.

Biochip is the name of the company while common is the particular machine within the company

The most commonly used Internet services are e-mail and newsgroup electronic mail standing for e-mail is a way of sending an electronic message between individuals or computers. Newsgroup is essentially an online discussion group that focuses on a particular topic.

World Wide Web (www), is Internet in multimedia form and global connected network of information resources. Collins (1996) posited that this is the most successful educational tool to have appeared for a long time. Keith (1999) opined that the characteristics of web are:

- Hypertext Transfer Control Protocol (HTTP). The heart of **www**, which composes and handles the information that is sent between computers on the Internet using TCP/IP.
- Hypertext Markup Language (HTML), which provides the information, is displayed.
- Universal Resources Locator (URL), which provides the addressing scheme.

The architecture that drives the web is client/server whereby the client (software residing in computer) requests for information from the server. The server will process the request and transfer the information.

Web-Based Course Management System

A well designed Web Management system can greatly enhance learning and according to Keegan (2000), Web-based management system should have the following attributes:

- **Text:** should be made of quality text.
- **Voice:** this is very important in that in several occasion it improves the quality of learning.
- **Graphics:** some aspects of a course are best illustrated by the use of graphics.
- **Assignment submission:** A structure for submission of student's assignments.
- **Assignment correction:** The corrected assignment must have a way of getting back to the student.

- **Simulations:** support for simulated exercises enhances the system.
- **E-mail facility:** This feature will permit student –to- student and student – to- teacher interaction

Web-Based Course Management System Design

A typical e-learning system will have three major modules namely:

- The course development
- System support
- House keeping

Course development: will handle everything that concerns the course content course lesson, and assignments.

System support: consists of module that will take care of activities from enrolment to examination. It will also include student's counselling, and other administrative procedures.

Housekeeping: This is the module that will care of feedback functions between the teacher and the student and between the student and student. The design of a good web-based course system will follow the established system Development Life Cycle (SDLC) phases that include: System investigation, system analysis, system implementation, and system maintenance and review.

All the modules in a web-based course system will involve screen design that will involve menus and at times database interrogation, which are critical to the user acceptability of the system.

User Interface Design

friendliness. The user friendliness as posited by Schederman (1992) is to be measured by five factors that include:

- Time to learn
- Speed of performance
- Rate of errors
- Subjective satisfaction

- Retention over time

Smith and Mosier (1984) offered five objectives for good data displays to include:

- **Consistency of data displays:** There should be standardization of abbreviations, and formats in the construction of menus
- **Efficient information assimilation by the user:** The format should be familiar, and also related to the tasks or expectations of the user.
- **Minimal memory load on user:** the design should be in such a way that it does not require the user to remember the information from one screen for use on another screen.
- **Flexibility for user control of data display:** User must be able to get information in the form most convenient for the task they are working on.
- Compatibility of data display with data entry. The format of displayed information should be clearly linked to the format of data entry.

Other criteria to be incorporated in the design are that pull-down menus should be constructed in such a way as to permit the following.

- Return to the last topic studied
- Selection of the courses
- Select a topic from main topics menu
- Review of the current lesson.

Data Base Design

The data base tables must be normalized for optimal interrogation and processing of the tables by use of ASP, which makes the web pages dynamic.

Conceptual Design of Kernel for a Web Based Distance Learning System

For the conceptual design, there is always a homepage, which is driven by HTML. This homepage will serve as a control page which links to other pages that will handle other functions of the system. The other functions include course delivery, system support, and housekeeping. The system support manages the security aspect of the system like password management. This page is to e driven by the active service page (ASP). The course delivery handles tasks that include course, notes, assignments, quizzes, bulletin board, etc. The house keeping handles course evaluation.

Implementation

The system will be implemented by testing all the modules that make up the system. The system after these tests will be loaded with data i.e. the course materials. The system will now be reviewed using the Internet explorer and published on personal computer by Microsoft personal web server (MSPWS). The website can now be hosted by copying all files and graphics of the web application to a web server connected to the Internet. Unless the institution owns such a server, it will need to find an Internet Service Provider (ISP) who will rent such a space on their own web server.

Benefits of Web-based course Software

Personalized: The instructions here are personalized and are normally customized to meet individual requirements.

Interactive: The instructions exhibited in the new system can truly engage the learner in a give-and-take type of learning that involves simulation of real world events and collaboration with other learners.

Convenient: The new system provides instructions that are convenient for the instructor and the learner. Many technologies are involved in these types of instructions. Technologies such as Internet, videotape and telephone are easily accessed at home.

Effectiveness: Apart from being convenient, it is more effective when compared with the traditional methods of instructions. It is more effective in the sense that in distance education, there is a better student –to-student interaction, teacher-to-student feedback.

Current: In this type of learning, up-to-date materials are always presented to the learners. In other words the contents of the course material are always up to date.

User-Centric: In distance education the primary focus is on the need of the learner instead of on the abilities of the instructor. It allows the learner and student to proceed at his or her own pace and he or she is fee to skip what is not needed.

Availability: There is always availability of materials for the instructions. The learner does not need to schedule in advance in order to access the instructions. Distance education materials are there whenever it best suits your schedule.

Worldwide Access: The Internet can be accessed by millions of people throughout the world. There is no other better way to meeting so many people. This implies that materials for distance education are available for as many people that can access the web provided the individual is registered for a particular course.

Easy Usage: The distance education materials are easy to use and understand. This is owing to the fact that they are browsers enabled.

Limitations

Below are the major limitations to implementation of e-learning

Lack of basic infrastructure (power): There is always lack of constant power supply, as can be seen with our several power outages. NEPA power supply, which is not reliable, can go a long way to hinder students' effort to connect Internet in order to access the lectures.

Lack of basic infrastructure (communications): There is always lack of proper working of telephone and other communications infrastructures in our environment. These infrastructures are not even available in rural areas. The combined fixed and mobile lines in Nigeria grew to 11 million in 2005 raising the country telephone density to 9.2 (www.nairaland.com/nigeria/topic.146.0.html). Telephone density is less than two lines per 1000 inhabitants.

Connectivity: Another challenge to implementation of e-learning is access to connectivity. It is basic that for a student to connect to the Internet, he will

require a computer equipped with the appropriate software that includes word processing, and Internet browser. This is not easily affordable to many students. Other items that might be required by students depending on course type include video recorder. Closely related to these limitations are financial matters.

National Policy: There is also lack of clearly defined national education policy in most part of Africa countries including Nigeria. With exception of South Africa, most Africa countries have not clearly defined their national information and communication policy.

Conclusion

E-learning solutions present live content in a structure that allows self-directed, self-spaced instruction on any subject matter. Also the use of ICT as an enabler of learning has changed it from face-to-face learning to virtual learning (E-learning). The basic foundation to make this possible is creation and deployment of quality courses that will drive the environment. Quality courses are obtained by quality design of these web-based courses. Hence the framework presented in this paper provides options available when one is faced with the task of deploying courses on the web and selection of in-house development as the optimal strategy for the design and delivery of web-based course.

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