ABSTRACT

Distance Learning is a web-based environment that allows students to participate in live teaching and learning events without the need to travel. The aim of the study is to develop a Web Base System for Distance Learning using Federal Polytechnic Ede as a case study. In achieving this aim, the following specific objectives were laid out as follows to design an application that will, provide alternative way of attaining education, facilitate the development of information technology, enhance examination and certification of students thereby improving the standard of education, reveal the use and technology of wireless network to the user, proffer solution to students whom because of nearness to institute and are unable to acquire knowledge that they need, and provide students easier way to acquire any of the Federal Polytechnic Ede certificates without been in the institute or with less difficulty. The methodology adopted in this study is the object oriented analysis and design methodology (OOADM) which is a technical approach for analyzing and designing an application or system by applying object throughout the software development process. The programming language used is HTML, CSS, C#, MONGODB and JQUERY. The reason why web programming languages was used is because, it is platform independent and it is a web based application. This project will be of benefit to: organizations and students, and lecturers. This study will be of immense benefit to researchers who intend to know more on this study and can also be used by non-researchers to build more on their research work. This study contributes to knowledge and could serve as a guide for other study. The expected result is a Distance Learning System that will bridge the communication barrier between students learning and lecturer teaching in a Polytechnic Environment.

CHAPTER ONE

INTRODUCTION

1.1 Introduction

Distance learning is a way for students to access and learn at a university of their choice, either in person or remotely. It can include a mix of face-to-face instruction, online courses, and learning with print and computer-based materials. This means that many students will be e-learners for at least part of their education, using resources such as e-mail, online materials, and computer-based training and instruction. This chapter will provide an overview of the background and purpose of the study, including the problems being addressed, the aims and objectives, the significance of the study, the scope of work, and any limitations. It will also define any technical terms used in the study.

1.2 Background of Study

Distance learning is a way of delivering education remotely, which allows students to learn at their own pace and in their own environment, without the constraints of a traditional classroom setting. It involves the separation of teacher and learner in terms of location, with students having more control over their learning and communicating with their instructors through various forms of technology such as email, video conferencing, and online discussion forums. There are two main types of distance learning systems: online and offline. Online distance learning, also known as a virtual classroom, is a type of learning system in which students work independently and communicate with their teachers and other students online. Offline distance learning, on the other hand, is a multi-campus system in which a university or polytechnic establishes multiple campuses that may be centrally controlled or decentralized.

Education is a process that promotes lasting changes in behavior and helps to preserve, maintain, and improve cultural values, standards, and knowledge. In developing countries, education plays a vital role in promoting innovation and passing on current understanding to future generations. It serves as a platform for introducing people to various organizations, providing skills for daily tasks, leisure, and teaching sound ethics for the benefit of individuals and society. Overall, education is a platform for younger generations to understand their cultural heritage and actively contribute to the development and advancement of society. Historically, education has been delivered in physical classrooms with standardized and regulated classes of students and teachers.

This traditional method of education has consequences for both teachers and students. For example, education is typically only available to those who can physically be in a classroom and follow the instructor at a specific pace. However, the rapid population growth around the world and various educational systems in different regions have presented challenges to this method of education. There is a lack of sufficient human and material resources to meet the needs of the growing population.

Due to the increasing number of school-aged residents in many areas, only a small percentage can be admitted to traditional classrooms. This has led to a high student-teacher and student-classroom ratio, which can be less effective for teaching and learning. As a result, the field of education has become an attractive area for the application of computing systems, particularly since the late 1960s when computers were first introduced into classrooms. Information technologies such as computer-aided instruction, computer-aided learning, research packages, project monitoring, and computerized libraries have been used in education. With the advancements in multimedia

technology, computer networks, and the internet, computers are now being used in distance learning through online and real-time teaching and instruction.

1.3 Statement of the Problem

Students often face difficulties in obtaining necessary education at their desired institution, even when resources are available. This can lead to problems such as students not attending school at all. It is also not practical for students in one country (e.g. America) to travel to another country (Nigeria) for lectures or for staff to travel to students in other countries. When the number of students increases, admissions may be reduced to ensure there are sufficient facilities for lectures. These issues motivated the research in order to find solutions.

1.4 Aim and Objectives of Study

The aim of the study is to develop a Web Base System for Distance Learning using FEDERAL POLYTECHNIC EDE as a case study. In achieving this aim, the following specific objectives were laid out as follows to design an application that will:

1. Provide course material on time and with different media types (audio, text and video).
2. Provide chat room, online exams, upcoming events and grade report.
3. Provide students easier way to acquire any of the FEDERAL POLYTECHNIC EDE certificates without been in the institute or with less difficulty.
4. Proffer solution to students whom because of nearness to institute and are unable to acquire knowledge that they need.

1.5 Significance of Study

Individuals and organizations alike can gain from distance learning. enhanced efficiency: It increases students' productivity because it is interactive.

1. **Improves Standard of Education:** it eliminates examination inadequacies like examination malpractices.
2. **Increased Access:** It enables people from any part of the world to be educated.
3. **Convenience and Flexibility to Learners:** learning process is structured in units; this makes the learner study at his own convenience without getting too bored with lectures.
4. **Reduced cost:** it reduces the cost of learning, examination and result processing institutions.

This study can be used by non-researchers to enhance their research and will be extremely beneficial to researchers who intend to learn more about it. This study adds to our understanding and could serve as a model for future research.

1.6 Scope of Study

The scope of this study's focus is on developing and implementing a web-based system for distance learning that makes use of cutting-edge technology to improve the quality of education at The Federal Polytechnic Ede.

1.7 Limitations of the study

During the course of this study, many things militated against its completion, some of which are:

1. **Time Constraint:** The time frame given to accomplish this project was very short due to school academic calendar and it was carried out under pressure which made the researcher not to implement some necessary features.
2. **Research material:** availability of research material is a major setback to the scope of the study.
3. **Frequent power failure:** This made the researcher append more money on fuel to ensure sustainable power.
4. **Financial Constraint:** Insufficient fund tends to impede the efficiency of the researcher in sourcing for the relevant materials, literature or information and in the process of data collection (internet).

1.8 Definition of Terms

Computer: an electronic device that is capable of accepting data, processing data automatically, store it, produces the result where needed.

Distance Learning: is an act of using IT tools to distribute or share knowledge between groups of learners. It is not going to be physically but the use of electronics.

E–Learning: it is an acronym of electronic learning it is an aspect of Distance Learning that is concerned with sharing of knowledge electronically by use of text video, web or any other IT tools.

File: This is a collection of related records.

VEL: This is the acronym of virtual electronic learning

Program: a set of logical instructions combined together to perform a specific task to a given problem and providing solution to it.

IT Tools: is any machines techniques etc. used in information technology.

Output: result of the processed data by the computer.

Input: data supplied to the computer for processing.

IT (Information Technology): It is combination of computing and telecommunication facility.

Data: raw materials used by the computer.

Information: processed data capable of solving a problem

E-mail: electronic mail, which is an alternative of HIPOST. This is the use of on - line computer to send messages across the net.

Storage Devices: a device for storing data in the computer

Computer Network: it is connection of two or more computers using special protocol such that they share data or information inform of text, audio, messages or mail.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

The review of related literature is the primary focus of this chapter. The current body of knowledge as well as theoretical and methodological contributions to a particular subject are included in a literature review. It demonstrates the current state of knowledge regarding the subject of your writing. It examines the available literature on the chosen subject. The Conceptual Review, Theoretical Framework for Distance Learning, Overview of Constructivist Learning and Distance Learning, and Empirical Review are all parts of the literature review for this study.

2.2 Conceptual Review

Humans are constantly learning new things. To survive in a changing world, a man learns new things every day. This is informal learning because he learns new things every time he interacts with his environment. However, in a formal learning environment, learning begins at home in a credle format and continues in the workplace, school, and universities (Singh, 2011). During the 20th century, learning was restricted to a few narrow categories: This new generation of connected young school students, as well as their teachers, are finding learning to be truly exciting thanks to teachers' professionalism, creativity, and reflection. Students are, in effect, freed from being constrained to a single building, location, or time by virtual learning environments (VLEs).

For the institutional teaching and learning process, the school learning environment provides opportunities for teachers and students to collaborate. Various technological devices are utilized to facilitate this learning process. The internet, e-mail, website, mobile phone, iPod, and other advanced technologies are examples (Mangal and Mangal, 2009). These cutting-edge technologies

are a viable alternative to the conventional educational approach and can be used in a variety of ways to provide useful assistance. This alternative might take the form of online instruction.

According to Turoff (2007), distance learning is a web-based environment that enables individuals to participate in live training events without having to travel to another location. You can listen to lectures from the comfort of your own seat. You can participate in the lab exercises, ask questions, and effectively communicate with the instructor just like you would in a traditional classroom, but you can do so from a desktop computer with an internet and phone connection. The internet, on the other hand, offers teachers and students new opportunities for information assessment, interaction, and communication.

Distance learning is a way of learning remotely through the use of online platforms and video conferencing. It allows people to interact, communicate, and collaborate with each other in an online setting. In distance learning, both teachers and students are usually logged into a virtual learning environment (VLE) at the same time and participate in synchronous instruction, similar to a traditional classroom setting. Distance learning is facilitated through specialized video conferencing applications and can be viewed as an online classroom environment.

According to Turoff (2007) in Mangal (2009:774), distance learning (VC) is a type of online learning that allows you to participate in live training events without having to physically travel to a training site. With distance learning, you can engage in lectures, lab exercises, and receive feedback just like you would in a traditional classroom setting, but from the convenience of your own computer or any location with an internet and phone connection. This can save you the hassle, expense, and travel time associated with attending in-person training.

In another words, Distance Learning could be seen “as the classrooms”, capable of replacing partially or totally the conventional educational, evaluative and administrative functioning of a regular classroom by adopting the advanced computer and ICT technologies like the internet, e-mail, on-line chatting, www, CD-ROMS, DVDs, teleconferencing and video conferencing” (Mangal and Mangal:774).

The use of the internet in education is gaining widespread attention globally and is replacing the traditional method of teaching, which relies on in-person lectures (Olibie, Ezoem, and Ekene, 2014). In this system, students are like raw materials in the production of education and teachers are the machines that produce it. Teachers send materials to students for character transformation and provide instructions for the learning process.

The following are the merits accruable from the Distance Learning:

- It provides the learners the flexibility of getting the learning experiences at the time, place and rate of assimilation.
- Distance Learning can help in good class organization. The operational documents, assignments, class notes and other related information in the internet can be readly categorized for easy accessibility for the teachers and students. The information posted on the internet could be easily revised and updated for more effective teaching and learning.
- Distance Learning provides the learners with the opportunity of gaining learning experiences 24 hours of every 7 week days without tampering with the learners leisure time.

- The system has the capability of employing the services of most experienced personnel in different areas of need which is not possible in traditional classroom setting.
- Another educational value is the intellectual and social partnership created by the technology of Distance Learning. Students in their use of technological equipments cultivate the habit of leadership role in relation to other students (Husu, 2000). The implication is that the technology used increases group cohesion and mutual support more especially inn remote classrooms. Besides the Distance Learning enables the students to develop a range of communicative skills that enable them perform creditably in class.
- Cost effectiveness is a great advantage. Distance Learning saves money, time and transport for students. The students who are motivated could work on their own at their home environment without wasting time and money to travel to school.
- The teacher equally enjoys the teaching because everything is digital and these works in general are sent through e-mail typed. The teacher can easily re-use his materials and can easily get materials elsewhere.
- The system can prove quite advantageous to the students in various ways with regard to its on-line features. It will help in admission, information about the courses and academic activities, assignments and projects, tests and evaluation, grading and results, faculty available for interaction, guidance and needed help, information about the commencement of the public examinations, merit schemes, entry in a vocational and professional streams etc.
- Despite the merits of Distance Learnings as listed above, there are some demerits associated with it. They include the following:

- Flexibility of the system: The flexibility of the system to the learners as they go about their studies with ease and convenience, comforts and adjustment of the space and timings to suit them could be abused. When they are young in age and immature to handle responsibilities to build up their career, they play away their time and fall short of expectation in the long run.
- Poor quality of organization and the poor quality of study materials with low quality of teaching staff make Distance Learning unacceptable in quality educational pursuit. The staff inefficiency and low productivity will adversely affect the students enrolled in the system which will affect the overall assessment of the Distance Learning.
- Training problem of personnels: In a Distance Learning, professional training is very essential. University professions who are not trained in computer and internet functions should not operate effectively. Consequently, the professors should undergo training because the more conversant they are with the online services, the more efficient the teaching strategy and curriculum would be.
- The Distance Learning is not providing real classroom experiment such as teacher-student face-to-face interactions. The warmth of teacher-student relationship is absent in Distance Learning.
- Students at times generate problems for themselves by enrolling on online classes without an e-mail address or account with an internet service. This means that they cannot assess information for Distance Learning consumption. Consequently, they cannot achieve their objectives of effective learning.
- Effective participation in Distance Learning requires ‘robust hardware and a broad band internet connection’. Some classrooms or computer labs may not have computers

that meet the minimum or recommended specification for optimal use of virtual world (Stacy & Liz, 2008).

- Standard for accessibility is limited. Virtual words do not operate with screen readers which makes the virtual impaired not to benefit from virtual worlds.

2.3 Theoretical Framework for Distance Learning

Constructivism is the belief that individuals construct their own knowledge through active involvement in learning activities, such as doing tasks, sharing ideas with others, and interacting with their environment. In constructivism, learners use their senses and prior experiences to make sense of new information and tasks. This approach emphasizes collaborative learning, where a group of learners works together to solve problems and create meaning through their interactions and use of cognitive tools. Constructivism also emphasizes the use of a variety of learning activities, such as navigating physical space, reading, field trips, research projects, workshops, and presentations (Jonassen, 1997).

On the other hand, in the social learning theory, Bandura (1976) opined that learning is a cognitive process that takes place in a social context. This context could be observed through imitation of behaviours that occur in the immediate contests of the individual. The tenets of social theory of Bandura are as follows:

1. Learning is not purely behavioural, rather it is a cognitive process that takes place in a social context.
2. Learning can occur by observing a behavior with its consequences.

3. Learning is a function of observation, extraction of information from those observations and making decisions about the performance of the behavior (observational learning or modeling).
4. Reinforcement plays a role in learning but is not entirely responsible for learning.
5. The learner is not a passive recipient of information. Cognition, environment and behavior all mutually influencing each other (reciprocal determinism).

2.3.1 Audio-visual Theory

According to Edgar Dale, a prominent American audio-visual educationist, there are three primary ways to gain experience: personal experience, observation and summarization, and abstract generalization. Dale proposed the theory of the "cone of experience" in his monograph on audio-visual teaching methods. In the context of distance learning, nonlinear multimedia resources are used to provide learners with a multi-level learning experience that includes sensory interaction and the ability to revisit scenes, in order to enhance learning efficiency and effectiveness.

2.3.2 Constructivist Learning theory

According to constructivist learning theory, students should be actively involved in the learning process and should be seen as active builders of knowledge rather than passive receivers of it. This approach emphasizes the importance of learning in real-world situations and tasks, and of cooperative learning. In constructivism, learners construct and acquire knowledge with the help of others (including teachers and learning partners) by using relevant data in a specific context or background. A distance learning system should provide virtual situations and learning data, facilitate cooperative and competitive learning, and encourage learners to be proactive in their learning, in line with the principles of constructivism.

2.3.3 Humanistic Learning Theory

According to humanistic learning theory, the most effective method of learning in modern society is helping learners develop the ability to learn on their own. In this approach, the role of the teacher is to teach students how to fish rather than simply giving them fish. In distance learning, teachers should recognize the importance of students, create a learning environment that encourages student perspective (such as exams, group discussions, and proactive questioning), and allow students to master learning skills and draw conclusions from a single instance.

2.3.4 Cooperative Learning Theory

Cooperative learning theory, emerging in the 1970s, is a teaching strategy aimed at promoting learning in which some students cooperate to compete in regard to a given learning objective and in which students are organized for learning in groups or teams

2.3.5 Internet

The internet is a global network that connects a group of protocols, allowing for the exchange and sharing of information at a low cost and without geographical limitations. It enables communication in distance learning and has evolved with the advancement of science and technology, becoming mobile, cloud-based, and more widespread. This provides a larger development space for distance learning.

2.3.6 TCP/IP

A TCP/IP protocol stack divides the network into five layers: physical layer, data link layer, IP layer, TCP/UDP layer, and application service layer from low to high. The TCP/IP protocol stack provides technical support for data communication between Distance Learning networks.

2.3.7 UDP

The transmission layer of a TCP/IP protocol stack contains the UDP and TCP protocols. The TCP can guarantee that data will be sent reliably and without errors. TCP ensures that all data packets are delivered to the application layer in the correct order when multiple data packets are sent. For one-time transmissions, the UDP is a simpler connectionless transmission protocol. It lacks a lost packet retransmission mechanism and cannot guarantee consistency between the submission and sending orders of data packets.

In a distance learning system, audio and video files are frequently transmitted via the internet using the UDP protocol rather than the TCP protocol. Audio and video files are frequently sent over the internet in smaller data packets. Although the transmission process results in the loss of one or two data packets, it is manageable. Additionally, modern audio and video encoding algorithms are able to occasionally recover lost packets without compromising audio or video quality.

Video and audio, on the other hand, are extremely time-dependent. Using the TCP protocol for communication will result in significant time delays. Surprisingly more terrible on account of bundle misfortune, the TCP convention will endeavor to resend information parcels until it has achievement, which will deliver more prominent time delays.

2.3.8 VoIP

The internet-based voice processing technology is referred to as VoIP, or Voice over IP. Voice data is compressed using compression algorithms, transformed into IP data packets, and transmitted using an IP network by this technology. Voice transmission over the internet is achieved by connecting voice data packets in series at the receiver and recovering the original

voice signal through decompression processing. A distance learning system can use VoIP to send large amounts of voice and video data at low costs.

2.3.9 Virtual reality

Augmented reality (VR) innovation is a thorough innovation created with the incorporation of extensive PC designs innovation, media innovation, sensor innovation, equal constant innovation, and man-made consciousness and reenactment innovation. It allows users to directly participate in the exploration of functions and changes of virtual objects in the environment through the realistic experience of perceptual behaviors such as vision, auditory sense, touch, and smell as if they were in a real world. It also creates a three-dimensional image world that reflects the change and interaction of entity objects in analog form in real time for users. When applied to distance learning, virtual reality technology has the potential to create a picturesque learning environment, present information in multiple dimensions, activate students' sensory organs, and reproduce natural phenomena that cannot be observed. In addition, it has the potential to alter how things are processed in everyday life or to assist in the visualization of abstract ideas and theories, such as demonstrating the internal symmetry of crystals using virtual reality technology. In the interim, different virtual research facilities can be laid out with computer generated reality innovation. In industrial arts design experiments, for instance, students can engage in a wide range of practices without having to worry about material waste as a result of disoperation.

2.4 Overview of Constructivist Learning and Distance Learning

The constructivist learning and Distance Learning are relatively related in various forms as outlined below: (Chen, 2000).

1. Constructivist learning is always interesting, attractive, problem representing with contextual issues that surround the problem. But Distance Learning can present problem to students in a three dimensional environments that can portray the real world situation.
2. Constructive learning can give interpretations of a problem to encourage various ways of thinking. While Distance Learning can present multiple viewpoints, independent controlled viewpoints for each learner and can do away with negative elements that would divert the attention of the learner in the learning process.
3. In constructive learning approach, the learner utilizes his sensory potentials to construct meaning out of a given concept. But the virtual learning creates problem space for free exploration. Here feedback and interaction can be observed through visual, auditory and other cues by participating learners.
4. In constructivist learning understanding is enhanced by experience. On the other hand in the Distance Learning, virtual experience is provided without words or pictures. This creates indelible meaning in the students mind without further explanation.
5. Constructivist learning requires the learner to construct his own knowledge. But in the virtual learning, there is no pattern. Any type of interaction is permitted.
6. Constructivist learning provides rich sources of information. Also Distance Learning contains required information and can be supported with other technological gadgets for more relevant information through the web.

7. In constructivist learning, conversation and collaboration tools are used to access and share information and knowledge to help learners construct socially shared knowledge. But in Distance Learning, a shared space for a group of learners could be provided to collaboratively construct knowledge through synchronous and/or asynchronous communication. It could also take control of virtual bodies to actualize the reality of collaborative process.

Participants use inexpensive computers to create experiences from the virtual environment that are displayed on a computer monitor, establishing a connection between the Distance Learnings program and constructivism theory. Typically, as students collaborate in teams, there are interactions with other students. The reality was noted in Chen (No date) who announced that human collaboration with the produced virtual world should be possible by means of info mechanical gadgets.

Once more, when members are associated with augmented reality framework to the organizations, it will permit understudies who are at various areas geologically to collaborate and furthermore they will encounter similar virtual learning universes. Every participant clearly observes the results of their activities and the students collaborate in groups. Consequently, in the environment of distance learning, these activities that are typically observed influence others' behavior. As a result, the environment of distance learning is supported by Bandura's social learning theory. The networked virtual worlds that are available allow for collaborative activities that are similar to those that take place in the real world and definitely improve learning experiences.

2.5 Empirical Review

Distance learning is a flexible system that allows for learning without being constrained by time or location. It uses various technologies, such as multimedia, the internet, blogs, websites, mobile

phones, and wikis, to deliver content and facilitate learning. Virtual learning expands the possibilities of using the internet and other technologies, such as satellite links and simulations, to access, analyze, create, exchange, and use data, information, and knowledge in ways that were previously unimaginable. It involves network-based input and tutoring support obtained through online tools and media, such as the internet, intranets, extranets, virtual worlds, and web platforms. It can also involve electronic communication, such as email, social networking, and web platforms. Mobile learning, in which educational content is accessed on personal devices like PDAs, smartphones, and mobile phones, is also a part of virtual learning. These technologies enable students to fully realize the potential of virtual learning.

Online learning, web-based training, and instruction delivered by technology are all methods of bringing distance learning into practice. This multitude of Virtual Learning Conditions (VLEs) are characterized as PC based conditions which are generally open frameworks. According to Pellet & Lecarte (2013), they function by facilitating interactions and encounters with other participants who also have access to a wide range of resources. According to Downes (2009), Fournier & Kop (2011), and Merrih (2009), virtual learning environments (VLEs) offer educationally relevant tools. Due to the growth of internet technology, these tools for learning have become extremely popular among students even in higher education.

The establishment of distance learning, also known as virtual world education, was brought about by the development of information and communication technology (ICT). The rapid spread of information and communications technology throughout the world has raised students' and other individuals' technological awareness and made it easier for them to acquire diverse knowledge and realize their professional goals. Higher education institutions are expected to place a greater emphasis on meeting students' expectations and increasing their involvement in information and

communication technology (ICT). Students can acquire the lifelong learning skills necessary to deal with emergencies in new subject areas and make greater use of technology in the classroom through this ICT. It cannot be overstated how ICT can help students achieve greater success. Innovative learning strategies like virtual learning are already being extensively tested in both traditional and non-traditional educational settings worldwide thanks to ICT. According to Crawford and Kirby (2008), this generation's approach to education, socialization, and normalization should include a significant component of the utilization of relevant virtual learning for this course.

Information and communication technology underpins distance education. Because the world is becoming more technologically inclined, tertiary institutions should successfully incorporate virtual learning into their systems. Because of this, Oye, Lahad, Madar, and Ab In 2012, Rahim referred to the current technological trend as an "e-driven world." Every aspect of life has undergone unimaginable shifts as a result of this e-driven world. Thus, understudies ought to be exceptional through virtual figuring out how to give them the vital encounters for self-awareness and advancement.

Olibie, Ezoem, and Ekene (2014) described virtual learning as an enabling process that relies on students' awareness in their contribution. The meaning, structure, and components of any new technology must be recognized and comprehended in order to achieve virtual learning. The foundation for effective learning among university students will be established when this is completed. In addition, according to Pellet and Lacarte (2012), virtual learning environments (VLEs) are computer-based environments that are relatively open systems that permit interactions and encounters with other participants and provide access to a variety of resources. The VLEs

provide educational-specific technological equipment (Downes, 2009; Knof, Fourmer, and Olibie et al. ; 2014:35).

However, recent research (Fallon, 2011a, 2011b) has investigated the roles of synchronous and asynchronous online systems at a distance. The kinds of interactions between students that are crucial in online distance learning (ODL) were compared by Hrastinski (2008). These include related material, task planning, and social support When the oral discussion between two groups of students was analyzed; The results showed that social support communication in synchronous chat platforms and related content interactions on asynchrous groups occurred. Kock (2005) stated in the results discussion that synchronous communication appeared to have "increased psychological arousal" (Hrastinski, 2008:53) due to its capacity to disseminate information demonstrating the characteristics of natural media. Immediacy, feedback, facial or oral expression, and body language are just a few examples. The recommendation was that students might have felt more opportuned in regard to using the synchronous chat to, “exchange social support and discuss less complex issues… since this type of communication more closely resembles face-to-face interaction (Hrastinski, 2008:54).

In all, Hrastinski revealed that the asynchronous platforms showed better in facilitating deeper cognitive involvement as suggested in Garrison and Cleveland – Innes (2005) whereas, synchronous learning platforms enhanced less formal, or social, involvement. The two are very important in Open and Distance Learning experience.

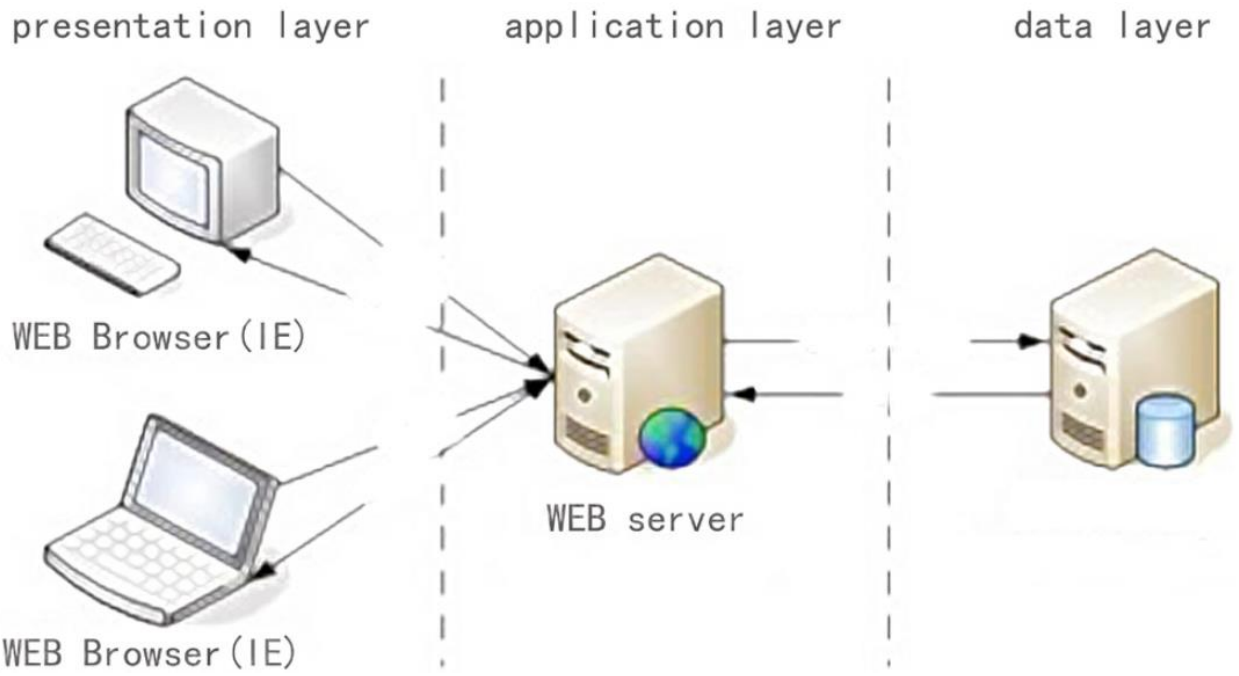

Figure 2.1: Schematic diagram of Virtual Class Architectural Pattern

CHAPTER THREE

SYSTEM ANALYSIS AND DESIGN

3.1 Methodology Adopted

The structured system analysis and design methodology (SSADM) was adopted for the analysis, design and implementation of this system. Structured systems analysis and design methodology (SSADM) is a set of standards for systems analysis and application design. It uses a formal methodical approach to the analysis and design of information systems.

SSADM follows the waterfall life cycle model starting from the feasibility study to the physical design stage of development. One of the main features of SSADM is the intensive user involvement in the requirements analysis stage. The users are made to sign off each stage as they are completed assuring that requirements are met. The users are provided with clear, easily understandable documentation consisting of various diagrammatic representations of the system. SSADM breaks up a development project into stages, modules, steps and tasks. The first and foremost model developed in SSADM is the data model. It is a part of requirements gathering and consists of well defined stages, steps and products. The techniques used in SSADM are logical data modeling, data flow modeling and entity behavior modeling.

- **Logical Data Modeling:** This involves the process of identifying, modeling and documenting data as a part of system requirements gathering. The data are classified further into entities and relationships.
- **Data Flow Modeling:** This involves tracking the data flow in an information system. It clearly analyzes the processes, data stores, external entities and data movement.

- **Entity Behavior Modeling:** This involves identifying and documenting the events influencing each entity and the sequence in which these events happen.

3.1.1 Problem Identification Using SSADM

The SSADM was used to discover some problems;

1. **Feasibility Study:** This assumes that the proposed project has been identified as a result of an exercise such as strategic planning and sets out to evaluate the various technical, organizational, financial and business options available. The aim is to establish the whether the direction and requirements of the project are feasible. The aim is to evaluate the feasibility of the proposal, involving an analysis of the problem and determination of the best solution; usually a range of potential solutions are presented.
2. **Investigation of the Environment:** The process of identifying, modeling and documenting the data requirements of the system being designed. The result is a data model containing entities (things about which a business needs to record information), attributes (facts about the entities) and relationships (associations between the entities).
3. **Business System Option (BSO):** A BSO defines the functional scope of a proposed solution. At its most basic level it consists of textual descriptions of those requirements satisfied by the solution. All BSOs must satisfy the minimum requirement as identified by user representatives.
4. **Requirement Certification:** Requirement Certificate aims to equip the learner or end user (client) with the advanced knowledge of project management and will enable the learner to understand the system requirement to uphold the project management required parameters.