

The Design and Implementation of a Web Based E-Learning Platform as Automated Content Delivery Tool In Technical, Vocational and Educational Training Institution

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ABSTRACT

E-Learning technologies continue to expand. Learners separated by time or space have a multitude of choices in how and what skills and knowledge are delivered. Online programs are rapidly becoming a popular form of learning in educational institutions today. The online environment offers extraordinary opportunities for people who would otherwise have limited access to education, as well as a new paradigm for educators in which dynamic courses of the highest quality can be developed. It provides an excellent method of course delivery unbound by time or location allowing for accessibility to information at anytime from anywhere. "Collaborative learning" is taking place where the facilitator and student collaborate to create a dynamic learning experience. The new era of teaching, at all education levels, is overwhelming the world; the challenge is how and where we integrate it. The minimum requirement for students to participate in an online course is access to a computer, the Internet and motivation to succeed in a non-traditional classroom. In this paper, we are proposing some measures to guarantee successful integration of online teaching in education institutions, focusing at National Diploma Degree level.

Keywords: Educational institutions, educators, Collaborative learning, online course, non-traditional classroom, Internet and motivation

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1. BACKGROUND TO THE STUDY

In recent time, the use of computer technology has greatly improved in the general aspect of human life by enhancing the rate at which work is done and increasing the efficiency of the work done. Thus making it nearly impossible to envision a life without it, be it educationally, medically, financially and even economically. The Global Information Technology (GIT Report, 2015) states that, "This technologies supplies a wealth of knowledge which is made available by connecting the user with unprecedented information within a click of a button. It provides a platform for creative learning, problem solving access to information, guidelines and instruction protocols."

Kaplan-Leiserson, (2011) considered computer as a powerful machine that can serve as an educational tool if used effectively because it has the potential to transform our teaching and learning experience by modifying the methods of communication and information transfer. This method acquaints us with the electronic means of learning which is the key factor to improve learning and successful transfer of information by creating an online platform where strategic learning and effective communication can be utilised as a content delivery tool for both student and lecturer in Technical, Vocational and Educational Training (TVET) institution. Wikipedia.Org defines E-learning as a content delivery tool used in software application to create multimedia package for delivery on the world wide web to the end users. Electronic learning is generally divided into two (2) categories;

- Synchronous Electronic Learning
- Asynchronous Electronic Learning

1.2 Synchronous Electronic Learning:

This learning involves any communication that is in real time, it allows students and lecturer to interact simultaneously by asking and answering questions during lessons. The main benefit of the synchronous learning is that it enables student to avoid the feelings of isolation since they are actively in communication with others through out the learning process. However, synchronous learning is not a flexible electronic means of teaching as it is time dependent. It requires student to set aside a specific time slot in order to attend a live teaching session of online course in real time. Hence, it is not the ideal method of E-learning for student with busy schedules.

1.3 Asynchronous Electronic Learning

This form of electronic learning can be carried out when either the student or lecturer is not online. With this form of learning communication can continue offline even in the absence of the other party until the other user is available. The benefit of the asynchronous electronic learning is that student are able to follow the curriculum at their own pace without having to worry about scheduling events. Hence, this maybe a perfect option for users who enjoy taking their time with each lesson plan in the curriculum and would prefer to research topic on their own. However, this learning can lead to feeling of isolation as there is no real interactive educational environment.

Table 1.1: Categories of Electronic Learning

ELECTRONIC LEARNING CATEGORIES	RESOURCE TECHNOLOGIES	COMBINED RESOURCE AND COMMUNICATION TECHNOLOGIES
<p>Synchronous :</p> <p>Instant Messaging (e.g. Google Talk; Windows Live – formerly MSN) Chat Room (e.g. IRC) Video call (e.g. Skype)</p> <ul style="list-style-type: none"> • Online Whiteboard • Application Sharing • Online Video Conferencing • Web-conferencing (e.g. Meeting Space; Wimba; iLinc; Connect; WebHuddle, DimDim, Vyew) • Live Webcasts/Podcasts 	<p>Level 1 :</p> <p>Intelligent tutoring/ Adaptive systems On-line Simulations Closed Virtual Worlds</p> <p>Level 2:</p> <p>Institution Created Online Materials Online (Multi-media) Courseware</p>	<p>Focus on Resource :</p> <p>Blogs and micro-blogs</p> <ul style="list-style-type: none"> • Wikis • Social Rating/Evaluation/ Recommender • Social Bookmarking <p>Focus on Communication:</p> <ul style="list-style-type: none"> • Micro-Worlds • Social Networking (e.g. MySpace, Facebook; Ning; etc.) • Open Virtual Worlds (e.g. Second Life)
<p>Asynchronous:</p> <ul style="list-style-type: none"> • Email • Electronic mailing list • Newsgroups • Computer Conferencing • Forums 	<p>Level 3:</p> <p>Lecturer/Teacher Created Online Materials e.g. Web-pages; Instructional Guides; etc.</p> <ul style="list-style-type: none"> • e-Assessments; • Stored Webcasts/Podcasts • Screen Casts • 'Grass Roots' Video <p>Level 4:</p> <p>'Flat' Web-pages Online Abstracts and Citation Indexes Online (full-text) Journals Online Databases Learning Object – Fundamental</p>	<p>Mobile Communications :</p> <p>Mobile video streaming Mobile Computing (iPhone, Nokia N-Series, Google Android) Mobile txt messaging (1-to-1 and 1-to-group)</p> <p>Other:</p> <p>Interactive White Boards</p> <ul style="list-style-type: none"> • Wiimote • Other tools with multi-touch input

Ideally, the use of a web based E-learning platform should include both asynchronous and synchronous learning activities. This allows students and teacher to benefit from the different delivery formats regardless of their schedules or preferred learning methods as the approach provides student with access to immediate help if needed, while still giving them the ability to learn at their own pace, thereby making the learning process more reliable and flexible. The web based E-learning platform makes use of computer technologies which have been developed specifically for it, whilst conveniently complements the learning process. For instance, the platforms implements communication technologies such as; instant messaging, email, message forums and social networks etc. Also, this learning makes use of data base and content management system (CMS), this technologies which are used to record conversation, store course content, test results and overall students record. Software such as Adobe Dreamweaver CS7, Corel draw x7, Adobe Photoshop, Swishmax and Microsoft front-page are used to develop the online platform.

1.4 E-Learning As Content Delivery Tool And Learning Object

Different researchers have defined content delivery tools (learning tool or object) in different ways. The most generic one as defined by IEEE is, “any entity, digital or non-digital, which can be used, re-used or referenced during technology supported learning”.

While, (Willey, 2009) described learning object as “any digital resource that can be reused to support learning”. The basic difference between these two definitions is IEEE definition is more generic where as the latter one is more specific considering only the digital objects.

(Chiappe, et al. 2007) described learning tool as, "a digital self-contained and reusable entity, with a clear educational purpose, with at least three internal and editable components: content, learning activities and elements of context.

(Rehak, et al. 2008) defined it as, "a digitized entity which can be used, reused or referenced during technology supported learning".

In describing the content delivery tool and learning objects, the Learning Objects Network (LON) pointed that “This content tools are stand-alone ‘chunks’ of information designed to be easily reused and repackaged to meet the needs of different audiences. For example, a chapter in a text book; a case study, or an interactive courseware topic, to smaller items such as a single pedagogical concept (e.g., teaching the boiling point of water)”.

So, “content delivery tool” can be defined as “any digital and web based self-contained re-usable learning resource having specific learning objective that supports learning. Also it is to be noted that 'Collection of a set of learning objects forms the lesson, whereas aggregation of lessons forms the courses'. management system provides an interface for one to add, update and delete data.

1.5 Aim And Objectives Of The Study

The goal of this project is to design a Web based E-learning platform which can be implemented as an automated content delivery tool in TVET Institutions. If this purpose is achieved, the following objectives would be attained;

- I. The construction of a database that supports technical, vocational and educational training institution.

- II. To offer flexible learning possibilities and decrease the proportion of lectures while increasing the proportion of individual work in the study process.
- III. To reduce cost of education system in TVET institution.
- IV. To diversify the learning process by making it more effective, interesting and efficient.
- V. To allow student pace their educational need with their individual comfort level.
- VI. To improve the student's computer skill and digital literacy in computer networking.
- VII. To make information and studying materials readily available for students.
- VIII. To compare the method of traditional learning to web based e-learning platform.

1.6 Scope Of The Study

The scope of this work is limited to the designing of an automated content delivery tool for TVET institution with particular reference to courses being taken by students running the national diploma degree program within the School of the Industrial Maintenance Engineering (SIME). The targeted user of this project includes the administrative, lecturers and the national diploma student of computer engineering department of Yaba College of Technology.

1.7 Limitation Of The Study

With the use of this modern and advance technology, learners tend to feel uncomfortable to sit in front of a computer for a duration of time as this may strain the eyes. This method of education also subjects student to rely on a constant source of power supply without which they may find it impossible to communicate effectively. The proponent of e-learning is the individual self pace of knowledge but due to this inherent freedom, student can languish indefinitely in such environment. Thus, this learning process requires maximum discipline as students/lecturer may abuse the opportunity.

1.8 Significance Of The Study

Since technology is leveraged for learning purposes, student and lecturers can interact with each other via online forums, threaded management system, video conferencing, as well as email and chats. These tools serves several functions including course documentation, administration and evaluation that allows all parties involve gain from a centralised source of information and education. Hence, the system becomes fascination and interesting for new users whom are satisfied with the multiple features made available and excellent deliver of learning modules. However, old users find some information outdated and they becomes weary as these challenges and shortcoming making the system static.

2. LITERATURE REVIEW

2.1 HISTORY AND EVOLUTION OF E-LEARNING

The development of e-learning performance cannot be reviewed without mentioning technological development in the educational tools, due to the fact that both are linked to each other. Since the invention of Personal Computers (PCs), technology has rapidly developed in the recent decades by the utilization of the Internet, established Networks and the comprehensive usage of Information and Communication Technologies. The origin of eLearning can be dated from the concept of distance education which was founded on the principles of flexible access. The aim of this access was to allow distance learners, generally, adult learners in part-time or full-time employment to study at different time, place and pace as per their convenience. The goal was to free the learners from the constraints of traditional residential/physical educational systems where they had to physically attend the lecture.

The printed distance study materials, which each distance learner received, would carry the core subject matter content they would need including all their learning activities and assessment tasks. Students would be required to complete these tasks, submit their assignments and take their examinations within a set time frame. While these printed study materials allowed distance learners a great deal of freedom from time, place and pace of study, it had its limitations some of which are; lack of contextual understanding, limited peer support etc. The root of web-based training can be traced to the concept of on-line training programme which emerged in early '90s and were used in business. In 1924, the first testing machine was invented this device allowed students to tests themselves. Then, in 1954, a Harvard Professor B. F. Skinner invented the “teaching machine”, which enabled schools to administer programmed instruction to their students this was based upon the on-line distribution of autonomously used learning materials.

The next phase of web-based training can be identified as **E-learning 1.0**. this was influenced by Web 1.0. The e-learning 1.0. referred to the state of the Internet when interaction with the online content was not possible. It was the age of static and non-interactive content and the use of proprietary software, this type of software is owned by an individual or a company (usually the one that developed it). It entails major restrictions in its use and its source code is always kept private and concealed. Whereas, it is optimally necessary for a user to have the source code of a program in order to be able to modify or improve it.

It can be said that, Learning Management Systems (LMS) were the basis of eLearning 1.0. As this systems are very effective in designing and delivering the course contents, registering, managing, tracking and certifying the learners. The biggest advantage of this generation of electronic learning is; it is easier to administer and manage the learning content, courses and a large number of users. However, In this platform, there is no teacher available in guiding the learners physically as it is a self-learning space with minimum support from the tutors. Thus, the biggest disadvantage in this learning platform is there is little use of communication technologies in making the learning process collaborative and interactive.

E-Learning 2.0 refers to second generation Web which have been designed to facilitate online communication and collaboration. In 1980 online learning became more interactive. The Britain Open University was keen to take advantage of e-learning. Their system of education has always been primarily focused on learning at a distance. In the past, course materials were delivered by post and correspondence with tutors was via mail. With the internet the Open University began to offer a wider range of interactive educational experiences as well as faster correspondence with students via email etc. Wikipedia described it as a new ways of thinking about eLearning influenced by the emergence of Web 2.0. In defining Web 2.0, MacManus stated “Enter Web 2.0.a vision of the Web in which information is broken up into “micro content” units that can be distributed over dozens of domains. The Web of documents has morphed into a Web of data. We are no longer just looking to the same old sources for information. Now we’re looking at a new set of tools to aggregate and remix micro content in new and useful ways”. The web is shifting from being a medium in which information was transmitted and consumed into being a platform, in which content is created, shared, remixed, repurposed and passed along.

The Web is transforming from “read only Web” to “read-write Web”. But we should not just recognize this evolution as a technological revolution but we should consider it as a social revolution. Downes further stated that “Web 2.0 is an attitude, not a technology. It is about enabling and encouraging participation through open applications and services”.

This learning platform which was influenced by Web 2.0 placed increased emphasis on the use of social software such as blogs, wikis, instance messaging systems (IMS), social bookmarking, Web feeds, podcasts, etc. In e-Learning 2.0, the learning content is also used by the learners rather than just strictly reading it. Also, this content comes from the students than just from courseware authors as with the support of Web 2.0, it is now easy to create and publish contents on the Web. In contrast to this, conventional eLearning where learning materials were only produced by publishers, organized and structured into courses and delivered to students using Internet technologies. The roles played by the students consist in learning by going through those materials and preparing assignments which are always evaluated by the teacher.

The fundamental difference between eLearning 1.0 and eLearning 2.0 is that, eLearning 1.0 is based on “*formal*” learning which is developed within a structured and organized context, such as, school education, business training courses. While eLearning 2.0, is predominantly based upon “*informal*” processes and is developed as a result of daily activities related to work. It is not structured in terms of learning objectives, time and support.

In e-Learning 1.0 the focus was on using the Internet to replicate the instructor-led experience while e-learning 2.0 has its platform designed to lead a learner through the content, providing a wide and ever-increasing set of interactions, experiences, assessments, and simulations. Therefore, the latter is built around collaboration as it assumes that knowledge is effectively attained through socially interaction. Hence, Learning takes place by continuous conversations about a course content and the conversation is grounded about problems and solutions.

E-learning 3.0 is a learning platform influenced by the emerging Web 3.0. The emphasis is on creation of high quality content and services and it is defined as the next evolution of linked data, ubiquity of linked devices and connection of people across the Web. It is a new way of finding, integrating and analysing data created by individuals, organizations or machines, from diverse sources to achieve new information and insights which was never possible in previous generations. Ubiquitously linked devices makes it possible for developing new ways of connecting to the Web via a variety of machines and exchanging data between machines. This enables Web access for anyone, anywhere, anytime, using any device. The World Wide Web Consortium standardizes the emerging technologies that will enable Web 3.0 to become a reality. These include: *Semantic Web*, *Video on the Web*, *Mobile Web* and *Ubiquitous Web* as it basically comprises of semantic technologies and social computing environment.

In describing the eLearning in the context of Web 3.0. Four (4) key drivers where identified, these includes;

1. Distributed computing
2. Extended smart mobile technology
3. Collaborative intelligent filtering
4. 3D visualization and interaction

E-Learning 3.0 is not just about the technology but it is the combination of technology, methodology and skills to use the technologies properly. Also it is worth mentioning that it bring the learners much closer in an 'anytime and anywhere' learning environment. Hence, it provides intelligent solutions to web searching, document management and organization of content.

In comparing the supportive tools between eLearning 2.0 and eLearning 3.0 platform, the former is made up of forums, podcasts, wikis, weblogs, pedagogical games, etc., whereas the later one consists of interactive synchronous tools such as, chats, conference calls, webcasts, e-meetings, e-workshops, video conferencing etc. The good thing about eLearning 3.0 is that it is developed under the umbrella of open standards and open source software (OSS).

2.2 DEFINITION OF ELECTRONIC LEARNING

E-learning is generally referred to as a web based computer-enhanced learning which is enabled by digital technologies. It is a means of employing education, which can be applied in on-campus mode and distance mode of learning with the use of ICT. The implementation of information and communication technology (ICT) in Electronic learning is its ability to provide flexible access to a wealth of resources. This refers to the utilization of information and resources at a time, pace and place that is convenient for the individual learners and teachers in technical vocational and educational training institution. With the use of ICT, the educators are presented with courses delivered online on a mass customized basis which aims at reducing institutional expenses while increasing institutional revenues.

However, (The European Commission, 2007) describes e-learning as: "The usage of new multimedia technologies and the Internet to develop the quality of learning and teaching by easing access to facilities and services in addition to remote exchanges and collaboration" The Joint Information Systems Committee (JISC, 2009) offered a parallel definition in 2003 defining e-learning as "learning facilitated and supported through using the information and communications technology (ICT)" Likewise, (Clark & Mayer, 2009) have indicated that e-learning is the instruction delivered on a computer by way of CD-ROM, internet or intranet with the next qualities: containing content relevant to the learning objective; using instructional methods which include the examples and practice to support learning; using the media elements for example words and pictures to transport and deliver the contents and methods by building fresh knowledge and skills linked to individual learning goals or to improved organizational performance. (Stocky, 2005) defined e-learning as "the delivery method of a learning, training or education program by electronic means, e-learning is involving the usage of a computer or electronic device (e.g. a mobile phone) to provide training, or learning material".

The new technologies including computer networks, interactive-media, digital technologies, and the internet significantly increases the reach of e-learning provision. It enables and allows students to connect and interact with each other, and with their teachers, at any time, and it has opened up a universal market and would be highly effective if used in TVET Institutions. This suggests that e-learning offers a wide range of opportunities that needed exploring. Hence, the proposition of these various definitions by Professionals implies that e-learning can be defined through three broad domains:

- 1 As a distance education method
 - 2 As a transactions facility on the web
 - 3 As an electronically facilitated learning
- **E-learning as a distance education method:**

Most of these authors working in this field have accepted that the conceptual idea of the term E-learning indicates distance education or education delivered online.

- **E-learning as transactions facility on the web:**

Some writers have highlighted that the facilities offered via the Learning Management Systems (LMS) increased the success of the Web based platform. Therefore, the Los proposal is an extensive set from the

options and communication tools to service the lecturers and their students' interactions in order to implement daily activities that help in improving the learning process.

- **E-learning as electronically facilitated learning:**

This domain relates to the material of e-learning courses itself, rather than the electronic system used. It focuses on the material design of the e-books, CD-ROMs and Web sites, to assessment and electronic tests. Even though there are natural differences in all of those tools, they are all mediated electronically.

From the highlighted domains, it can be concluded that most of the authors working in this field have accepted that the conceptual idea of the term E-learning indicates distance education or education delivered online.

This correlates with the ideal and accepted definition by the Open and distance learning quality council (ODLQC) which states that, "E-learning can be defined as any electronic provision where a significant element of flexibility, self-study, and learning support, is an integral part of the provision which is at the discretion of the learner and electronically supported and facilitated by the provider."

2.3 Requirement for an Ideal Web Based Platform

Listed below are some of the important characteristics required for an ideal eLearning system;

1. Learner centric approach - This approach empowers the learner by facilitating to move from teacher centred learning systems to learner centred learning environments. Typically, in classroom teaching, a teacher decides the agenda and is often the active participant, whereas students are mostly passive participants.
2. Flexibility (time & space independent) - This adopts the flexi-time approach. A learner with his/her daily tight schedule can have flexibility in participating with the learning process. They can adjust the pace of study to other obligations (e.g. family, work, sport). They are not bound to a semester or strict timetable based educational system.
3. Customized and/ or personalized content- The learning content is determined by a group of learners or by the individual learners based on their needs and aims.
4. Non-linear content- This allows direct access to knowledge in whatever sequence that the learner is looking for, unlike static learning.
5. Continual learning- Learning and knowing runs continuously in parallel loops. They are constant, ongoing processes and never stop.
6. Interactive Learning- A common misconception about eLearning is that the absence of human interaction means that there is no one at hand to help learners with their problems. But in reality it works in the reverse order. It facilitates more chances to have someone around the learners (24/7) to help them with their problems.
7. Dynamic content- Content is changed automatically (repackaged, reoriented, enriched) continuously for a given user based on the users input, experiences, new practices and heuristics.
8. Systematic Learning- Occurs as an integrated activity.
9. Distributed Content- This content is generated from educator-learner interactions and can be shared amongst unlimited user at the shortest period of time.

2.4 Essential Characteristics Of Learners For Successful E-Learning Experience

In comparison to the traditional (face-to-face) learning process, learners in e-learning process need or must have several characteristics that contribute to success in this process. Learners' success as well as their failure in e-Learning depends on multiple interdependent factors, for example, "*technology*", "*course materials*", "*participants' personal characteristics*", etc.

Some of the essential characteristics of e-learners to success in the eLearning experience are as follows:

1. Cognitive skills – since e-Learning is a self-learning pace, cognitive skills, such as, sensory, memory, elaboration, and problem solving, appear to be essential for a self-directed eLearning process.
2. Executive Skills - e-learner must have the ability to use strategy for gathering and using information. They must be self-aware and self-monitored.
3. Self-discipline – learners in eLearning process can set their own pace of study. They must be self-discipline to that pace of study and complete tasks as defined by the learning system, no matter when and where. Learners have a lot of freedom on one hand, but on the other hand, participants must be very self-disciplined in order to succeed in e-Learning process.
4. Information Processing Skills - information processing skills such as; observing, seeing and translating, reading, and listening are also important in self-directed learning pace. Self-directed learner must have the ability to see, understand, and do, as well as the ability to translate visual information to notes and records, and to graphically reproduce visual information and to relate it to existing information schemes.
5. Decision Making Skills - It is essential that self-directed e-learners develop the ability to determine and evaluate the sources of information as well as its reliability, validity, and meaning.
6. Self-awareness - Successful self-directed e-learners must have the ability to be aware of their learning processes. This includes, their strengths and weaknesses so that they can have a realistic perception of the ability to achieve their learning goal. They need to recognize the gaps in their knowledge in order to establish what they need to find out.
7. Independent thinking capacity – learners should have the capacity to think independently.
8. Attitude towards usage of modern ICT – since ICT is a central construct and a basis for eLearning process, learners must have high positive attitudes towards usage of modern ICT.
9. Skills and knowledge for working with modern ICT and computers – since eLearning process is mainly computer-mediated, participants need appropriate and sufficient level of skills enough for them to exploit the system according to their needs.
10. Motivation for studying – participants with higher motivation have good prospects for succeeding in any (e.g. traditional, eLearning) type of learning. In this case, due to the lack of social interaction with the teachers in e-Learning process, learners' self-motivation is needed.
11. Interest in participating the e-Learning process – learners with high level of interest for participation in e-Learning process has more prospects to succeed.
12. Positive attitudes towards usage of e-literature – a great proportion of literature in e-Learning process is in electronic form. Learners who like to use mainly e-literature in comparison to traditional literature (e.g. hard copy books) are more suitable for this process.
13. Lower need for social interaction with peers – learners in eLearning process almost never meets face-to-face. Therefore learners who have low need for social interaction with peers are very suitable for participation in eLearning process on the other hand learners with feeling of isolation, will find e-Learning as boring.

14. Time management – learners must have good time management skill. They must be capable to develop a schedule, establish goals and meet due dates.

2.5 Importance Of E-Learning Process

- **Convenience And Portability**
Courses are accessible as per students' schedule
Does not require physical attendance
Learning is self-paced (not too slow, not too fast)
24/7 accessibility makes scheduling easy and allows a greater number of people to attend classes
Unbound by place - study at home, work, (anywhere!)
Read materials online or download them for reading later
- **Cost And Selection**
Choose from a wide range of courses to meet requirements
Degree, Vocational, and Certificate programs
Continuing Education
Individual courses
Wide range of prices to fit your budget
Go back to school to get a degree, learn a new skill, learn a new craft, or just have fun!
- **Enhancement Of Skills**
It helps the students to build their own learning skill, improve their thinking power and their problem solving skills
It helps in preparing learners as potential researchers
- **Flexibility**
Student-centred – accommodates their preferences and needs
Skip over material you already know and focus on topics you'd like to learn.
Choose from a wide range of courses to meet requirements
Use the tools best suited to individual learning styles
Learning is self-paced (not too slow, not too fast)
- **Higher Retention**
Online learning will draw you to topics you like and enjoy. Studies show that because of this and the variety of delivery methods used to reach different types of learners, retention is frequently better than in a traditional classroom.
- **Greater Collaboration**
Technology tools make collaboration among students much easier. Since many projects involve collaborative learning, the online environment is far easier (and often more comfortable) to work, since learners do not have to be face-to-face.

- **Global Opportunities**
 1. The global learning community is at learners' fingertips with online learning. The technologies used give online instructional designers the ability to build tools that take the learners to resources, which they never might have seen in a traditional classroom.
- **Reduce Costs**
 2. Teachers as well as TVET Institution can reuse the learning materials prepared for a course. This saves time as well as reduces cost for delivering courses while increasing the number of participants attending the electronic learning process.

2.6 Benefit Of E-Learning To Students

Online learning offers a variety of educational opportunities:

1. **Student-centered learning:** The variety of online tools draws on individual learning styles and help students become more versatile learners.
2. **Collaborative learning:** Online group work allows students to become more active participants in the learning process. Contributing input requires that students comprehend what is being discussed, organize their thinking coherently, and express that thinking with carefully.
3. **Easy access to global resources:** Students can easily access online databases and subject experts in the online classroom.
4. **Experiential learning through multimedia presentations:** New technologies can be used to engage and motivate students. Technology can also be used to support students in their learning activities.
5. **Accessible for non-traditional students:** Online delivery of programs and courses makes participation possible for students who experience geographic and time barriers in gaining access to higher education. Draws on student interest in online learning Many students are interested in online learning. In a recent survey conducted by the Office of Academic Planning and Assessment at UMass Amherst, more than 50% of students surveyed said that they were “very interested” or “somewhat interested” in taking an online course.

2.7 Benefit Of E-Learning To Lecturers

Lecturing online courses can:

1. **Offer the opportunity to think about teaching in new ways:** Online teaching can allow you to experiment with techniques only available in online environments, such as threaded discussions and heliographies.
2. **Provide ideas and techniques to implement in traditional courses:** Online email discussions, a frequently-used practice in online learning, can be incorporated into traditional courses to facilitate group work. Other techniques, such as web-based course calendars and sample papers posted on the Internet (with student permission) can easily be incorporated into a traditional course.
3. **Expand the reach of the curriculum** Online teaching can expand existing curriculum to students on a regional, national, and international level.
4. **Professional satisfaction:** Teaching online can be an enormously rewarding experience for teachers. Teachers often cite the diversity of students in online courses as one of the most rewarding aspects of teaching online.
5. **Instructor convenience:** Teaching online can offer teachers conveniences not available in traditional classroom settings; for example, at-home office hours and flexible work schedules.

2.8 Classification Of Electronic Learning

Depending on the functionalities and the goals of the e-learning platform we can classify them as:

CMS: Content Management System

The CMS system is the most basic functionality as its mainly used for small projects where it is needed to generate the content within the system. Among the communication tools can be found forums, email and chat. As an example we can mention: PHP Nuke, Drupal, Mambo, Content Management Server, CoreMedia CMS, etc.

LMS: Learning Management System

The LMS is a system that is focused precisely on the area of education; it allows control on both the contents and individual users who interact within it. The contents which includes; collaborative environment, evaluation/assessment, course manager, learners profile manager are created and loaded with some external authoring tool. It has most of the tools of communication and monitoring activities of users. For example, Moodle, ATutor.

LCMS: Learning Content Management System

This system integrates profits from the previous systems and gives greater robustness. In addition to managing the administrative functions of online learning, some systems also provide tools to deliver and manage instructor-led synchronous and asynchronous online training based on learning object methodology. These systems are called Learning content management systems. An LCMS provides tools for authoring and re-using or re-purposing content as well as virtual spaces for learner interaction such as discussion forums, live chat rooms, content authoring tools, content management tools and delivery environment.

3. RESEARCH METHODOLOGY

Dede (2006) briefly explained that, “based on cognitive theory, E-learning courses include words and graphics rather than words alone. By words, it simply means printed or spoken text (that is, words presented as speech that one can listen to through earphones or speakers). By graphics, it means static illustrations such as drawings, charts, graphs, maps, or photos, and dynamic graphics such as animation or video. Hence, its appropriate to use the term Multimedia presentation to refer to any presentation that contains both words and graphics.”

3.1 Graphics That Supports The Designing Of An E-Learning Platform

Consider the possible functions of Graphics used in the development of a Web based E-learning platform:

1. Decorative graphics serve to improve the appearance of the page without enhancing the message of the lesson such as; A diagram of different types of electronic device that can be used to access the web based platform.
2. Representational graphics portray a single element such as; Screenshot of a page in the learning platform with label “List of courses offered by NDI Computer Engineering Student”.
3. Relational graphics portray a quantitative relationship among two or more variables such as; A line graph showing the relation between a declining success rate of Traditional learning in comparison to a promising Web based learning platform.
4. Organizational graphics depict the relations among elements, such as a screenshot of all department in the School of Industrial Maintenance Engineering (SIME).

5. Transformational graphics depict changes in an object over time, such as; A video showing how a computer program is being implemented in robots.
6. Interpretive graphics illustrate invisible relationships such as an animation of the robot performing the specific task it has been designed to carry out.

3.2 E-Learning Content Delivery Approach

(Clark, R.C., 2008) showed the various approaches (offline learning, online learning, hybrid or blended learning) can be used to make learning objects available over the web. The simplest approach is to generate web pages containing these resources and making the web pages available through a web site for the course. Another approach is to use a full-fledged course management system such as a Learning Content Management System (LCMS).

(Clark, 2008) further identified five different kinds of content delivery type, these are; fact, concept, process, procedure, and principle. Table 1.2 briefly describes each content type and lists graphic types commonly used to teach specific lesson content such as facts, concepts, processes, procedures, and principles. Since 63 percent of computer-systems training is delivered by e-learning (ASTD, 2010), many e-learning graphics are screen captures. A screen capture is a graphic that is a replication of an actual software screen.

Table 1: How E-learning can be used as Content Delivery Tool.

CONTENT TYPE	DESCRIPTION	E OF GRAPHICS USED	EXAMPLES
Fact	Unique and isolated information such as specific application screens, forms, or product data	Representational, Organizational	A screen capture
Concept	Categories of objects, events, or symbols designated by a single name	Representational, Organizational, Interpretive	A tree diagram of biological species Three Excel formulas to illustrate formatting rules.

Process	A description of how something works	Transformational, Interpretive, Relational	Animations of how the heart pumps blood Still diagrams to illustrate how a bicycle pump works An animation showing how a virus invades a cell
Procedure	A series of steps resulting in completion of a task	Transformational	An animated illustration of how to use a spreadsheet as in Figure 4.4 A diagram with arrows showing how to install a printer cable
Principle	Guidelines that result in completion of a task; cause-and-effect relationships	Transformational, Interpretive,	A video showing two effective sales approaches An animation showing genes passing from parents to offspring

3.3 Structuring An Online Course

- Data of each School and Departmental Structure
- Course Planning
- Course Organization
- Communication

Experienced online instructors and students alike emphasize the need to have a clearly structured and well-planned course when teaching and learning online. Structuring the course effectively means planning the course well in advance of when it is being taught, thinking through the organizational structures and qualities that will help students learn, and understanding that the online environment presents a number of communication challenges.

3.4 Data Of Schools Structured In The Polytechnic

The Polytechnic is structured into eight schools (8) and Thirty-four (34) academic departments with a total of sixty four (64) accredited program which cuts across the National Diploma (ND), Higher National Diploma (HND). The College also offers B.Sc (Ed) courses in Technical and Vocational education with Post Graduate Diploma in Computer Science.

3.5 School Of Industrial Manufacturing Engineering

Department of Industrial Maintenance Engineering
Department of Mechanical Engineering
Department of Electrical Engineering
Department of Computer Engineering
Department of Mechatronics
Department of Metallurgy
Department of welding and Fabrication

School Of Civil and Natural Resources Engineering

Department of Civil Engineering
Department of Marine Engineering
Department of Chemical Engineering
Department of Agricultural and Biological Engineering
Department of Mineral and Petroleum Resource Engineering

School Of Technology

Department of Computer Technology
Department of Agricultural Technology
Department of Food Technology
Department of Hospitality Management
Department of Leisure and Tourism
Department of Polymers Food Textile Technology

3.6 Course Planning

Designing a course always takes a great deal of time and thought. That is no different with online courses. At the same time, the online environment offers particular obstacles and opportunities for both instructors and students. As you think through the course elements, pay particular attention to the course components that may serve as stumbling blocks to student learning online. One particular tension that emerges is the need to have a clear and organized structure, while allowing flexibility for making adaptations mid-stream.

3.6.1 Develop Course before the semester begins

Often new faculty discover that developing online courses is time-consuming and that transitioning a successful traditional course to an online setting can be difficult. Experienced online instructors suggest developing your course well in advance and with a clear, concise objectives statement. The better prepared you are, the better your online teaching experience will be.

3.6.2 Allow flexibility in Course design

Although it is important to make course expectations and due dates clear, it is also important to build in flexibility to your schedule. Building flexibility into your course structure will allow you to compensate for unexpected technological problems as well as give you opportunities to respond to student feedback.

3.7 Course Organization

Students in online courses are in particular need of a clear organizational structure. Keep in mind that each student is experiencing the course on his or her own – without the opportunity to turn immediately to a neighbour if confused or unclear about something in the course. In addition, students in online courses do not have the imposed structure of attending class at a consistent time and place each week they do not have the traditional “markers” of handing in papers in class or coming to the classroom to take a test. For all these reasons, it’s important to think carefully about how to appropriately organize your course to encourage student participation and facilitate student learning.

3.7.1 Chunk the syllabus into sections

It is paramount to divide the course syllabus into discrete segments, organized by topic. Self-contained segments can be used to assess student mastery of that unit before moving forward in the course. It’s more organized to use an “Assignments” page for course assignments, and on that page, I outlined each assignment in a paragraph, explaining its purpose in helping students, and provide explanations and guidelines for evaluation. See the sample course homepage in this chapter for an example of organizing your course this way. Also, another way to divide the course is by time.

Consider the following organization of a Course in Computer Engineering NDI, each unit is labelled by week and author. The below diagram shows the first two weeks of the course:

Table 2: First two weeks of the course:

<p>Course Home</p> <p>Syllabus</p> <p>Calendar</p> <p>Questions</p>
<p>Week 1: Electrical elements and circuits; Kirchhoff's laws</p> <p>Reading Notes</p> <p>Weekly Exercise</p> <p>Journal</p> <p>Threaded Discussion</p>
<p>Week 2: Elements in series and parallel; Circuit Analysis</p> <p>Reading Notes</p> <p>Weekly Exercise</p> <p>Threaded Discussion</p>

3.7.2 Break assignments into chunks.

Since students work at their own pace (and procrastinate) in an online course, it works best to develop guidelines that require students to come back to the course website often. Chunking assignments helps students keep up with the work.

3.7.3 Provide due dates for assignments

Each assignment is required to have a clear due date and time (for example, “midnight EST on Dec 8th”). In addition, multiple due dates every week keep students on track with course requirements.

3.7.4 Provide multiple opportunities for graded activities

Assess students on writing assignments, standard test formats, and class participation. The online course format offers a number of opportunities for graded written assignments, including threaded discussions, papers, web research, and online exercises. Multiple measurement points will stimulate students to become involved in multiple activities and keep them participating in class.

3.7.5 Give credit for participating in online discussions

Give students credit for the substantive learning that students provide for each other through online discussions. In many online courses, these discussions are essential for advancing the course goals. By assigning credit for participation in online discussions, instructors can deter “lurking,” where students listen to the conversation but do not participate.

3.8 Communication

Considering how you communicate with students about course goals and your expectations, it is again important to remember that students experience your course on their own and will come to the course with varying levels of technical expertise. Thus, it is necessary to place important information in variety of places, and repeat it often, in order to enhance the chances that students will pay attention to it. Give students a clear overall understanding of the course structure as they need a clear message of the “vision” of the course to provide them a sense of the overall landscape of the course.

- Post course syllabus, policies, expectations, and objectives on the course website. Posting Course syllabus on the homepage will eliminate confusion as student may access the course homepage at any time. Also, the Lecturer can't always be online to answer questions, so it's necessary to make the assignments easy to find and easy to understand.
- Setting up a housekeeping clearinghouse section on your Web page in order to cut down on the number of individual questions. This is also called “Frequently Asked Questions”, this is a Healing on the webpage where students can post a question and get answers about general course information (e.g., how do I download the article, when is the next paper due, etc.) Encourage students to go to this section of the course before asking the instructor.
- Use printed materials if a student requests a printed workbook of course syllabus and other critical course information available for use by those who request printed copies.
- Structure online discussions to capitalize on the threaded discussion format. Use existing textbook material or website readings for “lecture” and guide students through activities and threaded postings for active learning.

4. SYSTEM DESIGN AND IMPLEMENTATION

4.1 The Designing And Development Of The E-Learning Platform

The development of rich and responsive web applications requires an iterative design process to create applications that result in a user interface (UI) design that harmonizes beauty, simplicity, symmetry and consistency. The combination of new web technologies and innovations in web browsers makes it possible for designers and developers to complement their UI with an engaging and intuitive user experience (UX).

4.2 Adobe Dreamweaver

This application is a micro media web design and development application that combines a visual surface used as a web editing tool for creating website. It is used to modify file locally before it uploads it to the remote server using the file transfer protocol. Hence, it is the most preferable web editor because it has inbuilt functions. There are different sections of a website and each has their distinct assigned function, they are; Header, Calendar Navigator (links), Banner (scrolling text and slides), Body (text and advert), Footer (Developers info).

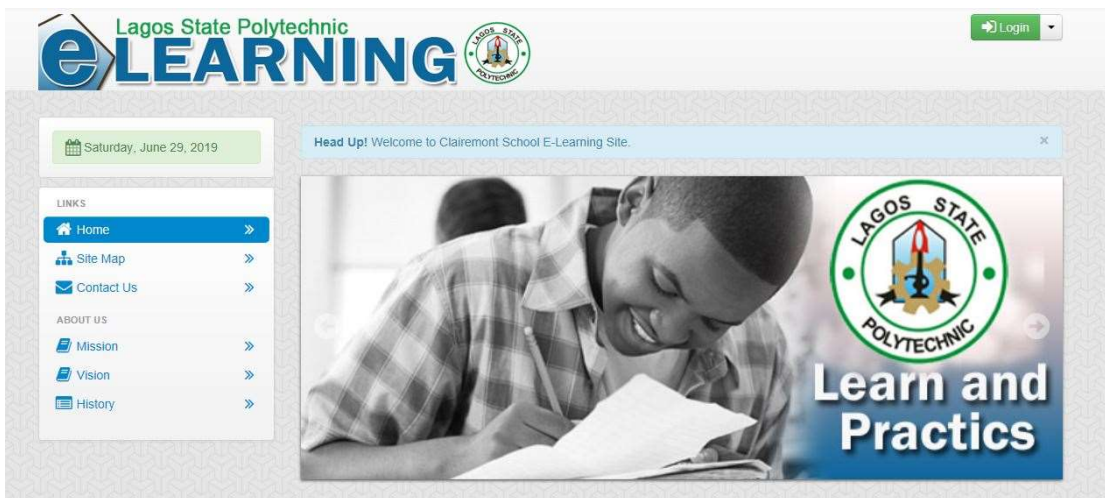


Fig 1a: The Web Layout

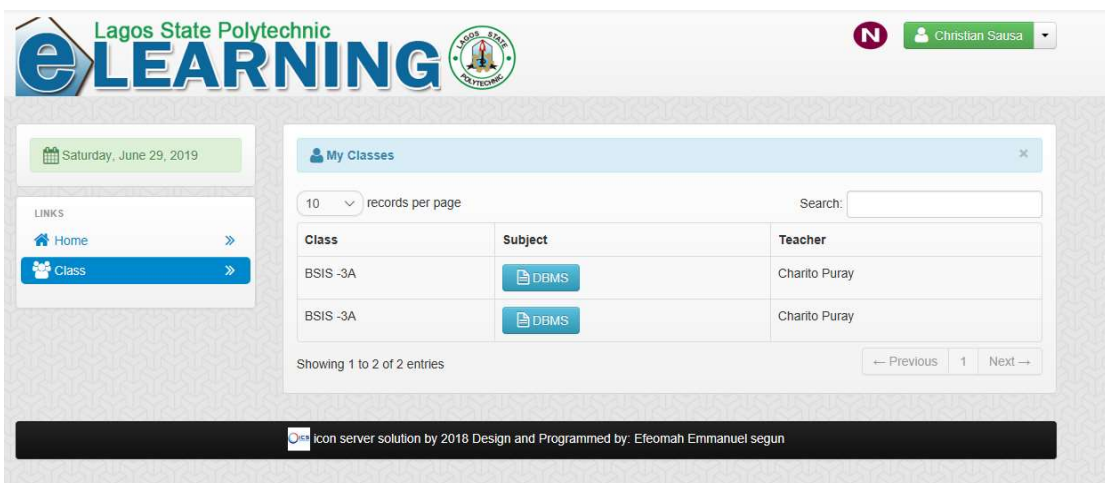


Fig 1b: The Web Layout

← Back

Class: **BSIS -3A** Subject: **DBMS** Teacher: **Charito Puray**

Files ×



10 records per page Search:


File Name	Description	Date Uploaded	Action
Chapter 1 - Computer in our World	Computer in our World	2013-03-25 08:46:46	
Chapter 2 - Searching the Web	Searching the Web	2013-03-25 08:47:16	
Chapter 3A - The Keyboard and Mouse	The Keyboard and Mouse	2013-03-25 08:49:42	
Chapter 3B - Inputting Data in Other Ways	Inputting Data in Other Ways	2013-03-25 08:50:19	
Chapter 4B-printing	Printing	2013-03-25 08:55:30	

Showing 1 to 5 of 5 entries

← Previous 1 Next →

Fig 1c: The Web Layout


Jomar Pabuaya ▾

Saturday, June 29, 2019

LINKS

- Home >>
- Class >>
- Subjects >>
- Students >>

+ Add Subject

Subject Table ×

10 records per page Search:

Course Code	Course Description	Action
No data available in table		

Showing 0 to 0 of 0 entries

← Previous Next →


 Icon server solution by 2018 Design and Programmed by: Efeomah Emmanuel segun

Fig 1d: The Web Layout

4.3 The Header

This is the top rectangular shaped area that runs across the top of the web page design on your screen. The primary purpose of header is to promote the company's brand and make it instantly recognizable to the audience. The header is the most valuable space on the screen and it should be kept relevant

4.3.1 Header Code Section

```
<!DOCTYPE html>
<html lang="en"> <head><title>YCT Comp.Engr Elearning</title>
<link href="admin/img/ivserver.png" rel="icon" type="image">
<link href="admin/css/bootstrap.css" rel="stylesheet" type="text/css" media="screen"
<link href="admin/css/bootstrap-responsive.css" rel="stylesheet" type="text/css" media="screen">
<link href="admin/css/font-awesome.min.css" rel="stylesheet" type="text/css" media="screen">
<link rel="stylesheet" type="text/css" href="admin/css/DT_bootstrap.css"><?php include('admin/connect.php');
?></head>
<script src="admin/js/jquery.js" type="text/javascript"></script>
<script src="admin/js/bootstrap.js" type="text/javascript"></script>
<script type="text/javascript" charset="utf-8" language="javascript"
src="admin/js/jquery.dataTables.js"></script>
<script type="text/javascript" charset="utf-8" language="javascript" src="admin/js/DT_bootstrap.js"></script>
<script type="text/javascript" language="javascript" src="js/ndhui.js"></script>
```

4.4 Calendar

This section deals with time management scheduling section of a web site, it displays the current date of the website as it also allows users to edit and create event simultaneously.

4.4.1 Calendar Code Section

```
<title>Flexible Calendar</title>
<meta name="description" content="Flexible Calendar with jQuery and CSS3" />
<meta name="keywords" content="responsive, calendar, jquery, plugin, full page, flexible, javascript, css3,
media queries" />
<meta name="author" content="Codrops" />
<link rel="shortcut icon" href="..../favicon.ico">
<link rel="stylesheet" type="text/css" href="css/calendar.css" />
<link rel="stylesheet" type="text/css" href="css/custom_1.css" />
<script src="js/modernizr.custom.63321.js"></script>
</head><body>
<div class="container">
<div class="custom-calendar-wrap custom-calendar-full">
<div class="custom-header clearfix">
<h2>Flexible Calendar <span><span>Demo 1</span> | <a href="index2.html">Demo 2</a></span></h2>
<h3 class="custom-month-year">
<span id="custom-month" class="custom-month"></span>
<span id="custom-year" class="custom-year"></span><nav>
<span id="custom-prev" class="custom-prev"></span>
<span id="custom-next" class="custom-next"></span>
<span id="custom-current" class="custom-current" title="Got to current date"></span></nav>
```



```
</h3></div><div id="calendar" class="fc-calendar-container"></div></div><!-- /container --><script
  type="text/javascript" src="http://ajax.googleapis.com/ajax/libs/jquery/1.8.3/jquery.min.js"></script>
<script type="text/javascript" src="js/jquery.calendario.js"></script>
<script type="text/javascript" src="js/data.js"></script>
<script type="text/javascript">
$(function() {var cal = $('#calendar').calendario(
{onDayClick : function( $el, $contentEl, dateProperties )
{for( var key in dateProperties ){console.log( key + ' = ' + dateProperties[ key ] );}
caldata : codropsEvents} ),$month = $('#custom-month').html( cal.getMonthName() ),
$year = $('#custom-year').html( cal.getYear() );$('#custom-next').on( 'click', function() {
cal.gotoNextMonth( updateMonthYear );});$('#custom-prev').on( 'click', function()
{cal.gotoPreviousMonth( updateMonthYear );});$('#custom-current').on( 'click', function()
{cal.gotoNow( updateMonthYear );} );function updateMonthYear() {$month.html( cal.getMonthName()
);$year.html( cal.getYear() ) // you can also add more data later on. As an example://
someElement.on( 'click', function() {
cal.setData( {
```

4.5 Navigator

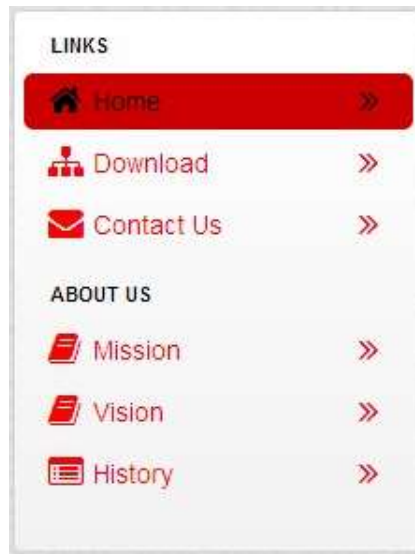


Fig 1.2: Diagram of the navigator

The navigator is split into six page; The Home page, download, contact us, mission, vision and history.

4.5.1 Home Page

This is the introductory page of the website, it serves as the default section that loads immediately the website is launched. The home page gives detailed information about on its owner and also provides links to the other parts of the site.

4.5.2 Download Page

This is the recipient of data from a remote server. It occurs when a file is copied to a folder in local home storage and saved for use.

4.5.3 Contact Us Page

This is the standard web page on a website that permits and allows visitors access to personal information which can be used to interact with the owner of the site or people responsible for maintaining the site.

4.5.4 Mission Page

It is a written declaration of an organization's core purpose and focus that normally remains unchanged over time. This statement is a formal summary of the aims and values of the website of which all visitor must comply for effective communication.

4.5.5 Vision Page

This page is an aspirational description of what an organization would like to achieve or accomplish in the midterm or long term future. It is intended to serve as a clear guide for choosing current and future course of action.

4.5.6 Navigator Code Section

```
<div class="hero-unit-1">
  <ul class="nav nav-pills nav-stacked">
    <li class="nav-header">Links</li>
    <li><a href="index.php"><i class="icon-home icon-large"></i>&nbsp;Home</a></li>
    <li><a href="download.php"><i class="icon-sitemap icon-large"></i>&nbsp;Download</a></li>
    <li><a href="#"><i class="icon-envelope-alt icon-large"></i>&nbsp;Contact Us</a></li>
    <li class="nav-header">About US</li>
    <li><a href="#mission" role="button" data-toggle="modal"><i class="icon-book icon-large"></i>&nbsp;Mission</a></li>
    <li><a href="#vision" role="button" data-toggle="modal"><i class="icon-book icon-large"></i>&nbsp;Vision</a></li>
    <li class="active"><a href="history.php"><i class="icon-list-alt icon-large"></i>&nbsp;History</a></li>
  </ul></div>
</div>
```

4.6 Banner

This is a form of advertisement that entails embedding a link or graphics into a web page with the intention to attract traffic to the website or to promote the brand. Banner can be created using different slider, but it is preferable to use a slider with less complex features for the easy compactibility and fast loading time. Hence the Nivo slider used in designing this web page maintained the loading speed of the site and added features to its outlook.



Fig 1.3: Diagram of the Banner.

4.6.1 Code Section For Banner

```
<!--slider--> <div class="slider-wrapper theme-default">
  <div id="slider" class="nivoSlider"> </div></div>
<!-- end slider -->
```

4.7 Footer

This contains information listed at the bottom of the page. This information consists of the name of the company or the organization that published the website along with relevant copyright information. The purpose is to meet business goals and contact information of the web developer.

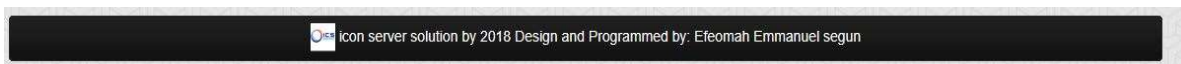


Fig 1.4. Diagram of the footer.

4.8.1 Code Section Of The Footer

```
<br><div class="navbar navbar-inverse"><div class="navbar-inner">  
<div class="footerindex"><center>&nbsp;I.V Server (C) 2018 Design and Programmed by: lfeoma Viany  
Akuma</center></div>
```

5. SUMMARY, CONCLUSION AND RECOMENDATION

Although basic didactical elements may be problematic within the E-Learning situation, the necessity for didactical aspects such as defining competencies, determining learning objectives and implementing assessment methods can be considered as very essential for online courses. As it was revealed in the paper, the assessment and the grading should not be realized by only using quizzes. There are several other ways to assess the learning process, which might work better or worse for defined objectives, like assigning tasks and assignments to enhance the student's knowledge on the course and make sure that he is fully aware of the material's content. In fact, mediating objectives of the affective domain through E-Learning is always more extensive and might not be assessable in online courses. Furthermore, it is also very hard to reach high-level objectives for all kinds of competencies within pure technology-based learning and teaching.

In order to achieve the research aim to study the effectiveness of students' use of interactive e-learning as a factor promoting the quality of the studies, both qualitative and quantitative data on joint activities (forums and chats) and the individual forum "The problems of use of computers" were obtained. In the course of the qualitative research, linkages among the three metacodes: experience, self-feeling and social recognition, and the conceptual codes which make these metacodes, were constructed. The quantitative data were used to confirm the real existence of these potential linkages.

Students acquire new knowledge and skills, dealing with unknown situations, in which their learning experience (one's own biography as a construction) as well as their positive and negative emotional experience (negative and positive basic emotional experience) motivate them to achieve the goals set. Intercommunication in the e-platform helps them to accept other people's points of view and change their own opinions if required.

Students' cooperation with their course mates, especially their positive pattern and the support and practical assistance from the tutor, lecturer and professors have a positive impact on students' wishes to achieve their goals. The cooperation and communication in the e-platform help students to solve problems and realise practical tasks. It especially is observed in the forum "The problems of use of computers".

The work in the e-platform widened students' opportunities to use ICT. If in the beginning of the programme students faced traditional basic problems of using ICT, such as: nebulosity on how to use e-platform, how to log in, upload and download files, send e-mails, use chats and forums, etc., in some time, after having worked in the e-platform, the students' experience grew and the character of the problems which they dealt with, changed. Now they had to use the study material, acquire the study content, search information, use different software, etc., which are connected with actions appropriate to definite situations. The growth of the level of problems' difficulties which students had to solve can vividly be observed in the forum "The problems of use of computers".

The research aim to show that the effectiveness of interactive e-learning organization has a positive impact on quality assurance in the chosen three dimensions: experience, self-feeling and social recognition, has been achieved. This research has both the advantage of multi-language studying in real life situations by using ICT, and the disadvantages caused by its limitations:

- The initial levels of students' experience in the beginning of the programme were not similar;
- The students found themselves in a new unknown situation without prior experience of studying in e medium;
- The students had to pass a certain way from individual studying to the decision that, in order to succeed, they had to combine their efforts in cooperation, which caused some delay in studies;
- In the beginning the students did not use opportunities to attend face-to-face studies in order to clarify nebulosities;
- In the course of the growth of students' ICT competence it became more complicated to observe all their activities and get data, as they enlarged the scope of their ICT use, coming out of the e-platform into Google, Skype, etc;

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