E-LEARNING USING CLOUD COMPUTING: A PROPOSED MODEL FOR FEDERAL POLITECHNIC, ILARO.

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Abstract

The emergence of internet has transformed educational system in every part of the world. One of the major areas where we use information communication and technology in modern day educational system is e-learning. E-learning is achieved with computer network. With the conventional system of running distance learning which is database server system, data loss and high cost of running is a problem. There is also problem of fixed and limited bandwidth which made it not easily accessible. Cloud computing is a big shift from the traditional database server computing. It eliminates the capital expense of buying hardware and software and setting up and running on-site datacenters. E-learning using cloud computing will provide access to information and applications online instead of having to build, manage, and maintain them on the personal hard drive or servers. It's fast, efficient, and secure.

Keyword: E-learning, Cloud computing, database server, computer network.

Introduction

Education has been transformed greatly through the massive proliferation of affordable computers, Internet broadband connectivity and information and communication technology (ICT

One of the major areas of application of ICT in modern day educational system is e-learning. E-Learning is convenient and portable and does not need physical attendance. Learning is self-spaced (Armstrong, 2012). One can study at home, work or on the road, one can read materials online or download them for reading later.

At federal polytechnic, ilaro, accessing an institution's repository and other academic materials have been increased dramatically, as the use of online documents and digitized print media is rising. It is very difficult and time consuming for students and lecturers to access lecture materials at the same time online. This is because there is a fixed and limited bandwidth which made it not easily accessible. However, there is a need to develop an e-learning platform which will be accessible for both students and lecturers. The proposed system will be designed in such a way that it will reduce bugs that might be observed in the conventional hosting plan. This bug may lead to loss of data and effectually cause a total failure of the system.

E-Learning is currently a fashionable term used to describe the diverse use of information and communications technologies to support and enhance learning, teaching and assessment from resource-based learning to fully online courses

E-learning platform could be used as a tool to decongest student's population in schools, and therefore eliminate all forms of problem associated with overpopulation of students in our institutions of learning. Among the learning technologies, e-learning offers several benefits over conventional classroom-based learning. Its biggest advantage is the reduction in cost since a physical environment is no longer required and therefore it can be used at any time and place for the convenience of the student. Additionally, the learning material is easy to keep updated and the teacher may also incorporate multimedia content to provide a friendly framework and to ease the understanding of the concepts. (Ellison, 2013).

E-learning can be achieved in a computer network environment. In fact, without computer network, there cannot be e-learning. Depending on the area of coverage, computer network can be local area network (LAN) or wide area network (WAN). Wide area network covers nations and thus, it can be referred to as network of networks. This network of networks is known as internet.

Cloud computing is a network-based computing like the traditional database server computing. Database servers are high-powered computers that store and manage data stored on a server for a network of users and devices. (Sam, 2021). Databases server may provide resources to clients without a web or application server.

Jake (2021) defined cloud computing as the delivery of different services through the Internet. These resources, according to Jake (2021), include tools and applications like data storage, servers, databases, networking, and software. According to him, cloud-based storage makes it possible to save data to a remote database rather than keeping files on a proprietary hard drive or local storage device. As long as an electronic device has access to the web, it has access to the data and the software programs to run it.

Richard (2022) said Cloud Computing is storing and accessing data and computing services over the Internet. It doesn't store any data on users' personal computers. It is the on-demand availability of computer services like servers, networking, databases, data storage, etc. The main goal of cloud computing is to give data centers access to many users for accessing data from remote servers.

Wesley (2021) defined Cloud computing as a general term for anything that involves delivering hosted services over the internet.

According to Jake.2021, cloud computing services provide users with a series of functions that include, Email, Storage, backup and data retrieval, Creating and testing apps, analyzing data, Audio and video streaming and Delivering software on demand

However, from all the definitions given above, one is saved to conclude that cloud computing is a way to access information and applications online instead of having to build, manage, and maintain them on your own hard drive or servers. It's fast, efficient, and secure.

The architecture of cloud computing, according to Richard (2022), is a combination of components required for a cloud computing service. A Cloud computing architecture consists of several components like a frontend platform, a backend platform or servers, a network or Internet service, and a cloud-based delivery service (Richard,2022).

The major disadvantage of cloud computing is the risk of security. According to Wesley (2021) and Jake (2021), once cloud computing is adopted, one should be aware of the fact that you will be sharing all your company's sensitive information to a third-party cloud computing service provider. Hackers might access this information.

According to Wesley, cloud service has three distinct features that differentiate it from traditional web hosting. These features are: Ability to access large amounts of computing power on demand users due to it pay as you go property. It is elastic as it gives users the option to change services from much to little at any time and management of the services by the provider coupled with improved access to high-speed internet.

Literature Review

E-learning is an Internet-based learning process, using Internet technology to design, implement, select, manage, support and extend learning, which will not replace traditional education methods, but will greatly improve the efficiency of education (Ellison, 2013). As e-learning has a lot of advantages like flexibility, diversity, measurement, opening and so on, it will become a primary way for learning in the new century.

Manprit (2011) illustrated that in traditional web-based learning mode, system construction and maintenance are located inside the educational institutions or enterprises, which led to a lot of problems, such as significant investment needed but without capital gains for them, which leads to a lack of development potential. According to Manprit (2011), cloud-based e-learning model introduces scale efficiency mechanism, i.e. construction of e-learning system is entrusted to cloud computing suppliers, which can make providers and users to achieve a win-win situation. The cloud-based environment supports the creation of new generation of e-learning systems, able to run on a wide range of hardware devices, while storing data inside the cloud.

Jake (2021), said, Cloud computing is not a single piece of technology like a microchip or a cellphone. Rather, it's a system primarily comprised of three services which are software-as-a-service (SaaS), infrastructure-as-a-service (IaaS), and platform-as-a-service (PaaS).

Wesley (2022), as well categorized cloud computing services as: infrastructure as a service (IaaS), platform as a service (PaaS) and software as a service (SaaS). He however stated that

cloud computing can be private or public. A public cloud sells services to anyone on the internet. A private cloud is a proprietary network or a data center that supplies hosted services to a limited number of people, with certain access and permissions settings. According to Wesley, Private or public, the goal of cloud computing is to provide easy, scalable access to computing resources and IT services.

Chandran focused on current e-learning architecture model and on issues in current e-learning applications (Chandran, 2010). The article presents the Hybrid Instructional Model as the blend of the traditional classroom and online education and its customization for e-learning applications running on the cloud computing infrastructure. The authors underline the e-learning issues, especially the openness, scalability, and development/customization costs. The existing e-learning systems are not dynamically scalable and hard to extend – integration with other e-learning systems is very expensive. The article proposed the hybrid cloud delivery model that can help in fixing the mentioned problems.

In September 2011, the US National Institute for Standards and Technology (NIST) issued a special release document regarding the definition of cloud computing which states that "cloud computing is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction".

There are six things that must be considered in adopting Cloud computing in the education system (Bulla, 2016) functionality, platform, contract, user experience and accessibility, technical issues and costs. The concept of cloud computing adoption in the E-learning System consists of five independent factors derived from the combination of Diffusion of Innovation (DOI) and Technology Accepted Model (TAM) theories. These factors are associated with two dependent variables "Intent to adopt cloud computing" and "Actual usage of cloud computing". These factors are: Usability Factor, Innovation Factor, Economic Factor, Technological Factor and Contextual Factor (Sabi, 2016). Of the five factors, Usability which contains Usefulness and Ease to Use are many factors that arise in the adoption of cloud in education (Kayali, 2016).

The third evolution of education called E-learning era, actually consists of two types, namely when the E-Learning System on the web is often referred to as Traditional E-Learning and when the E-Learning System is based on Cloud Computing. For traditional E-learning, most of the resources are provided by institutions, while cloud-based e-learning is a part of resources using cloud service facilities so that it can increase effectiveness and efficiency.

3.   DESIGN

The architecture of cloud-base computing is designed with two components; front and back end like data-based server design.   The front end is the client part. It comprises interfaces and applications that are required to access the Cloud computing or Cloud programming platform. The back end is the cloud itself which comprises the resources that cloud computing services required. Required resources like virtual machines, servers, data storage, security mechanisms, etc.

The application for this proposed system has it front end consisting of two parts mainly- the users' module and the admin module.

The system flowchart shows the flow of operations performed by the users of the system.

 Figure one below is a procedure and program flow chart used for the design and development of the application.
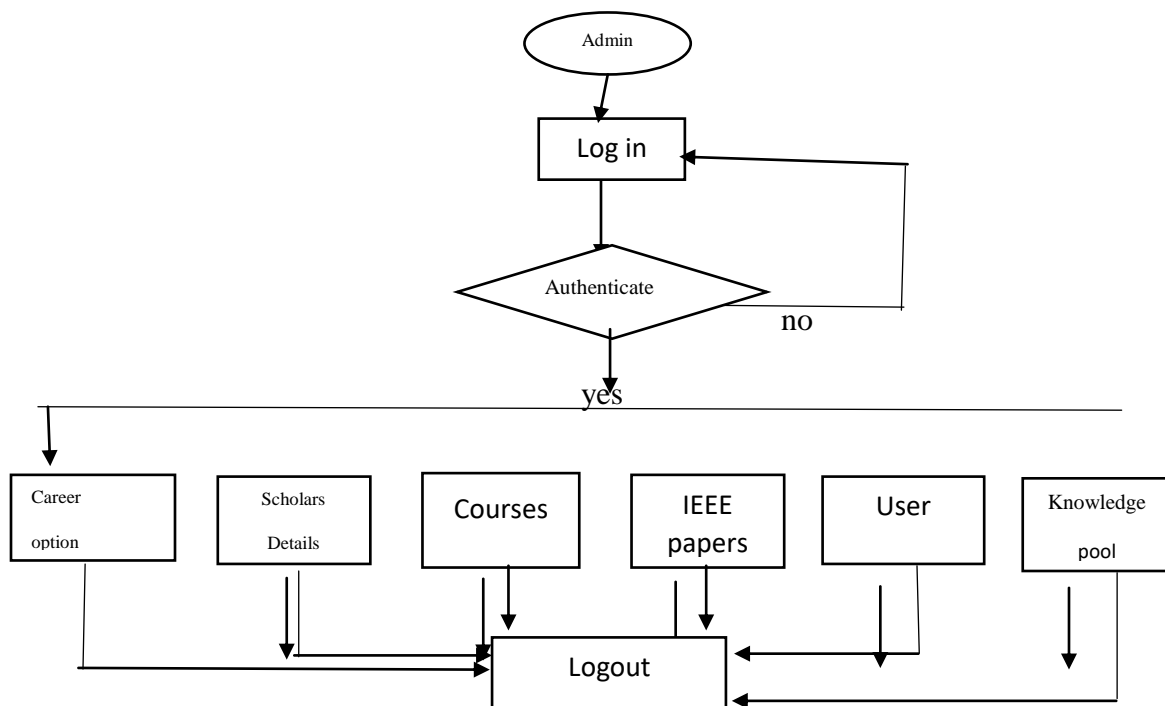
Figure 1 System Flowchart

The features of the modules include:

i. Admin login: Admin is the one who administers the system by adding or removing e-books into and from the system respectively.

ii. User login: Students have to register themselves into the system to create an account. After registering successfully, they can then login into the system by entering 10 digits mobile number and their email id.

iii. Categories of books: The e-books are organized according to categories. Thus. this classifies the books and students can view the list of references books available.

iv. View Videos: Students can watch videos with ease due to efficient streaming on cloud infrastructure.

v. Search option: Students can even search for books according to subjects and authors.

vi. Students can then download the required e-book on selecting it.

vii. Feedback form: Students can even provide their feedback into the system by filling up feedback form.

The input to the new system is designed to capture data in the subsystem as shown in the diagram below.

ENTER LOGIN DETAILS

EMAIL ADDRESS

PASSWORD

LOGIN

Figure 2 Input Design

With the identification of the input design, it is logical to state the output design too. Output is the data that should go out of the system which includes names and other information about the numerous staffs and possible responses the computer could produce when it encounters an authorized conclusion.

LOGIN SUCCESSFUL

CLICK HERE TO PROCEED TO LEARNING PLATFORM

Figure 3: Output Design

System Architecture

The architecture of the system is shown in figure 3. The architecture diagram shows the overall flow of the E-Learning System. There will be admin and user. Admin can dump the data in web application and manages, controls all the activities of the application. The user has to register in the web application, fetch and view data which was added by admin. The web application is hosted in the cloud server.

FRON END

BACK END
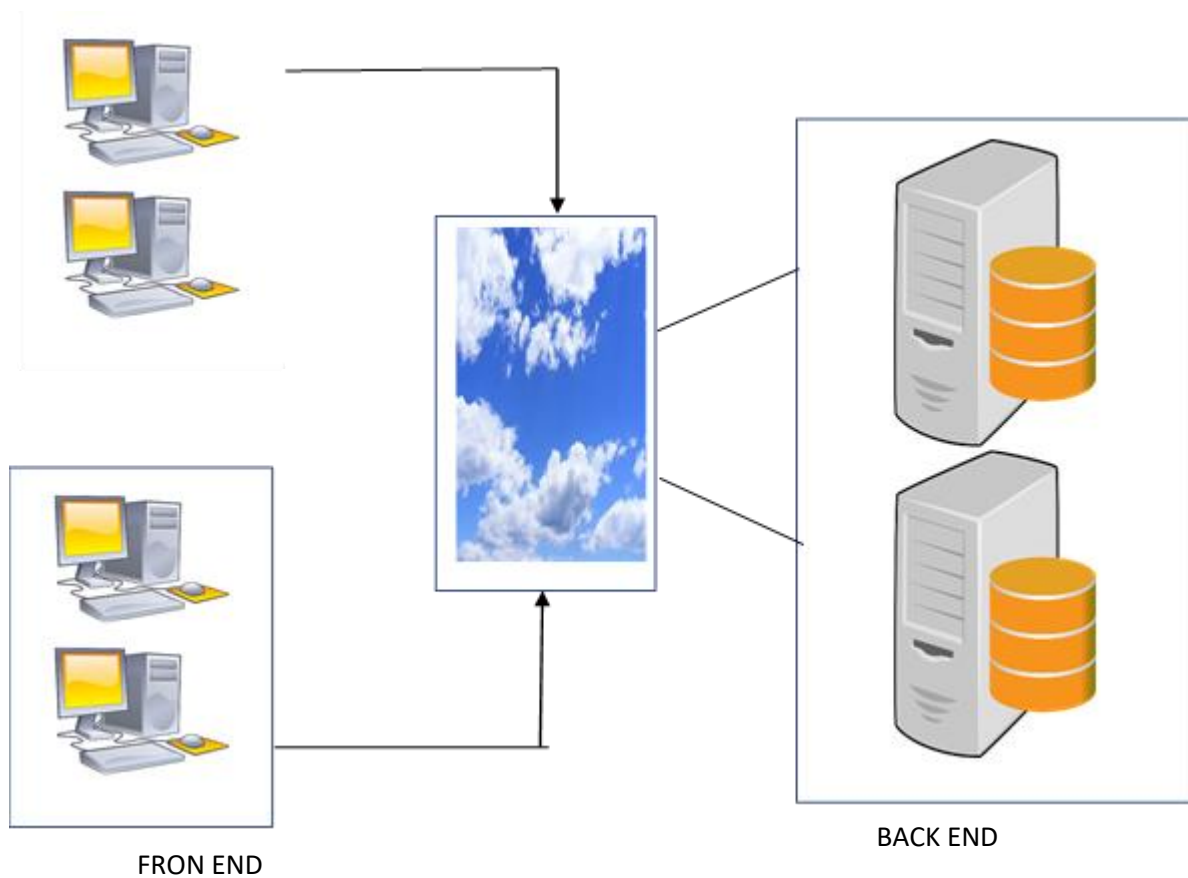
Figure 4: System Architecture

The system consists of several screens and components working independently together as one to achieve the aim of the system. The screens are displayed below showing their functions too:

Admin Login Page

This page displays input boxes that accepts the email address and password of the admin for login purpose.
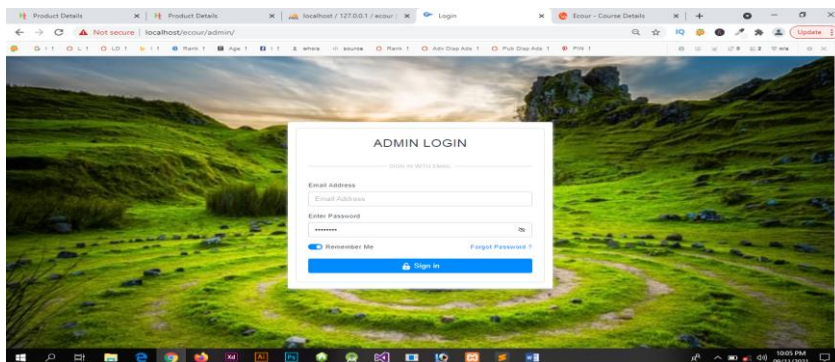

Figure 5: The Admin Login Page

This page displays the total certificate earned, total course, total lessons, total students and list of recently registered learners.
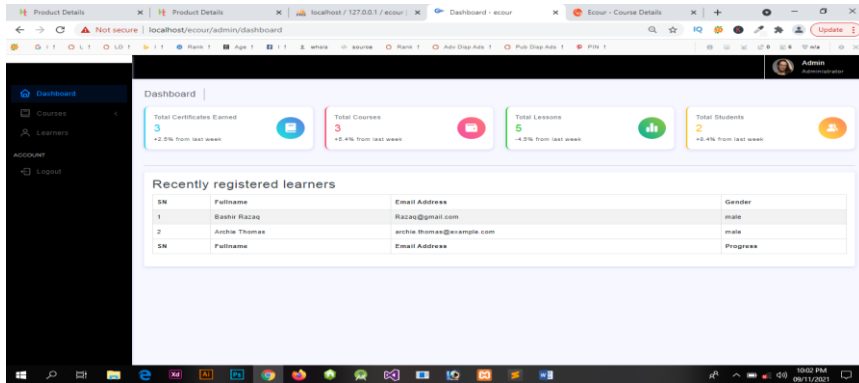
Figure 6: The Admin Dashboard Page

This page displays a platform where the admin can register new course. The admin provides the title of the course, duration, featured image and description of the course.
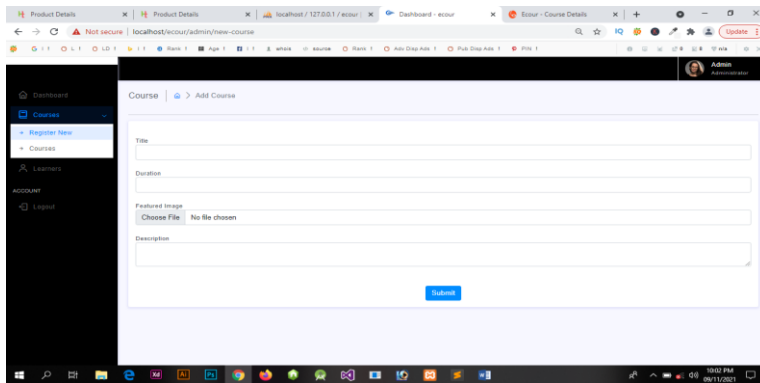
Figure 7: The Admin new course Page

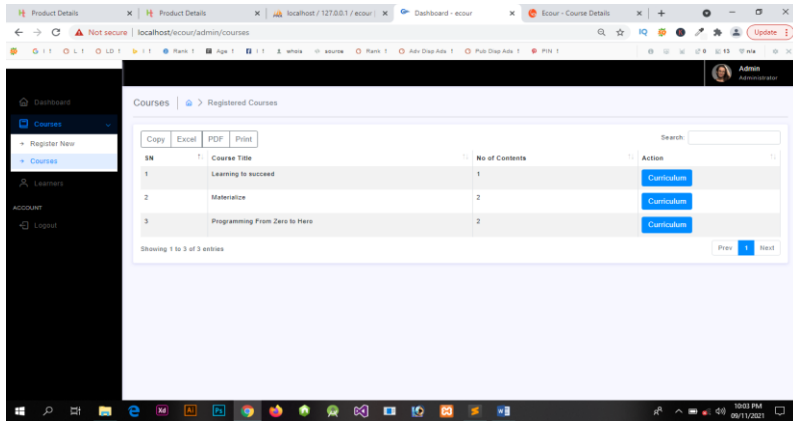This page displayed the courses that has been registered by the admin.

Figure 8: The Courses Page

This is the learner's module. This page displays the details of course to the learner.
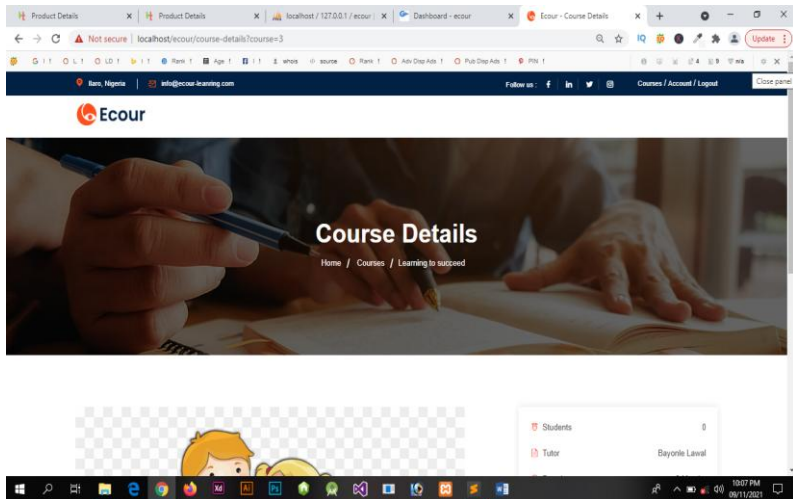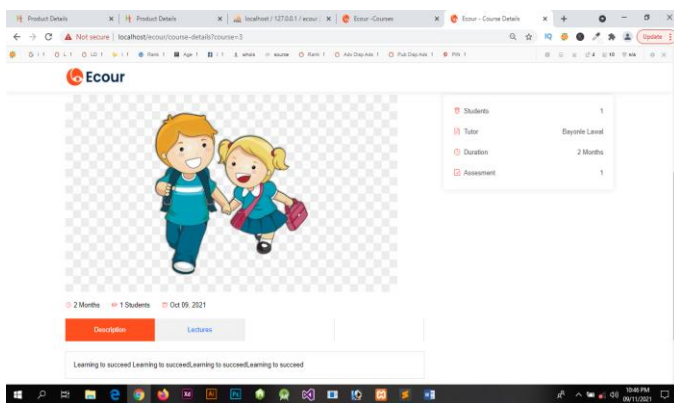

Figure 9: The Course details Page

Figure 10: The Course details Page

This page displays the completed courses and ongoing courses of the learner.
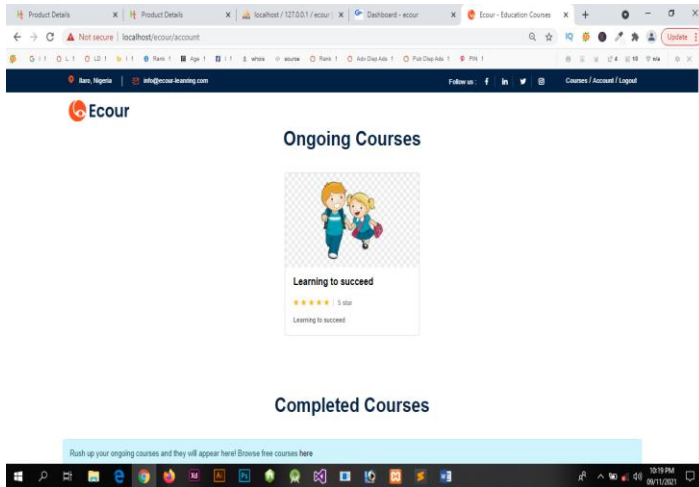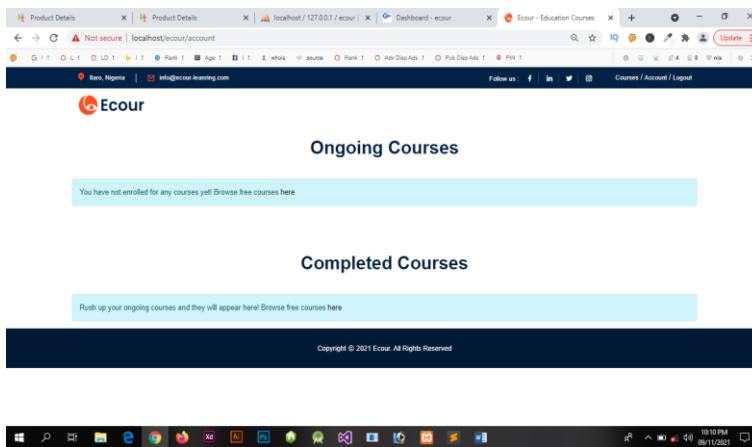

Figure 11:The Account Page

Figure 12:The Account Pag

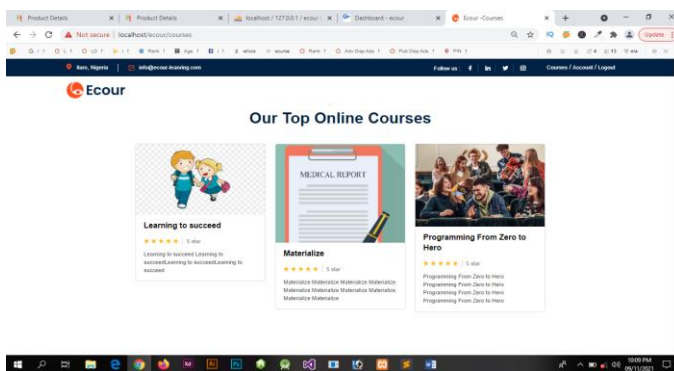This page displays varieties of courses available for learning and their description.

Figure 13: The Courses Page

CONCLUSIONS

A cloud-based e-learning system is a welcome idea in this modern-day life, because the massive proliferation of affordable computers, Internet broadband connectivity and rich education content has created a global phenomenon in which information and communication technology (ICT) is being used to transform education. This study presents the design and implementation of cloud-based e-learning platform. The system is design in such a way that learners can study at their own pace with or without instructor and can also switch from one instructor materials to another when studying offline.

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