CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND OF THE STUDY

Virtual library learning systems are online platforms that provide a user interface for both creators (instructors) and information users to share resources conveniently via the internet. VLPs can vary in complexity depending on the functionalities they provide and the target audience. An example of such systems are Institutional Repositories; “An institutional repository is an archive for collecting, preserving, and disseminating digital copies of the intellectual output of an institution, particularly a research institution” (Crow, 2002). Institutional repositories focus more on the preservation and dissemination of research information resources. This project focuses on the design and implementation of a digital learning platform that aids effective storage and dissemination of information from the instructor to the learner and provides an effective means of communication between users of the system.

A virtual learning environment refers to a system that offers educators digitally-based solutions aimed at creating interactive, active learning environments. VLEs can help professors create, store and disseminate content, plan courses and lessons, and foster communication between student and professor (in the form of e-mails and discussions), even in real-time. Virtual learning environments are often part of a higher education institution’s wider learning management system (LMS) (Tophatmonocle Corporation, 2021).

A virtual learning environment (VLE) in educational technology is a web-based platform for the digital aspects of courses of study, usually within educational institutions. They present resources, activities, and interactions within a course structure and provide for the different stages of assessment. VLEs also usually report on participation; and have some level of integration with other institutional systems. (Liber, 1999). A virtual learning environment is an online-based platform that offers students and professors digital solutions that enhance the learning experience. Unlike a virtual classroom, which is meant to replicate and replace the physical classroom environment for distance learners, a virtual learning environment (or VLE) harnesses technology to supplement an in-class experience, with, for example, digital communication, interaction and quizzes or polls run through the VLE (Tophatmonocle Corporation, 2021).

Learning is the process of acquiring new understanding, knowledge, behaviors, skills, values, attitudes, and preferences. The ability to learn is possessed by humans, animals, and some machines; there is also evidence for some kind of learning in certain plants (Karban, 2015). Some learning is immediate, induced by a single event (e.g. being burned by a hot stove), but much skill and knowledge accumulate from repeated experiences. The changes induced by learning often last a lifetime, and it is hard to distinguish learned material that seems to be "lost" from that which cannot be retrieved (Daniel, Daniel & Daniel, 2011). The process of learning is employed by humans in various levels of development; from childhood to adulthood. Students in academic institutions learn to acquire certain academic qualifications. They employ various tools and learning styles to reach their goal of learning a thing or acquiring a skill.

The world today is faced with so much development in various spheres of life; all works of life managed by man must see to it that they move with the trend and see how various developments can be made adaptable where necessary. The growth of the internet and technology in the world today has brought about several changes to how things are done. When it comes to the way knowledge is being transferred and acquired by individuals, technology has brought about a massive change. We see this when we consider the rise in online platforms making available course resources that people can access to acquire knowledge. An issue arises when we consider the opportunities and advantages made available by these online learning platforms as people tend to see them as competition to physical learning environments.

Students and Lecturers are faced with several opportunities to facilitate and ease the processes involved in knowledge transfer and acquisition considering the potentials embedded in technology. This could be seen in the way students and instructors communicate and share information. Instructors now put to use various technological tools to communicate with their students; We see the increase in the use of emails for communication, hosting of lecture videos on the internet on platforms such as YouTube, we see instructors harnessing the powers of Google classroom; a software that facilitates learning. “Google Classroom uses the standard Google office software tools such as Google Docs as well as spreadsheet and presentation applications, audio and video conferencing, not to mention Google Drive for online storage. Additionally, there are administrative tools to make it easier for teachers to manage their classes” (Tech Radar, 2021). Considering the multiple tools available for use by both instructors and students, we see that a problem is introduced as there would be a need to properly select what is usable and would be effective on the long run.

A library is a collection of materials, books, or media that are easily accessible for use and not just for display purposes. It is responsible for housing updated information to meet the user's needs daily. Libraries may provide physical or digital access to material and maybe a physical location or a virtual space, or both. A library's collection can include books, periodicals, newspapers, manuscripts, films, maps, prints, documents, microform, CDs, cassettes, videotapes, DVDs, Blu-ray Discs, e-books, audiobooks, databases, table games, video games, and other formats. Libraries range widely in size, up to millions of items (Lalrohlui, 2021). According to Lankes, Newman, Kowalski, Tench, Gould, & Silk (2016), a library is a mandated and facilitated space supported by the community, stewarded by librarians, and dedicated to knowledge creation.

A library is a collection of resources in a variety of formats that is organized by information professionals or other experts who provide convenient physical, digital, bibliographic, or intellectual access and offer targeted services and programs with the mission of educating, informing, or entertaining a variety of audiences and the goal of stimulating individual learning and advancing society as a whole (Robert, 2003). One of the benefits and advantages of libraries to learners is that they ensure access to materials through indexes, catalogs, and other information tools that allow learners to locate items appropriate to their needs.

E-learning (Electronic learning) which is also known as Virtual Learning refers to learning that is carried out electronically. Learners employ various electronic tools to acquire knowledge easily which exposes them to more opportunities to access knowledge irrespective of location constraints and other limiting factors.

E-learning unites two main areas, learning, and technology. Learning is a cognitive process for achieving knowledge, and technology is an enabler of the learning process meaning that technology is used like any other tool in the education practice, as is a pencil or a notebook, for example. E-learning systems aggregate various tools, such as writing technologies, communication technologies, visualization, and storage. For these reasons, researchers and scientists have sought to transform e-learning systems into the technically transparent tool, like pencil or notebook (Aparicio, Fernando & Tiago, 2016). Moore (1989) purported that three core types of interaction are necessary for quality, effective online learning:

1. Learner–learner (communication between and among peers with or without the teacher present),
2. Learner–instructor (student-teacher communication)
3. Learner–content (intellectually interacting with content that results in changes in learners' understanding, perceptions, and cognitive structures).

According to Stephen (1998), Information sources accessed via the internet are ingredients of a digital library. Today, the network connects some information sources that are a mixture of publicly available (with or without change) information and private information shared by collaborators. They include reference volumes, books, journals, newspapers, national phone directories, sound and voice recordings, images, video clips, scientific data (raw data streams from instruments and processed information), and private information services such as stock market reports and private newsletters. These information sources, when connected electronically through a network, represent important components of an emerging universally accessible, digital library.

The advantages of virtual libraries as a means of easily and rapidly accessing books, archives, and images of various types are now widely recognized by commercial interests and public bodies alike.

Advantages of virtual-learning-environments includes:

* Teachers can track if learners are engaging with internet-based communication and related materials by submitting evaluations online and providing quick feedback.
* The message services can inspire teamwork and communication both between instructor and learner and learner and learner.
* Teachers and learners can also involve more enthusiastically in a course at a time and place that is suitable for both (British Educational Communications and Technology Agency, 2005).
* Course information such as past exam papers, timetables, and administrative information can all be found in one place, and are accessible from one authoritative source.
* Careful signposting (such as including links with course material) can provide extra care for learners, or inspire learners to study at an intensive level.
* With a VLE, it is possible to save time for teachers by dropping the time required for photocopying, course material delivery, and updating course material (British Educational Communications and Technology Agency, 2005).
* The main benefit of virtual learning environments appears to be that they can present information at a variety of scales and present images from a variety of perspectives at once (for example aerial views, cross-sectional views, animated rotating block diagrams, etc.).
* The apparent and most thoughtful shortcoming of VLEs is that they are less effective at informing merely based skills than the actual world (Schlosser & Simonson. 2006).
* The material presented on a computer is only an abstraction of the real thing’ and ‘being on a VLE does not have the same impact as a real-world or face-to-face education

The project aims to develop a virtual library learning system made available via a website and mobile application. The basics are to build a space that aids the process of learning and makes it possible for learners and instructors to share knowledge and communicate virtually. Instructors would be provided various tools which they could use to reach out to students better; share lesson resources in various formats, a custom forum for every course created/managed by instructors, and many more functionalities that aid instructors in teaching and communicating easily. This proposed project is more of a virtual library for learning purposes, it is structured to facilitate easy access to resources needed for a particular topic to which students are subscribed.

The Faculty of Management science which was previously a department under the Faculty of Social Sciences has undergone some changes over the years. It was initially known as the Department of Management Studies and later the Department of Accounting and Management Sciences. Although the University of Jos Senate gave formal recognition to the separation of the Departments of Accounting and Management Sciences in 2004 and took up formally in August, 2004. After the separation, the Department was called Management Sciences.

With the creation of the Faculty of Management Sciences in December, 2010, the Department of Management Sciences was renamed as Business Administration. (University of Jos, n.d).

Faculty of Management Sciences is one of the faculties in the University of Jos. The Faculty is made up of three Departments which are the Department of Accounting, Department of Actuarial Science and Department of Business Administration.

The 300 level students of Management Science were selected to be used as a case study for this project as the platform would be first tested on them. These students currently employ the traditional means of learning which includes;

1. Instructor to student (One to One).
2. Instructor to students (One to many).
3. Group discussions (Many to many).
4. Learning using lecture notes and handouts.

1.2 STATEMENT OF THE PROBLEM

In University of Jos, students and instructors employ the traditional means of learning and teaching. Instructors often engage in physical lecture sessions where they avail themselves in a lecture hall to pass knowledge to students physically. They create lecture materials that are being distributed to students as photocopies by course representatives. The traditional method of knowledge transfer from instructor to students used in the university when compared to the opportunities posed by ICT is outdated and needs to be improved on. Some of the problems of the current system used by instructors in the University of Jos are;

1. Instructors must be available physically for lecture sessions to take place, they need to depend on course representatives to pass information across to learners.
2. Instructors need to redistribute learning materials every session.
3. Instructors depend on course representatives to quickly pass information across to learners.
4. There is no central repository for information resources to be stored and accessed easily by learners.

All these are some of the problems associated with traditional methods of teaching and learning.

The need for a virtual library learning platform (VLP) in 21st-century universities cannot be overemphasized as we see the opportunities made available by digital technologies and the internet. A functional VLP makes it possible for the information to be shared easily with a set audience and also provides a means for instructors to communicate with learners. Instructors can use these platforms to easily host a collection of information resources accessible by their students. A virtual library learning platform goes beyond the functionality provided by virtual libraries as it makes room for instructors and learners to interact actively while providing access to information resources uploaded.

1.3 OBJECTIVES OF STUDY

The aims and objectives of this research were to design and implement a virtual library learning platform for instructors and learners. The proposed platform aims to meet the key objectives outlined below.

1. Design of Virtual Library Learning Platform (VLLP) for learners and instructors for Faculty of Management Sciences.
2. Design and implementation of a Login Module for learners and instructors to access the functions of the Virtual Library Learning Platform (VLLP) which includes, course creation and management, course enrollment and access to course resources, and information resource upload and browsing.
3. Design of Course Management and Accessibility Module on the platform for learners and instructors.
4. Identification of the effectiveness and efficiency of the platform in granting the learners access to personalized data such as, courses enrolled in and related resources, information resources (e.g Articles, PDFs and Webpage links), and chat functionalities with other users of the system.
5. Identification of the effectiveness and efficiency of the platform in granting the lecturers/instructors access to virtual course and information resource management functionality and online interaction with learners.

**1.4 METHODOLOGY**

This project brings about the development of an online virtual learning platform that instructors and learners could easily access (via a website and custom mobile application) to utilize the functionalities provided. This platform runs on several software and hardware components at the back-end which ensures user access to the platform via the front end (Website and mobile application).

The online platform is built on three areas outlined.

MongoDB is a source-available cross-platform document-oriented database program. Classified as a NoSQL database program, MongoDB uses JSON-like documents with optional schemas. MongoDB is developed by MongoDB Inc. and licensed under the Server Side Public License (SSPL). (Wikipedia, 2021). MongoDB was chosen to be used as the primary database for this platform considering that it provides a flexible database schema that supports growth in the long run and has fast data retrial capabilities.

The mobile application which learners can install on mobile phones to access information resources on the platform is built on the flutter framework. Flutter is an open-source UI software development kit created by Google. It is used to develop cross-platform applications for Android, iOS, Linux, Mac, Windows, Google Fuchsia, and the web from a single codebase. (Amadeo, R, 2018).

For the development of this platform, several programming and scripting languages were used which include TypeScript, Dart, HTML, CSS, Javascript, and OpenAPI sepecification.

**1.5** **SIGNIFICANCE OF THE STUDY**

This project brings about web and mobile applications instructors could use to easily manage information resources and courses effectively, communicate with learners easily via chat functionality and electronic mail, view course participants' discussions in custom forums, and manage learner access to courses managed. Instructors no longer need to manually distribute course materials every session as the platform automatically distributes resources to eligible members in real-time as they are published.

This project makes it possible for learners to easily manage and access courses resources, interact with fellow course-mates online in the course forums, access information resources published by instructors, and easily reach out to instructors via chat functionality. This project is valuable to students and instructors in general but is targeted for use by students and instructors in the Department of Management Science in University of Jos. It’s of high value to academic institutions. The project uses a combinations of various IT components (databases, online servers, mobile development frameworks, and more) and online third-party resources to run effectively.

**1.6 SCOPE/DELIMITATION OF THE STUDY**

The proposed product is targeted for the attainment of effective communication between learners and instructors. This implies the ability for instructors to easily communicate knowledge with learners; store information resources for easy use and accessibility by learners; Aside from the basic functionality of making it possible for instructors to easily communicate with the learner, the system provides other tools that foster learning, a forum for students of a course to easily communicate with each other, a virtual store where instructors can make information resources available for free/sell, the possibility of learners to subscribe to multiple courses created by instructors (free/paid).  
 The system makes it possible for instructors to share and make available information resources to learners by providing an interface through a website or mobile application where courses can be created and learning resources for such courses can be uploaded periodically. This includes the upload of videos, documents, pictures, and audio recordings. Students automatically gain access to these resources on a real-time basis immediately they are uploaded, students are only required to sign in to their accounts to get access to these resources.  Accessibility to the platform is limited to computers and mobile devices with internet connection and a browser software through which the platform website can be accessed.

**1.7 OPERATIONAL DEFINATION OF TERMS   
Design:** A design is a plan or specification for the construction of an object or system or for the implementation of an activity or process, or the result of that plan or specification in the form of a prototype, product or process.

**Implementation:** Implementation is the realization of an application, or execution of a plan, idea, model, design, specification, standard, algorithm, or policy.  
**Virtual :** Virtual is a digitally replicated version of something real.   
**Library:** A library is a place that houses print and non-print materials useful for study and research and for preservation of man’s intellectual activities for potential users. The collections could be books, journals, periodicals, theses & dissertations, etc.  
**Learning:** Learning is the process of acquiring new understanding, knowledge, behaviors, skills, values, attitudes, and preferences.  
**Platform:** A computing platform or digital platform is the environment in which a piece of software is executed.  
**Virtual Library Learning Platform:** A platform that provides learning, teaching and information searching and accessibility functionalities to its users digitally.  
**University of Jos:** The University of Jos, abbreviated as Unijos, is a Federal University in Jos, Plateau State, central Nigeria.  
**300 Level Management Science Student :** Students who are formally engaged or enrolled in courses under the Faculty of Management Sciences in the University of Jos.

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