# CHAPTER ONE

# INTRODUCTION

## 1.1 Background to the study

Education is one of the key sectors that have been transformed by the digital revolution, especially the internet. Most institutions of learning now carry out many of their academic and administrative functions including student admission, student registration, staff recruitment, program advertisement, course delivery and general administration via the university electronic portals or web-portals (Lim, 2014). According to. Worjtkowski and Major (2015), a web portal is a collection of technologies that ‘function together as a presentation tool to securely display corporate data, add to it information on the Internet, and customize and simplify access to that information’.

Educational portals have become major communication platform between universities and their students, prospective students, parents, faculty, staff, alumni and donors (Pierece, 2015; Hasan, 2013). They. enable students to register online, upload and download course materials, access grades and campus bulletins, use email and search engines. Other capabilities of e-portals include unified login, personalization, document management, personal and, group calendars, to do list and system security (Sharma & Gupta, 2015; Abuhamdieh & Sehwail, 2017).

Most academic institutions in Nigeria have invested substantially in creating institutional e-portals in order to take advantage of the possibilities that e-portals technology offers. The widespread adoption of the e-portal technology by academic institutions has instigated research into the usability of web portals. This is due to the fact that most web site design efforts are focused on technology and business objectives rather than user needs. Usability is the extent to which users are able to use a product to achieve the desired goals with effectiveness, efficiency and satisfaction. It connotes understandability, learnability, operability and attractiveness (International Standard Organization, 2018). Usability assessment serves as feedback mechanism and can be used to enhance information systems to better meet user’s needs. Since students are the principal users of educational e-portals, this study was conducted to understand undergraduate students’ assessment of the usability of e-portals in selected private universities in south-west Nigeria. Portals build on the same technology used for Web sites, but enhance the functionality and flexibility to cater for the demands of specific classes of user. According to Gerd (2015), “Portals are a special breed of external or internal Websites offering a blend of information, applications and services. This implies that portals always have more than just information to offer, as many Websites do”.

According to Allan (2014), “Put simply a portal is a presentation layer which aggregates, integrates, personalizes and presents information, transactions and applications to the user according to their role and preferences”. Portal and website is definitely different in term of their definition where portal is a gateway to access information meanwhile, website represent the basic delivery of online content. There is chemistry between portal and website where portal build on the same technology used for web site, but enhance the functionality and flexibility to cater for the demands of specific classes of user.

From both perceptions portal can be concluded as a gateway to web access which users can locate all the web content they commonly need which required personalization, search, channels, links, and customization base on role and workflow.

According to Masrek (2017), “Traditionally, a portal denotes a gate, a door, or entrance. In the context of the World Wide Web, it is the next logical step in the evolution to a digital culture”. Formerly, portals are defined as search engines where it offers a full text index of document content. Today’s Internet portals offer a more structured, navigable interface compare to Internet search engines. Internet portal is more focused on better delivery of specific information among a group with the same interest.

## 1.2 Problem Statement

In present system all work is done on papers manually. The attendance in the present system is maintained in register books. The semester marks and mid sectional exam marks are maintained in papers. The student cannot access his/her academic details at all time and moreover searching for his marks in those set of papers is a time consuming activity.

Retrieving detail and accurate information is very critical especially for public and people that are involved in an organization. The registration problem due to some manual means of operations which easily lead to misplacement or loss of student information and documents.

The manual pre-assessment, of student registration system is very slow and consumes a lot of time which causes the delay in completing the entire enrolment process. Consume time and human effort due to long queue in the process of paying money in the bank and registration processes.

Due to manual means of generating report, such report can easily be misplaced or loss. The outcomes from this study will assist the university to know whether or not the problems of manual handling of students’ registration and mismanagement records have been overcome. The level of acceptance and use of e-registration by the students of the university that ‘will be unraveled in this study will provide a framework for the improvement of e-registration at the university from which other universities in the country can copy to improve their own e-registration exercise.

The problems so discussed above gave room for the necessity of developing a system that will help Poly Staff Secondary School in handling these various problems so identified.

## 1.3 Aim and Objectives

Owing to the difficulties experienced, retrieving detail and accurate information is very critical especially for public institutions, this project is aimed at designing and implementing a system for Poly Staff Secondary School. The objectives of the study are as follows:

1. To design an automated student database management system in place of papers.
2. To design a system that will generate funds for the institution by creating Result Checking PINs.
3. To create an online Student Portal which provides a pre-assessment module that allows subjects verification to the students when login on the website.
4. To design a system for Online Result Checking System for both Students and Parents of Poly Staff School.

## 1.4 Significance of study

The student portal makes available one source of information to be integrated and accessed from a single search source, thereby reducing time, complexity and cost of obtaining information over various sources and also to give full details of individual students in the school.

In addition, the student portal can also automatically evaluate and showcase the report of subjects of the students.

Also, the project will create a platform for the checking and printing of students’ result which will contribute to the school management financially through the sales of PINs for result checking and create room for parents to access and review their children/wards academic performance.

Through this system, both the students and management will be able to use the Student Portal effectively for their online registration process especially for registering their personal information, subject registration etc.

The future researchers could gain knowledge from the study on the benefits, advantages, and disadvantages, the impact of developing web portals which they may apply to their research in the future. By improving on the portal in such a way that is being connected with Interswitch whereby students will be able to make any necessary payment through the website, payment like school fee, craft fee, and sports fee and so on.

## 1.5 Scope of the study

The proposed system is targeted for the effective and easy use by Students, Parents and the Management of Federal Polytechnic Staff Secondary School, Mubi.

The scope of the study includes Registration of Students, Uploading and Checking of Students result and querying of the database for the necessary information for administrative purposes.

## 1.6 Definition of operational terms

**E-portal:** Rao (2013), defined an enterprise portal is a web interface for users of enterprise applications. Enterprise portals provide access to enterprise information such as corporate database, application (including web applications).

**PHP**: Normally used for increased functionality on a website or to work with a database. It works in conjunction with html and html variants and allows for functions to be run from the server rather than the visitor’s browser (Brayand, 2014).

**Portal**: A portal is a presentation layer which aggregates, integrates, personalizes and presents information, transactions and applications to the user according to their role and preferences (Brayand, 2014).

**Portlets**: They are small applications that provide interaction with different external data sources. They are also known as gadgets web parts or web nodules. Portlets are regions that display data from different sources like websites and application (Adepoju and Osofisan, 2018).

**Responsive design:** A website that adjusts to the screen it is being viewed on, whether desktop, mobile or smart phone. Media queries are used to figure out the resolution of the device the website is being displayed on. Then, flexible images, fluid grids and the site menu are adjusted to fit the screen (Brayand, 2014).

**User Personalisation:** Enables the end-user to take customisation one step further, namely to subscribe and unsubscribe to channels and alerts, set application parameters, create and edit profiles, add or remove links, and many more (Adepoju and Osofisan, 2018).

**Vertical Portals:** Provide access to a variety of information and services about a particular area of interest. For example, http:/Avww.wine.com is a vertical portal. Such portals offer information and services customized for niche audiences (e.g., undergraduates, faculty) (Boye (2015).

**Web Portals:** According to Babie (2014), a web system that provides the functions and features to authenticate and identify the users and provide them with easy intuitive personalized and user-customizable web-interface for facilitating access to information and services that are of primary relevance and interest to the users.

# CHAPTER TWO

# LITERATURE REVIEW

## 2.1 Introduction

This chapter intends to equip the project with knowledge of research works done by other writers on the problem; the aspect they have studied, approaches they have used, and the results they produced.

## 2.2 Review of related literatures

E-portal usability studies are conducted to determine the extent to which web portals meet the needs of end users. Like most studies on usability of information systems, studies on usability of e-portals are mostly based on Davis (2019) Technology Acceptance Model (TAM). The TAM has been found useful and reliable in explaining the reasons for user acceptance or rejection of information technology and the influence of user's attitude (Chen, Li & Li, 2014) hence; the present study is also based on the model. According to the TAM, people's use of information technology can be influenced directly or indirectly by their behavioral intentions, their attitude as well as usability variables namely, Perceived Usefulness (PU) and Perceived Ease of Use (PEU) of the system. Perceived Ease of Use is “the degree to which a person believes that using a particular information system would be free of effort” while Perceived Usefulness describes “the degree to which a person believes that using a particular information system would enhance his or her job performance” (Chen, Li & Li, 2014).

Various approaches have been used in carrying out the few studies that are available on e-portal usability. While some studies used automated tools (Zaphiris & Ellis, 2013), others used user surveys (Adepoju & Osofisan, 2018) and still others, a combination of the two (Okene & Enukpere, 2011). One notable feature of usability studies however, is the lack of uniformity in the usability criteria. Criteria such as quality of content in terms of clarity, comprehensiveness and currency, accessibility of the system, navigation, consistency of design, download time, attractiveness, reliability and simplicity have been used to evaluate e-portal usability (Pierce, 2015; McKinney, Yoon & Zahedi, 2012).

Zaphiris and Ellis (2013) conducted a study to assess the usability and accessibility of top fifty Universities in the U.S. using automatic evaluation tools. Their findings indicate low accessibility and usability rating for the all the websites. Also, Cappel and Huang (2017) reported that most of the INC. 500 company websites they evaluated did not conform with standard usability guidelines especially in terms of navigation. Astani and Elhindi (2018) assessed the websites of the top 50 American university and reported that although most of the websites were rated highly in terms of their access speed and information content, they were rated less than 4 out of 5 scales in terms of the currency and organization of the information, ease of navigation, customization and security.

Abuhamdieh and Sehwail (2017) compared student’s perception of the ease of use and usefulness of their school portal and found differences with students indicating rating of usefulness and ease of use. Also, communication features such as emails, announcement and the Black Board modules were used more than other features on the portal among students.

Among the challenges they reported were accessibility or log in difficulties, short time-out period and absence of certain desired features. Similarly, Bringula and Basa (2016) found that availability of web portal got the lowest rating among faculty users indicating a challenge with accessibility. Aesthetics, information content, structure and organization were however moderately acceptable. The study concluded that information content was the only significant predictor of web portal usability from the faculty's perspectives. Mentes and Turan (2012) assessed the usability of the web site of Namik Kemal University, Turkey, using attractiveness, controllability, helpfulness, efficiency and learnability. They reported a positive relationship between attractiveness, helpfulness, learnability, efficiency and usability perception of website but a negative relationship with controllability.

In Nigeria, Adepoju and Osofisan (2018), carried out a study to determine the effectiveness, efficiency and user satisfaction with the websites of three federal universities of technology. Their findings showed that only one of the websites satisfied the effectiveness and efficiency criteria. Also, Olalekan and Adepoju (2012) evaluated the usability of twenty-five indigenous web sites in Nigeria. Their findings, showed that the usability index of the websites ranged between 65 to 84 percent which falls below the recommended 90-100 percent usability index. On the contrary, Tella and Bashorun (2012) reported a high level of satisfaction among undergraduate users of the University of Ilorin with respect to information quality, system quality, and ease of use of the e-portal.

## 2.3 Web-Portal

A web portal is a specially designed website that brings information from diverse sources, like emails, online forums and search engines, together in a uniform way. Usually, each information source gets its dedicated area on the page for displaying information (a portlet); often, the user can configure which ones to display. Variants of portals include mashups and intranet "dashboards" for executives and managers. The extent to which content is displayed in a "uniform way" may depend on the intended user and the intended purpose, as well as the diversity of the content. Very often design emphasis is on a certain "metaphor" for configuring and customizing the presentation of the content (e.g., a dashboard or map) and the chosen implementation framework or code libraries. In addition, the role of the user in an organization may determine which content can be added to the portal or deleted from the portal configuration. A portal may use a search engine's Application Programming Interface (API) to permit users to search intranet content as opposed to extranet content by restricting which domains may be searched. Apart from this common search engines feature, web portals may offer other services such as e-mail, news, stock quotes, information from databases and even entertainment content. Portals provide a way for enterprises and organizations to provide a consistent "look and feel" with access control and procedures for multiple applications and databases, which otherwise would have been different web entities at various URLs. The features available may be restricted by whether access is by an authorized and authenticated user (employee, member) or an anonymous website visitor (Richard, 2016).

Commonly referred to as simply a portal, a Web site or service that offers a broad array of resources and services, such as e-mail, forums, search engines, and online shopping malls. The first Web portals were online services, such as AOL, that provided access to the Web, but by now most of the traditional search engines have transformed themselves into Web portals to attract and keep a larger audience (Richard, 2016).

As defined by IBM, an Internet portal is “a single integrated, ubiquitous, and useful access to information (data), applications and people.” A portal may look like a Web site, but it is much more. The latter, while an important part of any university’s communications strategy, is primarily a way to provide static information (Richard, 2016).

Many references point out that portal is a Web site which acts as a starting point or ‘gateway’ and provides a wide variety of resources, services, tasks and links to other websites. Among those resources there are search engines, news, e-mail, discussion groups, online shopping, references and so on. This type of portals, sometimes called horizontal portals (Babie, 2014), is generally offered by Internet Service Providers or search engines. Yahoo! is an example, with an index to a lot of services, that is, the first screen that a user will see when going online, a place to go to find an organized view of the online information space. More specialized portals, sometimes called vertical portals (Rao, 2013), are those addressed to a specific interest or field, for example portals with the aim at medical information. There, users can get information about clinical trials, professional directories, patient forums, support groups, health articles, health care associations, and so on. Even more specialized portals, enterprise portals deliver organization wide information in a user centric manner, based on user authentication they offer customized services to specific users, employees, customers, and the like. They offer support for tasks, workflow, groupware, and the creation and integration of knowledge. In this last category, we can find, for example, the employee portal of a university. There, employees, in general, can access their salaries, information about their medical insurances, and the like, and, more specifically, research staff can access a service to complete their curriculum vitae, forms to request financial support for research, and so on. Personal portals are also distinguished. They are customized by the user and typically are associated with a search engine and display selected information such as news, weather, dictionaries and so on. Google and My Yahoo are examples of this type of portals.

**2.3.1 Features of a portal**

According to Boye (2015), the following are the basic features of a portal.

**Single sign on:** A portal is a doorway for a wide range of applications. Rather than expecting an end-user to remember and maintain a password for each application hosted by the portal, the portal offers a strong authentication scheme, where the end-user only has to remember one password. Once authenticated, the end-user has unrestricted access to all applications to which she is entitled. For applications external to the portal, a mapping is needed between authentication parameters of the portal, and the authentication parameters of the external application.

**Personalization**: The end-user can change the interface and behaviour of the portal according with the way she works or with her needs and preferences. She can subscribe and unsubscribe to channels and alerts, add and remove specific links, set application parameter defaults, or format portal page (i.e., colours, fonts, columns, and the like).

**Adaptation**: The portal is able to save common tasks the end-user does, her schedule and workflow, and then, it is able to change services it offers her or to make new recommendations, depending on the stored information. Therefore, the portal changes its behaviour depending on context.

**Integration**: Companies use portals to help disseminate information to their employees in a timely and efficient manner. From this perspective, portals can be seen as the natural evolution of Content Management Systems (CMSs), but now portals strive to integrate legacy applications. This feature is seen as paramount. Indeed, some authors define portals “a framework for integrating applications and processes across organisational boundaries”. Portal system features can also be viewed as “managing content”, but what differentiates them from a CMS is they facilitate the access (integration) to information from various applications, data sources and structures, and back-end systems. Users select from a list of pre-defined site components (sometimes called “portlets”) and manage the layout and presentation of this information in a page location of their choice. They can add selected application interfaces, real-time data dashboards, reporting functions, and personalize how their page looks.

**2.3.2 Portlets**

Portlets are presentation-oriented Web Services which are packed to be delivered through third-party Web applications (e.g., a portal). Portlets are user-facing (i-e., return markup fragments rather than data-oriented XML) and multi-step (i.e., they encapsulate a chain of steps rather than a one-shot delivering). So far, portlets are mainly used as a modularization technique to structure portal content. However, their ability to be delivered through other Web applications makes portlets be the enablers of service-oriented architectures (SOAs) but now at the front-end (Rao, 2013).

**2.3.4 Classification of web portals**

Web portals are sometimes classified as horizontal or vertical. A horizontal portal is used as a platform to several companies in the same economic sector or to the same type of manufacturers or distributors (Reus, 2013). Horizontal portals target the entire Internet community. These sites, often referred to as "mega portals", usually contain search engines and provide the ability for user to personalize the page by offering various channels (i.e. access to other information such as regional weather, stock quotes or news updates). Yahoo! and Lycos constitute mega portals. These portals are also gateways to contents and services of other offers.

A vertical portal (also known as a "vortal") is a specialized entry point to a specific market or industry niche, subject area, or interest (Reus, 2013). Some vertical portals are known as “vertical information portals" (VIPs). VIPs provide news, editorial content, digital publications, and e-commerce capabilities. In contrast to traditional vertical portals, VIPs also provide dynamic multimedia applications including social networking, video posting, and blogging.

There are innumerable possibilities for establishing special vertical portals on the market. The numerous solutions can be divided into 3 major groups that partially overlap:

1. **Corporate Portals:** Provide personalized access to selected information of a specific company.
2. **Commerce Portals:** Support business-to-business and business-to-consumer e-commerce.
3. **Pervasive Portals:** Support access via Pervasive Devices such as PDAs particularly this type of vertical portal will have a great stake in the future.

**2.3.5 Types of portals**

Portal applicable to institution of learning are usually referred to as ‘campus portal’. Campus portals were pioneered by UCLA in 1999, followed by similar systems at the University of Washington and the University of Buffalo (Moskowitz, 2011). Roberts-Witt (2019), claimed that there are three types or portals. These are:

Data Portals which are concerned with managing such structured data as corporate databases with a single point of access.

Information Portals, this is similar to the Data Portals. This type of portal is concerned with managing such unstructured data as e-mail, text, and other documents by using indexing and cataloguing systems with search and retrieval functionality.

Collaborative Portals, is the type that focus on group interactive functionality as well as the integration of the enterprise by bridging intranet, extranet, private source data, and public information. The users are also allowed to access all collaborative functions such as classified topics, conferencing, team discussion, news channel, calendaring, and the abilities to personalise the interface. Fuangvut and Hasan (2015) assert that campus portals have many pecialised features. However, they are distinguished by their main user-base: the students.

Although students are a critical component of the social life of the institution they are not employees. Nor can they necessarily be considered the organisation’s customers as they are frequently not the ones paying the bills. Like most professional organisations, an educational institution has two types of employees, in their case academics and administrative staff:

## 2.4 Effectiveness of E-portal

E-portal usability studies are conducted to determine the extent to which web portals meet the needs of end users. Like most studies on usability of information systems, studies on usability of e-portals are mostly based on Davis (1989), Technology Acceptance Model (TAM). The TAM has been found useful and reliable in explaining the reasons for user acceptance or rejection of information technology and the influence of user's attitude (Chen & Li, 2015) hence; the present study is also based on the model. According to the TAM, people's use of information technology can be influenced directly or indirectly by their behavioral intentions, their attitude as well as usability variables namely, Perceived Usefulness (PU) and Perceived Ease of Use (PEU) of the system. Perceived Ease of Use is “the degree to which a person believes that using a particular information system would be free of effort” while Perceived

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## 2.5 E-Portal Satisfaction

Several studies suggest that internet service success is composed of a set of factors that apply to all systems, in addition to a set of factors specific to each type of system. Researchers identified several criteria of internet service success: user satisfaction, system usage, and performance (Zviran & Ehrlich, 2013). User satisfaction is the most prevalent measure of internet service success due to its applicability and ease of use (Mahmood, Burn, Gemoets, & Jacquez, 2010). Ives (2013), defined user satisfaction as the degree to that internet service fulfils user needs. In general, if the users are satisfied with the internet service, they use it, if otherwise, they do not. Many studies refer to user satisfaction as a measure of internet service success, internet service effectiveness, and internet service acceptance (Rai, 2012). A study by Geldman (2018) indicates that user satisfaction directly and significantly relates to internet service performance. The portal is commonly operated in a web-based environment. However, the way the users interact with it is similar to how they interact with computer applications at the University of llorin environment. Once the users successfully access the portals, they can perform their work- related or personal tasks without needing to consult with computer analysts or programmers unless technical problems occur. In other words, they interact with the portal directly. Therefore, user satisfaction with portal is defined as an affective attitude towards the portal by students who interact with the portal directly.

There is little documented empirical research on portal evaluation Mahmood (2010), stated that most internet service user satisfaction studies are based on one point in time, and suggest that there should be longitudinal studies. Some studies investigate single aspects of portal success, but none of the studies reviewed took a comprehensive, integrated approach. In order to measure user satisfaction with e-portals, Sugianto (2017) and Tojib (2018) proposed using the business-to-employee portal user satisfaction (B2EPUS) model, which goes back to the work of Doll and Torkzadeh (1988). Masrek (2017) proposed another approach to assessing user satisfaction with campus portals.

While user satisfaction with general internet service and certain types of IT applications has been extensively studied in internet service research, far less attention has been paid to user satisfaction with portal technology, specifically the students’ portal.

To determine the user satisfaction with the Web-portal in the current study, the followings constructs were considered: System quality, Information content quality, service quality, process quality, and collaborative quality, ease of use, convenience of access, individual impact and management support. Though there are many constructs available for determining e-portal satisfaction. These nine are chosen for this study because of their generic nature and because they directly relate to or similar to the characteristics of e-portal identified based on literature.

## 2.6 Major functions of portal

Portal can be very hard to define sometime because it provides wide range of functions.

According to Ovum (2015), the ideal portal is based on eight functionality areas which are search and navigation, information integration, personalization, notification, task management and workflow, collaboration and groupware, integration of applications and business intelligence and infrastructure functionality. The project is only concentrate in three: major functionalities which are search and navigation, personalization and collaboration and groupware.

**2.6.1 Search and Navigation**

This functionality forms the basis for most of the successful public web portals meaning that a successful portal should support its users in an efficient search for contents. The portal should automatically present its users with the information appropriate to the user’s role and allow the user to search for information that was not previously known to be relevant to the user’s role, but which may be available through the portal.

**2.6.2 Personalization**

Personalization should be based on user roles, as well as user preferences. Personalization of navigation should provide shortcuts to specific information, mostly known as bookmarks or favorites. The design of personalization is such as the initial appearance of the portal, which may be pre-personalized according to the user’s role.

**2.6.3 Collaboration and Groupware.**

Knowledge management and groupware ensure that the required information is stored in the right place and in the right mode. By this means the right persons are brought together with the right information. Groupware software assists in less formal collaboration than workflow tools.