# CHAPTER ONE

**INTRODUCTION**

* 1. **BACKGROUND OF STUDY**

Since the rise of smart phones and social media, even the global increase of websites and the maximization of the internet, the methods and system of many activities have change drastically. In academics, there have been implementation of online classes, sales of course materials online, registration and many more have been in use. Lectures can take place from the comfort of a lecturer’s room to the front of the students, students can get lecture material from the slide of few webpage and download and also students can register for a course, access departmental information from the internet without stress.

Students no longer have to queue in front of the administrative block or wait a long period of time to complete a five step registration process in order to satisfy institution requirements or gain access to some departmental benefits as member of respective departments since these can be done from their phones or PC from accessing a portal for registration. Such old methods of queuing are no longer in use in most prestigious institutions as mobile registration is becoming more and more population amongst institutions.

The role of education as an instrument for promoting the socio-economic, political and cultural development of any nation can never be over-emphasised. According to Abdulkareem (2001), a nation’s growth and development is determined by its human resources. The provision of the much-needed manpower to accelerate the growth and development of the economy has been said to be the main relevance of university education in Nigeria (Ibukun, 1997).

The colonial education which was inherited by Nigeria was criticised for being too theoretical to be able to make meaningful impact on the life of Nigerians (Akinlua, 2007). Subjects taught in schools reflected the taste of the colonial education officials; hence school curricula were built around the existing colonial values. Students were supposed to mimic their teachers in subject like English Language which involved demonstration of competency. The same problem which informed dependency on past colonial education relics seems to have continued till date. Woolman (2001: 41) was forced to comment on issue of this sort in his remark about African education. According to him, “African school systems today still follow the rigid structure of time periods and grade-level progression found in Western education.”

As more information is made available in a variety of formats and media and in a variety of locations, the need to manage information/data efficiently becomes more and more critical. Both staff and public users want access to stored information and want to access it more efficiently. It is the Department Policy to improve both the efficiency and effectiveness of departmental registration and result processing operations and services through the implementation of an integrated automated database System.

This thesis is conducted on the basis to create an avenue through which students are able to effectively register and rely on the departmental website to ease the physical and psychological stress of the old methods (queuing and such). By (designing and implementing) providing a suitable solution to the institution and the department by giving an alternative of using the power of the internet via websites, software development to design and implement the departmental portal to perform the aforementioned methods and introducing new features that are beneficial for the overall performance of the department and the institution at large.

The website is very dynamic and very easy to understand, the interface of the website is very easy and the students can easily work in our website, the portal links to the department home page provides all the details about the department, courses, subjects, event, news, attendance, result, some important information about fresh news & events. The portal is an extension of the existing websites the department uses and improves upon their shortcomings. The online departmental management website is also very useful because the student don’t have to read notice board, he can easily view all info. Like result via this website. To make this website work successfully we have used some latest technology such as PHP as the Development Platform, PHP frame work as the development and MYSQL as the Database Management environment.

* 1. **STATEMENT OF THE PROBLEM**

As the number of internet user keep increasing by a large margin each day, there are more factors to consider to attempt to meet the insatiable need of these users when creating a website. In respect to this research, the need of a larger server, a more appealing GUI, a proper backend, an interactive webpage and above all a more reliable portal is mandatory to consider for the department portal.

Today in the department, student details are entered manually. The student details in separate records are tedious task. Referring to all these records and updating is needed. There is a chance for more manual errors.

After analyzing the existing portals, developers, clients and the school management noticed the many shortcomings which negatively influenced the performance of the portal. With thousands of students accessing the school’s portal, each having different preferences and likings; it was always subjective to user to be satisfied by the performance of the website but with the number complains and mumbling about how unsatisfied users were, it eroded the interaction of the users and the website.

For instance, if ten students accessed the portal, two will be mildly satisfied. On a larger scale about 15%-20% of users were mildly satisfied by the portal and registration process. This project built upon these shortcomings and implemented a more effective *department portal*.

[www.safportal.net](http://www.safportal.net) and [www.safsoftwaredevelopers.github.io](http://www.safsoftwaredevelopers.github.io) are case study on which this project was conducted. These websites implemented portals each but the portal did not meet the expectations of users as need to improve in areas such as: larger server, a more appealing GUI, a proper backend and registration, students dashboard, a responsive website and a reliable department portal.

In light of this project, programming languages such as HTML, CSS, JavaScript, Jquerry were used for the frontend and MySQL, PHP, python for the backend are used to build this project.

* 1. **AIMS AND OBJECTIVES**

The objectives of this project is to design and implement a department portal for the students of SAF POLYTECHNIC, ISEYIN; computer science department.

The specific aims and objectives are:

* To implement a functional portal for the students of the department.
* Creating a user friendly portal with login to the department home page.
* To motivate other departments and to school management to implement this project for their use.
* To design a more reliable website.
* To satisfy the individual needs of the users.
* Creating a website where students feel the academic environment and perform academic activities like submitting assignment and so on.
  1. **SIGNIFICANT OF THE STUDY**

The project was carried out as a degree thesis in frontend development and Database management system within the field of student registration for the department.

This study provides technical questions and shows the systematical, step by step solution and the significance of each question and how it influences the overview of the study. Questions such as

* Why does the department need a portal?
* What does this portal access?
* What are the criteria to consider for designing and implementing a web interface optimized for students’ accessibility and usability?
* What are the aftermaths of the registration from the portal?

These questions prove challenging and showing how each question are logically and technically answered are the significances of the study using the necessary tools and right working conditions.

* 1. **SCOPE OF STUDY**

A larger section of the designing and implementation involves development-coding the software- the administration platform. Due to this project’s focus on designing and implementing student registration, majority of the software development (coding and running) will not be included in this report but a link to see the source codes and follow through the process will be provided in the appropriate section. Although the steps, methods, and tools for creating the user interface, the questions asked during the registration processes and why, the concepts of the database management system, the results of each registration and the end of the project are properly outlined and detailed in this report.

Also, features changed from existing websites, demos, and individual reviews are also detailed. The programming languages used, the Independent Development Environments(IDE), methods used, algorithms are included but mediocre information like the origin of each programming languages are not included in this these report.

 This system also gives the student the opportunity to keep their information up-to-date by allowing them to edit their profiles.

* 1. **DEFINITION OF TERMS**

**MODULE: One of the parts of a program.**

**PORTAL: A dynamic site that allows access to some many modules.**

**DATABASE: A large store of data being held in a computer and is easily accessible by a person.**

**UX/UI: User experience and User Interface. One of the major cornerstones of website creation.**

**SYNCHRONOUS: A form of transmission in which data is sent as a block using frames or packets.**

**ASYNCHRONOUS: A form of transmission that transmits only one character at a time.**

**STUD ID: Abbreviation for Students Identification.**

USER/CLIENT: a person (in this case student) who accesses and uses the website.

**CHAPTER TWO**

**LITERATURE REVIEW**

This project brief from the computer science department of SAF POLYTECHNIC ISEYIN and is to create an alternative whilst improving and making up to the shortcomings of the existing websites ([www.safportal.net](http://www.safportal.net) and [www.safsoftwaredevelopers.github.io](http://www.safsoftwaredevelopers.github.io)) to give the students an avenue to register, get updated with the happenings around the department and institution at large, contact the department staff for complaints and above all recreate the academic environment on their mobile devices.

In order to design and implement this project (website), it is important to have a quick overview of the following factors: website, portal, criteria to consider when designing and implementing the portal and review of the existing case study.

**2.1 OVERVIEW OF A WEBSITE/ WEBPAGE**

A website (also written as web site) is a collection of [web pages](https://en.wikipedia.org/wiki/Web_page) and related content that is identified by a common [domain name](https://en.wikipedia.org/wiki/Domain_name) and published on at least one [web server](https://en.wikipedia.org/wiki/Web_server). All publicly accessible websites collectively constitute the [World Wide Web](https://en.wikipedia.org/wiki/World_Wide_Web). There are also private websites that can only be accessed on a [private network](https://en.wikipedia.org/wiki/Intranet), such as a company's internal website for its employees. Website is a location on web and is hosted on a web server. It is a set of related web pages.

Websites are typically dedicated to a particular topic or purpose, such as news, education, commerce, entertainment, or [social networking](https://en.wikipedia.org/wiki/Social_networking). [Hyperlinking](https://en.wikipedia.org/wiki/Hyperlink) between web pages guides the navigation of the site, which often starts with a [home page](https://en.wikipedia.org/wiki/Home_page).

[Users](https://en.wikipedia.org/wiki/User_(computing)) can access websites on a range of devices, including [desktops](https://en.wikipedia.org/wiki/Desktop_computer), [laptops](https://en.wikipedia.org/wiki/Laptop), [tablets](https://en.wikipedia.org/wiki/Tablet_computer), and [smartphones](https://en.wikipedia.org/wiki/Smartphone). The [app](https://en.wikipedia.org/wiki/Application_software) used on these devices is called a [web browser](https://en.wikipedia.org/wiki/Web_browser).

Websites can be divided into two broad categories: static and interactive. Interactive sites are part of the [Web 2.0](https://en.wikipedia.org/wiki/Web_2.0) community of sites and allow for interactivity between the site owner and site visitors or users. Static sites serve or capture information but do not allow engagement with the audience or users directly.

Some websites may be included in one or more of these categories. For example, a department website may promote the department's products, but may also host informative documents, such as [white papers](https://en.wikipedia.org/wiki/White_paper). There are also numerous sub-categories to the ones listed above. A [fansite](https://en.wikipedia.org/wiki/Fansite) may be a dedication from the owner to a particular [celebrity](https://en.wikipedia.org/wiki/Celebrity). Websites are constrained by architectural limits (e.g., the computing power dedicated to the website). Very large websites, such as Facebook, Yahoo!, Microsoft, and Google employ many servers and [load balancing](https://en.wikipedia.org/wiki/Load_balancing_(computing)) equipment such as [Cisco](https://en.wikipedia.org/wiki/Cisco_Systems) Content Services [Switches](https://en.wikipedia.org/wiki/Network_switch) to distribute visitor loads over multiple computers at multiple locations. As of early 2011, Facebook utilized 9 data centers with approximately 63,000 servers.

To view a website requires a [browser](https://www.computerhope.com/jargon/b/browser.htm) (e.g., [Internet Explorer](https://www.computerhope.com/jargon/m/msie.htm), [Edge](https://www.computerhope.com/jargon/m/microsoft-edge.htm), [Safari](https://www.computerhope.com/jargon/s/safari.htm), [Firefox](https://www.computerhope.com/jargon/f/firefox.htm), or [Chrome](https://www.computerhope.com/jargon/c/chrome.htm)). For example, you are reading this web page using a browser. Once in a browser, you can open a website by entering the [URL](https://www.computerhope.com/jargon/u/url.htm) in the [address bar](https://www.computerhope.com/jargon/a/addrebar.htm)

**2.1.1 TYPE OF WEBSITES**

Websites can be used in various fashions: a personal website, a corporate website for a company, a government website, an organization website, etc. Websites can be the work of an individual, a department or other organization, and are typically dedicated to a particular topic or purpose. Any website can contain a [hyperlink](https://en.wikipedia.org/wiki/Hyperlink) to any other website, so the distinction between individual sites, as perceived by the user, can be blurred.

**2.1.1.A STATIC WEBSITE**

A static website is one that has web pages stored on the server in the format that is sent to a client web browser. It is primarily coded in [Hypertext Markup Language](https://en.wikipedia.org/wiki/Hypertext_Markup_Language) (HTML); [Cascading Style Sheets](https://en.wikipedia.org/wiki/Cascading_Style_Sheets) (CSS) are used to control appearance beyond basic HTML. Images are commonly used to create the desired appearance and as part of the main content. Audio or video might also be considered "static" content if it plays automatically or is generally non-interactive. This type of website usually displays the same information to all visitors. Similar to handing out a printed brochure to Users or clients, a static website will generally provide consistent, standard information for an extended period of time. Although the website owner may make updates periodically, it is a manual process to edit the text, photos, and other content and may require basic website design skills and software. Simple forms or marketing examples of websites, such as *classic website*, a *five-page website* or a *brochure website* are often static websites, because they present pre-defined, static information to the user. This may include information about a company and its products and services through text, photos, animations, audio/video, and navigation menus.

Static web pages are suitable for content that never or rarely needs to be updated, though modern web template systems are changing this. Maintaining large numbers of static pages as files can be impractical without automated tools, such as [static site generators](https://en.wikipedia.org/wiki/Web_template_system#Static_site_generators). Any personalization or interactivity has to run client-side, which is restricting

**2.1.1.B DYNAMIC** **/ INTERACTIVE WEBSITE**

A dynamic website is one that changes or customizes itself frequently and automatically. Server-side dynamic pages are generated "on the fly" by computer code that produces the HTML (CSS are responsible for appearance and thus, are static files). There are a wide range of software systems, such as [CGI](https://en.wikipedia.org/wiki/Common_Gateway_Interface), [Java Servlets](https://en.wikipedia.org/wiki/Java_Servlets) and [Java Server Pages](https://en.wikipedia.org/wiki/Java_Server_Pages) (JSP), [Active Server Pages](https://en.wikipedia.org/wiki/Active_Server_Pages) and [ColdFusion](https://en.wikipedia.org/wiki/ColdFusion) (CFML) that are available to generate [dynamic web systems and dynamic sites](https://en.wikipedia.org/wiki/Programming_languages_used_in_most_popular_websites). Various [web application frameworks](https://en.wikipedia.org/wiki/Web_application_framework) and [web template systems](https://en.wikipedia.org/wiki/Web_template_system) are available for general-use [programming languages](https://en.wikipedia.org/wiki/Programming_language) like [Perl](https://en.wikipedia.org/wiki/Perl), [PHP](https://en.wikipedia.org/wiki/PHP), [Python](https://en.wikipedia.org/wiki/Python_(programming_language)) and [Ruby](https://en.wikipedia.org/wiki/Ruby_(programming_language)) to make it faster and easier to create complex dynamic websites.

A site can display the current state of a dialogue between users, monitor a changing situation, or provide information in some way personalized to the requirements of the individual user. For example, when the front page of a news site is requested, the code running on the webserver might combine stored HTML fragments with news stories retrieved from a [database](https://en.wikipedia.org/wiki/Database) or another website via [RSS](https://en.wikipedia.org/wiki/RSS) to produce a page that includes the latest information. Dynamic sites can be interactive by using [HTML forms](https://en.wikipedia.org/wiki/HTML_forms), storing and reading back [browser cookies](https://en.wikipedia.org/wiki/Browser_cookies), or by creating a series of pages that reflect the previous history of clicks. Another example of dynamic content is when a retail website with a database of media products allows a user to input a search request, e.g. for the keyword [Beatles](https://en.wikipedia.org/wiki/Beatles). In response, the content of the web page will spontaneously change the way it looked before, and will then display a list of Beatles products like CDs, DVDs, and books. [Dynamic HTML](https://en.wikipedia.org/wiki/Dynamic_HTML) uses [JavaScript](https://en.wikipedia.org/wiki/JavaScript) code to instruct the web browser how to interactively modify the page contents. One way to simulate a certain type of dynamic website while avoiding the performance loss of initiating the dynamic engine on a per-user or per-connection basis is to periodically automatically regenerate a large series of static pages.

Early websites had only text, and soon after, images. Web browser [plug-ins](https://en.wikipedia.org/wiki/Plug-in_(computing)) were then used to add audio, video, and interactivity (such as for a [rich web application](https://en.wikipedia.org/wiki/Rich_web_application) that mirrors the complexity of a desktop application like a [word processor](https://en.wikipedia.org/wiki/Word_processor)). Examples of such plug-ins are [Microsoft Silverlight](https://en.wikipedia.org/wiki/Microsoft_Silverlight), [Adobe Flash Player](https://en.wikipedia.org/wiki/Adobe_Flash_Player), [Adobe Shockwave Player](https://en.wikipedia.org/wiki/Adobe_Shockwave_Player), and [Java SE](https://en.wikipedia.org/wiki/Java_SE). [HTML 5](https://en.wikipedia.org/wiki/HTML_5) includes provisions for audio and video without plug-ins. [JavaScript](https://en.wikipedia.org/wiki/JavaScript) is also built into most modern web browsers, and allows for website creators to send code to the web browser that instructs it how to interactively modify page content and communicate with the web server if needed. The browser's internal representation of the content is known as the [Document Object Model](https://en.wikipedia.org/wiki/Document_Object_Model) (DOM).

**2.2 OVERVIEW OF WEBSITE PORTAL**

A web portal is a specially designed [website](https://en.wikipedia.org/wiki/Website) that brings information from diverse sources, like [emails](https://en.wikipedia.org/wiki/Email), [online forums](https://en.wikipedia.org/wiki/Internet_forum) and [search engines](https://en.wikipedia.org/wiki/Web_search_engine), together in a uniform way. Usually, each information source gets its dedicated area on the page for displaying information (a [portlet](https://en.wikipedia.org/wiki/Portlet)); often, the users can configure which ones to display. Variants of portals include [mashups](https://en.wikipedia.org/wiki/Mashup_(web_application_hybrid)) and [intranet](https://en.wikipedia.org/wiki/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](https://en.wikipedia.org/wiki/Application_programming_interface) (API) to permit users to search [intranet](https://en.wikipedia.org/wiki/Intranet) content as opposed to [extranet](https://en.wikipedia.org/wiki/Extranet) content by restricting which domains may be searched. Apart from this common [search engines](https://en.wikipedia.org/wiki/Search_engines) feature, web portals may offer other services such as [e-mail](https://en.wikipedia.org/wiki/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](https://en.wikipedia.org/wiki/Look_and_feel)" with access control and procedures for multiple applications and databases, which otherwise would have been different web entities at various [URLs](https://en.wikipedia.org/wiki/URL). The features available may be restricted by whether access is by an authorized and authenticated user (employee, member) or an anonymous website visitor.

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 A vertical portal (also known as a "vortal") is a specialized entry point to a specific market or industry niche, subject area, or interest. 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.

The demand of a rich suite of easy-to-use tools and help that simplify data management within a

network is more increasing. These tools should give users immediate access to resources,

and control over when and how they share information (Portals and Gateways references 2006).

Web portals are sites on the World Wide Web that typically provide personalized capabilities to their visitors. They are designed to use distributed applications, different numbers and types of middleware and hardware to provide services from a number of different sources. In addition, department portals are designed to share collaboration in workplaces. A further department-driven requirement of portals is that the content be able to work on multiple platforms such as personal computers, personal digital assistants (PDAs), and cell phones (Wikipedia 2006).

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 on-line 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 (Webopedia 2006).

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 (Katz R.N. and Associates, 2006, chap 8).

2.2.1 HISTORY OF WEB PORTAL

In the late 1990s, the Web portal was a Web IT buzzword. After the proliferation of [Web browsers](https://en.wikipedia.org/wiki/Web_browser) in the late-1990s, many companies tried to build or acquire a portal to attempt to obtain a share of an Internet market. The Web portal gained special attention because it was, for many users, the starting point of their Web browsing if it was set as their home page. The content and branding of a portal could change as Internet companies merged or were acquired. Portal metaphors are widely used by public library sites for borrowers using a login as users and by university intranets for students and for faculty. Vertical markets remain for ISV's (Independent Software Vendors) offering management and executive intranet "dashboards" for corporations and government agencies in areas such as [governance, risk management, and compliance](https://en.wikipedia.org/wiki/Governance,_risk_management,_and_compliance)

2.2.2 TYPES OF WEB PORTAL

A web portal is a website that provides a broad array of services, such as [search engines](https://en.wikipedia.org/wiki/Search_engine), [e-mail](https://en.wikipedia.org/wiki/E-Mail), [online shopping](https://en.wikipedia.org/wiki/Online_shopping), and [forums](https://en.wikipedia.org/wiki/Internet_forum). [America Online](https://en.wikipedia.org/wiki/AOL) was the first web portal.

### PERSONAL PORTAL

A personal portal is a Web Page at a Web site on the [World Wide Web](https://en.wikipedia.org/wiki/World_Wide_Web) or a local HTML home page including JavaScript and perhaps running in a modified Web browser. A personal portal typically provides personalized capabilities to its visitors or its local user, providing a pathway to other content. It may be designed to use [distributed applications](https://en.wikipedia.org/wiki/Distributed_application), different numbers and types of [middleware](https://en.wikipedia.org/wiki/Middleware_(distributed_applications)) and hardware to provide services from a number of different sources and may run on a non-standard local Web server. In addition, department portals can be designed for sharing and collaboration in workplaces. A further department-driven requirement of portals is that the content be presented on multiple platforms such as [personal computers](https://en.wikipedia.org/wiki/Personal_computer), laptops, tablet computers, [personal digital assistants](https://en.wikipedia.org/wiki/Personal_digital_assistant) (PDAs), [cell phones](https://en.wikipedia.org/wiki/Cell_phone) and [smartphones](https://en.wikipedia.org/wiki/Smartphone).

Information, news, and updates are examples of content that could be delivered through such a portal. Personal portals can be related to any specific topic such as providing friends information on a social network or providing links to outside content that may help others beyond your reach of services. Portals are not limited to simply providing links. Outside of department intranet user, very often simpler portals become replaced with richer mashup designs. Within enterprises, early portals were often replaced by much more powerful "dashboard" designs. Some also have relied on newer protocols such as some version of RSS aggregation and may or may not involve some degree of Web harvesting.

### GOVERNMENT

At the end of the dot-com boom in the 1990s, many governments had already committed to creating government web portal sites for their citizens. These included primary portals to the governments as well as portals developed for specific branches (e.g., a particular government ministry, department or agency), or for specific sub-audiences (e.g., senior citizens, parents, post-secondary students, etc.). Notable government web portals include:

* [my.gov.au](https://en.wikipedia.org/wiki/Digital_identity_in_Australia#myGov) for [Australia](https://en.wikipedia.org/wiki/Australia).
* [Disability.gov](https://en.wikipedia.org/wiki/Disability.gov) for citizens with disabilities in the United States.
* [Europa (web portal)](https://en.wikipedia.org/wiki/Europa_(web_portal)) links to all EU agencies and institutions in addition to press releases and audiovisual content from press conferences.
* [GobiernoUSA.gov](https://en.wikipedia.org/wiki/GobiernoUSA.gov) for the United States (in Spanish).
* [gov.uk](https://en.wikipedia.org/wiki/Gov.uk) for citizens & [departmentlink.gov.uk](https://en.wikipedia.org/wiki/Businesslink.gov.uk) for departmentes in the United Kingdom.
* [Health-EU portal](https://en.wikipedia.org/wiki/Health-EU_portal) gathers all relevant health topics from across Europe.
* [india.gov.in](https://en.wikipedia.org/wiki/India.gov.in) for [India](https://en.wikipedia.org/wiki/India).
* [National Resource Directory](https://en.wikipedia.org/wiki/National_Resource_Directory) links to resources for United States Service Members, Veterans and their families.
* [USA.gov](https://en.wikipedia.org/wiki/USA.gov) for the United States (in English).

### SEARCH

Search portals aggregate results from several search engines into one page. You can find search portals specialized in a product, for example property search portals. Library search portals are also known as discovery interfaces.

### TENDER

A tender portal is a gateway for government suppliers to bid on providing goods and services. Tender portals allow users to search, modify, submit, review and archive data in order to provide a complete online tendering process.

Using online tendering, bidders can do any of the following:

* Receive notification of the tenders.
* Receive tender documents online.
* Fill out the forms online.
* Submit proposals and documents.
* Submit bids online.

### HOSTED

Hosted Web portals gained popularity and a number of companies began offering them as a hosted service. The hosted portal market fundamentally changed the composition of portals. In many ways they served simply as a tool for publishing information instead of the loftier goals of integrating legacy applications or presenting correlated data from distributed databases. The early hosted portal companies such as [Hyperoffice.com](https://en.wikipedia.org/wiki/Hyperoffice) or the now defunct InternetPortal.com focused on collaboration and scheduling in addition to the distribution of corporate data. As hosted Web portals have risen in popularity their feature set has grown to include hosted databases, document management, email, discussion forums and more.

* ENGINEERING PORTAL

The main concept is to present the user with a single Web page that brings together or aggregates content from a number of other systems or servers. The application server or architecture performs most of the crucial functions of the application. This application server is in turn connected to database servers, and may be part of a clustered server environment. High-capacity portal configurations may include load balancing strategies. For portals that present application functionality to the user, the portal server is in reality the front piece of a server configuration that includes some connectivity to the application server. For early Web browsers permitting HTML frameset and iframe elements, diverse information could be presented without violating the browser same-source security policy (relied upon to prevent a variety of cross-site security breaches). More recent client-side technologies rely on JavaScript frameworks and libraries that rely on more recent Web functionality such as [WebSockets](https://en.wikipedia.org/wiki/WebSocket) and asynchronous callbacks using [XMLHttpRequests](https://en.wikipedia.org/wiki/XMLHttpRequest).

**2.3 ELEMENTS OF WEB PORTAL**

A portal lets users view each application or Web page in its own window, called a portlet, and a single browser window can contain multiple portlets. For example, a portal page can contain portlets for logging in, searching, displaying news feeds, and managing appointments with a calendar application.

*For a portal to be great, it must have the following elements:*

## Scaleability and Adaptability

A great User web portal must be able to scale with the size of the department. It was noticed in the case study for this thesis, the portals could not accommodate the large numbers of users.

Furthermore, the platform must be adaptable. Not only should it adapt to the department needs, but it must also be flexible enough for you to adapt it to your Users’ needs.

The portal must also be flexible in terms of access. Today, everyone is on the move constantly, which means that you can’t tie people down to one form of access – this refers to employees as much as consumers. Thus, your portal must perform the same on any and all devices people might use to access it.

## Excellent Self-Service Capabilities

As previously shown, users prefer solving problems on their own and would much rather use a self-service portal than speaking to a live agent. By providing these services, you will immediately create a far better experience.

## Robust Security Features

Protecting the personal information of your Users is vital. If Users don’t feel safe, they’ll turn to your competition. So, investing in robust security features should be at the top of your priority list.

After all, it only takes on successful data breach to ruin a reputation and result in millions upon millions in lost revenue.

## Excellent Analytics Tools to Improve the Users Experience

The main reason for a User web portal is to provide Users with a great experience. However, an experience is subjective and – as we’ve already seen – User expectations are constantly evolving. What they might consider a great experience today might only be a mediocre one tomorrow.

In other words, you need to be constantly working to improve the User experience to ensure that you’re exceeding User expectations.

A platform that provides you with the information you need to constantly improve and deliver that great experience is essential.

## User-Oriented Features

When building your User web portal, you have to design it (or buy a solution) with your User in mind. It must have features that improve the experience for your User, which is what you should be focusing on.

A great User web portal will have lots of different elements, but the most important will always be those that improve the User experience. As long as you build your User portal for the User, it will be a success and you will be able to reap all the outstanding benefits of great User service.

**2.3.1 FEATURES OF A WEB PORTAL**

Functionality, navigation, design, coding integrity, and much more goes into the web portal development process. You have to work with developers and ensure that the solution meets their requirements. In addition, it should engage customers, provide relevant information, meet industry requirements, etc.

Web portals enhance customer experience. If we look at the stats, over [88%](https://review42.com/resources/customer-service-statistics/) of the users expect a digital self-service portal to address the basic queries. If customer service is excellent, [93%](https://blog.hubspot.com/news-trends/customer-acquisition-study) are likely to repeat the purchase. Hence, it pays to follow the web portal development steps thoroughly for businesses who want to keep up with changing customer behavior. Ensure that the web portal consists of all the essential elements such as:

### 1. UI and UX

The first impression is the last. For your customers, that first impression is the look of your portal. If the design is attractive and easy to read with smooth navigation, they are likely to use it. A clean design helps customers focus on the content instead of getting distracted by graphics. However, that’s not enough. You need to improve the overall user experience too. So, focus on the portal loading speed, placing buttons, navigation, and how efficient you can make it.

Just imagine, if a customer can quickly raise a ticket with one click, why would they put in the effort to call a support team? Now that’s possible only if they can find the option to raise tickets quickly in the first place.

Hence, a clean design and intuitive interface are vital to providing a positive customer experience.

### 2. Functionality

When thinking about portal functionality, there are a few things to consider. Like, is the portal mobile responsive? Does it provide effective reporting? Are the security features of a portal adequate? In addition to these, you need to focus on the features from the user’s perspective. See if the registration, login, customer feedback, ticket generation, survey features are working correctly.

Ensure that all features such as knowledge base, community, live chat, voice search, and others are included in your web portal. Missing out on these features can prompt users to abandon your portal services. Hence, they are essential for your portal development process.

### 3. Fresh Content

The primary reason for having a self-service portal is to allow customers to solve their queries on their own. To make this possible, you need to provide customers with relevant information with user manuals, how-to guides, steps, FAQs, and more. On-site blogs will also help keep customers updated about the latest products, company events, and industry-specific information. Featuring blogs is a great way to engage customers. However, you must update the content regularly.

Fresh content helps gain trust and loyalty from customers along with SEO. A new customer can learn valuable information about your business or products and services. For example, say you provide tax services and have a featured article on the tax laws from 2015 on your main page. What do you think your client would do? I certainly would reconsider. I want to know that the business is alive, knows about the market, and is worthy.

### 4. Security

With technology advancement, new and more advanced security risks are threatening the company’s integrity. A web portal must prevent security breaches on the frontend and backend, from malware and malicious attacks to unauthorized access. At the database level, any loophole in the SQL query can result in SQL injection. Hence, the development team should meet all the coding standards.

They should include features like role-based access so that only the authorized person can view the data. This would reduce the chances of data manipulation. It will streamline the internal and external processes. Internal staff and external customers/vendors can access relevant information via a secure login, reducing dependency.

### 5. Communication

Portals improve interaction. So, integrate multiple channels to facilitate real-time communication with customers. For example, offer live chat, chatbots, email service, social media chats, and community.

Provide them ways to come to you directly or indirectly, in the hour of need. For instance, if they have a query and hesitate to contact a support team, they should be able to get help from the community – people like them helping one another. For basic queries, they can chat with an AI chatbot and should be allowed to switch to a live chat at any stage.

Overall, your web portal should keep the communication ongoing. It should make the interaction easy and comfortable.

**2.4 REVIEW OF EXISTING LITERATURE**

This thesis was conducted on the basis of two existing websites used my students of the department. Building on these website required thorough review and analysis in order to deduce the shortcomings and implement a more reliable and accessible portal that serves a variety of tasks ranging from students registration to submission of assignments and many more.

As mentioned earlier, the existing websites are:

[www.safportal.net](http://www.safportal.net)

[www.safdevelopers.github.io](http://www.safdevelopers.github.io)

**2.4.1** [**WWW.SAFPORTAL.NET**](http://WWW.SAFPORTAL.NET)

This is the official website for the institution in which all students can access, create a stud id and view the previous semester’s result. This site functions as originally intended to but crashed shortly and greatly left users (students) unsatisfied by its performance. Basically, the portal was not reliable and effective. Besides the registration page (portal), the website was a static one and users didn’t feel the academic environment via the website.

The uses of this web portal are as follow:

* 1. Allow students view last semester’s result: This website was designed to allow all students of the institution have access to see their results online via the site. This was a really good idea as students do not need to wait turns in front of the notice board to see their results. This is a really good use of this website and it functioned as intended for a while.
  2. Student registration: Upon accessing the website for the first time, users are presented with two options which are; *“log in”* and *“register”.* New students are prompted to click the register link and then, redirected to a web page that asks specific questions necessary for the portal and log in functionality.

After several hours of analysis and questioning previous users of this website, it was discovered that there are several shortcomings and needed to be corrected immediately hence, this initiation of this project.

Some of the shortcomings are:

THE WEBSITE IS NOT RELIABLE

As an internet user, one of the features individuals require from any website is reliability and dependability. The website was not reliable to majority of its users. Few clients were able to successfully register and have a stud id recognized by then website on their first trail while most tried more than twice before they could successfully register and another few were unable to register at all.

Analysis shows that this was as a result of failure from the server as it could only accommodate N numbers of students at a time and will not exceed this limit.

This made the website function as a “*first come first serve*” and it was reliable to users.

POOR LOOKING GUIs

In this 21st century, it is culture to design an interactive and attractive website. A static website must look eye catching to invite users and clients to stay longer, an attractive site must have good coloration and minimal but cool animation slides (Jquerry, CSS, and JavaScript) to keep the users interested as they transverse through different sections of the website.

In this case study, the safportal.net lacked a great deal in coloration and animation. The GUI was not in any what attractive and needed many improvements. The website feels like it was designed for students in the 1990s because it resembles the standard of the old portals.

“In order to satisfy this current generation of computer users, it is important to consider the things of the generation” (Anonymous 2022).

WRONG QUESTIONS ASKED

For a school portal that only linked to result viewer, some of the registration question for the backend was intense and didn’t reflect on the students’ dashboard. Users complained of odd questions asked and felt a psychological shift from an academic environment to another registration portal.

Irrelevant questions like: height, weight, postal code, home address and date of birth were asked and defeated the purpose of student registration. Many of the information requested did not appear on the dashboard and were not meant to be asked.

Analysis showed that student friendly questions be asked and the whole registration questions should be brief and must be reflected on the dashboard and profile.

NON-RESPONSIVENESS OF THE WEBSITE

This has always been a major detriment to most big websites as developers do not spent time redesigning responsive websites thinking they (users) will always access from a desktop. As users move from one device to another or tilt their mobiles into a landscape position, the elements of the website jump from one position to another and over lapping themselves. Some important sections became hidden and many features were displaced because of overlooking this key factor.

After analyzing the website, this project was taken into consideration and worked on improving all the shortcomings and adding new features making the new website more and more student-friendly.

[WWW.SADSOFTWAREDEVELOPERS.GITHUB.IO](http://WWW.SADSOFTWAREDEVELOPERS.GITHUB.IO)

This is the second case study of these reports. The project was conducted by students of the department, software developers group.

This group designed and implemented a departmental website on which majority of this project is revolving around. The website has plenty of improvement to the safportal.net and carried the department along thoroughly.

* Some of the safsoftwaredevelopers.github.io key features are:
* Home page: showing animation, information about the department, list of lectures and some brief introductory to the school and the developers motto
* Login portal: the website did implement portal and this portal was used to access the home page. It requested Matric number and password of users only.
* About us page: this showed all the developers, their name, matric number and picture individually.
* It has few more pages but nothing in it and links leading back to the school website.

This website has been accessed by many member giving positive review and a few negatives. In order to correct these few negative reviews, a new project was initiated to best the two existing portals and implement a student academic environment.

Analysis shows the following shortcomings of the safsofytwaredevelopers.github.io, they are as follow:

NON-FUNCTIONAL PORTAL

The website was designed for students of the department to access and perform a few academic tasks like submitting assignment, viewing the day’s times table, reading read about the institution and department and many more.

Although, it is necessary to login before accessing the home page, there was no real portal as only developers knew the login condition and for any other student, they need to hear the condition from a developer that has knowledge about the portal. With no solid foundation backend and little to no knowledge about PHP, mySQL and java for backend programming, the developers played around the portal page and added a portal page with no real purpose.

There was no section for new students’ registration, no questions, no footer navigation and many important elements to consider in a portal. For professional developers, this was no proper and should not be in a departmental portal.

This project corrected this flaw and added new features to amplify the general website performance.

NO STUDENT REGISTRATION

One of the major purposes of the project was to design a website that allows students register online for the semester’s course provided they have record with the department and the school management at large.

Unfortunately, the website did not have this page. After users gain access to the home page, they do not perform any registration process. It is key to design a website that allows the student have records in an online database management system that can be accessed by authorized personnel via the website to verify, correct, contact or change information about a student of the department, but since there is no avenue for the students to register, this innovation was disregarded.

Lastly, the follow up of this analysis shows no section for the students to download lecture materials or submit assignment and read news within the department. All these factors became key features of this project as the new website entails each section and how effective they made the performance of the department improve drastically

**CHAPTER THREE**

**METHODOLOGY**

The methods used in the project were based on existing methods validated through extensive use in other similar projects, confirmed by the references to each method. By using several complementary, valid methods as tools in the process—from beginning to end—this use of methodological diversity has ensured an end result with a high level of reliability.

**3.1 RESEARCH APPROACH:**

Research designs or methodology is the conceptual structure within which research is conducted and solution is sought to the problems identified and meeting the aims and objectives. This chapter contains a comprehensive and properly detailed blueprint for the collection of data, measurement, analysis, validation and instruments used during the course of this research.

The first step was to set up a plan for the coming work, which would result in a more structured progression of the project. The planning included steps for the context immersion, coming up with relevant topics for the literature review that would give the project a solid theoretical framework to work with, as well as finding methods for the exploration and implementation phase.

In light of this project, there were two major approaches taken into consideration for ensuring accurate results. These approaches are:

* THEORITICAL APPROACH: This is to review appropriate related literatures and establish a black and white template (algorithm) to be strictly followed to gather, analyze and validate data for this project. The theoretical approach taken was written in a jotter and was strictly adhered to which we can see the result resonating in the contents of this report.
* PRACTICAL APPROACH: This is the experimental approach and more realistic method that follows the steps and guidelines written in the theoretical approach. This method covers over 80% of the entirety of the project because this is what brings the written idea into an implemented departmental portal.

**3.2 RESEARCH METHODS**

A variety of methods were developed at different phases of this project to ensure accurate results. A list of the major methods can be seen below:

3.2.1 USERS EXPERIENCE (UX) AND USABILITY: This was the method majorly used in the during the analysis and literature review. A website, in this case, a portal designed is used for by clients who have little or no idea about the programming and coding of a website. User experience or usability was the method developed to accurately measure the rate of satisfaction and interaction of users and the website.

User experience (UX) has, according to Hassenzahl and Tractinsky (2006), gained momentum to counter task- and work-related paradigms, but the ideas are not original. The term first appeared in Don Norman’s book The Design of Everyday Things—originally published in 1988—where he defined it as a practice of focusing on the needs of the user, instead of the system itself (Norman, 2013). Since then, Norman and Nielsen (n.d.) has refined the definition to encompass every aspect of the user’s interaction with a company and its services and products.

One of the cornerstones that make up the principles of UX is the term usability, which Petrie and Bevan (2009) explain as principles which focuses on achievements of tasks in specific contexts. There’s also an official ISO definition of the term which defines it as the “extent to which a system, product or service can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use“ (International Organization for Standardization 2018).

The principles of usability and UX are of course not only applicable to physical product design, but digital product design as well, which makes this highly relevant for the project. Garrett (2010) says that good UX becomes even more important on the web, as users often blame themselves when something goes wrong. And as Garrett (2010) furthermore explains, “if your users have a bad experience, they won’t come back”.

3.2.2 USER INTERFACE DESIGNS: User interface design refers to the design of a user interface (UI)—the part of the application that the user can see and interact with (Chong, So, Shum, Li, & Goyal, 2004), which includes things like input controls, navigational components, informational components, and content containers (Usability.gov, n.d.).

McKay (2013) details one concept of describing a UI as “a conversation between users and a product to perform tasks that achieve users’ goals” (p. 11), and furthermore mentions that a well-designed UI communicates to the users in ways that are natural, professional, friendly, efficient, and easy to understand.

McKay (2013) also presents five core principles that make up his concept of UI as a means of communication:

1. UI is communication: essentially a conversation between users and a product.

2. Explain tasks clearly and concisely, as you would in person: UI is still communication, just using a slightly different language.

3. Every UI element can be evaluated by what it communicates and how effectively it does that job: The communication applies to everything in the UI, and elements that doesn’t communicate anything should be removed.

4. Be polite, respectful, and intelligent: Like people, UIs communicate through personality, tone, and attitude.

5. If a UI feels like a natural, professional, friendly conversation, it is probably a good design: A simple yet effective technique for evaluating a design.

As the end results from this project is a user interface which helps the users achieve their needs, the interface has to be able to communicate well with the users, which proves the need for good user interface design. The relevance and importance of good user interface design is also heightened by the findings of Adobe (2015), which state that 38% of users will stop interacting with a website if it’s not engaging or if the user interface is unattractive.

To maximize the users’ needs, the departmental portal should work on both desktop and mobile devices, as the user might have to—or even prefer to—moderate their content on a mobile device. There are some differences, however, when it comes to user interface design for mobile devices that has to be taken into account. Elements such as color, font-size, background images and animation differ from mobile to desktop.

This website is a very easy to use and contains good interface that allows student with little knowledge about website use freely and smoothly.

3.2.3 INDIVIDUAL CREATIVITY: This is a personal skill cultivated and matured during the course of this project. It involves the innovation, analytical process and sampling technique used from studying other standard websites and thorough practice and recreation of certain features of such websites. Some of the innovative methods used during this project are: *Click to submit*, *Advertisement, Multi-tasking and lecture recap* to add new features to the departmental portal that has not been in most institution websites seen so far.

3.2.4 UNIVERSAL DESIGN OF WEBSITES: Universal design is a term coined by Ron Mace as “the design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design“(NC State University, 1997). According to this definition, the principles of universal design do not only apply to the physical products and environments, but also the digital world. As we cannot make assumptions about our users’ abilities or disabilities, focus has to be placed on designing and implementing an interface that works as good as possible for everyone. This applies to all areas of the departmental portal, both the visuals and the user experience, as well as the functionality on the platform.

The principles of universal design is also related to users’ lack of skills or disabilities in the technologies which they use—not only users’ physical disabilities. Henry, Abou-Zahra, and Brewer (2014) extends the area of universal design to include focus on people without access to high-speed Internet, low language literacy, low computer skills, and outdated hardware.

Accessibility on the web has been promoted by the World Wide Web Consortium’s [W3C] Web Accessibility Initiative [WAI] since 1997, which has proved to be very successful in both raising awareness and the development of a standardized model (Sloan, et al., 2006). In 2018, WAI published the Web Content Accessibility Guidelines [WCAG] 2.1 (W3C, 2018), which is at the time of writing the latest web accessibility guidelines published. The document is divided up into four different areas—perceivable, operable, understandable, and robust—which each include recommendations to follow.

During the design and implementation of the departmental interface, all recommendations of the WCAG 2.1 guidelines were considered, to ensure an end result which was accessible by as many users as possible. While some of the guidelines aren’t directly related to an interface’s visual design, this still included things like color contrasts, typography, readable messages and labels, error identification, and more.

By taking the principles of universal design and web accessibility into account, we help contribute to a institution and society where everyone can reach their true potential, by supporting their needs. Tim Berners-Lee, the inventor of the World Wide Web, once expressed the importance of this focus: “The power of the Web is in its universality. Accessible by everyone regardless of disability is an essential aspect” (World Wide Web Consortium, 1997). After all, the portal can only be accessed through the internet.

3.2.5 BRAND IDENTITY DEVELOPMENTS: Visual recognition has become a competitive factor when it comes to brand and products where they not only need to fulfill the users’ needs in terms of functionality, but also aesthetics (Karjalainen, 2007; Karjalainen & Snelders, 2010).

This is due to the market saturation of products and services which all seem to provide a similar experience (Karjalainen & Snelders, 2010). Qubstudio (2018) mentions that it used to be enough to create an intriguing advertisement for the brand, but this is no longer viable as the market has become more competitive. Stompff (2003) supports this statement by saying that “product design should be rooted in the culture of a company to ensure a consequent message—because, if they’re any good, products will outlast any brand identity campaign“ (p. 32).

In order to develop a departmental portal which is to be used by all students and lecturers of the department, the first brand identity is the school’s logo as well as school’s color. Other identity are features found within the department such as popular quotes (in this case, “*WE NETWORK THE WORLD*”), Head of department and the department color #f3f3f3, #111 as well as #53a4cd and many more colors that have been adopted into the website.

3.2.6 CODING: This is the scientific process of writing, test-running, decoding and documenting codes (programming language) that perform specific tasks. Coding is the entirety of the project because a website is achieved by using various languages, each having their own specific purpose and functions.

For our research, we used the following languages to code our website that has two parts, Frontend and Backend. For the frontend development, HTML (HYPER-TEXT MARKUP LANGUAGE), CSS (CASCADING STYLE SHEET) and JavaScript were used while the backend contains programming language such as MySQLI, PHP and Java.

**3.3 INSTRUMENTS AND TOOLS USED**

Since developing and implementing a website has various stages, it is only natural that each stage has its own specific tools and instruments necessary to perform specific tasks that ensure the desired preferable results.

Although, most tools can be used in multiple methods but each instruments have their specific purpose and tasks. The list of tools used in this research project is found bellow:

3.3.1 FRONTEND AND BACKEND: This is tool that controls the website interface (UI/UX) and the developers’ playground (backend). The frontend used for the physical appearance of the website that the developer code using HTML, CSS and JavaScript with each language used for specific purpose and cannot be used for another. HTML is to code the contents and structure of the websites, CSS is used to code the styling and presentation of the website (the beauty and interface of a website) and JavaScript is used to code the behavior of the website such as click, alert and many more.

Backend is where the “*magic*” of the website occur. The developers code the website to have data storage in the cloud or hosting companies. Logging in, signing up, course registration, assignment submitting are all performed by the backend using MySQLI, PHP and Java.

3.3.2 PERSONAL COMPUTER (PC): This is required for coding, hosting and documentation of the process involved in this project. Special system recommendations were required for installing certain software used for this project. The system specification and recommendation differ from software to software. The most appropriate system configuration is 6GB RAM and WINDOWS 8 and above MAC and LINUX.

3.3.3 MOBILE PHONE: This was used to conduct online interviews, browse the internet and compare the different working state of the design and implementation of this project. Mobile phone was a good tool used to test and validate the users experience and get quick reviews both positive and corrections needed for the website that have been adopted to the overall functionality of the website.

3.3.4 INTERNET: The most important tool used during the course of this project. It was used for analyzing, validation data through hosting and reviews, sourcing for data, testing the website and many more. To access the internet, it is necessary to use a web browser and the web browser used for testing the website is GOOGLE CHROME.

3.3.5 INDEPENDENT DEVELOPMENT ENVIRONMENT (IDE): This is the software used to write, test, debug and document codes and programming language used for this project. The particular IDE used for writing the code is software that required a larger RAM and a more updated Windows Version, VISUAL STUDIO CODE (VS CODE). This IDE has color difference for writing different syntaxes and it has installed all the major shortcuts that make writing codes easier and much more fun.

3.3.5 XAMPP: This is a JAVA oriented software that is used to program the backend of the website. Because this project uses a login system, it is necessary to have a backend. Although, not all websites make use of backend but we used backend to design and implement the portal.

XAMPP is the tool used to program the MySQLI. During the initial stages of the backend when the portal has not been hosted on a legal hosting company, the XAMPP software was connected and the creation a database management system offline was achieved by using the localhost of the PC.

All the tools used during this project are very symbiotic as they all share resources and cannot stand alone without the other making this project a very interesting but challenging one.

**3.4 ANALYSIS AND VALIDATION**

The analysis of data used for this research has already been properly highlighted in Chapter Two of this report in the Literature review section. The sources of data collected, the problems discovery, past state and current state of the departmental portal, validation of data and implementation is discussed below.

3.4.1 SOURCE OF DATA: The types of data used in the project differ from stage to stage but the most common data gather was for the users experience and interface because this key information after been analyzed proves a very crucial data that the creation of this project revolves around. The sources of this data are

* Questionnaire.
* Person to person.
* Online interviews.
* Literature reviews.
* YouTube.
* Personal.

3.4.2 PROBLEMS DISCOVERY: The project’s first stage comprised of getting an understanding for the project’s problem and context, and was done through a problem analysis, looking at current and possible future states of the product, as well as conducting a stakeholder mapping and a literature review.

Before diving into the project, a critical analysis of the problem as described by the department was conducted, by looking at the department’s mission in relation to its main purpose and the institution current state. By doing so, a deeper understanding of the context and situation could be conceived, in an attempt to comprehend not just what the department thought they were looking for, but also what they actually were looking for.

The project brief was simple and straight-forward; design and implement a new departmental portal to help realize the department’s vision. Due to this broad and openended statement, however, there was a great opportunity for free interpretation. This made a critical analysis of the problem even more crucial, to be able to steer the project’s focus in the right direction.

While performing this analysis, a broader perspective of the department’s context was taken into account, not just the department portal in question. This included, for instance, the department’s mission of providing an online academic environment for the students; why is this such an important part of creating a better future of news consumption, assignment submission, course registration, and how will the success of this affect our society?

3.4.3 PAST, CURRENT AND FUTURE STATE OF THE PROJECT: The existing portal was thoroughly tested and documented, as can be seen in chapter 2.2. This was done by navigating around the interface and trying to accomplish the intended functionality, while taking notes on the current state of its user interface, user experience, accessibility, and information architecture. Some aspects and features were also discussed with the authorities of the department, as the platform was difficult to use or understand at times. This was to develop an understanding for what had been tried and tested already, what worked and what didn’t, to help support the redesign of the product.

The future state of the product was then imagined, to set up an initial, brief conception of what the final solution might require, based on the current knowledge of the portal and the vision for it. As this was merely based on intuition very early in the project, this was more seen as a warm-up method for future work to come.

3.4.3 EXPLORATION, IMPLENTATION AND VALIDATION: The project’s second stage was comprised of different methods, together making up the main part of the work; the exploration and implementation of the product. This is the last part of the practical approach earlier discussed.

As an agile process had been chosen for the project, a suitable way to move forward, after identifying the context and the user’s needs, was to set up a list of user stories. User stories/reviews are user-focused end-goals that the final product should fulfill. By organizing the identified needs in this way, it becomes much easier to divide the work up for coming sprints, where one or a few user stories can be selected and focused on at a time.

User stories are often sentences created following a specific format; ”As a … [persona], I want to… [achieve something]”, and sometimes ending in ”so that I can … [reason]”. It ensures a focus on the user and what they’re trying to achieve, instead of focusing on a specific feature of the portal.

*“****As a student, I want a website that must be reliable so that I can depend on the information around the department.”*** Ajayi Michael, a student’s story.

*“****As a lecturer, I want the new department portal to be very effective so we can start conducting online tests for the department.”*** Mr. Alabi M.A, a lecturer’s story.

*“****Wow, so people that have business can start advertising on the department portal, that’s very nice ”*** Idowu Christiana, a student’s story.

*“****People like me that have miss school a lot can be assured that we can always have lecture summary at the end of the day. That is a very good innovation.”*** Ojebola Semilogo, a student’s story.

*“****Use a different font for the contents of the website because of people with bad sights.”*** Miss Busola O.J, a lecturer’s story.

*“****There is room for improvement, compare your development to other department websites.”*** Mr. Ajemiboye Moses, a developer’s story.

There are many more reviews that motivated and pointed out areas that required immediate attention and corrections.

**3.5 METHODS DISCUSSION**

The methods used in the project were based on existing methods validated through extensive use in other similar projects, confirmed by the references to each method. By using several complementary, valid methods as tools in the process—from beginning to end—this use of methodological diversity has ensured an end result with a high level of reliability.

Working in an agile process divided into sprints was a great decision for the project, as it was a natural way of structuring the work enough to not focus on too many things at once. During two weeks, I could focus on a specific part of the project—for instance, a specific feature or page in the interface—while going through the concepts of think, make, and check for the work in question. This process was a bit different from most other product development projects I’ve had done so far, but proved to be both something I found to work very well, and something I really enjoyed.

Another method that was used to keep the user in focus when designing the interface was to develop a set of user flows. User flows or tasks analysis, which is another word for them, are according to (Komninos, 2019) diagrams explaining steps that a user must take to achieve a certain task or goal. By developing user flows, you put yourself in the user’s shoes of trying to accomplish a certain task, giving you a valuable insight in how easy or complex the task might be. This can be useful early in a project when you don’t have an actual prototype or product to perform user tests on.

The discovery phase of immersing myself in the project’s context ended up extending into the second phase a little bit further than expected. Parts of the literature review, for instance, ended up being done after the project’s half-way point. This did not cause any major issues, however, due to the work related to that specific theory being done at a later point in the project as well. After the addition features were finalized, I had an idea to continue exploring these features by creating interactive parts that will involve all users to interact with. I think this would’ve been a great way of diving deeper into the needs of the users, as I did not have access to input from most of the department information during this part of the project. However, due to limitations in resources this idea was never carried out, and I had to rely on the results from my problem statement instead.

The second phase started out really well thanks to the strategic planning of the department portal’s features with agile user stories. These user stories made the rest of the project progress in a very organized manner, due to how easy it became to divide the work up into the different sprints. The site architecture map was also a great tool for taking these textbased user stories and visually organizing them into the interface’s information architecture.

I did find it difficult, however, to keep the site architecture map updated throughout the project, which was planned in the beginning. The user stories were updated continuously whenever a new idea came into mind, but this visual map was somewhat neglected in the second half of the project. I did not feel like I missed out on anything by not fulfilling this original plan though, thanks to the wireframes I already had created at this point, which was more than enough to work with to keep track of the relationships between pages and features in the product.

The user flows were planned to be used for evaluation of the product’s UX, but as the first wireframes and interactive prototypes were in a usable condition earlier than expected, I found it much better to use these for user testing. The creation of the user flows still had its advantages, as it gave me another perspective on the ways a potential user could or would achieve a certain task. This led to a refined set of more intuitive flows for the functionality. For instance, the flow of disconnecting an article from a bundle (a set of similar articles) was initially planned as a feature related to the ‘bundles’ section of the interface; find the bundle and then disconnect the article. After writing out the steps of this task as a use flow, I quickly realized that it was much more logical to relate this task to the ‘articles’ section of the interface instead, as this allowed for a more intuitive flow; find the article first, then disconnect it from the bundle it belongs to.

At the beginning of the project, I had conducted some user tests with the whole target group; both internal administrators and external students’ body, but I only had access to fewer members of the latter. After the initial launch of the departmental portal—which is planned at a date outside the timespan of this thesis—input from the whole target group will be taken into account, and the website can then be further refined accordingly.

The heuristic evaluation method was optimally. Due to limited amount of resources, however, the method used in this project was only done by one evaluator. It’s important to keep this in mind when using the results from the method, as there might still be some usability problems yet to be identified. According to Nielsen (1995), somewhere around 35% of the usability problems will be found by a single evaluator. The same thing applies to the accessibility evaluation which, in effect, was a slightly modified heuristic evaluation. While this is a limitation of the method’s possibility, I don’t see this as an issue for the project’s end result, as the main evaluation of the product will be after the initial launch—which, again, is outside the scope of this thesis. Also, in terms of efficient use of resources, performing the main user testing of the interface after it has been fully coded and implemented—not just in the form of an interactive prototype—could in some cases be considered a better approach.