UNIVERSITY OF EDUCATION, WINNEBA

DEVELOPMENT OF CONCEPTUAL WEBSITE DESIGN MODEL FOR UNIVERSITY OF EDUCATION, WINNEBA, GHANA

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DECLARATION

Candidate's Declaration

I, Nicholas Opoku, declare that this thesis, with exception of quotations and references contained in published works which have all been identified and duly acknowledged, is entirely my original work, and it has not been submitted, either in part or whole, for the award of another degree elsewhere.

Signature: ……

Date: …….....

Supervisors' Declaration

We hereby declare that the preparation and presentation of this thesis were supervised in accordance with the guidelines for the supervision of thesis as laid down by the University of Education, Winneba.

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Signature: ……

Date: ……

Dr. Ebenezer K. Acquah (Co-Supervisor)

Signature: ……

Date: ……..…….

DEDICATION

This work is dedicated to my uncles Mr. Adjei Peprah, Mr. Kwame Adjei, my mother Alice Mensah, my lovely wife Priscilla Owusu and my lovely daughter Eliana Opoku-Peprah.

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ABSTRACT

University's website functions as a virtual front door that serves as a critical point of interaction for students, prospective students, alumni, faculty, and the global academic community. Beyond providing information to its community, a university website reflects the institution's identity and a strategic asset for communication. As the first point of contact for many prospective students and stakeholders, the design, development and functionality of a university website plays a crucial role in shaping perceptions about the institution and influencing decision-making. Despite the increasing reliance on platform for communication, preliminary investigation suggests that many Ghanaian university websites failed usability test and lack modern design standards. Again, there is no conceptual model that guide the design and development of university website. Hence, the study focused on developing a conceptual model that outlines the essential components of effective university website design and test it in the development of prototype website for the University of Education, Winneba. The study employed qualitative descriptive design to describe the experiences of users when interacting with university website and provide a snapshot of the existing selected universities websites. Again, a studio-based research designs was used to produce a prototype UEW website through creative design processes. The research employed the purposive and convenience sampling techniques with a total sample of six websites, two experts and fourteen (14) participants from selected Ghanaian universities. Observations, focus group discussions and interviews were used for data collection. Thematic, visual, and content analysis were employed to analyse data from the field. Findings from the study revealed that many selected Ghanaian universities' websites fall short in structure, content, accessibility, and modern digital standards. It emerged from the study that many users experience "click fatigue" when locating basic information on university website. Users reported search functionality failures, by returning zero results for programme specific information such as courses description on the university web. The study concluded that the conceptual model developed has proven to be a robust and effective framework for guiding the creation of functional and user-centred university websites. The application of the model was used in developing *UniSite* WordPress theme and further used to develop a prototype UEW website demonstrated its practical relevance and adaptability. The study recommends the adoption of the proposed conceptual model as a standard guideline for designing Ghanaian university website. Again, web designers and developers should adopt the *UniSite* WordPress theme for designing university website to reduce time and resources required to design, develop, deploy and maintain the university website due to its functionality and user-friendliness.

CHAPTER ONE

INTRODUCTION

1.0 Overview

This chapter serves as the introductory section of the research. It provides a detailed background to the study, articulates the research problem, and clearly states the purpose of the investigation. Furthermore, it outlines the specific objectives that directed the focus of the study. The chapter also discusses the scope within which the research was conducted and highlights its significance to both professional practice and society at large. In addition, it presents an overview of the structure and organisation of the subsequent chapters. The next section begins with a discussion of the background issues underpinning this study.

1.1 Background to the Study

The Internet has become an integral part of daily life for both individuals and businesses. With its capacity to connect billions of people across the globe, the Internet forms a crucial foundation of today's information-driven society (Petrosyan, 2023). It has evolved into the largest repository of information and stands out as one of the most powerful communication media available. Presently, the Internet has significantly influenced all facets of human activities. Over the past few years, the Internet has experienced rapid growth, making it increasingly difficult to fully comprehend its potential uses (Khanna & Kaur, 2019; Martins et al., 2017). Naughton (2016) argues that the Internet has transformed the world into a global village by providing widespread access to information through various devices such as smartphones, tablets, and computers, requiring only an Internet connection.

Among the several benefits of the Internet, websites play a crucial role in accessing information across various sectors such as employment, healthcare, governance, banking, investment, commerce, and education, among others (Akram & Sulaiman, 2019). Globally, websites facilitate interactions between businesses and consumers, enable market expansion, and support communication with key stakeholders (Ganiyu et al., 2017). Additionally, websites empower organisations to reach wider audiences, enhance operational efficiency, and strengthen their corporate image (Ganiyu et al., 2017; Jumalik & Oktaviany, 2024). Thus, maintaining an online presence has become essential for organisations to remain competitive both locally and internationally (Caglar & Mentes, 2012). Considering the importance of having a well-designed website in perspective, recent statistics show that as of January 2023, there were approximately 5.16 billion active Internet users worldwide, representing 64.4% of the global population (Petrosyan, 2023). Furthermore, there were over 1.74 billion websites on the Internet within the same period (Ahlgren, 2023). These statistics highlight the increasing popularity of websites and the growing emphasis that businesses and organisations, including higher education institutions such as universities, place on establishing and maintaining a strong online presence.

Ismailova and Kimsanova (2017) argued that the initial perception people form about an organisation is often influenced by its website. Kuppusamy and Balaji (2021) added that, as far as higher education institutions are concerned, their websites provide an excellent platform for information dissemination. Birol and Gedik (2017) defined a university website as a platforms that disseminate institutional information, offers opportunities for students, and facilitates cooperation between educational institutions and industry. Websites have become essential communication tools for universities, enabling them to connect effectively with various stakeholders. In the current globalised environment, universities strive to capture the attention of prospective students

worldwide by designing and developing attractive and functional websites. To enhance and sustain their visibility, many universities are investing in websites that are well-designed, both in terms of usability and functionality.

Developing and maintaining a high-quality, efficient website is considered a strategic priority for many universities (Al-Debei, 2014). University websites are the primary sources for accessing institutional content (Dei, 2024) and serve as valuable interactive platforms for communication (Bairamzadeh & Bolhari, 2010; Caglar & Mentes, 2012) with internal users such as students, faculty members, and administrative staff, as well as external audiences like prospective students and the general public. The university website provides gateways to critical information, including upcoming events, details about available courses, publications and online transactional services such as library access, registration, and information about modes of course delivery (Caglar & Mentes, 2012). As such, university websites play a vital role as information providers (El-Halees & Abu-Zaid, 2017), and should address the diverse needs of their stakeholders they serve, including faculty, students, and prospective students, to ensure their effectiveness, user satisfaction, and overall success. Again, a university website plays a critical role in promoting education to the general public and the world at large. Kem and Morphew (2014) reported that websites enable traditional universities to provide digital academic services to their users to enhance efficiency and conserve both time and resources.

There is an emerging trend among universities to utilise their websites as a platform to promote academic research collaborations with other universities and industries, both locally and internationally (Loren, 2017). Today, university websites serve purposes beyond merely showcasing academic programmes and institutional facilities. They also function as public relations tools, acting as the first point of contact for web visitors seeking information about the institution (Andalib & Danaee, 2013).

Prospective students rely on information from institutions' websites in evaluating the institution before applying for admission. Nasajpour et al. (2014) confirmed that they are often the first and only place users go for information when considering a school. In a study conducted by Losonczi (2012), 94% of participants responded positively to the statement: *Prior to considering a school, I examine its website*. This level of response underscores the significance of having a well-designed and attractive university website that serves as a promotional tool to sell the university.

Gabriela (2018) while deliberating on best practices for internationalising academic websites suggests that since a website represents the identity of an institution and frequently serves as the initial point of contact for faculty, students, researchers and prospective students, universities should see their websites as strategic tools for promoting the institution and its core values and design their website content and features accordingly. Having appropriate content such as clear language and hero imagery, good user interface, accessibility, and user user-friendly website is critical for reaching an international audience, as globalisation remains a key component in the ongoing evolution of higher education (Loren, 2017).

In recent years, the university website has become increasingly important, as universities have shifted more of their operations online due to the COVID-19 pandemic. Studies have shown that the COVID-19 pandemic has introduced the power of ICT in education and students are mostly dependent on the website of the higher education institution for their academic activities (Arulogun et al., 2020). These web-based mediums are widely used in higher education in general and Ghanaian universities in particular to continue the education of students during this time of pandemic. With more students and researchers relying on the Internet for access to educational materials and research, universities' web presence and online impact have become more important than ever before.

An empirical analysis of Asian universities' websites from the students' perspective conducted by Manzoor and Hussain (2012) revealed that usability issues associated with broken links, lack of proper information, navigation, and site performance-related issues are common in academic websites in Asia (Manzoor & Hussain, 2012).

Studies have revealed that users' perspectives should be considered as an inexorable clue while designing good interactive content like a university website (Sandhya & Suchithra, 2017). Penha et al. (2014)'s heuristic evaluation of the learning management system revealed that violations of the basic principles of design and usability greatly affect the effective use of the e-learning system.

1.2 Statement of the Problem

University's website functions as a virtual front door that serves as a critical point of interaction for students, prospective students, alumni, faculty, and the global academic community. Beyond providing information to its community, a university website reflects the institution's identity and a strategic asset for communication. As the first point of contact for many prospective students and stakeholders, the design, development and functionality of a university website play a crucial role in shaping perceptions about the institution and influencing decision-making. Research indicates that university websites need to be designed in ways that align with user expectations, thereby enhancing efficiency and saving users' time (Anyaoku & Akpojotor, 2020).

Despite the crucial role university websites play in promoting institutional identity, disseminating information, supporting academic and administrative operations, and enhancing user experience for diverse stakeholders, observations and a pilot study conducted revealed that many Ghanaian universities' websites are difficult to navigate, lacking clear information architecture, the unavailability of desired information and

inconsistent layout design. These shortcomings often result in poor user satisfaction, ineffective communication of institutional values, and reduced competitiveness in the global educational landscape.

Studies have shown that many university websites, particularly in developing countries, do not fully meet the needs of their users due to poor design, lack of content, cluttered user interface and non-intuitive navigation (Anyaoku & Akpojotor, 2020; Manzoor et al., 2019; Muhammad et al., 2021; Olaleye et al., 2018). These deficiencies can hinder information retrieval, negatively impact user satisfaction, and potentially affect the university's reputation and student enrolment decisions. Usability evaluation of a university website is significant in the area of user interface design. The results of usability evaluation are mainly used to aid user interface designers in addressing the changing demands of users.

In the latest Webometrics Ranking of World Universities released in January 2023, six Ghanaian universities' websites were ranked among the top 4000 university globally. The ranking system evaluates universities' web presence based on the size and visibility of their web content, as well as their online impact and presence in search engines. The University of Ghana was the highest-ranked university in Ghana, placing 1109th in the world, followed by Kwame Nkrumah University of Science and Technology at 1489th and the University of Cape Coast at 2056th. The other Ghanaian universities that made the list were the University for Development Studies at 2598th, the Ghana Institute of Management and Public Administration at 3498th and the University of Education, Winneba at 3560th (Webometrics Ranking of World Universities, 2023). This scenario reveals the dissatisfactory quality level of Ghanaian universities' websites.

Besides, there is a lack of a conceptual model to guide the design and development of Ghanaian university websites that are user-centred, easy to navigate and promote visibility. These issues underscore the need to have a comprehensive conceptual

model that will guide the design of university websites to ensure they are user-friendly, functional, accessible, secure, and aligned with user expectations and institutional goals.

1.3 Purpose of the Study

The purpose of the study was twofold: first, to propose a conceptual model for designing university websites, and secondly, to use the proposed model to design a prototype University of Education, Winneba website.

1.4 Research Objectives

The objectives of the study were to:

1. Examine the current state of selected Ghanaian universities' websites.
2. Investigate the user experience of selected Ghanaian universities' websites.
3. Propose a conceptual model for designing a university website.
4. Implement the proposed conceptual model in WordPress theme development.
5. Design a prototype UEW website using the WordPress CMS theme developed.

1.5 Research Questions

1. What is the current state of selected Ghanaian universities' websites?
2. What are the experiences of users when interacting with the selected Ghanaian university websites?
3. What conceptual model can be proposed for designing a university website?
4. How would the proposed conceptual model be implemented in a WordPress theme development?
5. How would the WordPress CMS theme developed be applied for designing a prototype UEW website?

1.6 Significance of the Study

Regarding the expected benefits from this, in addition to the expected success, the study contributes to existing literature by proposing a comprehensive conceptual model for university website design, filling the gap in scholarly frameworks that holistically guide university website development. The findings provide a clear structure for the design and development of the university website to ensure that the university website is accessible, responsive, and easy to navigate. This can help to improve the user experience and make it easier for students, staff, and other stakeholders to find the information they need. This would help Ghanaian universities to present a professional and consistent image to the public to improve the user experience and the reputation and credibility of the university.

Additionally, the proposed conceptual model can be used as a design guideline for designers and developers to design better and more accessible and usable websites not only for selected universities but for other higher educational institutions as well. Also, web designers and developers would use the proposed model for designing future university websites to improve the design to meet the highest standards of design and functionality. By providing a set of reusable components and guidelines for designers and developers to follow, the UniSite WordPress CMS theme can help to reduce the time and resources required to create and maintain the university website. The findings and proposed conceptual model from this study will form a basis for future research on website design in higher education, user experience studies, and digital communication strategies, particularly in the context of Ghana.

1.7 Delimitation (Scope)

The study focused on the design of a conceptual model for designing Ghanaian university websites and used the conceptual model to develop a prototype university website. The conceptual model developed in this study was based on the available data and

technologies such as users' feedback, website analytics of selected universities' websites, experts' views, content management systems, programming languages, and hosting services. Again, the prototyped UEW website focused on the Department of Graphic Design. Since all departments within UEW perform similar functions, the Department of Graphic Design page could serve as a replica for the other departmental pages within the UEW website.

1.8 Operational Definition of Terms

Exegesis: It is a critical and reflective explanation of a design or artefact, often accompanying a designed project to articulate its rationale, processes and impacts.

UniSite: The WordPress theme that was developed based on the proposed conceptual model, which was later used to design the prototype UEW website

WordPress: It is a Content Management System platform for building websites.

1.9 Abbreviations Used

CMS: Content Management System
CSS: Cascading Style Sheet
HTML: Hypertext Markup Language
HTTPS: Hypertext Transfer Protocol Secure
KNUST: Kwame Nkrumah University of Science and Technology
PHP: Hypertext Preprocessor
SEO: Search Engine Optimisation
SSL: Secure Sockets Layer
UCC: University of Cape Coast
UEW: University of Education, Winneba
UG: University of Ghana
UI: User Interface
UX: User Experience
W3C: World Wide Web Consortium

1.10 Organisation of the Rest of the Text

Chapter Two presents a review of relevant theories and literature. The initial section discusses the theoretical frameworks underpinning the study, while the subsequent section reviews current studies related to the research topic and the conceptual framework for the present study. Chapter Three explains the research methodology and design employed in the study. It also provides a justification for the chosen methods over alternative approaches, and details the research approach, data sources and collection procedures, the target population and sample size, as well as the data analysis procedures used. Chapter Four presents and discusses the findings in relation to the research objectives one, two, and three and the literature reviewed, and presents the proposed conceptual model for designing a university website. Chapter Five describes the design and development processes involved in creating the UniSite theme and the prototype UEW website. Finally, Chapter Six concludes the study with a summary of the study, presentation of key findings, conclusions drawn, and recommendations provided. Moreover, references for this study are organised alphabetically in line with the APA 7th edition referencing format.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.0 Overview

This chapter presents a review of literature that is relevant to the study. Specifically, it delves into a comprehensive review of existing literature relevant to the design and development of a conceptual model for designing a university website. The literature review covers studies conducted in the field of website design which deal with user experience, usability, web security, responsive design, user interface design, website genre, etc. This chapter aims to lay the groundwork for understanding the current state of knowledge in the field to identify gaps, controversies, and emerging trends in the design of university websites, and to establish the theoretical framework for the study. By critically analysing and synthesising existing research, this research seeks to contextualise the study within the broader academic discourse. The first phase of the literature review concentrates on theories and conceptual framework that guided the study.

2.1 Theoretical Framework

The theoretical framework for this study is anchored on User Experience (UX) theory and User Interface (UI) theory, which provide a lens for examining existing universities' websites and propose a conceptual model for designing an effective prototype university website. These theories underpin the conceptual framework guiding this research, ensuring the website design addresses user needs, expectations, and usability standards within the higher education context.

2.1.1 User Experience (UX) Theory and User Interface (UI) Theory

User Experience (UX) theory focuses on the holistic perception, emotions, attitudes, and satisfaction that users derive when interacting with a system or digital interface

(Hassenzahl & Tractinsky, 2006). Don Norman is widely credited for introducing and advocating the concept of user experience to extend beyond usability, encompassing emotions, perceptions, and holistic interaction with products and systems. Hassenzahl and Tractinsky (2006) structured UX as a formal research agenda, defining it as encompassing users' emotions, perceptions, beliefs, preferences, physical and psychological responses, behaviours, and accomplishments occurring before, during, and after use of a system.

User experience is a person's perceptions and responses that result from the use and/or anticipated use of a product, system or service (Ketola & Roto, 2008). A term that describes a user's feelings towards a specific product, system, or object during and after interacting with it. According to Ketola and Roto (2008), various aspects influence the feelings, such as the user's expectations, the conditions in which the interaction takes place and the system's ability to serve the user's current needs. User experience theory emphasises usefulness, usability, desirability and accessibility as its core dimensions (Nielsen, 2018). Usability is the ease with which users achieve their goals effectively and efficiently when interacting with a system (International Organisation for Standardisation, 2018). Usefulness is the system's ability to provide functionalities that meet user goals (Venkatesh & Davis, 2000). Desirability is the emotional appeal and aesthetics that attract and retain users on a system (Hassenzahl & Tractinsky, 2006). Accessibility: The degree to which users of diverse abilities can use the system without barriers (W3C, 2024).

The user experience theory implies that optimal user engagement and feedback are integrated into the design process of a system to design interfaces that balance challenge and skill, enhancing satisfaction and immersion (Peters et al., 2018). Studies

underscore that positive UX drives user satisfaction, loyalty, and system acceptance (Garrett, 2011; Hassenzahl & Tractinsky, 2006).

Hassenzahl and Tractinsky (2006) noted that UX is about the user's story with the system, extending beyond mere usability to how it fits in their lives. In university website design, UX theory ensures the platform creates positive emotions and attitudes towards the institution through effective branding and aesthetics, provides task-oriented functionality efficiently, and supports inclusive access for all users, including those with disabilities, aligning with universal design principles.

User Interface (UI) theory relates to the structural, visual, and interactive components of a system that enable users to engage with functionalities effectively (Shneiderman et al., 2017). UI is the point of interaction between the user and system, shaping perception, task performance, and aesthetic impression of a system.

The key thoughts of user interface are layout and structure, which talk about the logical and hierarchical arrangement of content for intuitive navigation of a system (Tidwell et al., 2020). The visual design, such as colour, typography, imagery, and spacing to create aesthetic appeal and readability. Interactivity, which concerns the responsiveness and feedback mechanisms enabling users to control the interface effectively (Shneiderman et al., 2017), and uniform design patterns for familiarity and reduced cognitive load for users (Nielsen, 2018). UI theory guides the interface design components that directly affect user interactions with the university website by establishing clear navigation menus, intuitive page layouts, and prominent call-to-action buttons. As Nielsen (2018) asserts, "A good user interface is invisible, letting users focus on their goals rather than the mechanics of the interaction."

While UX and UI are conceptually distinct, they are interrelated. UI forms the medium through which UX is experienced (Garrett, 2011). In this study, the UX theory guides what users need and their holistic experiences with the website. The UI theory guides how the interface is structured visually and interactively to meet these needs. This integration ensures that the proposed conceptual model for university website design developed in this research addresses both functional requirements and user tasks (UX), interface design, aesthetics, and interaction mechanisms (UI).

The UX and UI theories were employed to study the UniSite theme and prototype university website design process, information display format, appropriate use of colour, typography and white space to design user user-friendly university website. These theories inform the design decisions for the UniSite theme and prototype university website developed in this study. Again, this dual-theory approach ensures that the UniSite theme and prototype university website design are user-centred, aesthetically effective, and functionally efficient, aligning with best practices in university website design and development.

2.2 Conceptual Framework and Its Implications for the Study

Based on the theoretical reviews, the researcher constructed a conceptual framework to serve as an engine to drive the study. The conceptual framework brings concepts from the user interface and user experience theories, existing websites and future updates of university websites. Together, these concepts provide a visual representation of the academic engine, which the researcher believes can aid in driving the research to attain the purpose of the study, which is to propose a conceptual model and use it to design a prototype university website.

This study takes the view that the development of a model to guide university website design starts with a usability study, which in the end would reveal users'

challenges and suggestions for better user interface design on the university website. Hence, the first two boxes of the diagram are the dependent variable for this study because the study seeks to propose a model to guide the design of university website and translates the model into WordPress CMS theme development with good user interface design that directly affect user interactions with the university website by establishing clear navigation menus, intuitive page layouts, and prominent call-to-action buttons. As Nielsen (2018) asserts, "A good user interface is invisible, letting users focus on their goals rather than the mechanics of the interaction." User Interface (UI) theory guided the structural, visual, and interactive components of the WordPress CMS theme " UniSite" that enable users to engage with functionalities of the prototyped UEW website effectively (Shneiderman et al., 2017).

Again, the third and fourth boxes which is the user experience guided the prototype UEW website design with the users in mind. The User Experience theory implies that when optimal user engagement and feedback are integrated into the design process of a system, it enhances satisfaction and immersion (Peters et al., 2018). Studies underscore that positive UX drives user satisfaction, loyalty, and system acceptance (Garrett, 2011; Hassenzahl & Tractinsky, 2006). Users feedback were integrated into the prototype UEW website design. Finally, usability evaluation of the newly designed UEW website was tested with the users to get the user experience with the new website.

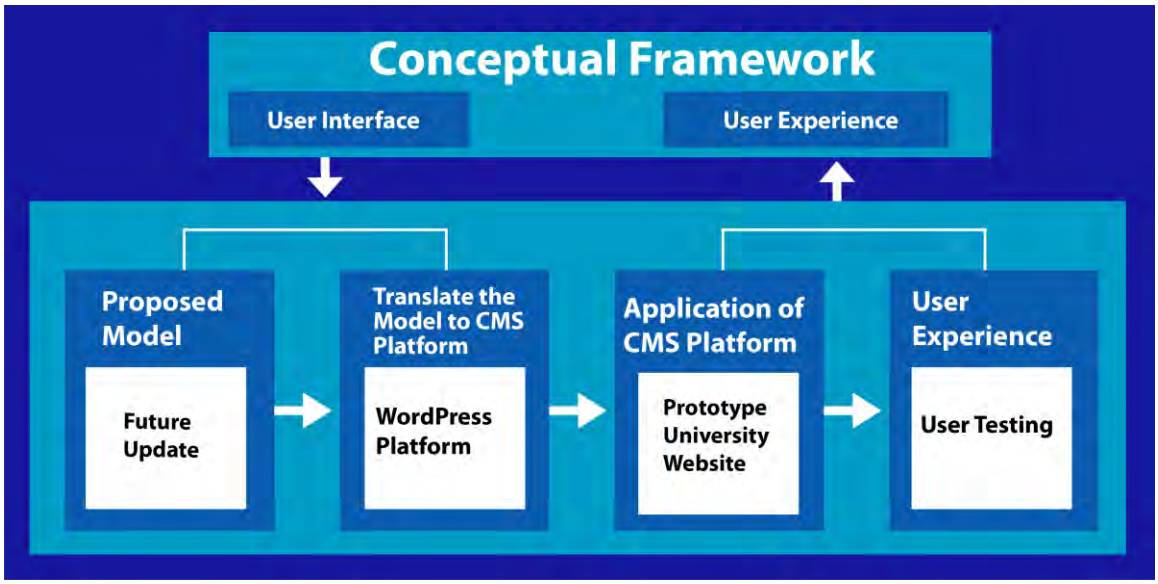

Figure 2.1: Conceptual Framework for the Study

Source: Researcher's Construct (2023).

2.3 Understanding the Use of the Website

In today's digital age, a website is a crucial tool for organisations to interact with users globally, attracting them to access information and gain a competitive edge (Faustina & Balaji, 2016; Shayganmehr & Montazer, 2019). A website refers to a collection of interconnected web pages and associated digital content, accessible through a shared domain name and hosted on one or more web servers. It serves as a virtual space where individuals, businesses, organisations, and communities can share information, communicate, transact, and interact with users worldwide. High-quality websites lead to increased client satisfaction and competitive advantage (Joyami & Salmani, 2019). Websites are now more prevalent across various sectors such as healthcare, government, education, commerce, entertainment culture industry, finance and others (Fogli & Guida, 2018; Y Lee & Cho, 2021; Najadat et al., 2021).

2.3.1 Importance of the Website in the Digital Era

In today's digital age, having a well-designed and user-friendly website is essential for any organisation, especially an educational institution. Websites have become integral components of the digital landscape, serving as virtual extensions of organisations, businesses, and individuals. In the educational landscape, a website serves as a platform for students to access course materials, communicate with instructors and collaborate with peers.

One of the main benefits of a website for an organisation is its ability to provide unrestricted access to information, anytime, anywhere. It enables customers to obtain details about products and services at their convenience, regardless of location or time. This level of accessibility is especially vital in today's fast-paced digital environment, where consumers demand immediate access to information and services (McKinsey & Company, 2022). McKinsey and Company (2022) are of the view that businesses that offer online purchasing options through their websites can capitalise on consumer demand for convenience and drive sales. A website operates continuously to ensure that users can conveniently access the information they need from the comfort of their homes.

Having a professional and user-friendly website is essential for establishing credibility and trust with potential customers. Research by Nielsen (2018) suggests that consumers often judge the credibility of a business based on the design and functionality of its website. A well-designed website instils confidence in users, demonstrating that the business is reputable, trustworthy, and committed to providing a positive user experience (Webflow Team, 2023). This attention to detail conveys professionalism, making visitors more likely to engage with and invest in the business.

Websites play a crucial role in enhancing the visibility and reach of businesses in the digital landscape. Smith and Anderson's (2018) analysis revealed that an increasing

number of consumers turn to the Internet to research products and services before making purchasing decisions. A well-designed website ensures that businesses can be easily found by potential customers through search engine optimisation (SEO) strategies, thereby expanding their reach and attracting new leads.

Additionally, websites serve as powerful marketing and branding tools, enabling businesses to communicate their unique value proposition and brand identity to a global audience. A study by Chaffey et al. (2019) highlights the importance of integrating digital marketing strategies, such as content marketing and social media engagement, with website development to maximise brand exposure and customer engagement. Through engaging content, multimedia elements, and interactive features, businesses can effectively convey their brand story, values, and offerings to customers.

Finally, websites facilitate effective customer relationship management by providing channels for customer interaction, feedback, and support. According to Gartner Incorporated (2019), businesses that leverage their websites for customer engagement and support can improve customer satisfaction, loyalty, and retention rates. Features such as live chat, contact forms, and FAQs enable businesses to address customer inquiries promptly and efficiently, fostering positive relationships and driving repeat business.

2.3.2 Evolution of Website

Websites have come a long way since the early days of the Internet. Technological advancements, changes in user preferences and evolving design trends have all played a role in shaping this evolution. In the early days of the World Wide Web, websites were static and text-based, functioning as digital brochures or information repositories (Berners-Lee, 2000). Tim Berners-Lee's invention of the World Wide Web paved the way for the development of the first websites, which were primarily made up of basic HTML pages connected through hyperlinks (Berners-Lee, 2000). Websites during this

period were characterised by static text, limited graphics, and minimal interactivity. The introduction of Cascading Style Sheets (CSS) in the late 1990s transformed website design by separating presentation from structure, allowing for greater control over visual elements and layout (World Wide Web Consortium (W3C), 2022). This innovation made HTML documents more visually appealing and adaptable for websites.

The rise of scripting languages like JavaScript and server-side technologies such as PHP and ASP led to the evolution of websites with dynamic content interactivity and social media integration (Flanagan, 2006). In the early 2000s, dynamic Content Management Systems (CMS) like WordPress and Drupal emerged, enabling users to create and manage websites without extensive coding knowledge. Dynamic content allowed for easier updates, improved user experiences, and the integration of interactive features. Websites transformed into interactive platforms where users could create and share content, engage in discussions and build online communities. Social media integration became a key aspect of website design, facilitating seamless interaction and content distribution. Websites like Wikipedia, YouTube and Facebook showcased this trend, allowing users to create, share and interact with content in innovative ways (O'Reilly, 2005).

Another important development in website evolution is the rise of responsive design. The proliferation of smartphones and tablets emphasised the need for websites to be mobile-responsive and accessible across devices of different screen sizes (World Wide Web Consortium (W3C), 2022). Ethan Marcotte introduced the concept of "responsive web design" in 2010, highlighting the importance of creating websites that adapt to various screen sizes and devices (Marcotte, 2011). This approach revolutionised website development, ensuring optimal user experiences across different platforms. Responsive web design principles such as fluid grids and flexible layouts became crucial for web

designers and developers to deliver consistent user experiences across desktop, tablet and mobile platforms (Marcotte, 2011).

Advances in web technologies, including HTML5, CSS3 and JavaScript frameworks like Angular, React and Vue.js, have further driven website evolution (W3C, 2022). HTML5 introduced multimedia capabilities, improved semantic structuring and enhanced interactivity. CSS3 brought sophisticated visual effects and animations, enhancing the overall user experience. JavaScript frameworks facilitated the development of robust and interactive web applications.

Progressive Web Apps (PWAs) have emerged as a hybrid approach that combines the best features of web and native mobile applications (Houssein, 2018). They provide offline capabilities, push notifications and app-like experiences while still maintaining the reach and accessibility of the web (Houssein, 2018). This development allows websites to bridge the gap between traditional websites and mobile applications.

Looking ahead, emerging technologies like Artificial Intelligence (AI), voice interfaces and augmented reality (AR) are set to shape the future of website development (Purna, 2019). AI-powered chatbots, voice-activated search and AR-enhanced experiences are opening up new frontiers in user interaction and engagement. As technology continues to advance, we can expect to see even more innovative developments in website design and functionality.

The evolution of websites has been marked by continuous innovation, driven by technological advancements and evolving user expectations. From static HTML pages to dynamic web applications and beyond, websites have evolved into sophisticated platforms for communication, collaboration and commerce. Understanding past and current trends in website evolution is crucial for designers and developers to create user-friendly websites that enhance visibility and opportunities in the ever-changing digital landscape.

2.4 Academic Websites

Academic websites play a critical role in promoting education to the general public and the world at large. Kem and Morphew (2014) report that websites enable traditional universities to utilise digital platforms to deliver academic services to users, thereby enhancing efficiency and saving both time and resources. Birol and Gedik (2017) defined an academic website as a platform that provides institutional information, opportunities for students, educational facilities and industry cooperation.

Study has revealed that educational institutions should have their own website to publish their content, academic and administrative resources, among others (Akram & Bt, 2017). Graduate students, students in training, future students and students' families and so on can use these websites.

Institutions of higher education increasingly depend on websites to communicate their unique missions and quality-driven objectives to students (Anctil, 2008; Saichaie et al., 2014). Academic websites serve as primary communication platforms through which users can access institutional information, complete online assignments, and engage in promotional activities (Bairamzadeh & Bolhari, 2010). Students see university websites as essential tools and technological resources, which play a critical role in their daily academic routines and admission processes within higher education institutions (Saichaie et al., 2014).

Over the years, universities across the globe have exhibited significant commitment to establishing a robust digital presence by developing comprehensive web portals. These portals function as effective tools for engaging students, offering intuitive interfaces that facilitate the delivery of academic, administrative, and student support services ranging from course information and assignments to news about campus activities and events

(Bradbard et al., 2010; Osika et al., 2009). Furthermore, students find it highly convenient to navigate institutional websites when seeking access to digital learning materials, as these platforms often contain extensive information regarding academic resources, campus updates, and administrative policies.

One of the turning points in higher educational systems in developing countries like Ghana is the adoption of websites. The COVID-19 pandemic highlighted the transformative role of information and communication technology (ICT) in education globally. Web-based platforms, particularly institutional websites, became essential tools for sustaining educational activities, especially in higher education. These digital solutions enabled the continuity of teaching and learning during the pandemic, a trend that also extended to universities in Ghana (Demuyakor, 2021). Universities' websites serve as a classroom, a global office that brings lecturers and students together for knowledge sharing and administration.

Academic websites have evolved into large and complex web-based systems that serve a diverse range of users. These platforms facilitate access to essential functions such as learning management systems (LMS), online admissions, and various administrative processes (Amadiok et al., 2024). University websites extend the reach of educational activities beyond their physical campuses, serving as powerful tools for institutional promotion and branding. Through these platforms, universities showcase their strengths, academic excellence, and areas of expertise to a global audience. They also use their websites to highlight achievements in research, innovation, and development.

Olaleye et al.'s (2018) analysis revealed that university websites enable students to easily navigate and utilise the learning management system. Students can access class

timetables, course materials, bus schedules, academic results, and register for courses and examinations. In addition, websites offer printable resources and provide access to vital information. Many institutional platforms also integrate social media features such as Twitter now X, Facebook, and Google+, along with customised tools tailored to each institution's policies and user needs. Prospective students rely on information from institutions' websites in evaluating the institution before applying for admission. Nasajpour et al. (2014) confirmed that university websites are often the first and sometimes the only source of information prospective students consult when considering an academic institution. Supporting this, a study by Losonczi (2012) found that 94% of respondents agreed with the statement, *"Before considering a school, I examine its website."* This high response rate underscores the critical role of a university website as a persuasive tool in shaping perceptions and attracting potential applicants. Therefore, having a well-structured, visually appealing, and informative website is essential for effectively promoting an academic institution.

Gabriela (2018), in deliberating on best practices for internationalising academic websites, emphasises that a university's website serves as a reflection of its institutional identity and is often the initial point of contact for students, faculty, researchers, prospective students and the general public. She advocates that institutions should treat their websites as strategic tools for communicating their values and strengths, and therefore, content and features should be intentionally designed to fulfil this role. This view is reinforced by Loren (2017), who highlights that incorporating appropriate content, language, user experience, accessibility, and functional user interface design is crucial for engaging international audiences, given the growing importance of internationalisation within the evolving landscape of higher education.

Kane et al. (2007) note that university websites typically provide access to scientific resources, institutional policies, course registration systems, campus news and library services. These websites are often expansive and complex, consisting of multiple sub-sites representing various faculties, departments, and administrative units. Studies also suggest that to meet the diverse needs of users, website developers and designers must consider several critical parameters, including accessibility, content quality, and information security (Cocquebert et al., 2010; Lee & Koubek, 2010). The structural and functional complexity of university websites is closely tied to the expectations of their users, necessitating a thoughtful and user-centred design approach.

In the contemporary educational landscape, the website plays a pivotal role in the functioning of higher education institutions. University websites offer a reliable and efficient means of delivering information and services to various stakeholders, including those with disabilities. With the increasing enrolment of students with special needs, universities are urged to implement inclusive design practices to ensure their web content remains accessible to all users.

The design of university websites plays a crucial role in ensuring accessibility for a diverse student population, regardless of their backgrounds or disabilities. To promote inclusivity, web accessibility guidelines such as the Web Content Accessibility Guidelines (WCAG) 2.0, established by the World Wide Web Consortium (W3C), are strongly recommended. The increasing presence of students with disabilities in higher education has prompted growing scholarly interest in assessing the accessibility of academic websites (Ismail & Kuppusamy, 2016; Ismailova & Inal, 2018; Korbel et al., 2011; Rana et al., 2011; Ringlaben et al., 2014). In this context, it becomes imperative for Ghanaian university websites to be designed in a way that allows all users, including

individuals with disabilities, to perceive, understand, navigate, and interact with web content on equal terms (Espadinha et al., 2011).

2.5 Website Quality

Researchers have conducted empirical investigations on website quality and user interest across various industries, yielding diverse results. A website is commonly defined as a collection of publicly accessible, interconnected web pages that operate under a shared domain name. The World Wide Web was created by Tim Berners-Lee and made public in 1993. It has constantly advanced into the Web 2.0, enabling organisations to connect and engage with their target market, making their market offering(s) available from everyone to everyone using the Internet and websites (Cuillierier, 2016). The term "quality" refers to the extent to which a product or service meets or exceeds customer expectations. In the context of websites, quality is measured by how effectively and efficiently users can interact with the platform (Parasuraman et al., 2005).

Salavati and Hashim (2015) define website quality as the extent to which user expectations are either fulfilled or unmet during web-based interactions. They argue that website quality is largely dependent on the underlying software's performance, particularly its responsiveness and accessibility, which in turn influence user satisfaction. In a related study, Abbaspour and Hashim (2015) examined the impact of website quality dimensions on customer satisfaction within the context of travel websites. They identified key dimensions of website quality, including interactivity, security, information accuracy, and responsiveness. Their findings suggest that user satisfaction is strongly influenced by elements such as website convenience, design, and security features.

The degree of website quality is characterised by being attractive, secure, responsive, and easily accessible. It offers reliable and relevant information, an appealing

design, and a user-friendly interface that collectively fulfil users' needs and expectations. Thus, website quality can influence customers' purchase intentions and interest (Ifeanyichukwu, 2016). Website quality and perceived ease of use are critical factors that could enhance customers' interest in a product or service. Online merchants need to find ways to keep trusting customers satisfied and loyal (Shafiee & Bazargan, 2018).

Silvestre et al. (2015) studied the impact of website quality and perceived trust on customer purchase intention in the hotel sector: website brand and perceived value as moderators. The study employed website quality as the independent variable, with perceived trust as the dependent variable, while website brand and perceived value were examined as moderating variables. The research was conducted using a sample of 285 chain hotel customers in Taiwan. Using the structural equation modelling (SEM) technique, the results reveal that perceived trust is positively influenced by website quality, and purchase intention is positively influenced by perceived trust.

de Mesquita and Urdan (2019) studied the determinants of customer interest in mobile phone services in Brazil. Mobile phone customers were targeted using an online questionnaire. They found that there are limits to customer interest: if quality and satisfaction are too low, it can weaken and ultimately break the interest posture of mobile phone services.

2.6 Website Security

Many scholars and industry experts have provided varying definitions of website security within the context of web design and development. According to GoodFirms (2022), website security, also referred to as cyber security, is the act and science that involves identifying, preventing, and responding to cyber threats aimed at websites. Pericle et al. (2017) describe a website threat as any malicious intent or action carried out by a threat

agent seeking to cause harm to a website. Similarly, Tammany (2018) defines website security as any measure or application implemented to protect website data from unauthorised access and to prevent exploitation by cyber criminals.

Bugliesi et al. (2017) emphasise that website security involves organisational efforts to protect customers' personal information from unauthorised users. Building on this, Akhawe et al. (2010) explain that website security comprises the strategies and steps taken to safeguard an organisation's website from data breaches and to defend against threats posed by web attackers, network intruders, and device-level assailants. Kaspersky Lab (2022) offers a broader perspective, equating website security with information technology security or electronic information security. This definition encompasses the protection of computers, mobile devices, servers, networks, and data from malicious activities. It spans multiple dimensions, including network security, information security, operational security, and end-user security.

Sucuri Guides (2022) define website security as the protective measures undertaken to shield websites from cyber-attacks. Cui et al. (2020) note that when users perceive a website as secure, it fosters user trust and reduces resistance to engagement. Importantly, Sucuri Guides (2022) stresses that website security is not a one-time implementation but an ongoing process that requires a holistic, layered defence strategy. It demands continuous monitoring, assessment, and adaptation to effectively minimise cybersecurity risks.

2.7 Websites Accessibility

The web has become an increasingly vital resource across various sectors of modern life, including healthcare, education, governance, employment, commerce, and recreation. Given its pervasive role, ensuring web accessibility is critical for promoting inclusivity.

Shawn Lawton Henry, a key figure in global outreach and education efforts for web accessibility at the W3C Web Accessibility Initiative (WAI), emphasises that it is essential for the web to be accessible in order to guarantee equal access and opportunities for individuals with diverse abilities. She stresses that web inaccessibility can effectively exclude people with disabilities from using digital products and services (Henry, 2018).

Guidelines for Indian Government Websites (GIGW) describes web accessibility as *a* means that people with disabilities can also perceive, understand, navigate, and interact with the Web, and that they can contribute to the Web. It encompasses all disabilities that affect access to the Web, including visual, auditory, physical, speech, cognitive, and neurological disabilities (GIGW, 2019). The United Nations Convention on the Rights of Persons with disabilities defines access to information and communication technologies, including the Web, as a basic human right (United Nations, 2006). Additionally, GIGW (2019) emphasises that websites and mobile applications should be designed and developed to ensure accessibility for all users, regardless of their location, cultural background, language, hardware or software configurations, or physical and cognitive abilities. Accessibility is recognised as a fundamental criterion in the dissemination of information to a broad and diverse audience, and it remains a crucial component of web-based communication (Aizpurua et al., 2016; Ballesteros et al., 2014; Ismail & Kuppusamy, 2018; Ribera et al., 2009).

Accessible websites play a vital role in supporting students with disabilities by enabling them to independently access course materials, register for courses, and engage in other academic activities from remote locations. For users with physical impairments, websites that are easy to navigate and inclusive in design foster a sense of autonomy and

are more likely to attract repeat visits. It is therefore imperative that institutional websites provide equal access to students with disabilities, ensuring that they can fully participate in the academic experience without barriers. As such, the accessibility of digital content has become increasingly important in the realm of higher education.

The utmost concern about web accessibility stems from the growing reliance of modern society and organisations on internet-based platforms. This shift has drawn significant scholarly attention, leading researchers worldwide to explore the challenges associated with web accessibility and propose effective solutions to address them (Ahmi & Mohamad, 2019).

In recent years, a number of studies have evaluated the accessibility of university websites, with findings underscoring the urgent need to improve accessibility in order to facilitate meaningful interaction for users with disabilities. For instance, (Carlos Máñez-Carvajal (2020) conducted an assessment of the home pages of 57 university websites in Chile using the Web Content Accessibility Guidelines 2.0 (WCAG 2.0) as the evaluation framework. The study aimed to determine whether these websites allowed adequate interaction with assistive technologies used by individuals with disabilities. The findings revealed significant shortcomings in the accessibility of Chilean university websites, particularly in their compliance with the WCAG 2.0 Level AA standards. Most of the websites exhibited limited accessibility features and were not user-friendly for individuals relying on assistive devices. Furthermore, to deepen the evaluation, the W3C Markup Validation Service was employed to identify errors in the websites' source code that might hinder accessibility. The validation process showed that nearly all examined web pages contained multiple errors and warnings, suggesting widespread issues with both structural coding and accessibility compliance (Máñez-Carvajal, 2020).

A related accessibility study was conducted by Máñez-Carvajal et al. (2021), in which the researchers evaluated the web accessibility of university websites in Chile, Spain, and Mexico. The sample for the study comprised the home pages of the top 15 universities in each country, as ranked by Webometrics. Like the earlier study focused on Chile, this research employed automated tools to assess the degree of compliance with the Web Content Accessibility Guidelines (WCAG) 2.0. The findings revealed consistently low levels of compliance with WCAG 2.0 across the sampled universities in all three countries, highlighting a persistent challenge in achieving accessible web design in higher education (Máñez-Carvajal et al., 2021).

Similarly, da Silva & Alturas (2015) assessed the accessibility maturity levels of Portuguese higher education institution websites based on standards set by the European Commission. The study found that, on average, the accessibility maturity level of these websites was low, but also emphasised that there was considerable room for improvement in making these websites more accessible.

In another study, Iseri et al. (2017) examined the accessibility of higher education institutions' websites in Cyprus using WCAG 2.0 as the evaluation framework. Their results showed that none of the websites fully passed all the accessibility tests; each failed to meet one or more WCAG 2.0 criteria. The study concluded that substantial modifications were necessary for higher education websites in Cyprus to align with established accessibility standards.

Ringlaben et al. (2014) evaluated the homepage accessibility of 51 websites associated with special education departments, utilising automated evaluation tools such as A-Checker and Bobby. These tools were employed to determine whether the websites met minimum accessibility standards. The analysis revealed that 97% of the examined

homepages contained accessibility issues, indicating widespread non-compliance. In an earlier investigation, Kane et al. (2007) assessed the accessibility of the homepages of 100 top-ranking international universities. Their findings revealed significant accessibility issues across many institutions, with considerable variation observed between universities in different countries. Kamal et al. (2016) conducted a study on the accessibility of Jordanian university websites and identified numerous deficiencies. The evaluation also indicated that results varied depending on the assessment tools used, suggesting inconsistencies in how accessibility compliance is measured.

Studies have used A-Checker and WAVE as a tool to measure the accessibility of websites, including education, government and business websites. These evaluations revealed that many websites failed to adhere to established accessibility guidelines. Common issues identified included poor navigability, slow loading speeds, and inadequately structured content. Specific non-compliant elements included HTML coding errors, unlabeled images, lack of alternative text for visual aids, missing form labels, improperly formatted headings, broken or unclear links, and navigation bars that failed to meet the Web Content Accessibility Guidelines (WCAG) standards (Akg. l, 2020; AlMeraj et al., 2020; Barricelli et al., 2020; Ismail & Kuppusamy, 2018).

Menzi-Çetin et al. (2017) conducted a usability evaluation of a state university website specifically for visually impaired students. Five participants with visual impairments were asked to perform 11 tasks involving their university's main page, library, and departmental web pages using screen readers, while verbalising their thought processes. Researchers documented their observations using structured forms. The study revealed that the most difficult task was locating exam dates within the academic calendar. Additionally, accessing the course schedule and library pages took significantly

longer than other tasks, whereas navigating the main homepage was consistently the quickest and least problematic activity.

Similarly, Ismailova and Inal (2018) utilised automated assessment tools to evaluate the accessibility of top university websites in Azerbaijan, Kazakhstan, Kyrgyzstan and Turkey. The analysis found that while Turkish university websites were more widely used and popular compared to those of their counterparts, the majority of the web pages across all countries failed to meet the Web Content Accessibility Guidelines (WCAG) 2.0 standards. Regarding user efficiency and satisfaction, the study concluded that Turkish universities demonstrated greater attention to web performance and usability, followed in descending order by universities in Azerbaijan, Kyrgyzstan, and Kazakhstan (Ismailova & Inal, 2018).

Akgül (2020) and Yerlikaya and Durdu (2017) tested the accessibility of the homepages of Turkish University websites to authenticate compliance with WCAG 1.0. Findings from both studies show that all the sampled universities' home pages had many accessibility issues. Ismail and Kuppusamy (2019) conducted an analysis of the accessibility of higher education college websites affiliated with the University of Kashmir and Cluster University Srinagar in India. The study employed two widely recognised accessibility evaluation tools: the Web Accessibility Test (TAW) and the Accessibility Engine (aXe), which powers several browser-based accessibility extensions. These tools were used to identify key accessibility barriers across the websites, focusing on various metrics such as the number of detected issues, warnings, and violations of WCAG success criteria. The results of the statistical analysis highlighted significant accessibility shortcomings, serving as a call to action for improving inclusivity. The authors emphasised that the findings could serve as a

foundation for making these educational websites more accessible and free of digital barriers for all users, including those with disabilities.

A critical concern in digital inclusion involves the accessibility of library websites and electronic resources for individuals with varying physical, mental, or cognitive impairments. Kimura (2018) examined digital accessibility within academic libraries, focusing on practical guidelines for web content authors, the application of universal design principles, and the ethical responsibilities of libraries subscribing to digital content. The study also critically evaluated the existing accessibility guidelines, noting that many tools quickly become outdated and underscoring the importance of adapting to evolving technologies in the design of learning and digital resources. An automated tool was employed to assess the sample library web pages' compliance with technical accessibility standards. The results revealed that all evaluated pages had accessibility barriers and failed to meet even the most basic level of conformance. Among the most common issues identified were poor colour contrast and missing alternative text for images (Kimura, 2018). Interestingly, library web pages demonstrated relatively higher accessibility levels compared to other sections of the university websites.

Kimura's findings underscore the pressing need for clear, enforceable legislation to advance academic web accessibility. The study echoed the position of the World Wide Web Consortium (W3C), the body responsible for developing the Web Content Accessibility Guidelines (WCAG), by highlighting that the majority of university websites examined did not comply with the basic WCAG 2.0 accessibility standards. This reinforces the urgent need for institutions to invest greater effort into making their websites fully accessible and practically usable for all users. Additionally, Nir and Rimmerman (2018) suggest that technical training and awareness raising could be key elements in improving accessibility of websites.

Studies have highlighted the persistent challenges web designers face in adhering to web accessibility guidelines during the design and development process (Spyridonis & Daylamani-Zad, 2021). Despite the availability of standardised frameworks, implementing accessibility principles remains a complex task due to gaps in knowledge, training, or prioritisation. As emphasised by Aizpurua et al. (2016), a comprehensive understanding of web accessibility is essential for creating inclusive digital environments. Therefore, it is imperative that university administrators, particularly those responsible for website management, cultivate awareness and practical knowledge of accessibility standards. By aligning website design practices with recognised accessibility guidelines, academic institutions in Ghana can promote equity and inclusion, ensuring that their digital platforms serve all users, including those with disabilities.

2.8 Web Usability

Usability is widely recognised as one of the fundamental characteristics of an effective website and plays a critical role in shaping user experience. It is considered a primary determinant of a website's overall effectiveness and user satisfaction. According to Nielsen (2018), usability is essential and serves as a prerequisite for evaluating the performance and success of a website. Designers and researchers often assert that usability drives users' engagement and active interaction with a digital interface (Reinecke et al., 2013). The literature consistently identifies usability as a key variable influencing users' perceptions of website quality, making it a central factor in the development of user-centred web platforms. Different authors have defined usability differently. In view of Preece (1994), 'usability is measured in which a system can be learned and used, its safety, effectiveness and efficiency and the attitude of its users towards it'. According to the International Organisation for Standardisation (2018), usability means 'the extent to which a site can be used by a specified group of users to

achieve specified goals with effectiveness, efficiency, and satisfaction in a specified context of use'.

Usability is a quality attribute that measures the ease with which users can interact with a website interface (Ashraf et al., 2017). It reflects how intuitively and efficiently users are able to complete tasks, navigate content, and access desired information within a digital environment. The International Standard Organisation ISO9241 defines usability 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 Organisation for Standardisation, 2018). In website designing, usability can be defined as the extent to which a user can navigate across a website easily (Roy et al., 2014). Usability of the website plays an essential role in establishing a healthy communication between the organisation and its stakeholders. In this context, usability describes the quality of a website from the perspective of the user rather than the organisation or institution itself. It generally refers to how effective, efficient, and satisfactory a website is to its visitors. Srivastava (2017) asserts that usability is a critical component of website quality, not only because it influences website usage and user satisfaction, but also due to its significant impact on the overall success or failure of the website.

Brinck et al. (2002) defined usability in terms of websites that function correctly, are efficient to use, easy to learn and remember, error-tolerant, and subjectively pleasing. Similarly, Oulanov and Pajarillo (2002) identified efficiency, helpfulness, and adaptability as key usability attributes. In a usability testing study, Lee (2004) employed multiple usability criteria such as usefulness, effectiveness, satisfaction, supportiveness, and intuitiveness.

Shackel (1991) described usability as the capability of a system to be used easily and effectively by a specified range of users, given appropriate training and user support,

to accomplish a defined set of tasks within a given environment. Usability encompasses ease of use and ease of learning, both of which aim to reduce the cognitive and physical effort required of users to achieve their goals (Baumgartner et al., 2019).

Powell (2000) similarly argued that website usability is the extent to which a website enables users to achieve specified goals effectively, efficiently, and satisfactorily within a given context of use. Supporting this, Yusof et al. (2010) stated that website usability can be evaluated based on a user's ability to complete tasks on the website. Ahmet and Turan (2012) further emphasised that the usability of a university's library website is central to fostering effective communication between the institution and its stakeholders.

Drawing from the various definitions of usability, this study defines website usability as how easy it is to use the website and how effortlessly a user can access the required information. A core characteristic of website usability is the degree of ease it offers end users in accessing content and navigating through interfaces (Manzoor et al., 2019; Nielsen, 2018). A lack of user-friendliness in university websites may discourage engagement, leading to a loss of existing and potential users, including prospective students. This highlights the necessity for institutions to ensure their websites remain current, usable, and accessible (Agarwal & Venkatesh, 2002). Furthermore, a well-designed and efficiently managed university website with high usability not only facilitates access to information but also promotes a constructive and sustained dialogue between the university and its diverse stakeholders.

Gordon and Berhow (2009) believe that 'institutions of higher education need to engage within their power to keep positive images with their various constituents, and the way to do this is to make use of the opportunities the website presents. Almost all universities take advantage of their websites as a key marketing and public relations tool to reach prospective students. Website usability can be succinctly summarised as the

degree to which a user can efficiently, effectively, and satisfactorily retrieve the required information from a website.

Beyond defining website usability, numerous scholars have highlighted its significance for both individual users and organisational platforms. A wide range of empirical studies has examined website usability across various sectors using diverse assessment methods. These studies have predominantly focused on websites in domains such as healthcare, education (particularly universities), digital libraries, finance, and government. Common usability criteria include homepage design, visual layout, search functionality, information architecture, site-wide consistency, writing quality, linking strategies, and navigational structure (Hirakis et al., 2017; Venkatesh et al., 2017; Verkijika & Wet, 2018;).

For instance, Matsieli and Sooryamoorthy (2021) analysed four ministerial websites of the Government of Lesotho, assessing their usability, accessibility, interactivity, and transparency through content analysis. Their findings revealed considerable deficiencies in all four areas, with a notable absence or complete lack of critical web features necessary for delivering effective government services. The authors emphasised the need for substantial improvements to enhance citizen engagement, accessibility, and public trust in e-governance platforms.

Similarly, Verkijika and Wet (2018) evaluated government websites across 31 African nations, employing usability indicators such as online services, user support, navigation, credibility, and information architecture. Their analysis revealed generally poor usability scores, with an average usability rating of just 36.2%, and the highest-performing site achieved only 64.8%. Other studies, such as Huang and Benyoucef (2014), have identified a strong correlation between usability and the perceived credibility of e-government websites. In the Libyan context, Karaim and Inal (2019) employed heuristic evaluation techniques to assess the usability and accessibility of

select government websites. Their study uncovered numerous fundamental usability issues, underscoring the need for systematic design improvements.

Usability assessments have also been prominent in healthcare web applications. Venkatesh et al. (2017), for instance, examined the usability of the Obamacare website, evaluating dimensions such as interface design, homepage functionality, hardware and software compatibility, scrolling and pagination, and overall user experience. The study reported that the interface design issues with the Obamacare website render the website less than usable. The study also discovered that citizen satisfaction and intention to use the website were rated poorly. Again, considering the purpose of the website, which is to reach citizens who are likely to be less computer literate, the usability problems are likely to impede their use of the Obamacare website (Venkatesh et al., 2017). The study suggested important implications for assessing the usability of different websites and healthcare websites in particular. In another study, Hirakis et al. (2017) evaluated the usability of a health-related website aimed at increasing the likelihood of amphetamine users engaging with online treatment platforms. The study, which involved both healthcare professionals and users, provided practical insights into usability features and highlighted key areas for website improvement.

Within the domain of academic websites, a substantial body of research has examined usability from multiple perspectives. Macakoğlu et al. (2022) conducted a cross-continental analysis of university websites focusing specifically on prospective student pages in North America, Europe, and Oceania using automated online tools. The study revealed widespread shortcomings in accessibility, usability, and security. North American universities, in particular, showed significant neglect in optimising prospective student portals, followed by their Oceanian and European counterparts. Key recommendations included reducing query volume, optimising image sizes, and consolidating HTML, CSS, and JavaScript code to enhance website performance.

Similarly, Manzoor et al. (2019) assessed 86 university websites across Canada, the USA, and Europe against six usability criteria: layout, simplicity, navigation, organisation, communication, and content. Feedback from 300 student participants indicated that many of the websites failed to meet expectations, particularly in layout and navigational structure.

In Turkey, Menzi-Çetin et al. (2017) investigated the usability of a state university website for visually impaired students. Through interviews and usability testing, they identified several barriers and proposed recommendations to make the interface more inclusive and user-friendly for the visually impaired users.

Huang and Bilal (2019) used eye-tracking and task-based evaluations to explore usability from the perspective of international doctoral students. While students managed to complete their tasks, they reported difficulties locating certain types of content, indicating gaps in information architecture and navigation. Further, Işman and Işbulan (2010) used the WAMMI questionnaire to evaluate Sakarya University's distance education website. Although the site performed well overall, dimensions such as "appearance" and "effectiveness" showed room for improvement. In a similar study, Hasan (2013) employed both WAMMI and WEBUSE scales to evaluate nine Jordanian university websites. Students expressed satisfaction with navigation and content, but criticised the website's overall design aesthetics.

Singla and Aggarwal (2020) also observed that many academic websites underprioritized design and navigation, significantly affecting user engagement. Mentes and Turan (2012), in their study of Namik Kemal University's website, confirmed that usability positively correlates with attractiveness, helpfulness, efficiency, and learnability. Likewise, Caglar and Mente (2012) found that while users appreciated features such as controllability, helpfulness, and efficiency on Lefke University's website, they expressed dissatisfaction with its attractiveness and learnability.

Alotaibi (2013) used the heuristic evaluation method to assess the usability of university websites in Saudi Arabia. Twelve university websites were analysed by 30 evaluators on each heuristic. The results revealed that the website usability of all universities was acceptable on all seven heuristics used to measure website usability, namely 'visual design and consistency', 'links and navigation', 'data entry forms', 'information truth and precision', 'privacy and security', 'search functionality' and 'help, feedback and error tolerance'.

In the African landscape, many studies have attempted to contribute to website usability evaluation. Benaida and Namoun (2018) investigated the effect of four key factors, including the interface quality, usefulness, content, and satisfaction of users, on the perceived usability of four Algerian academic websites. The IBM Computer System Usability Questionnaire (CSUQ) was used to collect data from 200 students of four Algerian universities. The results imply significant usability improvements are needed for the four factors explored in the study.

Based on qualitative data, Ojugo and Eboka (2018) assessed users' satisfaction and experience on academic websites in Nigeria. They reported that out-dated content, inconsistency font size, ineffective internal search functions, misspelt words, lack of navigational support links/tools, an inappropriate page design, misleading and broken links, orphan pages, incomplete data, image problems, difficult interaction with a website, and a lack of support to the some languages were the usability issues with Nigerian universities websites. These findings provide insightful and valuable data to web developers and educational institutions regarding common types of usability issues that could be found on their websites.

Undu and Akuma (2018) conducted an empirical study on the usability of the Benue State University website from the perspective of its students, employing the

Website Analysis and Measurement Inventory (WAMMI) as the evaluation tool. The findings indicated notable usability shortcomings, and recommendations were given to improve the website interface. In a related study, Kiyea and Bolatito Yusuf (2014) assessed the usability of Nigerian university websites using automated tools such as Web Page Analyser and HTML Toolbox. Their results suggested a moderate level of usability; however, critical deficiencies were observed in areas including HTML coding errors, browser compatibility, page load times, and the presence of broken or malfunctioning links.

Tracing the historical development of usability testing, its origins can be linked to the early 1990s when Jakob Nielsen and Jeffrey Rubin pioneered usability engineering techniques. Initially applied in software development, these techniques were adapted for website design to enhance user experience (Battleson et al., 2001; Cockrell & Jayne, 2002). Over time, usability testing has evolved into a key strategy across multiple digital domains, supporting the creation of user interfaces, including websites. Although website usability has been widely studied across sectors, there remains a significant gap in the evaluation of university websites in Ghana. Previous research has not addressed how usability assessments can inform the design and development of Ghanaian universities' websites, which are crucial for student engagement and institutional communication.

As pointed out by Kaul (2006), modern university websites should serve as comprehensive platforms offering essential information and services such as course listings, online applications and registration, electronic fee payment, access to syllabi and study materials, academic calendars, exam schedules, and even online lectures. These features are critical for meeting the needs of students and other stakeholders. Nielsen (2018) emphasised that user satisfaction and ease of use are foundational to website usability. Subsequent studies have affirmed that evaluating usability is essential for designing more intuitive and effective websites, ultimately enhancing user satisfaction

(Nielsen, 2018; Rubin & Chisnell, 2008).

2.9 Websites Design Patterns

Design patterns represent solutions to frequently occurring software problems for designing good-quality software. The study of design patterns has gained significant attention since they were first proposed in 1977 in the field of building architecture (Unger & Tichy, 2000). Design patterns are solutions to problems at the design and implementation levels of software components. Design patterns are proven solutions based on experience which have been identified and organised by software developers. A study conducted by Google.com (2015) revealed that a poorly designed website may frustrate users and result in a high "bounce rate", or people visiting the entrance page without exploring other pages within the website. On the other hand, a well-designed website with high usability has been found to positively influence visitor retention (revisit rates) and purchasing behaviour (Lee & Kozar, 2012).

Web design patterns refer to a set of instructions focused on creating an impactful user interface for websites (Ramotion, 2022). TM Design (2023) defined a web design pattern as a standard solution applied to recurrent issues or challenges faced during the design process of a website. Website design patterns act as guiding principles, ensuring that designers and developers do not have to reinvent the wheel with every new project; instead, they can leverage these established patterns to deliver consistent and compelling user experiences (TM Design, 2023). These are also known as user interface design patterns as they primarily aim to create a better UI/UX structure for the entire website. These design patterns focused on developing a web layout that creates a visual balance and has a responsive design, ensuring easy navigation for visitors.

Design patterns play a vital role in modern website design because they offer reusable solutions to common design problems. They improve communication,

reusability, and maintainability in web development (Tidwell et al., 2020). Furthermore, design patterns help to make websites more accessible, allowing users of all abilities to navigate the websites (Krug, 2014). Website design patterns are recurring solutions that solve common design problems in web development. Tidwell et al. (2020) argued that design patterns encapsulate best practices and help designers and developers create web interfaces that users find intuitive, efficient, and aesthetically pleasing. They also reduce the cognitive load on users by providing familiar structures and functionalities (Krug, 2014). Furthermore, design patterns can improve cross-platform consistency, ensuring that websites provide a seamless experience across different devices and browsers (Garrett, 2010). However, careful consideration must be given to the context and application of these patterns to ensure that they contribute positively to the overall design (Tidwell et al., 2020).

2.10 Website Genre and its Design Patterns

2.10.1 Social Networking Website

A social networking website is an online platform that allows users to create a public or semi-public profile account within a defined system, articulate a list of other users with whom they share a connection, and browse and navigate their list of connections and those made by others within the system (Boyd & Ellison, 2011; Kaplan & Haenlein, 2010). These platforms allow individuals to interact with one another by sharing information, messages, multimedia content, and other forms of data. Popular social networking websites include Facebook, TikTok, Instagram, Twitter, now X, and LinkedIn.

Usability and user experience are critical to the success of social networking websites. Loranger (2014) emphasises the importance of usability in ensuring that users

can effectively explore and engage with the platform. A well-designed social networking site should have an intuitive layout, simple navigation, and easily accessible features that encourage user interaction. A positive user experience increases user satisfaction, retention, and loyalty. Key components like such as responsive design, fast loading speeds, and mobile compatibility are critical for delivering a smooth user experience on social networking platforms. Acquisti et al. (2015) argue that the design of privacy settings and controls influences users' perceptions of privacy and their willingness to share information. Users must be assured that their personal information is protected and that they have control over their privacy settings.

Design patterns such as navigation, user profile, interaction, privacy and security, visual design and content organisation are crucial for designing social networking websites. Navigation Patterns include breadcrumbs, menus, and pagination, which help users understand their location within a website and how to move between pages (Krug, 2014; Jakob Nielsen, 2018). Layout Patterns such as grid layouts, card layouts, and single-page layouts, which structure content in a way that is visually appealing and easy to follow (Nielsen & Budiu, 2013). Content Patterns include accordions, tabs, and modals, which help in organising and displaying content efficiently (Garrett, 2010). These patterns help designers and developers address common challenges and optimise the user experience, and create social networking websites that not only attract and retain users but also are user-friendly, engaging, and efficient that providing a safe and engaging environment for social interaction (Nielsen, 2018; Shneiderman et al., 2017).

2.10.2 Corporate Websites

A corporate website is a website that represents an organisation or company, providing information about its products, services, values, mission and activities. Ryan and Jones

(2016) highlight that the primary purpose of a corporate website is to provide information about the company, its products or services, and to facilitate communication and interaction with customers, stakeholders, and the general public. Corporate websites offer a platform for showcasing products and services, disseminating corporate news, and providing customer support (Ryan & Jones, 2016). As digital business environments evolve, the role of corporate websites in achieving business objectives continues to grow.

Chaffey et al. (2019) posit that a well-designed corporate website can enhance an organisation's credibility, provide important information, and facilitate customer interactions. A corporate website is often the first point of contact for potential customers and stakeholders, making it a crucial component of a company's digital marketing strategy (Chaffey et al., 2019).

Effective design patterns and principles are fundamental to the success of corporate websites. These patterns ensure that the website is visually appealing, easy to navigate, and user-friendly. According to Loranger (2014), key design principles include simplicity, consistency, and intuitiveness. Simplicity involves creating a clean and straightforward design that minimises clutter and focuses on essential elements. Consistency ensures that design elements such as colours, fonts, and layouts are uniform across the website, enhancing user familiarity and comfort (Lynch & Horton, 2016).

Common design patterns in corporate website design include hero images, which immediately capture the visitor’s attention and inspire them to explore various pages, heightening user engagement and retention. Lynch and Horton (2016) emphasise the importance of clear information architecture in corporate website design, which organises content logically and facilitates easy access to information (Lynch & Horton, 2016). Additionally, responsive design, which adapts to different screen sizes and devices, is essential in the current digital landscape where mobile access is prevalent in accessing digital content (Zeldman & Marcotte, 2010).

2.10.3 News Portal Websites

A news portal website is a platform, specially designed to serve the purpose of news delivery to users in an organised, comprehensive and sometimes interactive way. News portal websites typically aggregate news articles written by news sources or write their own original content to facilitate readers with the latest news across multiple categories such as international affairs, sports, politics and entertainment. Briggs (2020) defined a news portal as an online platform that consolidates and organises news from different sources, offering visitors a wide array of articles, videos, and multimedia content in a single, accessible interface on current events. Also, Laudon and Laudon (2021) describe a news portal as a website that serves as a hub for the dissemination of real-time information, offering structured and categorised information that can be tailored to individual user preferences and accessed through various devices, including smartphones, tablets and desktops. They usually include sections for breaking news and offer persistent, on-demand access to information (Abdallah et al., 2024).

News portals have become an essential part of modern media consumption, serving as platforms for delivering news content in a digital format. Dadapeer et al. (2023) argued that the design of these portals plays a crucial role in determining the ease of navigation, accessibility, interaction and shaping user experience with the news content. The evolving nature of web design patterns has significantly influenced how news portal is presented, consumed, and monetised on digital platforms (Abdallah et al., 2024). Mohammed (2020) is of the view that earlier news websites followed a static format, mimicking the layout of traditional print newspapers. However, as technologies like CSS, HTML5, and JavaScript developed, the layout became more dynamic, allowing for responsive designs that cater to different screen sizes and devices.

Grid layout has been identified as one of the design trends in modern-day website design and development. The grid is a system of intersecting horizontal and vertical lines

that divide a layout into columns and rows. This modular structure provides a framework for organising content and guiding the placement of elements within a webpage. From a designer's perspective, the grid layout streamlines the design process by offering a structured framework that promotes decision-making and ensures consistency throughout several pages of a website (Griffin, 2024). Grid layouts provide the organised presentation of news items, ensuring that several stories are viewable on a single page. This design pattern often resembles the front page of a newspaper, with content organised into clearly defined columns and sections. According to a study on user experience and grid layout design in news website design, Zhao et al. (2020) found that grid layouts improve the readability of news content and allow users to focus on stories that are most relevant to their interests.

Another design pattern in news portal website design is infinite scrolling. Infinite scrolling is an interaction design pattern in which a page loads content as the user scrolls down, allowing the user to browse a large amount of content with no clear endpoint (Interaction Design Foundation, 2024). It is commonly used on social media sites and news feeds where the content has no clear structure or sorting order. This design approach enables users to continuously scroll through content frequently without having to load new pages manually. According to one study on information overload in infinite scroll interfaces, infinite scrolling improves user engagement by eliminating navigation friction (Loranger, 2014).

The design of news portals' websites is heavily influenced by typeface choices and readability considerations. Sans-serif fonts, white space, and judicious use of headings increase readability and make text easier to consume. A study by Ou (2019) on typography and its implementation on websites revealed that the use of large fonts and clear headings has been associated with increased engagement, especially on mobile devices, where reading long articles can be problematic.

Voice-activated and AI-driven interfaces are another design pattern for designing a news portal website. Rather than typing or tapping, Voice User Interfaces (VUIs) allow users to communicate with technology by speaking, and the system will understand the user (Peixoto, 2023). With the advent of voice assistants such as Google Assistant and Alexa, voice-activated browsing is becoming increasingly important for news website design. This development shifts focus from traditional design patterns toward voice-first interfaces, which allow users to request news updates without having to engage with a visible interface of the website (Peixoto, 2023).

2.10.4 Gaming or Gambling Websites

The term gambling refers to a form of entertainment where a wager, typically a sum of money, is placed on the uncertain prospect of a larger monetary outcome. According to Griffiths et al. (2006), a gambling website is an online platform that provides various gambling-related activities, enabling users to wager real or virtual money on games of chance or skill in a highly interactive including lotteries, sports betting, casino games (e.g., poker, blackjack, roulette, slots), and other betting activities and often immersive digital environment. Tuguinay et al. (2022) define gambling websites as responsive and adaptable online platforms that deliver seamless user experiences across different devices, assuring optimal performance on desktops, tablets, and smartphones. This definition emphasises the importance of multi-device accessibility, as a large amount of online gambling takes place on mobile platforms.

Gambling websites are unique in their design due to the specific nature of user interaction and the psychological factors that influence user behaviour. The design of these platforms plays a significant role in user engagement, retention, and responsible gaming. Early gambling websites had rudimentary interfaces focused mainly on function

rather than form, but as competition increased, so did the emphasis on user experience and engagement. The design of gambling websites has evolved significantly over time, especially with advancements in technology and internet accessibility. Gambling websites now employ advanced web technologies like HTML5, CSS3, and JavaScript frameworks to create dynamic, responsive, and visually appealing designs (Griffiths et al., 2006). These platforms have evolved into highly interactive systems, offering real-time gaming, live dealers, and multiplayer options.

One of the common design patterns in gambling website design is the use of a dark-themed user interface. Dark backgrounds with bright highlights, typically gold, red, or blue, are popular choices for gambling websites. According to Tuguinay et al.'s (2022) study on the influence of customer experience with automated games and social interaction on customer engagement and loyalty in casinos, these colour schemes are used because they invoke feelings of luxury, excitement, and risk, which are associated with gambling environments like casinos. Dark backgrounds also make key features like games, buttons, and promotional content stand out, directing user attention to what is most required in gambling platforms (Tuguinay et al., 2022).

Another design pattern in gambling website design is gamification and security. Gamification has become an integral part of modern gambling website design. Elements such as loyalty points, badges, levels, and leaderboards encourage users to stay engaged with the platform. In proposing a new taxonomy of video game design features, King et al. (2010) argued that the strategy of employing gamification and security in gambling website design aimed at increasing user retention by rewarding frequent play and enhancing the overall experience through non-monetary rewards. In addition, achievements, unlockable rewards and progress bars are frequently used in gambling website design to build a sense of accomplishment among users (King et al., 2010).

Due to the competitive nature of online gambling, websites aim to provide easy

and intuitive navigation. Jansson-Boyd (2019) recognised minimal design as a design pattern for gambling websites. According to Jansson-Boyd's book "Consumer Psychology," minimalist designs, which feature simple navigation bars, clear calls to action, and clean interfaces, allow users to quickly find games, make deposits, or access promotions (Jansson-Boyd, 2019). User-centred design principles are applied to ensure that players can navigate the website with minimal effort, reducing friction and maximising time spent on gambling activities.

Another common design pattern used to enhance engagement on gambling websites is the inclusion of "near-miss" events, where players come very close to winning but ultimately lose (Clark, 2017). Kildahl et al. (2020) are of the view that near-miss events, especially in slot games, trigger an emotional response, encouraging players to continue playing. A study on the use of an educational animation to reduce erroneous wins overestimates revealed that "near-miss" events design pattern can be achieved in gambling website design by the use of visual cues such as flashing lights, celebratory animations, and sound effects that mimic a win, even when the user loses (Graydon et al., 2017).

The integration of responsible gaming features in design is also another emerging trend in gambling website design. In response to growing concerns over gambling addiction, many jurisdictions mandate that gambling websites must include responsible gaming features. These features include self-exclusion options, spending limits, and notifications about time spent on the website (Harris & Griffiths, 2017). For instance, pop-up messages may appear after a certain amount of time to encourage users to take breaks or set limits on deposits and wagers (Auer & Griffiths, 2014; Bjørseth et al., 2021; du Preez et al., 2016; McGivern et al., 2019). Additionally, introducing features like a progress bar in gambling websites' design helps users monitor their betting behaviour and access resources for problems when gambling.

The integration of secure payment systems in the design and development of gambling websites is essential for gambling companies seeking to enhance their online gambling business. Gambling websites frequently incorporate several payment channels, allowing customers to deposit and withdraw cash using a variety of safe methods, including credit cards, e-wallets, and cryptocurrencies (Griffiths et al., 2006). Having websites with a comprehensive payment system enables gambling merchants to provide several payment options to gamers, ensuring a smooth payment procedure (NOWPayments, 2024). Incorporating robust security measures such as Secure Sockets Layer (SSL) in the design process provides an encrypted link between a web server and a web browser to safeguard user data, assuring user confidence and safety, and maintaining the integrity of the gambling website.

2.10.5 E-Commerce Websites

E-commerce websites are digital platforms that allow businesses and individuals to conduct commercial transactions over the Internet. They enable the buying and selling of goods and services online, providing customers with a convenient and secure shopping experience without the need for physical stores. According to Turban et al. (2018), e-commerce websites facilitate a wide range of activities, including product discovery, comparison, selection, payment, and order fulfilment. Akin (2024) analysis of the e-commerce strategies implemented by leading online retailers revealed that e-commerce websites act as intermediaries, providing infrastructure and services to facilitate online transactions.

E-commerce website design has garnered considerable academic attention as online shopping has become a dominant force in the global economy. A well-designed e-commerce website can improve user experience (UX), increase sales, and create long-lasting customer relationships.

One of the common design patterns in e-commerce website design is performance optimisation. Website speed is a crucial factor in e-commerce success. Slow-loading websites negatively affect user experience and conversion rates. Google.com (2015) research on the impact of page load speed reveals that a one-second delay in page load time can result in a 7% reduction in conversions. Therefore, optimising website performance is essential for retaining users and ensuring smooth transactions on e-commerce platforms. Development strategies such as reducing HTTP requests, image optimisation, and using content delivery networks (CDNs) can significantly improve page load times on e-commerce websites (Google.com, 2015), making the site rank higher in search engine results, improving discoverability (Chaffey et al., 2019).

Visual hierarchy and consistent layout are the most widely recognised design patterns used in e-commerce website design. Visual hierarchy refers to the arrangement of elements in a way that guides the user's attention. In e-commerce, this is critical for highlighting key actions, such as product purchases, special offers, and calls to action (CTAs). The placement and design of CTAs (e.g., "Buy Now" or "Add to Cart") significantly impact conversion rates. Research by Koffka (1935), grounded in Gestalt psychology, suggests that using contrasting colours and adequate whitespace around CTAs increases their visibility and effectiveness. Also consistent across different product categories, making it easy for users to navigate the website. Tognazzini (2014) emphasises the importance of maintaining consistent layouts across all pages of an e-commerce website. This consistency improves usability and ensures that users can easily navigate from one section to another without confusion.

With the rise of mobile commerce (m-commerce), the responsive design pattern is on the rise as far as e-commerce website design is concerned. Ensuring that e-commerce websites are adapting seamlessly to various screen sizes and devices has become crucial. Research shows that mobile commerce accounted for more than 50% of global e-

commerce sales in 2020, underscoring the importance of mobile-friendly websites (Petrosyan, 2023). Marcotte (2011), who pioneered responsive web design, argues that websites should be designed with mobile devices as the primary consideration and then scaled up for desktops. This approach ensures an optimal user experience on smaller screens. Implementing fluid layouts, CSS media queries and flexible grids to ensure that design content adjusts appropriately to different screen sizes is essential to provide users with an optimal experience regardless of device. McKinsey and Company (2022) found that e-commerce sites with responsive designs had higher engagement and conversion rates than those with separate desktop and mobile versions.

Integration of high-quality imagery, detailed product descriptions and customer reviews is trending in e-commerce website design. Visual content is are key factor in e-commerce, as customers cannot physically interact with products. Research by Cyr et al. (2009) on colour appeal in website design shows that high-quality images and videos can improve customer trust and engagement, leading to higher conversions. Incorporating multiple images, zoom features, and videos in the design can give users the ability to inspect products thoroughly. Also, providing space for customers to review the products on an e-commerce website can significantly influence purchasing decisions. A study by Chen et al. (2011) on the role of marketing in social media revealed that consumers are more likely to trust peer reviews than product descriptions provided by the seller. This revelation by Chen et al. (2011) underscores the integration of the social review system critical in e-commerce website design.

2.10.6 University Websites

A public university website serves as the digital face of the institution, acting as its virtual representative to both internal and external audiences (Al-Khalifa, 2014; Oyibo & Vassileva, 2017). As the primary channel for digital interaction between the university

and its constituents, including faculty, students, researchers, alumni and the general public, the design and functionality of the website are crucial in projecting the university's image and credibility. It is therefore imperative that the website is carefully and professionally designed to reflect the identity and values of the university. In this regard, university websites offer significant opportunities for fostering engagement and building long-term relationships with their stakeholders. However, these opportunities also bring challenges. As website usage continues to grow due to the increasing variety of functions offered, universities must continuously update and evolve their websites to meet emerging expectations and technological standards. This ongoing development introduces new challenges in terms of functionality, usability, and user experience (Al-Khalifa, 2014).

For university websites development, common design patterns include consistent navigation menus, search functionalities, responsive grids, call-to-action elements like “Apply Now” buttons, personalisation and AI Integration (Krug, 2014). Nielsen and Budiu (2013) highlight that intuitive navigation patterns, such as breadcrumb trails, drop-down menus, and search bars, enhance the ease of finding information. For instance, a clear separation between academic programmes, admissions, events, and research ensures that users can locate desired content quickly on the university website. Poor navigation, on the other hand, may discourage users, particularly prospective students (Alfayez & Altawriy, 2020; Jainari et al., 2022).

The visual design of a university website significantly impacts user perception. Clean layouts, readable fonts, and the strategic use of institutional colours enhance credibility and trustworthiness (Fimberg & Sousa, 2020). Additionally, visual elements like web banners, videos, and infographics can effectively highlight key aspects such as campus life, academic achievements, and research projects (Tella, 2020).

With the rise of mobile browsing, the responsive design pattern has become essential for university website design. Responsive frameworks like Bootstrap allow websites to adapt seamlessly to different screen sizes and resolutions (Marcotte, 2011). Research indicates that a lack of mobile optimisation may lead to higher bounce rates, particularly among tech-savvy students (Tella, 2020).

Modern university websites are increasingly leveraging artificial intelligence (AI) and personalisation in design and development. AI-powered chatbots, for instance, provide real-time assistance to users, while personalisation algorithms tailor content recommendations based on user behaviour (Guan et al., 2020). Such technologies enhance engagement and streamline information retrieval on the university website. Designers and developers can deploy chatbots to provide instant answers to FAQs, such as admission requirements □□□□implement personalised content suggestions based on user behaviour, such as recommended programmes or events.

2.11 Benchmark for University Website Design

Benchmarking university website design provides a systematic framework for evaluating, improving, and sustaining web standards in alignment with international best practices. It establishes measurable criteria for assessing key components such as content quality and relevance, aesthetic coherence, technological infrastructure, usability, accessibility compliance, security mechanisms, and performance efficiency. This benchmark is therefore established to guide the design, development, evaluation, and continuous improvement of university websites.

The selection of the websites of Harvard University and Stanford University as benchmark references is grounded in their consistent top performance in global university web-based rankings, particularly the Webometrics Ranking of World Universities. Webometrics evaluates higher education institutions based on web

presence, visibility, transparency (openness), and excellence (research impact), thereby providing a comprehensive measure of digital performance and online academic influence. Harvard and Stanford regularly occupy leading positions in Webometrics rankings due to their strong digital visibility, extensive indexed web content, high citation impact, and robust domain authority (Webometrics Ranking of World Universities, 2023).

Therefore, using Harvard and Stanford as benchmark institutions is justified not only by their high Webometrics rankings but also by the holistic quality of their digital infrastructure, global academic influence, and sustained leadership in online institutional performance. Their websites serve as exemplary models for universities seeking to enhance digital visibility, stakeholder engagement, research dissemination, and global competitiveness.

2.11.1 Harvard University Websites

The Harvard University website adopts a clean, modern, and professional design reflecting the prestige and heritage of the institution. Its UI is structured to communicate credibility, accessibility, and user-centred information architecture. The header contains the Harvard University logo on the left, serving as a home button. A primary navigation menu with categories such as *About, Academics, Campus & Community, Research, Admissions, and News* is horizontally aligned, providing quick access to core sections of the website. Also, there is a search icon positioned at the top right, enabling global site search functionality. The website features a large, high-quality hero image with an overlay headline or call-to-action text, enhancing visual engagement.

The main content area of Harvard University's website is structured into well-defined sections with distinct background colours and white space, enhancing content segmentation and readability. The use of grid-based layouts for showcasing news articles,

research highlights, and feature stories with thumbnails and brief descriptions. Interactive elements such as sliders or carousels are used sparingly to maintain performance and simplicity.

The website uses large, legible serif fonts for headings, enhancing the traditional academic feel. Sans-serif fonts for body text improve readability on digital screens. Their colour scheme is dominated by Harvard's traditional crimson colour (#A51C30**),** used strategically in headers, links, and call-to-action buttons. Harvard uses predominantly white or light grey backgrounds to maintain high contrast and readability. The Strong use of Harvard's logo, colours, and typography ensures consistent institutional branding. The Minimalistic yet elegant design reflects prestige, tradition, and innovation, aligning with Harvard's global academic reputation.

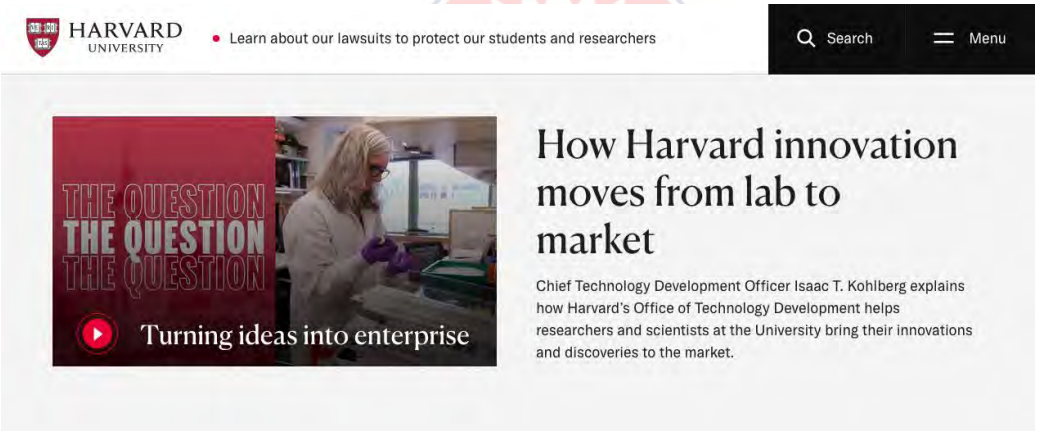

Figure 2.2: Harvard University Website Homepage

Source: Harvard University Website (2023).

2.11.2 Stanford University Websites

The Stanford University website adopts a clean, modern, and user-centred design that reflects its identity as a leading global academic institution. The design balances aesthetics, accessibility, and functionality to serve its diverse user base effectively. The header features the Stanford University wordmark logo on the top left, serving as a clickable home button. A horizontal primary navigation menu includes clear categories

such as *About, Academics, Research, Campus Life, Admission, and News*. Also, a search icon is positioned on the top right, providing global site search functionality.

Just beneath the header is a large full-width hero image with an overlay headline and call-to-action link, highlighting current news, achievements, or institutional initiatives. They use high-resolution photography to establish a strong visual impact on user engagement. The content area is organised into distinct sections with clear visual separation, often alternating between white and light grey backgrounds to segment content effectively. Content blocks include feature stories, news articles, research highlights, and event announcements, each with an image, headline, and brief description.

The colour scheme is dominated by Stanford's cardinal red (#8C1515), used strategically for headings, links, buttons, and accents. The background is predominantly white, creating a clean and uncluttered interface with high readability. The strong incorporation of Stanford's branding elements, including logo, cardinal red colour, and typography, ensures consistent institutional identity throughout the website. The overall design reflects Stanford's values of innovation, academic excellence, and global impact.

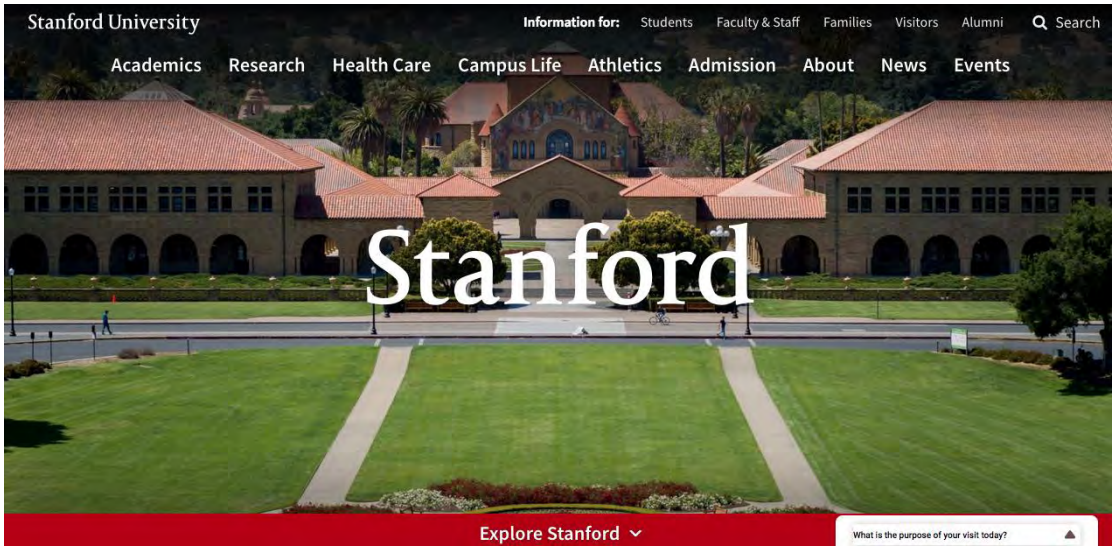

Figure 2.3: Stanford University Website Homepage

Source: Stanford University Website (2023).

2.12 Content Management System

Content Management Systems (CMS) have transformed how websites are designed, developed, and managed. A CMS is defined as a software application or set of related programs that are used to create and manage digital content (He & Huang, 2023). Divya (2013) defined Content Management System as a web application containing tools which enable you to add, edit and remove web pages and content on a website from within a web browser and without any knowledge of web page design software or other similar technologies. Traditionally, website creation required in-depth programming knowledge, such as writing HTML and CSS codes from scratch, and adding JavaScript functions to transform webpages from their static nature to more dynamic content. Those are the proper ways to create a website, but the web developer using those methods needs to be skilled and have a better understanding of HTML, CSS, JavaScript, SQL, etc. because programming skills using those languages are needed in order to develop a functional website. However, the emergence of CMS platforms has enabled non-technical users to create and maintain websites efficiently without writing a single line of code (Roberts, 2024).

Patel et al. (2019) argued that a typical CMS platform provides core features including content creation, editing interfaces, publishing workflow, content storage, user role management and version control**.** Modern CMS platforms also integrate search engine optimisation (SEO) tools, multilingual support, plugin extensibility, and responsive design features to enhance user experience (Hembram, 2022). Studies have emphasized that CMS platforms improve efficiency, collaboration, scalability, and website maintainability**.** They separate content from design and structure, allowing easy updates without affecting the site layout (Nicastro & Hawley, 2024). Additionally, they facilitate distributed content management, where multiple users can contribute while ensuring editorial control (He & Huang, 2023; Hembram, 2022).

Within higher education institutions, CMS are widely adopted to manage dynamic content, academic resources, and institutional information. Effective CMS adoption enhances institutional branding, student engagement, and administrative efficiency (Liu, 2023). Universities often prefer open-source platforms like WordPress due to their customisability, community support, and cost-effectiveness (Dei, 2024). However, studies reveal that the lack of skilled personnel to manage CMS platforms can limit their utilisation in educational institutions (Dei, 2024). Emerging trends in CMS include headless CMS architectures, where content is managed in the backend and delivered via APIs to any frontend device, enhancing flexibility in omni-channel delivery (He & Huang, 2023). Additionally, Artificial Intelligence integration in CMS is improving content personalisation, search, and automated publishing (Sharma et al., 2022). Selecting an appropriate CMS platform requires evaluation of factors such as ease of use, scalability, cost, security, community support, and integration capabilities (Liu, 2023). Patel et al. (2019) and Dei (2024) recommend a thorough needs assessment, stakeholder analysis and engagement, and feature evaluation to ensure the CMS aligns with institutional goals.

2.12.1 WordPress as CMS for Website Design

WordPress is an open-source CMS built with PHP and MySQL, licensed under the GNU General Public License, allowing unrestricted modification and distribution (WordPress, 2024). Its architecture consists of three main components, including the core system, themes and plugins. The core system provides the fundamental CMS functionalities such as user management, content creation, media management, and theme/plugin integration. The themes determine the website's aesthetics and layout, with thousands of free and premium options to achieve a professional design. Finally, the plugins extend

functionality to include SEO optimisation, security features, e-commerce systems (WooCommerce), learning management systems, and more.

One of the major reasons for WordPress adoption is its intuitive and user-friendly interface. Studies indicate that WordPress reduces technical barriers for content creation and website management compared to alternatives such as Drupal and Joomla, which require more advanced configuration skills (Iqbal et al., 2020). This makes it suitable for small businesses, individuals and institutions lacking extensive IT expertise for their website development.

According to Iqbal et al. (2020), WordPress is the world's most widely used CMS, initially launched in 2003 as a blogging tool but has evolved into a flexible platform supporting diverse websites, including e-commerce stores, news websites, institutional portals and corporate websites. WordPress growth reflects a shift from static HTML-based web development to dynamic, user-managed websites enabled by CMS platforms (Iqbal et al., 2020). Hembram (2022) usage statistics of CMS revealed that WordPress powers over 40% of all websites globally, and holds more than 60% of market share among CMS-based websites. Sharma et al. (2022) attributed this dominance to its user-friendliness, cost-effectiveness, extensibility and strong community support for updates.

WordPress offers over 59,000 plugins covering functionalities such as SEO (Yoast SEO), security (Wordfence), backup, analytics, and multilingual support (WordPress.org, 2024). Its extensibility allows developers to build complex sites while enabling non-technical users to maintain content efficiently (Iqbal et al., 2020). WooCommerce, a WordPress plugin, has made WordPress the leading e-commerce platform, powering approximately 25% of online stores globally (Iqbal et al., 2020). Being an open source, WordPress is free to download and use. Costs are limited only to hosting, domain registration, and premium themes or plugins, making it cost-effective

compared to proprietary CMS such as Drupal, Joomla, Adobe Experience Manager or SaaS platforms like Wix and Squarespace.

In higher education, WordPress is used to build university websites, departmental websites, faculty profiles, research dissemination portals, and e-learning resources**.** Dei (2024) found that Ghanaian university librarians prefer WordPress for their libraries' webpages due to its customisability, cost-effectiveness, and ease of use**,** although challenges exist with institutional capacity to maintain and secure the websites. Though WordPress is often criticised for its security vulnerabilities. However, Ljusegren (2023) argued that vulnerabilities mainly arise from poor management practices such as failing to update core files, themes, or plugins, and using insecure third-party extensions. With proper security measures, such as regular updates, strong authentication, SSL certificates, and security plugins (e.g. Wordfence, Sucuri), WordPress remains secure for institutional use (Iqbal et al., 2020).

2.12.2 WordPress Compared with Other Content Management Systems

Content Management Systems (CMS) have become essential tools for developing and managing websites. Among numerous CMS platforms, WordPress has emerged as the most dominant**,** powering over 40% of all websites globally (Hembram, 2022). This literature review critically analyses why WordPress is considered the best CMS compared to alternatives such as Joomla, Drupal, Wix, and Squarespace.

WordPress holds a market share exceeding 60% among all CMS-powered websites (Hembram, 2022). Its widespread adoption results from a combination of ease of use, scalability, cost-effectiveness, and community support (Iqbal et al., 2020). Unlike Joomla or Drupal, which require more technical expertise, WordPress allows non-technical users to build and manage websites efficiently.

Studies highlight that WordPress has the most intuitive user interface, enabling quick content creation, media management, and website configuration without advanced programming knowledge (Nicastro & Hawley, 2024). In comparison, Drupal's steep learning curve makes it more suited to developers (Iqbal et al., 2020), while Joomla's interface is considered less user-friendly for beginners.

WordPress offers over 59,000 plugins and thousands of themes for extending website functionalities and customising appearance (WordPress.org, 2024). This extensive plugin ecosystem surpasses that of Joomla and Drupal, allowing integration of SEO tools, security features, e-commerce systems (WooCommerce), and learning management systems with minimal configuration. For instance, WooCommerce has made WordPress the leading platform for e-commerce, powering over 25% of all online stores (Iqbal et al., 2020). In contrast, Drupal Commerce and Joomla's VirtueMart have significantly smaller market shares due to their complex configuration.

WordPress benefits from a large global community of developers, designers, and contributors**,** providing continuous updates, extensive documentation, tutorials, and free support forums (Iqbal et al., 2020). This community-driven development ensures that WordPress remains updated with modern web standards, security patches, and feature enhancements (Ljusegren, 2023).

Conversely, while Joomla and Drupal also have active communities, their user base is significantly smaller, limiting the availability of plugins, themes, and development resources (Iqbal et al., 2020).

WordPress is entirely open source and free to use. Users only pay for hosting, premium themes, or plugins if desired, making it highly cost-effective for individuals, businesses, and institutions (WordPress, 2024). Proprietary SaaS CMS such as Squarespace and Wix require monthly subscriptions with limited flexibility.

WordPress is inherently SEO-friendly, with clean permalink structures, customisable metadata, and plugins like Yoast SEO enhancing. Studies show that WordPress websites generally achieve better search rankings due to these features compared to Joomla or Drupal, where SEO configuration requires additional technical adjustments (Iqbal et al., 2020). While WordPress is often criticised for security vulnerabilities, research shows these issues largely stem from poor management practices such as using outdated plugins or weak credentials (Ljusegren, 2023). With regular updates and security plugins like Wordfence or Sucuri, WordPress remains secure (Iqbal et al., 2020). Drupal is often considered slightly more secure due to its developer-oriented framework, but this comes at the cost of usability (Iqbal et al., 2020).

WordPress powers a wide range of websites, from personal blogs to complex corporate and university websites. Its scalability is evident in large institutions such as The New York Times and Harvard University using WordPress for publishing and academic content management (WordPress.org, 2024).

2.12.3 Samples of Top Universities' Websites Developed with WordPress

In recent years, many universities globally have adopted CMS to manage their online presence effectively. Among these, WordPress has emerged as a preferred choice due to its flexibility, cost-effectiveness, ease of use, and strong community support (Iqbal et al., 2020). WordPress's popularity in academia stems from its open-source nature, large plugin ecosystem, and ease of customisation**,** enabling universities to tailor their websites to institutional branding (colour scheme) and communication goals (Iqbal et al., 2020). The adoption of WordPress allows decentralised content management while maintaining institutional design standards to reflect their brands.

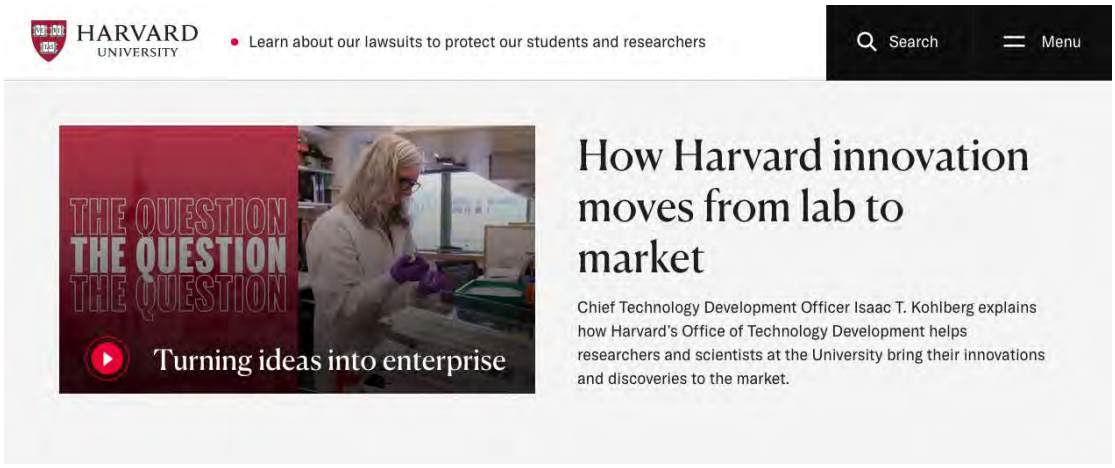

Figure 2.4: Harvard University website

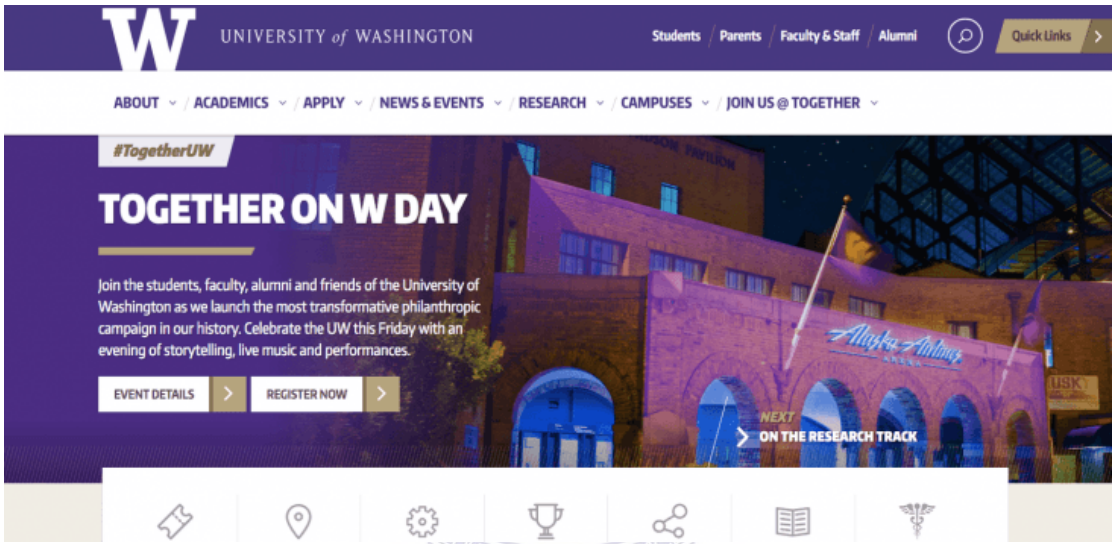

Figure 2.5: University of Washington Website

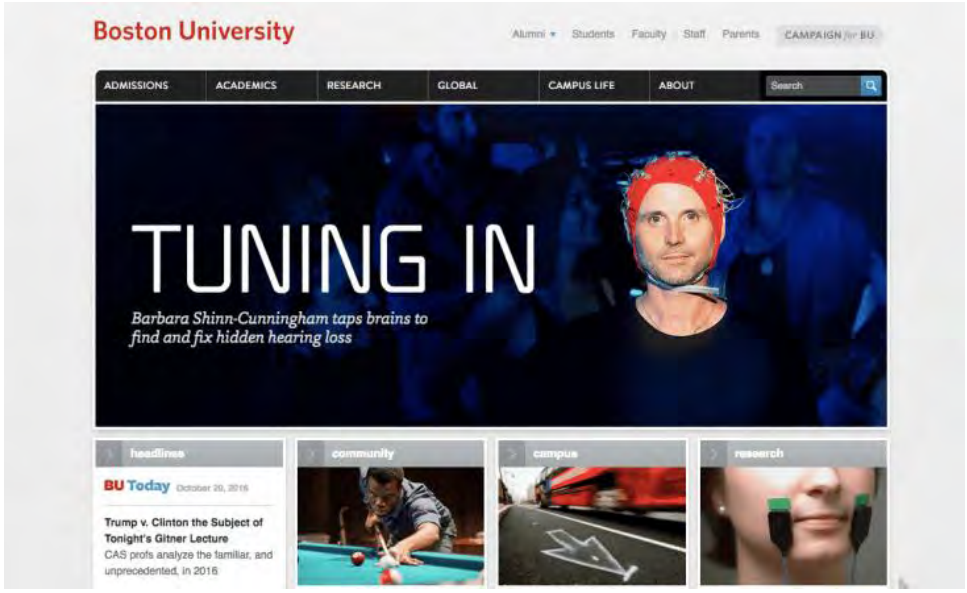

Figure 2.6: Boston University Website

Figure 2.7: Northeastern University Website

Figure 2.8: Cornell University Website

2.13 Webometrics Ranking of World Universities

Webometrics Ranking of World Universities is a ranking system developed by the Cybermetrics Lab, a research group belonging to the Spanish National Research Council (CSIC). The ranking system evaluates universities' web presence based on the size and visibility of their web content, as well as their online impact and presence in search engines. CSIC assesses university websites based on indicators such as web presence, visibility, openness, and excellence (Webometrics Ranking of World Universities, 2023).

This ranking emphasises not just website design but global online impact, research dissemination, and institutional visibility**.**

Studies have shown that Ghanaian universities generally rank lower globally on Webometrics due to limited online research visibility, underdeveloped institutional repositories, and low backlink strength. Again, many Ghanaian university websites face usability, accessibility, and content quality issues that hinder their effectiveness and efficiency, resulting in a poor global performance and visibility (Webometrics Ranking of World Universities, 2023).

In the latest Webometrics Ranking of World Universities released in January 2023, six Ghanaian universities' websites were ranked among the top 4000 university websites in the world. The University of Ghana was the highest-ranked university in Ghana, placing 1109th in the world, followed by Kwame Nkrumah University of Science and Technology at 1489th and the University of Cape Coast at 2056th. The other Ghanaian universities that made the list were the University for Development Studies at 2598th, the Ghana Institute of Management and Public Administration at 3498th and the University of Education, Winneba at 3560th. This scenario reveals the dissatisfactory quality level of the university websites in Ghana. Webometrics Ranking of World Universities recommends that if the web performance of an institution is below the expected position according to their academic excellence, university authorities should reconsider their web policy and promote the quality of their electronic publications through their websites (Webometrics Ranking of World Universities, 2023).

2.14 Aesthetics in Website Design

Aesthetics is a branch of philosophy concerned with the nature of beauty, art, and taste, as well as the creation and appreciation of beauty (Brady, 2013; Thielsch et al., 2019). It also encompasses how individuals perceive and experience beauty through the senses. In

the context of web design, aesthetics refers to the visual attractiveness or pleasing appearance of a website. Lavie and Tractinsky (2004) conceptualise aesthetics as beauty, often applied to elements that are gratifying to the senses, imagination, or intellect. In line with this, an aesthetically pleasing university website elicits a positive sensory or emotional response from users. Polger (2011) asserts that a website must be aesthetically agreeable for it to be considered effective, noting that a balance between content and design is crucial. This view is supported by empirical studies showing that users' aesthetic responses significantly influence their overall perception of a product, including digital interfaces such as university websites (Baumgartner et al., 2019; Reinecke et al., 2013).

Aesthetic impressions not only contribute to judgments about the beauty of a website but can also affect other evaluative dimensions, such as usability and trustworthiness. This phenomenon, referred to as the "halo effect" (Reinecke et al., 2013), suggests that websites perceived as visually attractive are also perceived as more usable (Reinecke et al., 2013) and trustworthy (Lindgaard et al., 2006). Furthermore, users form initial impressions of websites within the first 50 to 500 milliseconds of exposure (Tractinsky et al., 2006). These early judgments, based on visual cues, can determine whether a user continues to engage with the website. Therefore, in this study, it is posited that employing low-level image statistics from static website screenshots may predict user preferences and initial impressions of university websites.

2.15 Web Usability and Aesthetics

One of the critical challenges in website design is ensuring usability; however, usability alone does not guarantee a successful user experience. While it has traditionally been assumed that usability is the primary determinant of users' engagement with websites (Reinecke & Gajos, 2014), emerging research highlights the significant role of users'

initial aesthetic responses defined as spontaneous emotional reactions based on visual preferences in shaping their perceptions of usability (Flatla et al., 2013; Remøy, 2016). In essence, websites perceived as visually attractive are also more likely to be perceived as usable, demonstrating a psychological interplay between aesthetic appeal and usability.

Usability and visual aesthetics are two interdependent pillars of effective website design. These aspects should not be treated in isolation but rather integrated into the design process. According to Liu and Arnett (2013) and Liu and Ko (2017), a website's ease of use significantly influences its perceived visual appeal. If a website is difficult to navigate or lacks an intuitive design, users may struggle to appreciate its aesthetic qualities regardless of its visual aesthetics. This underscores the relationship between aesthetics and usability, where each component enhances or detracts from the other. Overemphasis on aesthetics at the expense of usability can result in visually stunning websites that frustrate users due to their complexity or inefficiency (Cox & Dale, 2002). Conversely, a purely utilitarian approach that neglects aesthetic considerations may fail to engage users emotionally, diminishing their overall satisfaction and trust. Therefore, a well-designed website should strike a balance between aesthetic appeal and functional usability, both of which contribute to a positive user experience (Liu & Ko, 2017). From a practical standpoint, usability and aesthetics are distinct yet interconnected components of web architecture. They should be designed in parallel, with careful attention to how each influences the other throughout the user journey. To support designers in achieving this integration, it is necessary to identify specific design attributes that bridge both usability and aesthetics. These attributes can then be developed into practical guidelines to ensure that both components complement each other effectively in the final web design.

2.16 Gaps in Literature

A considerable body of scholarly work has explored the themes of accessibility and usability in university websites. However, a number of critical research gaps have been identified in the existing literature. Most notably, previous studies have predominantly focused on evaluating only the home or welcome pages of university websites (Akgül, 2020; Ismail & Kuppusamy, 2019; Macakoğlu et al., 2022; Máñez-Carvajal et al., 2021; Máñez-Carvajal, 2020; Manzoor et al., 2019; Menzi-Çetin et al., 2017; Spyridonis & Daylamani-Zad, 2021). While the homepage serves as the entry point to the site, it offers only limited institutional information. The bulk of relevant academic content—such as course details, application procedures, staff directories, research outputs, and student resources resides on other internal pages. As such, limiting evaluation to the homepage provides an incomplete assessment of the overall accessibility and usability of the university website.

Furthermore, a significant geographical gap exists in the literature. Most prior studies have focused on universities in developed countries (Máñez-Carvajal et al., 2021; Máñez-Carvajal, 2020; Ringlaben et al., 2014; Wahyuningrum et al., 2017), with no research examining the websites of universities in Ghana. Although a few studies have been conducted in developing African countries (Afolayan & Adebayo, 2021; Anyaoku & Akpojotor, 2020; Benaida & Namoun, 2018; Fortune et al., 2018; Ojugo & Eboka, 2018; Olaleye et al., 2018; Undu & Akuma, 2018), Ghanaian universities remain unrepresented in the existing body of work.

Additionally, most of the reviewed studies relied heavily on automated tools and heuristic evaluations conducted by experts to assess website accessibility and usability. While these methods are efficient and useful for large-scale audits, they fail to capture the lived experiences and nuanced perceptions of actual users of the website. The absence

of user-centred evaluation methods in much of the existing literature limits the practical applicability of the findings, particularly in designing user-friendly digital environments (Afolayan & Adebayo, 2021; Anyaoku & Akpojotor, 2020; Benaida & Namoun, 2018; Máñez-Carvajal et al., 2021; Wahyuningrum et al., 2017).

Although several studies have evaluated accessibility and usability features, there is a lack of a conceptual model tailored specifically for the design of university websites. This omission highlights a critical need for a guiding framework that integrates accessibility, usability, aesthetics, and content quality into the design process. This study focused on evaluating the website of selected universities in Ghana through the experience of real users, intending to improve accessibility and usability and also proposing a conceptual model for future university website development.

CHAPTER THREE

METHODOLOGY

3.0 Overview

The purpose of this study was to develop a conceptual model for designing university websites and use the model to develop a prototype university website. This chapter, therefore, discussed the philosophical worldviews, research design, population for the study, sample and sampling techniques, data collection instruments, data collection procedure, ethical and trustworthiness considerations and methods of data analysis and production processes.

3.1 Philosophical Worldview

This research was situated in the Interpretivism philosophical worldview. This philosophical worldview posits that reality is socially constructed, subjective and multiple, rather than objective or singular (Creswell, 2009, Creswell & Poth, 2018; Habib, 2020).

Interpretivists hold that truth depends on context and that knowledge is subjective and idiographic. This philosophical worldview is value-laden and emphasizes that values

influence how we think and behave, as well as what we find to be important (Habib, 2020; Creswell, 2009, Creswell & Poth, 2018). According to interpretivists, people's experiences and perceptions shape their interpretation of reality, making truth and knowledge subjective as well as historically and culturally situated. This approach makes an effort to 'get into the head of the subjects being studied' so to speak, and to understand and interpret what the subject is thinking or the meaning s/he is making of the context (Kivunja & Kuyini, 2017, pp.33).

The main purpose of the research was to design a model for designing universities websites and use the model to develop a prototype university website that promotes visibility. This phenomenon involves stakeholders with multiple perspectives including prospective students, web developers, faculty members, students…etc. Thus, the core of the study was to examine the subjective responses about the use of university websites and the interpretations of users experience in order to design a conceptual model for designing university website to promote visibility.

As an interpretivist researcher, the focus was on the cultural construction of truth and reality as well as how human experiences influence the interpretation of meanings in their natural settings. By adopting this philosophical worldview, the researcher was able to gained insight into the user experience about the university websites. Such social phenomena can be best explored by getting closer and interacting with the subjects involved (Creswell, 2013).

Moreover, the researcher believes that the existence of reality or knowledge regarding the design of a model for designing university websites and use of the model to develop a prototype university website is devoid of objectivism but rather a product of constructionism and interpretivism which emanate from multiple sources by which the researcher played an active role.

Typical research approach used by interpretivists is qualitative approach. The method of data collection is chosen based on the choice of design, the nature of the respondents, and the research problem at hand (Creswell & Poth, 2018). They include interviews, focus group discussion, observations, visual aids, personal and official documents, photographs, etc. (Kivunja & Kuyini, 2017), that rely on a subjective relationship between the researcher and subjects.

3.2 Research Design

This study employed qualitative descriptive design and a studio-based research design. Qualitative descriptive design is a method that aims to provide a rich, straightforward description of an experience or event in its natural state, rather than focusing on thick description, theory development, or interpretative meaning (Bradshaw et al., 2017).

A qualitative descriptive design was deemed most appropriate as it recognises the subjective nature of the problem, the different experiences participants have and will present the findings in a way that directly reflects or closely resembles the terminology used in the initial research question (Bradshaw et al., 2017).

Descriptive design describes the experience of users of university websites and also provides a snapshot of the existing selected universities' websites in order to generate a conceptual model for university website design and studio-based research design to produce a WordPress theme and use it to design a prototype UEW website.

As indicated by scholars, descriptive design provides a snapshot of the existing situation, enabling researchers to understand and analyse behaviours, trends of characteristics of the population (Bradshaw et al., 2017; Christensen et al., 2014; Creswell & Creswell, 2018; Leedy & Ormrod, 2019). These research designs allowed the researcher to develop a conceptual model for designing university websites from the empirical reality of the research context (Chun Tie et al., 2019; Hassan, 2023).

Descriptive research design is used to provide straightforward descriptions of experiences and perceptions (Sandelowski, 2010), particularly in areas where little is known about the topic under investigation. It focuses on observing and describing phenomena as they exist naturally, without manipulation (Hall & Liebenberg, 2024). Descriptive research design was considered the most suitable approach, as it acknowledges the subjective nature of the issue, accounts for the varied experiences of participants, and presents the results in a manner that aligns closely with the language and concepts outlined in the original research question (Bradshaw et al., 2017).

In this study, a descriptive research design offered the best methodological fit to accurately describe the situation of selected universities' websites and the experiences of users when interacting with the university website. Creswell and Creswell (2018) argued that the main objective of descriptive design is to accurately depict characteristics, patterns, and trends in a given situation to understand a subject.

Hall and Liebenberg (2024) emphasised that in descriptive design, the realities of the phenomenon and participants are key, as the voices of the participants directly impact the clear picture of the situation or phenomenon. In this study, the views of users of selected universities' websites, existing universities' website design and web designers were considered. This was achieved through a description of the existing university's website, interviewing users and designers to find out what they think of the existing website. The assembled coded data from the analysis and interviews were used to develop a conceptual model for designing the university website (Muchira, 2023).

Again, the researcher adopted a studio-based research method under the qualitative research design to produce the prototype university website. Studio-based research is a unique arts-based research design that incorporates artistic practice and process as a means of inquiry and knowledge creation ((Leavy, 2020; McNiff, 2018; Sullivan, 2010). It is particularly common in disciplines such as fine arts, music, performing arts, and

design, where the design process itself serves as a form of research (Barrett & Bolt, 2007; Candy & Edmonds, 2018).

Studio-based research is an original investigation undertaken in order to gain new knowledge by means of practice and the outcomes of that practice. The central practice is primarily directed toward making artefacts or designs, whether they are visual or sound objects, installations or performances, that provide the basis of the research (Boeck & Tepe, 2021; Candy & Edmonds, 2018). In a studio-based research design, the research question emerges from the artistic practice of the artist-researcher. The methods employed are grounded in artistic processes and the use of creative materials, while the outcomes contribute both to the advancement of individual and broader artistic practices and to the wider body of artistic academic discourse. Conducted by artist-researchers, studio-based research generates unique knowledge, experiences, and insights that cannot be achieved through other research approaches (Hassan, 2023). In this context, the development of the WordPress theme and the design of the prototype UEW website could not have been possible with any of the research designs aside from the studio-based research design.

According to Batty and Kerrigan (2018), studio-based research is widely recognised within and beyond the domains of art and communication design as a legitimate research approach through which practitioners and researchers can generate and advance knowledge about design practices and the social impact of design products.

According to McNiff (2018), artistic inquiry is not limited to the production of artworks in the traditional sense but includes the design of visual systems and environments that express meaning. The prototype website, as a research artefact, functions as an “artistic presentation” and a “form of knowledge construction” (McNiff, 2018). In this context, the proposed conceptual model represents both a model for design and a reflective tool through which design decisions are critically explored. The design

and development of the prototype university website is therefore treated as an aesthetic inquiry. Each aspect of the website, its content, visual layout, user interface, and interactive features serves not only a functional purpose but also expresses a conceptual and aesthetic standpoint about what university websites should represent in a Ghanaian higher education context.

The adoption of the studio-based research design as a complement to the descriptive design was appropriate for the study because it helped the researcher to produce a WordPress theme and use it to design a prototype university website through the creative design processes. In this research, the studio functions as the space of creation and reflection, where the WordPress theme and the prototype university website were imagined, built, revised, and tested. This practice aligns with ABR's ethos of learning through making artefacts.

3.3 Population

Since this study focused on developing a conceptual model for designing university websites and using the model to develop a prototype university website, its target population included the top two world universities' websites, four selected Ghanaian universities' websites, users of Ghanaian university websites and web design experts. These groups formed the core population which the study examined and drew conclusions to fulfil its objectives (Casteel & Bridier, 2021; Creswell, 2014). The identified segments of the population were readily accessible to the study, from which the actual sampled population was drawn for empirical data elicitation for the study.

3.4 Sample and Sampling Techniques

Since it was impractical for the entire membership of the accessible population to be contacted for data, the study used purposive and convenience sampling techniques to sample a total of twenty (20) research participants, as segmented in Table 3.1

Table 3.1: Segmentation of Accessible and Sampled Population

Accessible Population	**Sample Size**
Users of university websites	14
Selected Ghanaian University websites	4
Seasoned web designers and developers	2
Total	**20**

(**Source:** Fieldwork, 2024).

Studies have shown that purposive sampling works best when the investigator has a lot of background information about the research topic (Creswell & Creswell, 2018). The homogeneous purposive sampling technique was used to sample the top four (4) Ghanaian universities' websites and the top two world universities' websites, as segmented in Table 3.4 with their Uniform Resource Locator (URL). Purposeful sampling is the most effective use of limited resources by selecting information-rich cases (Patton, 2015) for the aim of a study. Per the aim of this study, the top four Ghanaian universities' websites were chosen on the basis that they are the leading public universities in Ghana, and many learners, including those with disabilities prefer them for their higher studies and in such a case it is expected that their websites should be more user friendly and provide necessary information for users. Purposeful sampling is appropriate for researchers who want to investigate online material such as websites and web pages (Creswell & Creswell, 2018).

Table 3.2: Segmentation of Selected Universities' Website and their Domains

Selected Ghanaian Universities Website	**Domain Name**
Kwame Nkrumah University of Science and Technology	https://knust.edu.gh
University of Ghana	https://ug.edu.gh

University of Cape Coast	https://ucc.edu.gh
University of Education, Winneba	https://uew.edu.gh
Harvard University	https://harvard.edu
Stanford University	https://stanford.edu

(**Source:** Fieldwork, 2024).

Also, the expert purposive sampling technique was deployed to sample two (2) seasoned web designers and developers. These individuals have specialised knowledge in design and development of websites, which provided valuable insight, opinions and perspectives on how the Content Management System (CMS) theme "name of the UniSite" should be developed and used for designing the prototyped university website. Data to be collected from them focused on how to develop a conceptual model for designing a university website. Per their various expertise, their collective views have what it takes to develop a conceptual model to guide the design and development of the university website. In descriptive and studio-based designs, purposive sampling means that the investigator selects participants strategically, specifically because they are likely to provide information that ties directly to the study (Kristjansson-Nelson, 2020).

Finally, fourteen (14) users of the selected university's website were conveniently sampled to participate in the study. Convenience sampling collects data from whoever is willing to partake in a study, is the most approachable or is, in other ways, conveniently accessible to the researcher (Fisher & Sandell, 2015; Robinson, 2014; Staetsky, 2019). Staetsky (2019) argued that convenience sampling promotes the participants who are conveniently accessible from the population. In this study, it was practically not possible for the researcher to reach out to every single user of the selected universities' websites to share their user experiences of the websites to aid the development of the conceptual model for designing university websites and therefore, readily available users were recruited for inclusion in the sample.

3.5 Data Collection Instruments

In planning and conducting research, it is essential for researchers to clarify the instruments that are empirical enough to address the research problem (Christensen et al., 2014). Moyo (2017) is of the view that instruments for data gathering constitute a fundamental component of the research process, as they provide the basis for the quest for answers to the research questions. Haseski and Ilic (2019) argued that the data collection instrument is usually determined by the investigator and is tied to the study methodology and the research questions. This study relied on focus group discussions, observations, interviews and studio-based methods to collect qualitative data. The use of multiple data collection tools enabled the researcher to gather rich and in-depth data (Bordens & Abbott, 2018; Creswell & Creswell, 2018).

3.5.1 Focus Group Discussions (FGDs)

The study considered other data collection techniques for soliciting data from users of university websites. However, given that decisions users experience and view on the universities' websites are collective ones, the researcher felt that focus group discussions were the optimal vehicle to explore individual and group norms and attitudes toward university websites. Focus group discussion is a data collection method in which a researcher engages a group of individuals to explore a specific topic, aiming to capture the complex personal experiences, beliefs, perceptions, and attitudes of participants through moderated interaction (Hohenthal et al., 2015; Nyumba et al., 2018). According to Christensen et al. (2014), a focus group discussion involves a moderator guiding a small, homogeneous group, typically comprising 6 to 12 participants, to remain focused on the discussion of a research topic or issue. Leedy and Ormrod (2019) argued that focus groups may be beneficial when seeking collective perspectives, attitudes and

behaviour through group dynamics, such as understanding the issues users of a website face (user experience) when interacting with the website.

A focus group discussion was opted for because it gives participants the opportunity to share their views and experience while using the university website, and also listen to and reflect on the experiences of other group members. Finch et al. (2014) opined that the synergistic process of interaction among group members enables individuals to refine their viewpoints to a deeper and more considered level, generating insights that would not be attainable without the collaborative exchange inherent in a group setting.

Krueger (1994) and Morgan et al. (1998) also maintained that since all the target participants and the researcher are readily available in one location at the same time in focus group discussions, exploration of participants' opinions and views makes them particularly valuable for capturing multiple perspectives on the same topic. They can yield large volumes of data from several participants within a relatively short period. The interaction among group members further encourages participants to question one another and reconsider their personal understandings and experiences.

Studies have shown that the most compelling reason for employing focus group discussions is their ability to generate dialogue or debate on a research topic that requires collective viewpoints, as well as to uncover the meanings, experiences, and beliefs underlying those perspectives (Harisha & Padmavathy, 2013; Mfune, 2013). Thus, a focus group discussion was used, and it involved participants with common experiences together (university website users) to examine a specific topic of interest (Lune & Berg, 2017). In this study, real users of selected universities' websites and their user experiences were paramount in developing the conceptual model for university website development. Focus group discussions were useful for exploring ideas and obtaining in-depth information about how users of the selected university's website think and feel

about their university websites when using them. The discussions were beneficial for capturing diverse views, perspectives, and experiences for generating collective insights to shape the development of a prototyped university website that promotes good usability.

Moderation is central to unbiased data collection in focus group discussions. In focus group discussion (FGD) sessions, the moderator poses open-ended questions to elicit responses and stimulate debate among participants. The primary objective of the moderator is to generate the greatest number of arguments, insights, and perspectives within the limited time available (Prasad & Garcia, 2017). Nyumba et. al (2018) argue that one of the key requirements for a successful focus group discussion is a skilled and well-trained group moderator in the subject matter. In the context of the study, the moderator (researcher) has fourteen years of experience as a graphics and web design practitioner. This experience made the moderation of the discussion sessions smooth and successful. Each focus group session lasted an average of 2 hours and was tape-recorded for onward transcription.

3.5.2 Observation

There is no debate among scholars about the fact that observation is a well-established and widely accepted method of collecting data for a qualitative study. Observation is a qualitative data collection method that involves systematically watching and recording behaviours, actions, or events within their natural settings (Christensen et al., 2014; Creswell & Creswell, 2018; Marshall & Rossman, 2016). Observation can be useful in understanding how users interact with websites, as it allows researchers to capture real-time, naturalistic data that surveys or interviews may miss. In the context of website design, observation helps to analyse user behaviour, navigation patterns, and usability issues directly on the website.

Observation can be used to identify pain points in navigation, functionality, and overall user experience (UX). According to Nielsen (2018), usability analysis through observation can reveal usability issues that users themselves may not be able to articulate. This makes observation invaluable in improving website interface design. From providing academic resources to acting as a marketing tool for prospective students, university websites serve multiple purposes. Observing existing user interface design can help designers understand how users interact with these complex sites. By observing design patterns and information architecture of a website, designers and developers can note how easily users navigate the admissions page or how effectively they find course information to inform future updates or design.

Norman's (2013) study revealed that usability testing involving observation significantly improves website user satisfaction and website performance. For instance, in a study conducted on universities' websites in Egypt, the researchers used observation to identify specific areas where users struggled, such as finding academic calendars or course prerequisites (Hosseine et al., 2021). This feedback led to targeted redesigns that improved user interaction and overall satisfaction.

This current study employed structured observation to assess the state of selected universities' websites. Structured observation provided the researcher a direction for observing the selected websites: what was to be observed, how it was to be observed, and how the data were to be recorded and controlled (Smritirekha, 2019). The researcher developed an observation guide informed by the literature, Webometric guidelines for university website ranking, and Harvard University and Stanford University website design (see Appendix D). The observation involved a thorough interaction with the information architecture of the selected websites in order to guide the development of the conceptual model for university website design and development.

3.5.3 Semi-Structured Interview

In general, interviews can be classified into three types: unstructured, semi-structured, and structured (closed) interviews. Among these, unstructured and semi-structured interviews are the most commonly used instruments in qualitative research. Given that this study has a defined scope and boundaries, the semi-structured interview was deemed the most appropriate data collection method. An interview, in this context, is a research technique that involves asking questions to gather data from individuals who possess relevant knowledge, experiences, or opinions on the subject matter under investigation. Cresswell and Cresswell (2018) clarify that an '*interview*' is typically a face-to-face conversation between a researcher and a participant involving a transfer of information to the interviewer. Interviews provide researchers with an opportunity to delve deep into the experiences, thoughts, and perspectives of an individual, thus enabling a comprehensive understanding of complex phenomena under study (Haseski & Ilic, 2019). The choice of interviews as a data collection instrument for the study was the investigator's interest to understand the lived experiences of the study participants and the meaning they make of such experiences (Cresswell & Cresswell, 2018; Christensen et al., 2014). The study adopted semi-structured interviews.

A semi-structured interview is a qualitative research method that employs a pre-determined set of open-ended questions designed to prompt discussion while allowing the interviewer the flexibility to probe further into particular themes or responses as they emerge (Creswell & Creswell, 2018). DeJonckheere and Vaughn (2019) argue that using semi-structured interviews for data collection allows the investigator to gather information from key participants who have personal experiences, perceptions, attitudes and beliefs related to the topic of interest. Furthermore, semi-structured interviews involve the preparation of a set of guiding questions in advance; however, these questions are intentionally open-ended, allowing for the development of subsequent questions that

cannot be predetermined but must instead be carefully improvised in response to participants' answers (Creswell & Creswell, 2018; DeJonckheere & Vaughn, 2019). Cohen et al. (2008) clarified that a semi-structured interview is generally employed in a qualitative study where an interview schedule (list of questions, probes, items) is prepared that is sufficiently open-ended to enable the contents to be reordered, new avenues to be included, and further probing to be undertaken. In this study, an interview guide inspired by the research questions was developed, reviewed by the researcher's supervisors, streamlined, pretested, and, when found to be robust, used for data collection. This enhanced the trustworthiness and authenticity of the data collected for the study.

The semi-structured interviews were useful in contextualising the variables under discussion and, at the same time, creating a conducive atmosphere for both the interviewer and interviewee to engage in detailed discussions on the variables related to the research questions (Creswell & Creswell, 2018; DeJonckheere & Vaughn, 2019). This approach enabled the study to explore participants' views, experiences, and values, thereby providing a more in-depth understanding of the factors affecting university website design from experts' points of view and issues that emerged when interacting with the university website (user experience).

Before conducting the interviews, Robson (2011) recommends that interviewers prepare introductory comments and an orderly list of questions for informants to respond to. Probes and prompts are common techniques used to encourage participants to elaborate further, often guided by the interviewer's intuition that the informants have more information to offer (Robson, 2011). In this study, two semi-structured interviews were conducted with web developers, and the entire data collection process spanned four weeks. The first two weeks were dedicated to developing interview questions and protocols, followed by a pilot interview with two simulated interviewees. Amendments

were made to the protocol after the pilot to ensure the avoidance of leading questions, double-barrelled questions, and jargon or ambiguous wording that could confuse participants in the actual interviews. During the main data collection phase, the interview protocol (i.e., the procedures and a list of questions prepared beforehand; Appendix F) served as an introduction, with easier, general questions asked first to help interviewees "warm up." All interviews followed the same sequence of questions, while probes and prompts were strategically used to elicit more detailed responses.

Each face-to-face interview took about thirty (30) to forty-five (45) minutes and was digitally recorded in a quiet setting. The recordings were later reviewed and transcribed. To ensure reliability, validity, and alignment with the study's objectives, the researcher conducted follow-up telephone calls to clarify any ambiguous statements made during the interviews.

3.6 Data Collection Procedure

In addressing research question one, which sought to examine the current state of selected Ghanaian universities' websites against the best practices, the researcher observed existing universities' websites. In this study, the researcher chose University of Ghana (ug.edu.gh), Kwame Nkrumah University of Science and Technology (knust.edu.gh), University of Cape Coast (ucc.edu.gh) and University of Education, Winneba (uew.edu.gh) and compare the Harvard University (harvard.edu) and Stanford University (stanford.edu), the world best university websites design, according to Webometric current ratings of world best university website (Webometric, 2023).

The researcher conducted an empirical study to observe the websites of the four selected Ghanaian universities based on design and usability, content, accessibility and inclusive functionality, engagement, technology and performance, interactivity, information architecture, and social media integration against the world's best university

websites (Harvard University and Stanford University). Observation was employed for manually conducting the selected university websites. The rationale for employing observation was that the technique is popular in website evaluation (Nurdin & Aratusa, 2020) and has been used in similar studies. For instance, Mimbi and Lehong (2017) observed national government websites in ten countries of the Southern Africa Development Community (SADC) to determine their interactivity, usability and maturity. In addition, a website observation and content analysis study was conducted by Kaaya (2004) to assess the state of government websites in Kenya, Uganda and Tanzania using usability and visibility attributes. Also, Anyaoku and Akpojotor (2020) observed university library websites in South-South Nigeria. Based on the aforementioned rationale, the observation technique was deemed appropriate for the study to assess the presence or absence of the select universities ' website features and textual information for making valid inferences against the best practices.

The researcher accessed the selected universities' websites directly, reviewed them and conducted an in-depth content analysis and visual analysis of the websites. Specifically, the researcher focused on key indicators as stipulated in the observation guide. Appendix E shows the attributes that were used to assess the design and usability, content, accessibility and inclusive functionality, engagement, technology and performance, interactivity, information architecture, and social media integration of the selected websites to identify whether they are available or not. The assessment of the websites was carried out from August to December 2024.

To answer research question two, which sought to investigate the user experience of selected universities' websites, the researcher invited participants for a focus group discussion through advertisements on various notices of selected universities' campuses. The adverts captured detailed information (date, time, venue and purpose) about the

study. Approval was sought from selected universities' authorities before engaging the participants.

The researcher held two focus group sessions (14 participants in total). Readily available participants were recruited for inclusion. Seven participants per group were found to be ideal. This number is an ample amount to gain insight from different user groups (students and staff), according to Jakob Nielsen, a renowned personality on web usability. Christensen et al. (2014) suggest that seven participants per group in a focus group discussion is large enough to encourage participation, yet small enough to be inclusive and facilitate recording. Keeping a smaller group on restricting the size of the group also prevents “splinter group” formation, which usually happens to some degree with a large group in a focus group discussion. According to Christensen et al. (2014), the existing rule of thumb for effective and smooth focus groups that homogeneous groups (university students and staff) tend to encourage discussion and promote sharing of views. In this study, all participants were homogeneous in respect of key attributes: they were all users of the university website, and the students were allocated to separate groups in order to encourage discussion (Christensen et al., 2014).

Connelly (2015) recommends conducting between two and three focus groups, noting that having only one group can be problematic, as one group may be idiosyncratic, making it difficult to distinguish unusual perspectives from common ones. In this study, two focus groups were conducted due to resource constraints. The researcher observed that the second group had reached theoretical sufficiency, as no substantially new or salient views on the topic were emerging (Connelly, 2015). Each session lasted an average of 2 hours and was overseen by a main facilitator (researcher) and two assistant facilitators. The main facilitator explained the research purpose and guidelines, encouraged open discussion and allowed the participants to freely share their opinions on their university website. Opinions related to the need for an improved university website,

satisfaction with use, preferred university website, and desire for a user-friendly website were collected. The focus group discussions were digitally recorded. Several voice recorders were used to ensure multiple backups of the discussions. This approach made it easier to capture contributions from softly spoken participants and provided the researcher with several recordings to consult during transcription.

3.7 Validation of Instruments

Based on the research objectives, an observation guide was developed to reflect the constructs identified in the relevant literature for this study. Copies of the instrument were shared with colleagues for peer review, and senior web designers and developers were consulted for their expert contributions. In addition, input was sought from experienced researchers from other universities, both locally and internationally, to enhance the validity and comprehensiveness of the instrument. The final instruments were submitted to the researcher‘s supervisors for input and final validation. The researcher conducted a pilot study with selected members of the population. This helped the researcher to refine the instruments to establish reliability and adequacy for the interview and document review. Some of the questions were dropped since they showed a repetition of the responses. The final instruments were used for the actual administration and review of the existing university's website.

3.8 Method of Data Analysis

Data analysis in a qualitative study such as this is crucial as it allows the researcher to weigh the worth of the data collected and to eliminate contradictions and irrelevant evidence (Leedy & Ormord, 2019). Ravindran (2019) argues that in qualitative data analysis, the researcher attempts to understand the meaning behind the actions and behaviours of participants. This study employed visual analysis, content analysis and thematic analysis as data analysis methods.

3.8.1 Visual Analysis

Visual analysis is recognised as a valid qualitative data analysis that focuses on interpreting visual materials to understand the messages they convey, their cultural significance, and their effectiveness in achieving their purposes (Rose, 2016). This method of analysis is commonly used in graphic design studies, media analysis, art history, and user interface design. Visual analysis has been employed by Thwairan (2024) to explore the impact of all visual elements in website design. In the context of this study, visual analysis helped the researcher to assess the selected universities website design elements such as design and user experience, interactivity, clarity and accuracy of information architecture, multimedia components, functionality, technology and performance, social media integration, emphasising how the aesthetic and functional elements that influence user experience and engagement adhere to industry best practices using Stanford University and Harvard University websites design as benchmark.

The visual analysis of selected universities' websites against the best practice was performed based on the following attributes:

1. **Visual Hierarchy:** how elements are arranged on the website to guide the user's attention, ensuring that the most critical information stands out.
2. **Typography:** involves the selection of fonts, sizes, and spacing to enhance readability and brand identity
3. **Colour Schemes:** How the university website predominantly uses institutional colours to reinforce its visual identity and the mood of the website,
4. **Imagery and Graphics**: How photographs, campus landscapes, student life, and faculty interactions are showcased to appeal to prospective students and the general public.
5. **Layout and Navigation:** Ease of finding information and logical flow of content, clear and consistent menu structure, breadth and depth of navigation options and presence of a

search bar for quick access.

6. **Responsiveness:** Website adaptability on smartphones, tablets, and desktops.
7. **Depth and Breadth of Information on Academic Programmes**: Check for the organisation and comprehensiveness of programme details (e.g., degree structure, course modules, career opportunities)
8. **Research**: Observe how research activities are highlighted, such as dedicated pages for publications, ongoing projects, and funding sources.
9. **Faculty:** Assess the presentation of faculty profiles, including bios, research interests, courses taught and publications.
10. **Page Loading Speed and Performance:** Assess the time it takes for main pages (home, academic, admissions) to fully load and identify loading spinners, lazy-loading images, or placeholders.
11. **Security and Data Privacy Measures:** Look for visible security markers such as HTTPS (padlock symbol in the browser address bar), Presence of trust seals or certifications (e.g., SSL, PCI DSS)
12. **Presence and Activity on Various Social Media Platforms:** Observe the integration of social media links and activity feeds on the website.
13. **Online Application and Admission Processes:** Assess the clarity and ease of use for the application process, use of progress indicators to guide users through multi-step processes and visibility of help sections or live support for applicants.

The above attributes were inspired by the literature and the researcher's experience as a practitioner of graphic design and web development. Again, the attributes have been incorporated into the design and development of both Harvard University and Stanford University websites, which the current study used as a benchmark for the analysis.

3.8.2 Thematic Analysis

Thematic analysis is a qualitative method used to identify and interpret patterns or themes in a data set (Elliott, 2018; Naeem et al., 2023). It involves the identification and reporting of patterns in a data set, which are then interpreted for their inherent meaning (Liebenberg et al., 2020; Xu & Zammit, 2020), these patterns can be found on the basis of understanding the meaning of the keywords used by participants. A theme in this context relates to a meaning derived from the data that is in line with a research question (Liebenberg et al., 2020). The following are the steps followed by the researcher to analyse data from the focus group discussions and the interviews:

1. Data Preparation and Familiarisation: First, the researcher collated all recorded data from group discussions and the interview and field notes and produced a verbatim transcription. Then, the researcher backs up all data to ensure the safety of the data in the event of damage. Next, the researcher masked all the names of respondents to maintain the anonymity of the respondents. Moreover, the researcher ensured that the data was securely kept to protect confidentiality. Finally, the researcher read through the data several times. This was necessary as studies contend that researchers need to immerse themselves in qualitative data to become familiar not only with the raw data but also to have firsthand knowledge of the depth and orientations of the contents of the entire raw data generated by the study (Leedy & Ormrod, 2019; Oranga & Matere, 2023). Having fully familiarised with the entire data set and coming to terms with the depth and orientation of the contents of the raw data, the study proceeded to the next phase of the analysis process, thus generating initial codes.

2. Generation of Initial Codes (Coding): This stage mainly involved finding issues, views and opinions that emerged throughout the transcribed data that were collected from participants. Codes are labels given to phrases, expressions, behaviours, sentences and images as the researcher goes through the data (Morse & Richards, 2002). The study

adopted a manual open coding approach. The coding process was therefore conducted without the use of prior codes (pre-set codes) as a guide, but codes were inductively generated during the coding process in order not to miss any important and unexpected opinions, thoughts and expressions. The inductive approach helped the researcher to capture valuable issues, perceptions and thoughts. This was done through a careful reading of data several times to detect both conspicuous and latent themes and concepts that keep emerging from responses, even though the group discussion guide and interview questions were not directly designed to address them. To eliminate or minimise overlapping of codes, the coding process was well-defined with each code being a generic word and sometimes a phrase that symbolised a summative, salient, and evocative attribute of the data set, as affirmed by studies (Dawadi, 2020; Mohajan & Mohajan, 2022). After the entire data set was coded, the researcher collated the data according to their codes, which led to theme searching, the next phase of the thematic analysis process.

3. Searching for Themes: This phase, as suggested by Braun and Clarke (2006), began with a long list of the codes that were identified across the data set. The main purpose of this phase was to find out the patterns and relationships between and across the entire data set (Nowell et al., 2017). With a meticulously coded and collated data set, the researcher proceeded to manually search and sort the coded data into various categories of central themes and sub-themes of similar meanings, patterns or trends. Therefore, it was important to conceptualise those codes as the building blocks and combine similar or multiple codes to generate potential themes in relation to the research questions (Nowell, 2017). The combination of the codes into themes was not casually done, but involved thorough comparative and contrastive analysis of the individual codes to establish their relationship with and amongst each other and which theme a code best aligned with. The theme formulation was done taking into consideration the specific objectives and

research questions the study set out to achieve or answer. After the searching, sorting and collation of the various codes into themes and subthemes, all other codes that did not fit well into the initially categorised schemes were not abandoned but temporarily incorporated into a miscellaneous theme for further review, as concurred by previous studies (Nowell et al., 2017; Braun & Clarke, 2006). Nowell et al. (2017) affirm that it is important not to abandon data or codes at the initial theme-searching stage, as it is uncertain whether the initial themes generated will hold, or be combined, refined, separated, or discarded. Having organised the coded extracts into central themes, sub-themes and miscellaneous themes, the researcher progressed to the fourth stage of thematic analysis, thus reviewing themes.

4. Reviewing of Themes: At this stage, all the themes (master themes, main themes and sub-themes) were intentionally brought together as it was aimed at the refinement of those initially grouped themes and presentation of those themes more systematically. The review specifically involved a careful examination of the coded raw data extracts that constituted each theme to determine whether they formed a coherent pattern as well as whether the individual themes accurately and authentically reflected the meanings that inherently embody the data set as a whole. Reviewing coded data extracts in themes to ensure their coherence, accuracy and authenticity (Braun & Clarke, 2006; Dawadi, 2020; Naeem et al., 2023; Nowell et al., 2017). Through the review, wrongly coded data extracts, misplaced extracts, and irrelevant themes were detected and refined through recoding, re-assignment or movement of coded extracts from one theme to another other as well as collapsing and merging of some themes into more coherent, accurate and authentic themes that holistically reflect the data set.

5. Defining and Naming the Themes: This phase began with an aim of further refining and defining the themes, that is, "identifying the essence of what each theme is about (as well as the themes overall), and determining what aspect of the data each theme

captures" (Braun & Clarke, 2006, p.92). For the benefit of the doubt, the data excerpts of each theme were finally refined to ensure that they were succinct, sound and represented the data set as a whole. This was carefully done to ensure that the themes formed identify the 'story' that each theme told, and how it fitted into the broader overall 'story' that the researcher wanted to tell about his data in relation to the research questions and to ensure that there was not too much overlap between the themes. After the final refinement of all the central and sub-themes and with the surety that the themes were coherently and authentically organised, the researcher proceeded to name them. As Braun and Clarke (2006) have recommended, the names given to the themes were punchy, brief, clear and suggestive of the contents of the theme. For each theme, the researcher explicitly defined its essence by providing a detailed contextual analysis of the narratives behind it. As part of providing an explicit definition of the themes, the researcher carefully demonstrated the story told behind each theme, and how each theme fitted into the broader overall story told by the data set concerning the research questions (Dawadi, 2020; Nowell et al, 2017; Braun & Clarke, 2006). Having succinctly defined and aptly named the themes, the researcher proceeded to the final stage of the thematic analysis, thus producing the final report.

6. Producing the Final Report: In this final stage of the thematic analysis, the researcher adopted a qualitative descriptive analytical procedure to present a detailed report of the study's findings. The final report was written in a manner that tends to sufficiently convince readers about the merit and authenticity of the findings of the study as a notable part of the thematic analysis process (Braun & Clarke, 2006). By so doing, the researcher systematically provided a concise, coherent and logical evidential account of the findings of each theme as well as drew the synergic relationship that existed between and across all the themes. Also, examples and extracts in the form of essential data extracts (participants' verbatim accounts) were adequately incorporated, interpreted,

and explained not only to authenticate the trustworthiness of the study's findings but also for easy comprehension of the study in its entirety.

3.8.3 Content Analysis

Content analysis is a widely used research method for systematically analysing textual, visual, or audio content (Creswell & Creswell, 2018; Leedy & Omrold, 2019). In this study, the content analysis method was adopted to explore the websites of selected universities. It enables researchers to interpret patterns, themes, and meanings within qualitative data (Krippendorff, 2013). Content analysis enabled the researcher to conduct an in-depth review of the content of the websites of the selected universities.

Content analysis is one of the most suitable instruments applied by many researchers to observe and identify the specific information content and other characteristics of the messages. Again, content analysis was employed because it has been used in similar studies to identify usability issues and improve libraries and universities' website design and development (Dei, 2024; Farid et al., 2023; Kumar, 2023; Pant, 2015; Rahman & Batcha, 2020; Richardson, 2023). The researcher accessed the selected universities' websites directly, reviewed them and conducted an in-depth content analysis of the websites using the guidelines provided in Appendix D.

3.9 Ethical Considerations and Trustworthiness of the Study

This study was conducted in accordance with ethical guidelines and standards for research involving human participants. The researcher executed all ethical procedures and practices by researchers in conducting the research. The researcher avoided plagiarism by ensuring that works of scholars which were used to buttress the analysis of findings, and in the literature review, were duly acknowledged in-text and listed in the reference section.

In conducting research, Creswell (2014) instructed researchers to seek or obtain permission from the authorities in charge of the site of the study because it involves a prolonged and extensive data collection. In order not to violate the principle of informed consent as recommended by Creswell (2014), a letter of introduction was sent to the university's authorities and web developers to seek permission before the conduct of the study. In the letter, the purpose of the study was clearly stated to both the participants and the authorities.

Next, the researcher reassured all participants that they were at liberty to withdraw from the study without any limitations. Again, the researcher guaranteed all participants that their responses were purely for research purposes, and as such, their identity would not be exposed, as some have strongly indicated. The next ethical issue discussed was confidentiality and anonymity. Confidentiality indicates the researcher's ethical obligation to keep the respondent's identity and responses private (Creswell & Creswell, 2018; Patten & Newhart, 2017). In this study, the researcher ensured that the information provided was not shared with any other user. The information was used for the research. Anonymity was used to protect participants' 'right of privacy'. Participants were therefore considered anonymous when the researcher or another person could not identify the participants from the information provided (Patten & Newhart, 2017). In this study, anonymity was achieved by not asking participants to mention their names during the focus group discussion sessions and the interviews.

To ensure credibility, transferability, and dependability, the researcher used different methods like in-depth interviews, observations and visual study with instruments that were formulated based on key themes from the reviewed literature and variables of the conceptual framework for this study. This approach allowed for the triangulation of data to help compensate for participants ' personal differences and the researcher's extreme biases.

Furthermore, the researcher made use of peer scrutiny to examine the research throughout the study, which allowed other perspectives and prevented pitfalls that may show up due to the researcher's attachment to the study. Also, the analysis of the findings was compared to the previous body of literature studies. To ensure the quality of responses, the researcher frequently briefed the researcher‘s supervisor, experts, experienced researchers who had done related studies, practitioners and colleagues. This helped the researcher acquire the views and perspectives on the research, which helped shape the study. Finally, the researcher's background, qualifications and knowledge as a web designer and researcher helped in collecting quality data.

3.10 Production Equipment, Devices, Tools, Materials and Technologies Used

In answering research questions four and five of the study, the researcher adopted a studio-based research method under the qualitative research design to produce the prototype university website. As it has been alluded to by Barrett and Bolt (2007), the studio-based research method is geared towards an approach that focuses on producing tangible artefacts (website) that are based on their theory as well as practice in the studios. In other words, studio-based research combines the use of theories and methods to produce a creative piece, which differs from the already known research process (Puadi et al., 2020). The adoption of a studio-based research method for the study meant that the researcher used some materials, tools, equipment, as well as technologies to design and develop the prototype university website (Afriyie et al., 2022). Designing a university website requires a combination of design, development, and optimisation tools to ensure a functional, visually appealing, and user-friendly experience. Several software applications and other technologies were employed throughout the design and development of the prototype university website.

3.10.1 Computer

The computer played a significant role throughout the design and development process. The computer was used in coding the website's structure, functionality, and styling, as well as to manage files and organise assets for the CMS theme development and to prototype university website design. Again, it was used for testing and debugging the prototyped website across different browsers, devices, and screen resolutions to ensure optimal performance and usability (Rognerud, 2014).

3.10.2 WordPress

WordPress is the most widely used Content Management System, powering over a third of all websites globally (WordPress.org, 2024). It offers a range of customizable themes and plugins that allow designers to create websites tailored to specific needs. WordPress also supports SEO tools, responsive design, and e-commerce capabilities through plugins like WooCommerce.

3.10.3 Adobe Photoshop CC 2024

Adobe Photoshop is a powerful and versatile industry-standard software application used primarily for image editing, graphic design, and digital art creation (Faulkner, 2020). Photoshop was used for editing high-quality visuals and optimising them for the prototyped university website.

3.10.4 Adobe Dreamweaver CC 2024

Adobe Dreamweaver is a comprehensive visual and code-based website design application. It supports multiple programming languages like HTML, CSS, JavaScript, and PHP, making it a versatile tool for web developers and designers to develop websites. It also provides syntax highlighting, code suggestions, and error checking, making coding more efficient and less prone to mistakes (Cavanaugh & Schwartz, 2016).

It was used as a code editor for coding the WordPress theme, which was later used for designing the prototyped university website.

3.10.5 Programming Languages

A programming language for website design refers to a set of instructions or code that developers use to create, design, and manage websites. Programming languages were crucial for website design and development of the prototyped university website. These languages enable the structure, functionality, aesthetics, interactivity, and data management of a website.

HTML, which stands for Hypertext Markup Language, was used to define the structure and content of a webpage. It organises web elements such as text, images, links, and multimedia by marking them up with tags that browsers interpret. Without HTML, browsers cannot display content in a structured manner.

Cascading style sheet (CSS) is a style sheet language used to apply styles to the HTML structure of the website, including fonts, colours, spacing, and layouts. It enables responsive design, which adjusts the website's layout to fit different screen sizes, ensuring a consistent user experience across devices.

PHP is a server-side scripting language used to build dynamic websites. It handles tasks like form submissions, user authentication, and file upload. This scripting language was mainly used to build the CMS theme and interactive component of the prototyped university website

MySQL is a database management system used to store, retrieve, and manage data in an organised way for websites. It handles large datasets securely, making it ideal for high-traffic university websites. Integrated with PHP, MySQL was used to store and manage data for the prototyped university website.

3.10.6 WordPress Starter Theme

A WordPress starter theme is a basic, unstyled theme framework that developers use as a foundation for creating custom WordPress themes. It includes minimal styling and essential functions, allowing designers to customise from a basic structure without building from scratch. It also enhances theme performance and compatibility with WordPress standards.. It was used for building the main theme for the prototyped university website.

3.10.7 Local Server

MAMP (Mac, Apache, MySQL, PHP) is a simulated server on the local machine used for web development. This was used to test the website offline without an internet connection or a live server, making debugging and optimisation easier.

3.10.8 Hosting Server

A web-hosting server is a specialised system (hardware or software) that stores, processes, and delivers websites and web applications to users over the internet. It was used to provide the infrastructure and resources needed to make websites accessible to users globally.

3.11 Summary of Methodological Choice

In summary, this study has adopted an arts-based research paradigm. In view of the nature of the research questions and multiple perspectives, the study dealt with both descriptive and studio-based research designs. Focus group discussions, observations and interviews were used as the appropriate data collection instruments for the first phase of the study. Visual analysis, thematic analysis and content analysis were employed as data analysis methods for the study. The conjuncture derived from the first phase was then developed into a conceptual model for the second phase of the study. Finally, a studio-

based research design was employed for the development of the WordPress Content Management System (CMS) theme, which was used for the design and development of the prototyped university website. Various production materials, tools and technologies used have been elaborated.

CHAPTER FOUR

PRESENTATION OF FINDINGS AND DISCUSSION

4.0 Overview

This chapter presents the data analysis, results and discussion of the data gathered from the research participants. It is divided into two major parts. The first part focuses predominantly on answering the research questions 1 and 2: what is the current state of selected Ghanaian universities' websites against the best practices? And what are the experiences of users when interacting with the selected Ghanaian universities' websites? Answering the questions provided the contextual elements of the proposed conceptual model developed in the second part. Hence, the outcome of the first part was to present the key elements that were to be incorporated into the proposed conceptual model to guide the design and development of the university website. The first part involved a thorough examination of existing selected universities' websites and provided suggestions and improving the university website design. Also, real users' feedback and expectations were incorporated into the proposed conceptual model.

The second part dealt with answering the research question 3: what conceptual model can be developed for designing the Ghanaian university website? Answering the question satisfies the primary aim of the study: to develop a conceptual model to guide the design and development of a university website. Specifically, views were obtained from web design experts for the derived design components to be included in the conceptual model.

4.1 Analysis of Research Question One

The first research question sought to find out the current state of selected Ghanaian universities' websites in relation to the best practices. The findings are presented below.

4.1.1 Website Homepage and Access through Search Engines

A university website homepage, also known as the welcome page, is the main entrance page of a university's website, serving as a gateway to the institution's online presence. The primary purpose of a university's website homepage is to offer a brief introduction to the university, its mission, values, academic programmes and students' lifestyle on campus. It also provides easy access to intuitive navigation to various sections of the website, such as admissions, campus tour, research, etc.

The homepage of the University of Ghana (UG) website is organised with a top header navigation bar providing quick links for students, alumni, faculty, staff and a functioning search bar. The main navigation menu offers access to sections such as About UG, Academics, Admissions, Research, News, and Student Life. This hierarchical structure ensures intuitive navigation, allowing users to locate information efficiently. The inclusion of a search bar on the homepage further enhances user experience by directing visitors to search essential resources that do not have primary navigation on the homepage.

Also, the homepage of the University of Ghana (UG) website featured a photo slider of the university's recent and upcoming events, enriching the website's visual appeal and keeping the university community informed. However, some of the images used on the homepage look pixelated. The UG homepage employs clear and legible sans-serif fonts, maintaining consistency across the homepage. The use of contrasting colours and adequate white space also ensures readability, catering to diverse audiences including current students, staff, and prospective students.

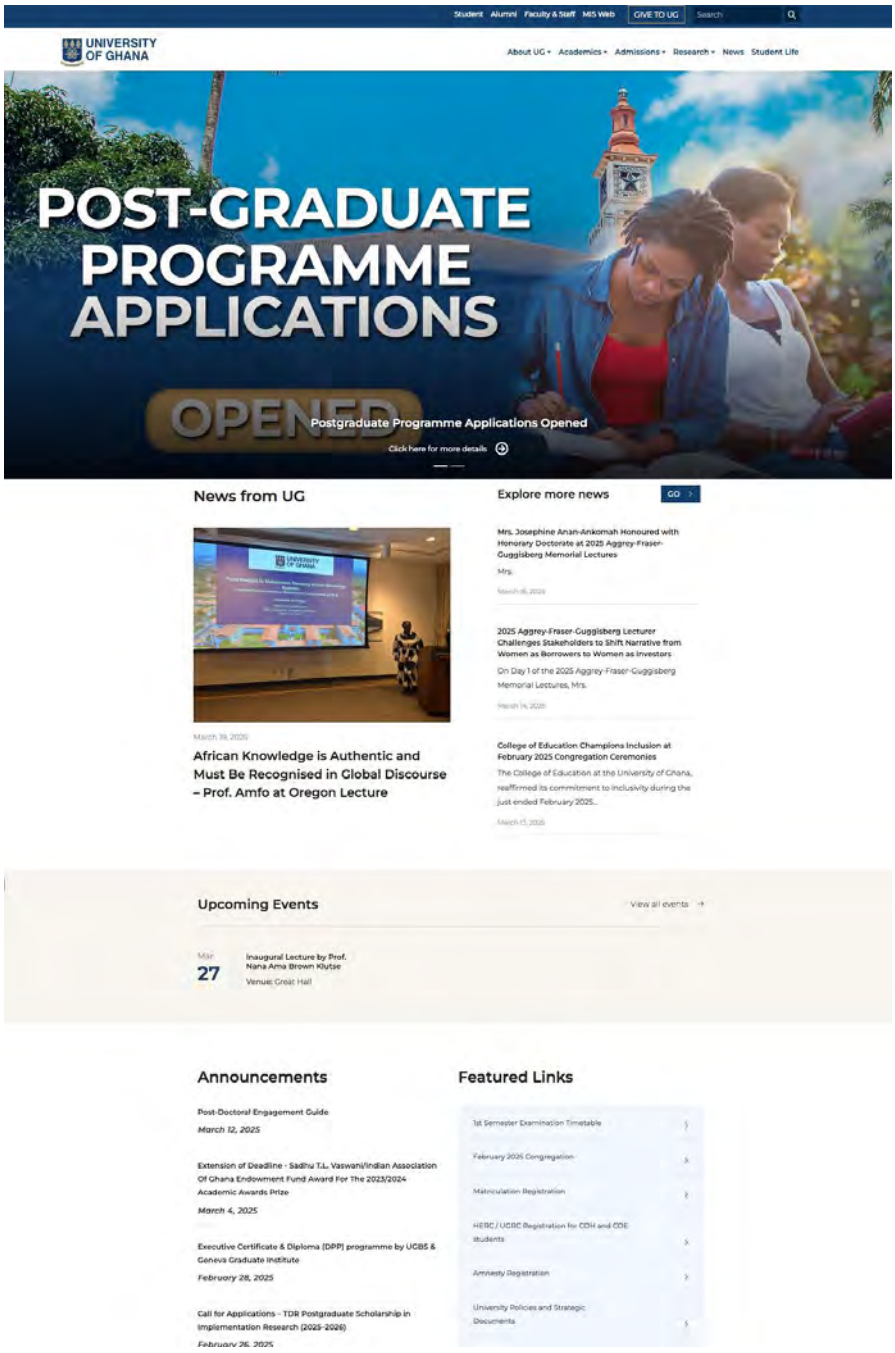

Figure 4.1: Screen Shot of University of Ghana Website Homepage

Source: Researcher's Gallery (2024).

The University of Education, Winneba (UEW) official website homepage presents a structured and user-friendly design, aligning with the institution's commitment to educational excellence. The website predominantly features the university's official colours - red, blue, and white.

The homepage is organised with a top header navigation bar providing quick links to essential sections such as Ajumako, CODel, Staff Page, Alumni, Downloads and Contacts. The main navigation bar provides links to academic-related issues such as Admissions, Academics, Research, and Media. This hierarchical structure ensures intuitive navigation, allowing users to locate information efficiently.

Again, with a photo sliders and a plain background, the homepage of the website gives a new look to the entire website. This slider showcases vibrant images of diverse activities and events happening at the university, such as conferences, admissions, seminars and matriculation. However, the UEW homepage has two different photo sliders, with the second one being “below the fold” that users must scroll down to see. Again, there is no student-related campus activity featured on the homepage slider. There are also sections for announcements and upcoming events.

Figure 4.2: Screen Shot of UEW Website Homepage

Source: Researcher's Gallery (2024).

Similarly, the homepage of Kwame Nkrumah University of Science and Technology (KNUST) is also attractive with high quality photo slider. The Kwame Nkrumah University of Science and Technology (KNUST) official website presents a structured and user-friendly design, reflecting the institution's dedication to technological advancement and academic excellence. The homepage predominantly features the university's official colours: gold, green and black, reflecting the colours of its logo. The homepage is organised with a top header navigation bar providing quick links to essential sections such as Home, About Us, Academics, Admissions, Research, Media and Press, Students, Staff and Alumni. This hierarchical navigation structure helps users to locate information efficiently on the website.

Also, the homepage of the KNUST website features a photo slider with high-quality images highlighting upcoming events, academic programmes, campus life, and academic activities, enriching the website's visual appeal and keeping the university community informed. The inclusion of featured links and the search button further enhances user experience by directing users to essential resources like past events that are no longer available on the homepage.

The website employs clear and legible fonts, maintaining consistency across pages. However, the serif font was used in some cases for other navigational items, making text difficult to read on smaller screens. The use of adequate white space and contrasting colours ensures readability, catering to diverse audiences, including prospective students, current students, staff, and researchers.

Designed to be responsive, the homepage of the KNUST website adapts seamlessly to various devices, including desktops, tablets, and smartphones. This adaptability ensures that users have a consistent and accessible experience, regardless of the device used.

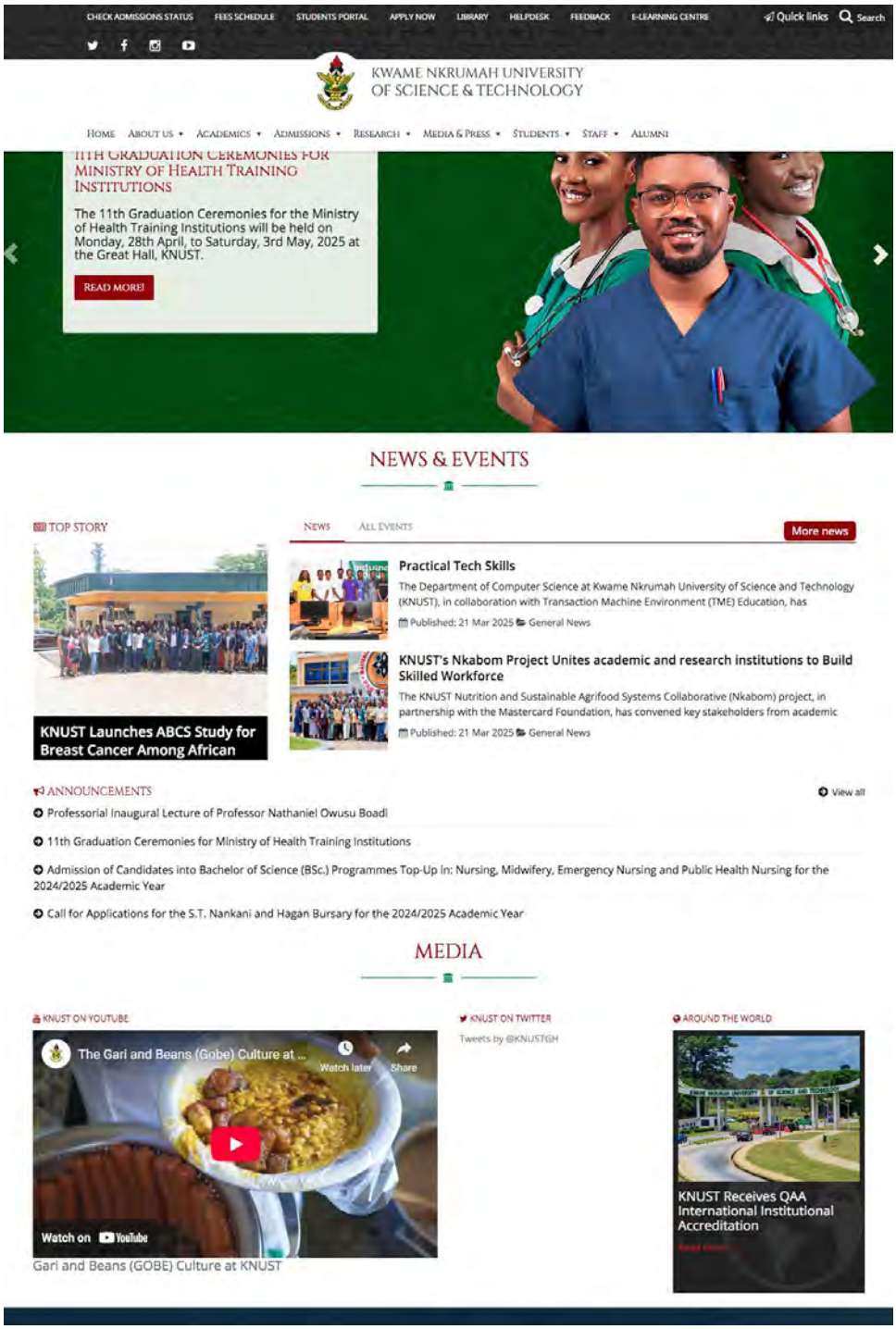

Figure 4.3: Screen Shot of KNUST Website Homepage

Source: Researcher's Gallery (2024).

The homepage of the University of Cape Coast (UCC) website seems to have three images as a photo slider, but aside from the first banner that is displayed, the two other

banners do not display on the homepage. The homepage is designed with multiple colours that give a decent look to its interface.

Figure 4.4: Screen Shot of UCC Website Homepage

Source: Researcher's Gallery (2024).

All the selected universities' websites contain useful content presented on their homepages. In addition, all four (4) websites feature homepage links that begin with the

most important keywords, enhancing search engine optimisation. Each website displays a clear page title, which improves visibility in search engine results. Furthermore, the homepages of all the websites have memorable URLs, facilitating easy recall by users. By looking at all four (4) selected universities' websites, a first-time user will know the website is an academic website and understand where to start, etc.

On the homepage of all selected universities' websites, there are no resources or support for current students, faculty members and even prospective students who are struggling to navigate the website.

Also, poor search optimisation, including irrelevant results that negatively impact user satisfaction, was also observed on almost all the selected universities' websites' homepage. Users usually prefer using a search function on the university website rather than clicking through multiple menu layers, especially when visiting the website for the first time to access content that does not have a direct menu in the navigational structure.

In observing how the four selected universities featured success stories of their current students and alumni on their homepage to entice the general public, especially prospective students, none of the four selected universities featured testimonials on the homepage of their homepage. However, few success stories were found on subpages under Admissions on the UCC website. Interestingly, while searching all four selected universities' websites through popular search engines like Google, all four universities were easily accessible and were able to be found through the search engines.

4.1.2 Domain and Security

A domain name serves as the digital identity of an organisation, enabling users to access websites easily. In the context of universities, a well-structured domain name enhances credibility, accessibility, and search engine optimisation (SEO). Globally, educational institutions opt for domains ending in .edu or country-specific (.ac, .uk, .gh) to establish

legitimacy. A university's domain name influences brand perceptions, with well-chosen names reinforcing institutional identity, improving search rankings and online visibility. A concise domain names enhance usability, and users can easily recall it. The domain names of all four selected universities' websites are very easy to remember. The website's URL consists of at least 2-5 letters using .edu and country-specific (ug.edu.gh, ucc.edu.gh, uew.edu.gh and knust.edu.gh), which is easy to remember and establishes legitimacy.

With reference to security, all four selected websites secured their domains. Privacy and security are indicators of trust in a website, which in turn persuade user engagement. HTTPS encryption at the beginning of the URL is essential for safeguarding a website from cyber attacks or hacking. HyperText Transfer Protocol Secure (HTTPS) is a critical security protocol that encrypts data exchanged between users and websites. For university websites, HTTPS ensures secure communication, protects sensitive information, and enhances credibility. From figure 4.5, it is clearly evident from the browser that all four selected websites were secured with HTTPS encryption, informing faculty, students and visitors that the website is safe and secure to use.

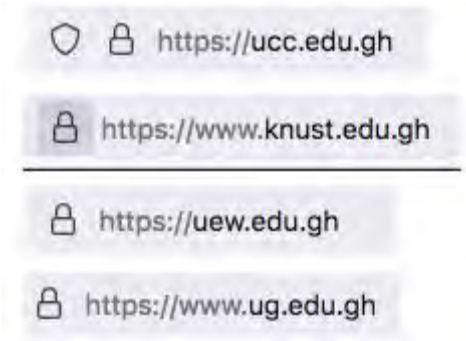

Figure 4.5: Domain Names of Selected Universities' Website

Source: Researcher's Gallery (2024).

4.1.3 Page Layout and Visual Design

Page layout and visual design are essential aspects of website design and development that attract and sustain visitors on the website. The page layout and visual design of these websites significantly influence usability, accessibility, and overall user experience. Page layout is how well the content, images, icons, and other elements on a webpage are arranged, while visual design is the aesthetic aspects of the overall website, including colour scheme, imagery, typography, etc. The visual design of a website has a substantial impact on its usability, particularly in terms of enhancing readability, legibility, navigability, and retaining users on the website.

The visual analysis performed on the selected universities' websites showed that two websites failed to ensure appropriate screen density for the target users and their tasks, making users suffer from information overload, where excessive content on the homepage makes navigation difficult. For instance, UEW and UCC homepages have cluttered layouts, which overwhelm users, causing frustration and reducing engagement. Poor spacing, an excess of links, and too much content on the homepage contribute to visual chaos. Two of the four selected websites failed to have a uniform design language and consistent layout across their faculties and departmental pages, which reduces credibility and professionalism, creating a disjointed user experience. However, UEW and KNUST used consistent layout and design across their entire faculty and department page design. For instance, the Department of Communication Design page at KNUST has the same layout as the Department of Environmental Science.

Traditional web navigation relies on vertical scrolling, and users are accustomed to this interaction pattern. However, some webpages were wide to the extent of scrolling horizontally to see or access content. This horizontal scrolling effect disrupts usability, as many users do not naturally expect to scroll sideways for content. This misalignment with user expectations can lead to confusion and frustration, especially for first-time

visitors. The analysis performed indicated that all four selected websites could be used without scrolling horizontally.

All the selected universities' websites adhered to the guideline, ensuring that non-clickable items do not possess characteristics that might suggest interactivity. However, none of the university websites provided pages formatted for printing, nor did they feature a print icon to indicate print-friendly functionality.

One of the websites had colours that do not work well together, like UG College of Humanity, which used gold colour text on a grey background, making the content hard to read.

4.1.4 Navigation System

Navigation plays a crucial role in university website design as it determines how users interact with and access information. A well-structured navigation system enhances usability, accessibility, and engagement for students, faculty, and other stakeholders, whereas poor navigation can lead to frustration and decreased user satisfaction.

Effective and intuitive navigation structures improve information retrieval, allowing students, faculty, and prospective applicants to find relevant content easily on the university website. A lack of consistency in navigation design creates usability issues on the website for users, especially first-time visitors.

Again, lack of consistency in navigation design creates usability issues for users. The visual analysis performed showed that some university websites do not have a simple navigational structure. One of the websites did not use a consistent navigation design and colour throughout its website pages. For instance, UG's website uses different colours for most of the individual departmental pages, disrupting the user experience of the website. Moreover, a sitemap providing an overview of the website content is not available on any of the four selected universities' websites.

Also, three of the websites suffer from too many navigation systems, such as multiple menus, excessive dropdowns, and redundant links. In particular, KUNST, UEW and UCC websites have many navigations that can confuse users. While universities' websites aim to accommodate diverse user needs, excessive navigation structures often lead to confusion, frustration, and poor user experience, leading to navigation fatigue for the user. Figure 4.6 shows too many navigational systems on the KNUST, UEW, and UCC websites.

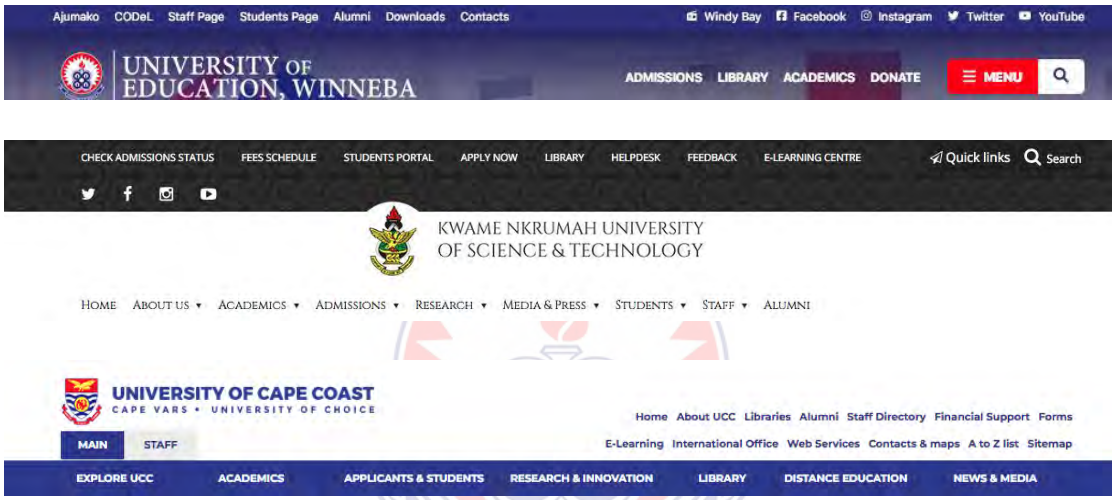

Figure 4.6: Screen Shot of Navigational System of UEW, KNUST and UCC Websites

Source: Researcher's Gallery (2024).

Navigation should follow a clear visual hierarchy to guide users toward key actions on the website. Some university websites fail to use proper content hierarchy, making it difficult for users to locate key information. For instance, admissions links were missing from all four selected universities' website departmental pages, discouraging prospective students from further exploring the website for application.

Interestingly, all four selected universities' websites used the same navigation bar for all pages. In all four websites, one finds major sections available from every page as

the navigation menu stays in the same position and takes users to their desired information.

Web accessibility is a critical factor in navigation design. All the selected university websites fail to meet WCAG (Web Content Accessibility Guidelines) standards, limiting access for individuals with disabilities. The study observed missing keyboard navigation, which reduces usability for visually impaired users.

4.1.5 Imagery and Graphics

Imagery and graphics play a crucial role in university website design and development, influencing user perception, engagement and overall user experience. High-quality visuals, such as campus landscapes, help create a professional and inviting digital presence, enhancing brand identity and communication effectiveness for the university. High-quality videos and images make the website content more attractive and encourage users, especially first-time visitors, to explore further. From Ivy League giants to innovative African universities, imagery on university websites serves as a powerful tool to reflect institutional identity, attract prospective students, guide user navigation, show research impact, celebrate community, and establish visual distinction. Carefully chosen imagery, whether current students' activities, campus landscape or events, is central to a university's digital branding to create an inviting atmosphere for the website users.

The analysis further observed how photographs such as campus landscape, students' life on campus and faculty interactions are showcased to appeal to prospective students and the general public on the selected universities' websites. All four selected universities feature high-quality photographs on their websites. However, in some cases, the study found a few low-resolution photographs on the UCC website.

UEW uses event banners with high-resolution photographs from ceremonies and cultural events to promote its community life to the general public.

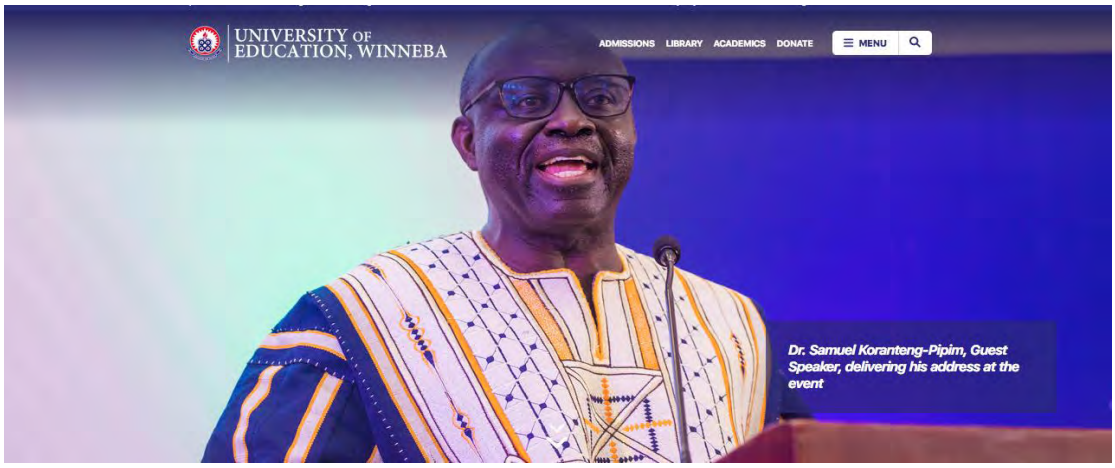

Figure 4.7: Screen Shot of High-Resolution Photographs from Ceremonial Event at UEW

Source: Researcher's Gallery (2024).

KNUST homepage often features high-resolution photos of its iconic campus buildings, seasonal landscapes, and current students to instantly communicate prestige and also highlight an active student community to the public, especially prospective students, what they have to offer. The images used also reflect the artistic and design-oriented nature of the institution. KNUST also uses muted colour grading and inclusive representation in its images presented on their website.

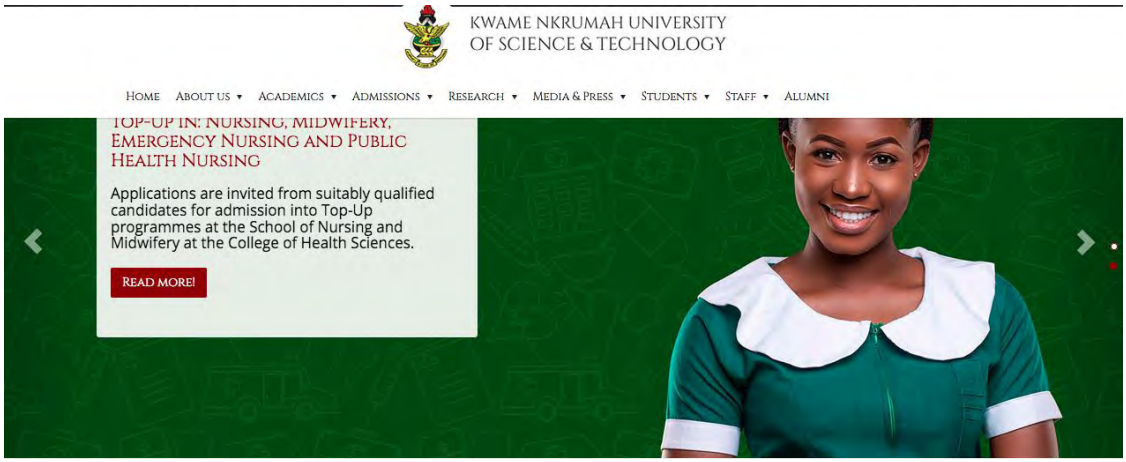

Figure 4.8: Screen Shot of High-Resolution Photographs from KNUST Website

Source: Researcher's Gallery (2024).

UG website uses images of student collaboration and leadership programs to appeal to students across Africa. They strategically present visuals that connect their university brand to change-making and Pan-African identity. They use vibrant hero images of students involved in academic settings to appeal to both domestic and international students.

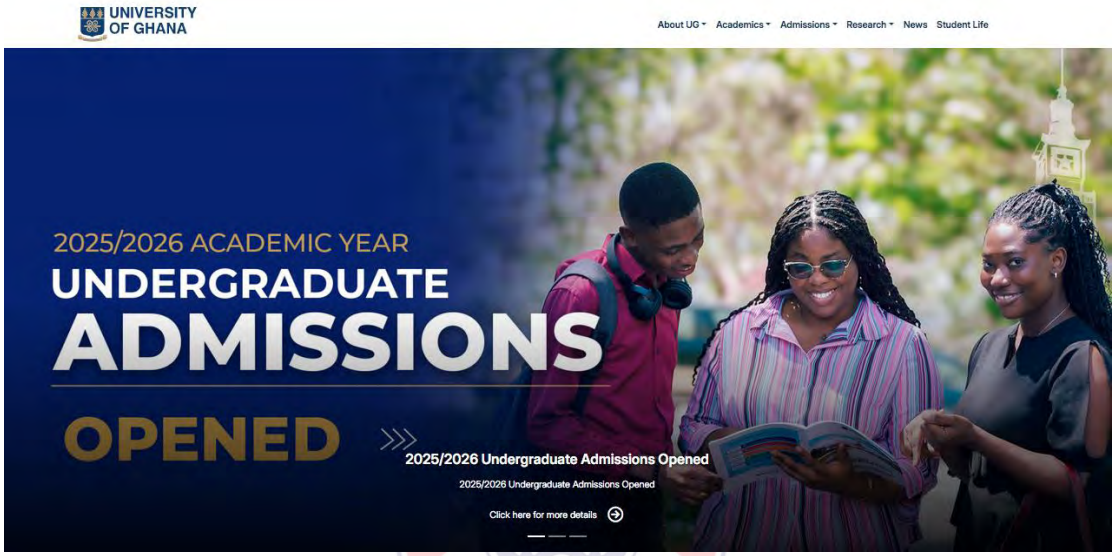

Figure 4.9: Screen Shot of High-Resolution Photographs from UG Website

Source: Researcher's Gallery (2024).

While many selected universities (KNUST, UEW and UG) rely heavily on high-quality imagery and multimedia to communicate their identity, UCC adopt a low-imagery approach using mostly text on its website. They occasionally use small images in news articles, sometimes only the institutional logos or event banners. In some instances, very low-resolution images were found on the Faculty of Arts page.

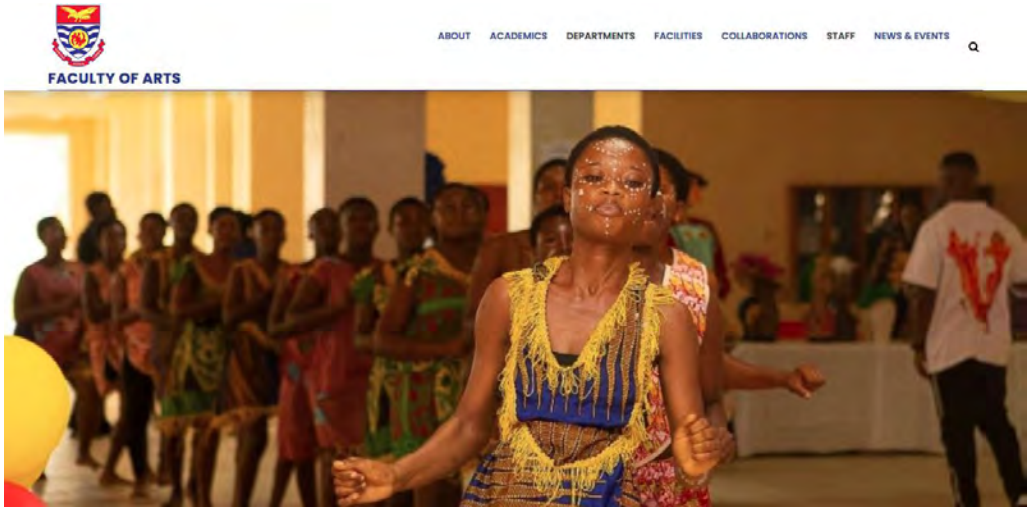

Figure 4.10: Screen Shot of Low-Resolution Photograph from UCC Website

Source: Researcher's Gallery (2024).

4.1.6 Responsiveness of Website

Responsive design ensures that a website adapts its layout and functionality across various screen sizes and devices. This is especially important for universities, as students, applicants, and staff access websites on smartphones, tablets, and laptops.

The analysis performed revealed that UEW, KNUST and UG websites dynamically adapt to screen size, with hero images resizing or stacking appropriately. Their homepage adjusts well to mobile, using grid-based sections that shift elegantly on smaller screens. However, on the UCC website, though some adaptation to screen size exists, it is basic and not consistent. For instance, the homepage layout breaks on smaller screens; text and images overlap or misalign on some pages. UCC website seems desktop-centric design; menus and text do not scale well on mobile. Users may need to zoom and scroll horizontally to see other content on the website.

4.1.7 Availability and Accessibility of Academic Programmes and Courses

Academic programmes represent the primary product of every university. They define what a university teaches, how it teaches, and what knowledge it contributes to society.

Users of university websites, especially prospective students, rate a university by the strength and diversity of its academic programmes.

For prospective students, programme information is often the first filter in deciding whether to apply to a university or not. International students also compare universities globally using the detailed academic programme pages. Academic programme pages significantly boost the university's search engine visibility. Programme details such as course descriptions, credit hours and learning outcomes promote accountability and trust among stakeholders.

While analysing the website of the selected universities, the researcher found that all four universities have updated their academic programmes in the "Academics" webpage, including undergraduate and postgraduate programmes under each faculty and department. Interestingly, the analysis performed did not find any course descriptions with content, units of study, credit hours, and outcomes available under each programme. Programmes are broadly stated on the websites, but individual **courses** studied under each programme and descriptions (e.g., "GRDC111: Foundations of Graphic Design") were not available on any of the four selected university websites. Universities that lack clear or comprehensive programme details, especially course descriptions and outcomes, risk losing applicants due to a lack of transparency.

4.1.8 Availability of Faculty Members' Details

Availability of faculty members' details is not just a convenience feature on the university website; it is a critical element of academic transparency, institutional credibility, and digital communication for the institution. Publishing lecturer details builds trust in the institution's academic integrity. Qualifications and areas of expertise, research interests and achievements, courses taught, and departmental roles help students

engage directly with the right lecturers for academic and career guidance. Well-presented faculty profiles highlight institutional strengths and increase rankings credibility.

The study again sought to find out the availability of lecturers' profiles on the university website. A university website without faculty members' courses taught and departmental roles makes students feel disconnected, uncertain about who teaches which course or how to seek academic help. The analysis further revealed that though the qualifications and research interests of lecturers are available on all four selected Ghanaian university websites, some departments have basic lecturer lists. Specifically, on the websites of UCC and UEW, often only names and titles, no bios or publications were available on some faculty members' pages. These missing key academic identifiers affect visibility on both the part of the university and the lecturers.

Again, none of the four selected universities published the individual course descriptions and courses lecturers who teach on their website for students to seek academic help from the right lecturer. KNUST and UG stand out for at least providing some structured profiles which include links to Google Scholar and ORCID for faculty members, aiding academic visibility, though still behind global standards for not having individual course descriptions and lecturers who teach them on the university website.

In a digital-first world, **lecturers'** visibility on a university's website is no longer optional but strategic. A university that invests in a well-structured, transparent faculty members' page strengthens student trust, academic partnerships, and institutional reputation.

4.1.9 Integration of Social Media Feeds and Multilingual Support

Social media is no longer an auxiliary communication tool; it is now central to how modern institutions like universities engage, inform, and connect. Integrating real-time

social media feeds on university websites enables institutions to showcase their vibrancy, culture, and relevance to the global market.

The analysis of all four universities' websites indicates that they have social media links embedded on their website. However, only two integrated social media feeds in their university website homepage. Specifically, UEW and KNUST used Facebook, X, and YouTube feeds on their homepage to share real-time campus events, press releases, and emergency notices to their students and the general public.

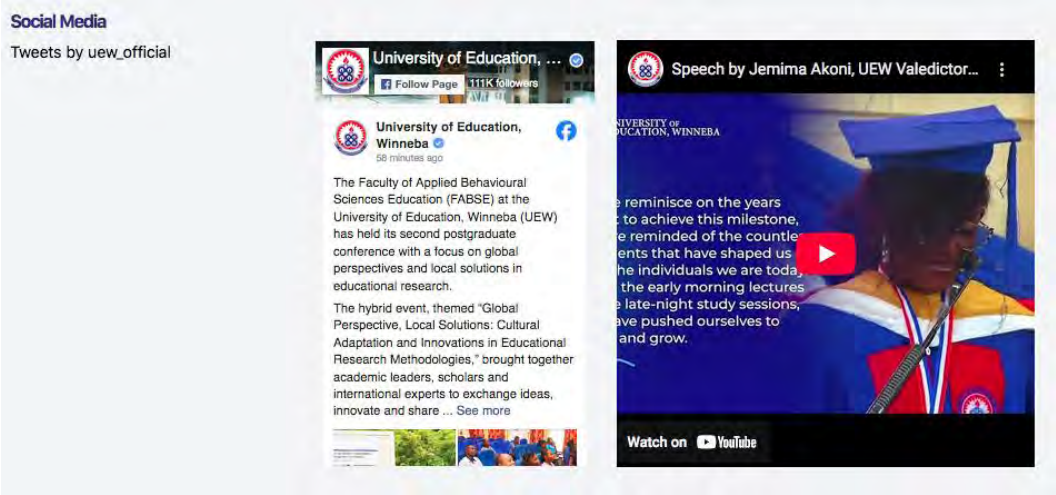

Figure 4.11:Screen Shot of Social Media Feeds from UEW Website

Source: Researcher's Gallery (2024).

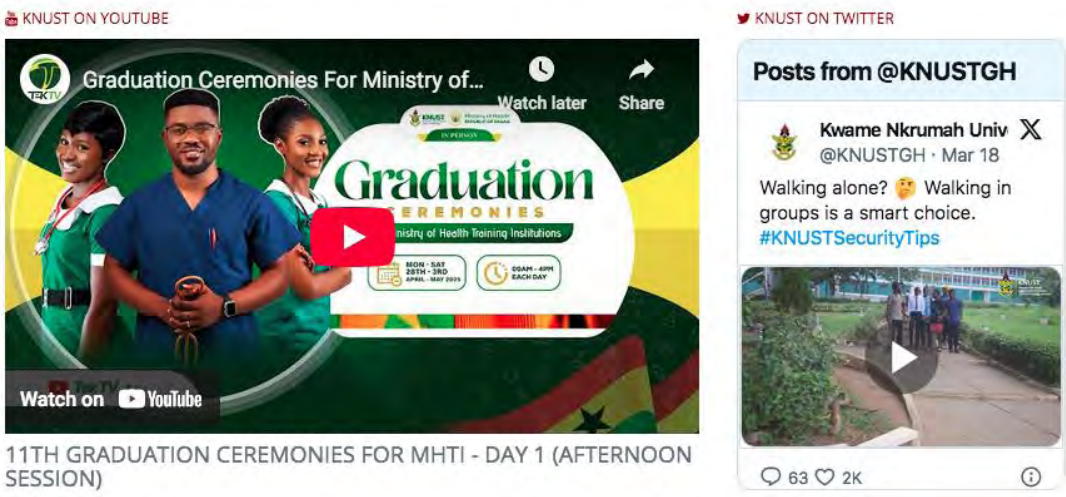

Figure 4.12: Screen Shot of Social Media Feed from KNUST Website

Source: Researcher's Gallery (2024).

Multilingual support refers to the ability of a website to present content in more than one language, permitting users to choose their preferred language for navigation and interaction. This feature is essential for universities that aim to attract international and multilingual students. Regarding the websites' support for multiple languages, the researcher fails to find any such thing on all four selected universities' websites. All four selected websites' interfaces contain text in English. They do not even have support for Google Translate for translating English to other languages.

4.2 Discussion of Findings for Objective One

4.2.1 Website Homepage and Access through Search Engine

Scholars such as Benaida and Namoun (2018), Macakoğlu et al. (2022) and Ojubo and Eboka (2018) have stated that the university website's homepage is the main entrance page of a university's website, providing easy access to intuitive navigation to various sections of the website, such as admissions, academic programmes, campus tour, research, and faculty profiles. The general information available on the selected website's homepage includes information about the university, a navigation bar to academic programmes, news and events, high-quality campus-related photos of recent and past events, and the university's official colour. The findings in this study generally suggest that the selected websites' homepages provided basic information with high-quality photos on their websites. Despite this, the UG and UCC homepages displayed some pixelated photos and a non-functioning photo slider, respectively. This is similar to the findings of Venkatesh et al (2017), who evaluated the usability of the Obamacare website and reported basic information is available on the homepage of the Obamacare website.

Again, all four universities' websites have useful content presented on their homepage. None of the four selected universities featured testimonials of success stories of their current students, alumni, or faculty members on their homepage to entice the

general public, especially prospective students who want to apply and pursue programmes at the university. However, UCC featured a few success stories on subpages under the admissions page. Benaida and Namoun (2018), disclosed that not all Algerian universities' websites have useful content on their homepage, and this was also revealed in this study. Therefore, providing information such as testimonials from the past and current students on the homepage should be a basic requirement of every university website design.

Interestingly, a search through popular search engines like Google revealed that all four understudy universities' websites were easily accessible and could be found through the search engines. This finding suggests that Ghanaian universities are fully optimised through search engines, making it easy for visitors who do not know the full domain name of the websites to still access them via Google.

4.2.2 Domain and Security

A well-structured and concise domain name enhances credibility, accessibility, usability, search engine optimisation (SEO), and users can easily recall it. As revealed in this study, the domain names of all four selected universities' websites are very easy to remember. The website's URL consists of at least 2-5 letters using .edu and country-specific (ug.edu.gh, ucc.edu.gh, uew.edu.gh and knust.edu.gh), which is easy to remember and establishes legitimacy. This is similar to the findings of Ojugo and Eboka (2018), who reported that Federal Nigerian universities' websites in Nigeria used between 2-6 letters for their domain names.

With regard to security, the findings in this study suggest that all four selected websites secured their domains. From Figure 4.5, it is clearly evident from the browser that all the selected websites were secured with HTTPS encryption, informing faculty, students and visitors that the website is safe and secure to use.

4.2.3 Page Layout and Visual Design

Page layout and visual design are essential aspects of website design and development that attract and sustain visitors on the university's website. The visual design of a website has a substantial impact on its usability, particularly in terms of enhancing readability, legibility, navigability, and retaining users on the website. Similar to the other results of this study, the layout and visual design of two of the selected websites evaluated (UG and UCC) failed to have a uniform design language and consistent layout across their faculties and departmental pages, which reduces credibility and professionalism, creating a disjointed user experience. However, UEW and KNUST used consistent layout and design across their entire faculty and department page design. For instance, the Department of Communication Design page at KNUST has the same layout as the Department of Environmental Science. These findings are similar to those of Ojugo and Eboka (2018), who reported inconsistent page layout in some selected universities' websites in Nigeria. According to Fimberg and Sousa (2020), having a consistent layout and good visual design across all faculty and departmental pages could significantly impact user perception. Again, all the selected universities' websites followed the guideline of confirming that items that are not clickable do not have characteristics that suggest that they are. However, the UG, College of Humanity page used gold colour text on a grey background, making the content hard to read. This supports the findings of Ojugo and Eboka (2018), who reported that the University of Agriculture, Abeokuta, used faint colours on some pages of its website.

4.2.4 Navigation System

A well-structured navigation system enhances usability, accessibility, and engagement for students, faculty, and other stakeholders, whereas poor navigation can lead to frustration and decreased user satisfaction on the university website. From the reviews of

the universities' websites in this study, it is clear that three of the websites suffer from too many navigation systems, such as multiple menus, excessive dropdowns, and redundant links. In particular, KUNST, UEW and UCC websites have many navigations that can confuse users. Despite this, UG employed a straightforward navigation system on its website.

Regarding web accessibility, all the selected universities' websites fail to meet WCAG (Web Content Accessibility Guidelines) standards, limiting access for individuals with disabilities. The study observed missing keyboard navigation, which reduces usability for visually impaired users. This finding is similar to those of previous studies, which reported that university websites were not user-friendly for persons with disabilities (Iseri et al., 2017; Máñez-Carvajal, 2020; Máñez-Carvajal et al., 2021).

4.2.5 Imagery and Graphics

High-quality imagery and graphics play a crucial role in university website design and development, influencing user perception, engagement and overall user experience. High-quality imagery, such as campus landscapes, helps create a professional and inviting digital presence, enhancing brand identity and creating an inviting atmosphere for visitors. From the observation, all four selected universities feature high-quality photographs on their websites. However, in some cases, very low-resolution images were found on the UCC Faculty of Art page. This supports Tella (2020), who suggested that using high-quality images, videos, and infographics sustains visitors on the website.

4.2.6 Responsiveness of Website

Responsive design ensures that a website adapts its layout and functionality across various screen sizes and devices of the user. This is especially important for universities, as students, applicants, and staff access websites on smartphones, tablets, and laptops. The analysis performed revealed that all understudy websites (UEW, KNUST, UCC and

UG) dynamically adapt to screen size, with hero images resizing or stacking appropriately on the user's device. Their homepage adjusts well to mobile, using grid-based sections that shift elegantly on smaller screens. This is in contrast with other studies (Ojubo & Eboka, 2018) suggesting that the majority of universities' websites in Nigeria were not responsive, making the websites not user-friendly and accessible for mobile users.

This implies that the web designers and developers have made good use of media queries, which makes the websites possible to switch between different CSS based on the features of the user's device without having the need to define different styles for mobile or tablet (Cazañas & Parra, 2017).

4.2.7 Availability and Accessibility of Academic Programmes and Courses

Academic programmes represent the primary product of any university. They define what a university teaches, how it teaches, and what knowledge it contributes to society. Users of university websites, especially prospective students, rate a university by the strength and diversity of its academic programmes. Programme details such as course descriptions, credit hours and learning outcomes promote accountability and trust among stakeholders. From the review, the researcher found that all four universities have updated their academic programmes in the "Academics" webpage, including undergraduate and postgraduate programmes under each faculty and department. Interestingly, the analysis performed did not find any course descriptions with content, units of study, credit hours, and outcomes available under each programme. Other studies have reported similar results on universities' websites (Macakoğlu et al., 2022; Menzi-Çetin et al., 2017). The findings reflect the need for Ghanaian universities to have course descriptions under various programmes available on their websites to help stakeholders, especially prospective students, make an informed decision about their academic career.

According to Wijayaratne and Singh (2015), providing access to course materials via the university website draws users to the website and facilitates easy access to academic information for applicants.

4.2.8 Availability of Faculty Members' Details

Having access to detailed and updated faculty members' profiles on a university website builds trust in the institution's academic integrity. Qualifications and areas of expertise, research interests and achievements, courses taught, and departmental roles help students engage directly with the right lecturers for academic and career guidance. Well-presented faculty profiles highlight institutional strengths and increase rankings credibility. The findings in this study suggest that basic information such as academic qualifications, research interests and departments of lecturers are available on all four understudy websites. Some of the pages of faculty members have only names and titles. Specifically, on the websites of UCC and UEW, often only names and titles, no bios or publications were available on some faculty members' pages. French and Fagan (2019) argued that missing key academic identifiers affect visibility on both the part of the university and the lecturers.

Again, none of the four selected universities published the individual courses lecturers teach on their website for students to seek academic help from the right lecturer. KNUST and UG stand out for at least providing some structured profiles that include links to Google Scholar and ORCID for faculty members, aiding academic visibility, though still behind global standards for not having individual course lecturers' teaching available on their websites.

4.2.9 Integration of Social Media Feeds and Multilingual Support

Regarding the integration of social media feeds on the university website, all four universities have social media links embedded on their website. However, only two

integrated social media live feeds in their university website homepage. Specifically, UEW and KNUST used Facebook, X, and YouTube feeds on their homepage to share real-time campus events, press releases, and emergency notices to their students and the general public.

The multilingual support feature is essential for universities that aim to attract international and multilingual students. Regarding the websites' support for multiple languages, the researcher fails to find any such thing on all four websites.

All four selected websites' interfaces contain text in English. They do not even have support for Google Translate for translating English to other languages. These findings simply mean that most of the universities in Ghana need to integrate at least Google Translate on their website.

4.3 Analysis of Research Question Two

The second research question sought to find out the user experience of selected Ghanaian universities' websites. A focus group study was conducted to gather in-depth user feedback on the websites of selected Ghanaian universities. A thematic analysis was performed on the transcribed data from two focus group discussions involving a total of 14 users of university websites from two Ghanaian universities. Participants included current students and staff members, who discussed their experiences and perceptions of their university websites. The analysis followed Braun and Clarke's (2006) six-phase framework for thematic analysis, which involves: (1) familiarising oneself with the data, (2) generating initial codes, (3) searching for themes, (4) reviewing themes, (5) defining and naming themes, and (6) producing the report. This structured approach ensured a systematic and rigorous interpretation of the qualitative data. The analysis below is organised thematically to address key aspects of the user experience, drawing on verbatim comments from participants (cited in APA format) to support each point.

Figure 4.13: Focus Group Discussion Session.
Source: Researcher's Gallery (2024).

4.3.1 First Impressions and Aesthetics

A first impression on a university website design refers to the initial perception and reaction that users, especially prospective students, current students, parents, or stakeholders, form within the first few seconds of visiting the website. This impression is influenced by the website's layout, visual appearance, ease of navigation, content clarity, loading speed**,** and overall user experience.

Participants noted that the first impression of a university website strongly shaped their view of the institution. A well-designed homepage was seen as signalling credibility and professionalism, whereas a cluttered or out-dated look generated negative reactions. One participant reflected a positive reaction to an engaging university website homepage:

> *My first impression of the university website was wow. The quality of the graphics used and the layout. When you see the layout and the graphics that have been used at the interface, it will just tell you that the institution has harmful designers. So that's what gets my attention when I get to the website* (UEW-P1, personal communication, March 17, 2024).

> *Okay, when I first launched the website, the colours caught my attention. Using the colours white and red. Also, when you first get to the university website, it tells you what's going on there. Has the admission been closed, so you get to know the updates about the university and how the banners have been arranged? The layout is very simple, nice, and with good designs. So launching it for the first time, it looks amazing and very professional* (UEW-P7, personal communication, March 17, 2024).

In addition to that, another participant had this to say:

> *So, for me, the first impression of the university website is that the overall look of the website is very professional. And because of how the layout is structured, every section has its own layout and how it is structure. And elements on the website are not scattered. So you can follow any particular section that you want to find any information. So every section has its own content. And I think it is the professionalism of the website that really gets my attention* (KNUST-P6, personal communication, June 7, 2024).

By contrast, another participant immediately felt distrust:

> *I saw the out-dated information in the copyright section and thought that the university hadn't updated anything in years. We're in 2024, but when you check the copyright, it states 2019* (UEW-P6, personal communication, March 17, 2024).

These reactions are consistent with established UX research that first impressions are formed almost instantly and heavily influence perceptions of usability and credibility.

Several participants remarked on colour schemes and imagery used for the homepage design. Participants expressed common positive comments suggesting that good quality images and institutional colours can reassure users. Participants had this to say:

> *The impression is that the website gives attention to imagery. So they want to communicate, but they want to use a strategy where you are not going to be bored with so much text. So they use imagery as their strategy. And so the moment you get to see details of the university, for example, people graduating, events that*

> *they've held, then all are done within the colours of the institution. If you are a first-time applicant, let's say you are an applicant and you see the university's website, you've not been admitted, but then you feel this is where you should go because you can clearly see what they do there. And the images give a very good impression of the website* (UEW-P4, personal communication, March 17, 2024).

> *Okay, for me, when I launched the website, my first impression was about the quality of the graphics used and then the layout. When you see the layout and the graphics that have been used at the interface, it will just tell you that the institution has powerful designers. So that's what gets my attention when I get to the website* (KNUST-P6, personal communication, June 7, 2024).

Overall, most participants felt that a clean, uncluttered homepage with high-quality imagery and readable fonts made for a good first impression, whereas busy layouts with dense text or outdated information left them overwhelmed. First impressions of the websites varied widely. Those with good layout design, clear headings and relevant imagery were praised, while outdated websites felt uninviting. Given that first impressions affect users' perception of aesthetics, usability, and credibility of a university website, these initial reactions were viewed as critical to the overall user experience. Participants made it clear that the homepage should immediately convey clarity and legitimacy to engage visitors.

4.3.2 Navigation and Information Accessibility

Nearly all participants commented on how easy or difficult it was to navigate their university website and find information. A dominant theme was that the website structure often felt confusing. Many users described getting "lost" or having to click through multiple menus to reach basic content.

> *Even though sometimes some of the information that you need, you have to click multiple times before you reach your desired information. I tried to find the*

> *admissions form, but I had to click five menus deep, and I still couldn't find it. It was later that I saw the search button to find the admissions through the search bar.*

> *Okay, so the website as a whole has a straightforward interface where every aspect of information is in a section that you have to. Even though sometimes, some of the information that you need, you have to click multiple times before you reach your desired information. But aside from that one, I think the structured interface is very easy to navigate* (UEW-P5, personal communication, March 17, 2024).

Difficulties with navigation mirrored known usability issues. Prior research on Ghanaian e-learning interfaces highlighted that Ghanaian learners place high importance on "finding and retrieving content" efficiently. Consistent with this, participants repeatedly emphasised a need for straightforward navigation. In practice, many reported poor search functionality or none at all. Several participants noted that the built-in search often returned no results, even for obvious queries, leading them to navigate manually. One participant explained that:

> *I typed second-semester undergraduate courses for communication design in the search bar and got nothing. It's like the search is broken or there's no content at all for communication design courses for the second semester on our university website* (KNUST-P2, personal communication, June 7, 2024).

Another participant had this to say:

> *The menus are not intuitive. I clicked on the Department of Textiles and Fashion Education under the School of Creative Arts page, expecting to see programmes and courses, but it showed me empty content. I don't know if they have not uploaded information for that particular department* (UEW-P1, personal communication, March 17, 2024).

Mobile responsiveness was another major factor that was analysed. Ghana has high mobile Internet use, so participants often accessed their university website on their smartphones. They found that their university websites adapt to mobile devices.

One participant summarised this:

> *I usually check the university website on my phone, and it fits perfectly. I don't have to zoom in or scroll sideways. The site adjusts well when I switch from my laptop to my phone. Everything realigns, and the menu becomes easier to use. It works fine on my mobile. The images resize, and the text stays readable., I don't have to zoom in before I read the text, which makes it convenient for me when I'm on the website* (KNUST-P1, personal communication, June 7, 2024).

Participant UEW-P4, who happens to be a lecturer, had this to say:

> *I was surprised that the whole website looked clean and organised on my tablet. It didn't feel cluttered or cut off, even on my phone. Even though I use a smaller phone, I can still navigate through the departments and news sections without any issues. They've made it mobile-friendly. The menu turns into a dropdown and everything stays clickable, even on my small touch phone* (UEW-P4, personal communication, March 17, 2024).

Participant responses indicate that sometimes they have to click through multiple menus to reach basic content on their university website. However, users reported positive experiences with mobile responsiveness, highlighting features such as responsive layouts, readable text, properly scaled images, and functional navigation menus on their phones. The participant responses clearly indicate that the university websites are effectively optimised for mobile devices. These observations suggest that the universities have adopted mobile-responsive web design practices, ensuring accessibility and convenience for students and other users who frequently access website content via

smartphones and tablets. This adaptability not only enhances user satisfaction but also reflects a commitment to inclusive and modern web design standards in higher education.

4.3.3 Design and Layout: Likes and Dislikes

Participants detailed both likes and dislikes in their university website layout and design. To clarify the feedback, their comments can be grouped into positive and negative aspects. Several users appreciated elements that conveyed clarity or professionalism. A few noted that effective use of whitespace made the content easier to read, and relevant high quality images made their university website feel welcoming. Reflecting on this, one participant said that:

> *For the first time, I'm seeing great efforts in the use of images where they've extended the images but still maintain quality. The layout is on point; the text and the background are all working well. Then again, for the first time, you could see that they want people to really see what you do as a university and that mindset is captured on the website. I think we are now coming to understand the need for a website in building these educational settings. If you compare this to what we used to have previously, you can see this is a great step to getting us to see the very thing that we need to see on the university website as an institution* (UEW-P4, personal communication, March 17, 2024).

Another participant had this to say:

> *I like the consistency on the website, including the colours and the arrangement. Because on some websites you click on the home page, the colours and then the arrangement are different from when you go to the subsequent page. But you could see the consistency in the colours and also the arrangement of elements throughout the website. ... Also, the layout adjusts well on both my phone and laptop, which makes it easier for me to check things on the go* (KNUST-P7, personal communication, June 7, 2024).

Reflecting on what they dislike about their university website, many disliked the outdated layout, as a participant suggested using a simple style guide. As one participant put it:

> *The layout looks outdated. It hasn't changed in years and doesn't reflect the image of a modern university. All pages should have the same navigation bar and header style, so I know I'm still on the university website. ...But on the other side, the information on the home page is much. I think some of them can be categorised* (KNUST-P3, personal communication, June 7, 2024).

Another participant reflected that:

> *My dislike is where there is a lack of information. For example, if you jump to the academic department, go and check, and there is nothing there. So if someone wants to find out about graphic design, you go to the graphic design page, and I don't know what is even there, scanty.*
>
> *...When you get to the departmental sessions, the images there are boring, pixelated, and there is no information. So if I cannot go to the university's website to pick up details about the course, where can I go? For example, if I want to read social science and I cannot even get to the social science page where I can even see testimonials of successful people who even went to the school, the courses, what it leaves you, hey, so how am I? Should I even apply in the first case? But I get to other universities; they are doing the very things we are not doing. So that means that there is something that we need to pay attention to on our university website.*
>
> *... Usually, you get to most institutions and the footer information that is going to capture the current year. I don't know if you are using an expired website or the website was registered in 2019, as it stands now is 2019 at the footer* (UEW-P4, personal communication, March 17, 2024).

The feedback gathered from participants reveals a balanced perspective on the university website's layout and design. On the positive side, many users appreciated the professional appearance and organised structure of the website and commended it for its aesthetic appeal and functional layout. However, participants also expressed clear concerns. Common issues included information overload on the homepage **and** outdated design elements, and a lack of content on departmental pages**.** These appreciations and

criticisms highlight areas where the university websites could be improved to shape future university website design to better meet user expectations and enhance usability.

4.3.4 Negative Experiences and Technical Issues

Participants recounted some negative experiences or technical problems encountered while using their university websites. The participants' feedback reveals critical gaps in the lack of informational structure of the university website, particularly on departmental pages, course listings, and real-time student support features. Many users expressed dissatisfaction with the limited content on departmental pages**,** noting the absence of detailed information about course descriptions, faculty activities, and student opportunities within the course. One participant had this to say:

> *The departmental pages feel empty. There is some information about the faculties, but some of the faculties do not have any information about the faculty at all. A typical example is the School of Creative Art. When you open it, you just see the image of some of the students performing. Other than that, there is nothing at all about the faculty. And even within the department, the programmes that they offer under those particular departments. Those are some of the information that should be easily accessible on the university website if the person has not visited the university or I don't know any other person to ask at the university. So I think they should work and improve on that section* (UEW-P1, personal communication, March 17, 2024).

Similarly, participants highlighted the lack of comprehensive course descriptions on their university website**,** which makes it difficult for students to understand course objectives, outcomes, and relevance to their academic goals. One participant admitted that:

> *Some schools I mostly visit their website outside Ghana have a lot of information on their website. When you click on a programme, you get details of the programme, even the course outline, the courses you take under that programme,*

> *the credit hours for that programme and even sometimes details of the particular lecturer or professor teaching that particular course.*
>
> *...I think that if we have detailed course descriptions and the lecturers' details, prospective students can even email the lecturer and find out about the programme. For example, an applicant can ask, "I realise you teach this course and I want to be this or that in the future, is it advisable for me to take this kind of course?" I think that will help* (KNUST-P7, personal communication, June 7, 2024).

Furthermore, the absence of interactive support tools**,** such as a live chat feature, emerged as a recurring negative experience while using their university website. Participants reported delays in receiving help and indicated a strong preference for immediate, on-site assistance on their university website or making academic decisions. One participant shared his experience and had this to say:

> *My first time in university, I didn't know anywhere. So I was trying to find information on the website. So me being a fresher on campus, there should be something like a live chat so that whatever I ask, let's say, the school will be able to give me answers through the chat. But here, the university doesn't have anything like that on the website. The university should have something like a live chat on the website to communicate with the new students. And it will be very helpful for those who are just new on campus* (UEW-P2, personal communication, March 17, 2024).

4.3.5 Recommendation of the University Website to others for Information

Participants discussed whether they would recommend their university website to others, and their responses reflected broader judgments of credibility and usefulness. Participant responses revealed a divided perception regarding recommending the university website as a reliable source of information. While some participants expressed a willingness to recommend the website for accessing basic information such as admissions procedures,

academic calendars, and general inquiries, others would recommend their university website conditionally. One participant said that:

> *I would strongly recommend the university website being it a resident student, staff or someone who is now enrolling. Regardless of the flaws that we've pointed out, it is still a hub of information for students and staff. There is are whole lot of information that you can access on the website that most people cannot tell you with a word of mouth* (KNUST-P4, personal communication, June 7, 2024).

Another participant added that:

> *Okay. I will also recommend a website for people to use because, personally, when I was about to purchase an admission form, I logged on to their website and I read a lot of things over there for myself. So I would say that it contains a lot of information here. Even though we are still hoping that most of the features will be updated, it still has a lot of information to help the first timers* (UEW-P6, personal communication, March 17, 2024).

Another participant expressed that he would recommend his university website to others for information. He expressed that:

> *It will also depend on the kind of information the person is looking for. I might recommend the website for someone to view information, but as I said earlier, some of the courses don't have details. So if the person wants to find details about a particular course, if I recommend the website to the person, the person might not get that information. So it will depend on what kind of information the person is looking for that will determine how the recommendation will be* (UEW-P5, personal communication, March 17, 2024).

The responses indicate that although the university website serves as a functional entry point for general information, it falls short as a comprehensive academic resource, especially in course descriptions, limiting its reliability and effectiveness from the perspective of its primary users. Even among those inclined to recommend their university website to others, the endorsement was often conditional, emphasising its

usefulness only for preliminary information rather than for in-depth academic course details.

4.3.6 Feedback Submission and Institutional Responsiveness

The participants' responses reflect mixed experiences with the university website's feedback and issue-reporting mechanisms. While a few participants reported positive outcomes, such as prompt responses and timely updates following their submissions, the majority expressed a lack of engagement or dissatisfaction. Several participants noted that their request was either ignored or never acknowledged, indicating potential weaknesses in the university's website management systems or communication. One participant described a failed attempt on another university's online platform, and because of the experience, would not submit any request on the university website. He had this to say:

> *I've never submitted feedback on the university website. I just assume they won't respond, so I don't bother. I remember somewhere 2022 when I started university, there was an online lecture platform called VClass. Students used to go there and study online. So I did report an issue on the VClass and am waiting for the response; I don't know if today that I'm going to receive it today or what* (UEW-P2, personal communication, March 17, 2024).

On the few occasions where participants saw positive engagement, it was noticed. Such cases were the exception rather than the rule, but they were pointed out to show what good responsiveness would look like. One participant mentioned a friend who had gotten a response. He had this to say:

> *He once reported a broken link on the course registration page. He said they actually fixed it within two days and sent a notification and a thank-you email. That was impressive, but it doesn't happen often* (KNUST-P1, personal communication, June 7, 2024).

Overall, the consensus was that university websites lacked effective feedback loops. The absence of a responsive acknowledgement of user feedback was cited as a disappointment. This gap made users see their university website as non-user-centric. Participants emphasised that improving this aspect by adding a working chat widget or a timely feedback form would greatly enhance their user experiences on the university website.

4.3.7 Suggested Features and Functionalities

Participant suggestions revealed a strong desire for enhanced functionality and user experience on the university website. A common recommendation was the inclusion of detailed academic resources on their university websites, including lecturers' profiles and courses taught, and detailed course descriptions. Participant suggested that:

> *A staff directory with photos, emails, and office hours would make it easier to know who to contact."* (UEW-P3, personal communication, March 17, 2024).
> *"They should add a search bar. Sometimes you just want to find one thing quickly without clicking through five pages* (KNUST-P1, personal communication, June 7, 2024).

> *It would be helpful if each course run under each programme had at least a detailed course description on the university website* (UEW-P5, personal communication, March 17, 2024).

Others emphasised the need for interactive features such as a live chat to provide immediate assistance, as well as real-time notifications for important academic updates. One participant added that:

> *I would like to see a chatbot or live chat option so we can ask quick questions and get answers instantly* (KNUST-P4, personal communication, June 7, 2024).

Again, participants' feedback strongly suggests that the inclusion of testimonials on the university website homepage would significantly enhance its appeal and impact. Many participants expressed a desire to see real stories from current students and alumni**,** believing that such testimonials would make the university appear more relatable, trustworthy, and student-focused. These personal accounts were viewed as a means to inspire current students and inform prospective applicants about the student experience. Participants had this to say:

> *It would be nice to see success stories from past students -it gives us hope and shows what's possible after graduation* (KNUST-P4, personal communication, June 7, 2024).
>
> *Testimonials from students or alumni can help prospective students understand what it's like here. It will add a human touch to the university website* (UEW-P7, personal communication, March 17, 2024).
>
> *Seeing testimonials from real students and alumni would make the site feel more relatable — not just official information* (UEW-P1, personal communication, March 17, 2024).

One participant emphasised inclusivity by requesting content on the university website in other languages. He suggested that:

> *Some pages should be in French or other foreign languages – it makes it easier for international members or parents who don't speak English to read the happenings in the university community* (KNUST-P5, personal communication, June 7, 2024).

This was seen as important for broadening access to information beyond English speakers. These suggestions from participants reflect users' expectations for a more intuitive, interactive, and user-centred university website. Incorporating these features and functionalities into future development could significantly enhance accessibility,

communication, and the overall digital experience for staff, current students, prospective students, and general users of the university website.

4.3.8 Benchmarking: Learning from other Universities' Websites

In order to improve Ghanaian universities' website design, participants were asked to discuss any competitive university website, both local and international, that they think their university could learn from to improve future design and development. Participant responses indicate a strong awareness of how other universities, both locally and internationally, design and manage their websites.

Participants express how their university could learn from other university websites to improve future design. One participant said that:

> *I will strongly recommend the Valley View University website. For them, I had the opportunity to take some courses with them, and I know their web system is very good. Their layout is also attractive. Anything that has a parent table attached to all its categories, so the moment you point or tap on a particular category, it displays everything that is under it.* We can learn a lot from how international universities structure their navigation — it's clean, simple, and informative without being too crowded on the website (KNUST-P6, personal communication, June 7, 2024).

Another participant has this to say:

> *I would set KNUST as the base; our university can learn from them as they have so much information, yet well managed, and you would hardly find complaints. KNUST sets a very good standard, and it's actually a university that we always learn from. So nothing stops us from looking at their website and learning from how they put theirs to use. Internationally, I would recommend the Stanford University website. I visited Stanford University's website, and it was very interactive; you could take virtual tours, chat live, and even watch student stories. I wish ours had those features* (UEW-P4, personal communication, March 17, 2024).

Participant UEW-P7 added this:

> *I will suggest Boston University. They also have a straightforward interface that helps the navigation. Their website shows rankings, students' testimonials, and achievements right on the homepage. That kind of visibility is missing from ours. Locally, the Ashesi University website is so clean and easy. I can find course information in two clicks* (UEW-P7, personal communication, March 17, 2024).

Lastly, participant KNUST-P3 recommends this:

> *I will recommend Bristol University College, UK. They have a very nice layout and very detailed information as to the number of credit hours you are supposed to take under each course, your lecturers and all their contacts. I think the Bristol University College website has very detailed course descriptions with videos and lecturers' profiles. That's something we can learn from to improve on ours* (KNUST-P3, personal communication, June 7, 2024).

Many participants had explored local and international university websites and highlighted features they admired that could be added to their university website. These include virtual tours, interactive content, testimonials from students, clear navigation, and prominent display of course descriptions. These suggestions reveal a perception that their own university website hinders in terms of modern functionality, accessibility, and user experience. The insights suggest that by studying and adapting best practices, the university could enhance its online presence, improve user engagement, and project a more professional and competitive image.

4.3.9 Impact on Overall User Experience

Participants reflected on how the website affected their overall experience of the university. The participants' responses underscore the significant influence the university website has on their overall experience with the institution. This impact covered academic, social and emotional dimensions. A key argument was that the university

website served as an extension of the university's brand and reputation. A well-designed website with up-to-date content contributed positively to pride and trust.

Participants noted that:

> *Honestly, a poor website makes the university look less serious. It reflects badly on the institution. The university website is the first impression for many people, especially prospective students. If it looks unprofessional, it creates doubts about the quality of the university* (UEW-P3, personal communication, March 17, 2024).

> *I think the website is part of the learning experience. If it's difficult to use, it adds stress to the already busy academic life of students. When the site is nice, I feel proud of my school. It shows the university cares about its image and students* (KNUST-P1, personal communication, June 7, 2024).

On the other hand, other participants admitted the website was only one factor among many. For instance, one participant commented that:

> *I don't base everything on the website because I have friends and lecturers I trust more. But it does help when I'm not sure of something* (UEW-P6, personal communication, March 17, 2024).

For many, the university website serves as the primary interface for accessing administrative services, academic information and institutional communication. A well-organised design, updated content and a user-friendly website were described as enhancing efficiency, convenience, and a sense of connection with the university. Equally, participants reported lack of essential features, outdated content, or poor navigation negatively impacted their perception of the university's professionalism and responsiveness. Several noted that the university website often shaped their first impression of the institution and could either build confidence or raise doubts about its quality.

4.4 Discussion of Findings for Objective Two

4.4.1 First Impressions and Aesthetic Presentation

The initial visual impact of Ghanaian universities' websites emerged as a critical factor shaping user perceptions. Participants consistently associated professional aesthetics with institutional credibility, where high-quality graphics and coherent colour schemes generated positive reactions like "*wow … When you see the layout and the graphics that have been used for the interface, it will just tell you that the institution is having powerful designers*" (UEW-P1). This observation corroborates global research indicating that website visual design accounts for 46.1% of perceived website credibility, with colour psychology significantly influencing user retention. This also aligns with Tella's (2020) findings that aesthetic consistency directly impacts user confidence in a university's websites.

However, one participant (UEW-P6) noted outdated elements like copyright dates on the university website, saying, "*I saw the outdated information at the copyright section and thought that the university hadn't updated anything in years … We're in 2024, but when you check the copyright, it stated 2019".* This observation highlights how minor details can trigger immediate distrust and undermine institutional image.

The emphasis on imagery as a communication strategy reflects contemporary design principles advocating visual over textual information where possible, given that images are processed 60,000 times faster than text. In line with scholarly views, one participant (UEW-P4) indicated that *'the images on the website give a very good impression about the website".*

Given that first impressions of a university website affect users' perception, usability, credibility and overall experience of a university, these initial reactions clearly suggest that the homepage of a university website should be designed and developed to immediately convey clarity and legitimacy to engage users.

4.4.2 Navigation and Information Architecture

Structural challenges dominated user experiences, with participants reporting frequent disorientation and "click fatigue" when locating basic information (UEW-P5). This navigation complexity contradicts Nielsen's (2012) principle that intuitive menus and search functionality are essential for institutional websites. While some praised "simple and straightforward interfaces" (UEW-P5), others encountered search functionality failures, exemplified by queries returning zero results for programme-specific information. One participant (KNUST-P2) summarised his experience on search functionality failures as follows: "*I typed second-semester undergraduate courses for communication design in the search bar and got nothing. It's like the search is broken or there's no content at all for communication design courses for the second semester on our university website."* This search bar inadequacy reflects broader usability issues identified in African e-government platforms, where Verkijika and De Wet (2018) found navigation deficiencies across 31 countries' websites.

Positively, mobile responsiveness received consistent praise, with participants noting seamless adaptation across devices. One participant (KNUST-P1) expressed that "*The site adjusts well when I switch from my laptop to my phone. Everything realigns, and the menu becomes easier to use. It works fine on my mobile phone. The images resize and the text stays readable, I don't have to zoom in before I read the text, which makes it convenient for me when I'm on the website."* In addition, one lecturer (UEW-P4) expressed shock at the responsiveness of their university website, stating: "*I was surprised that the whole website looked clean and organised on my tablet. ... Even though I use a smaller phone, I can still navigate through the departments and news sections without any issues. They've made it mobile-friendly. The menu turns into a dropdown and everything stays clickable, even on my small touchscreen phone.* This

aligns with Cox Group's emphasis on mobile-first design, given that 55% of global web traffic originates from mobile devices (Marcotte, 2011).

The contrast between navigation frustrations and mobile optimisation success suggests Ghanaian universities have prioritised good and effective technical adaptability over information architecture, implementing effective responsive frameworks while neglecting intuitive content organisation.

Again, the participants' responses clearly indicate that the university websites are effectively optimised for mobile devices. These observations suggest that the universities have adopted mobile-responsive web design practices, ensuring accessibility and convenience for students and other users who frequently access website content via smartphones and tablets. This adaptability not only enhances user satisfaction but also reflects a commitment to inclusive and modern web design standards in higher education.

4.4.3 Design Execution and Functional Limitations

Participants expressed polarised perceptions of layout effectiveness, praising "consistency in colours and arrangement" (KNUST-P7) while criticising "outdated" structures (KNUST-P3). This dichotomy reflects the tension between aesthetic appeal and functional utility identified in web design literature. Liu and Ko (2017) argue these elements must be balanced, as overly complex designs impair information retrieval despite visual appeal. The reported departmental information page inadequacies, described as "scanty" with "pixelated images", stating that: *if someone wants to find out about graphic design, you go to the graphic design page, and I don't know what is even there, scanty. ... When you get to the departmental sessions, the images there are boring, pixelated, and there is no information* (UEW-P4), demonstrating institutional underinvestment in content creation, contradicting Kaul's (2006) assertion that modern university websites should provide comprehensive programme details. Notably, the

absence of lecturer profiles and course descriptions (KNUST-P7) undermines websites' role as academic resources, aligning with Manzoor et al.'s (2019) findings that global university websites frequently fail to meet student information needs. These content gaps are particularly concerning given Nielsen Norman Group's (2018) principle that user satisfaction hinges on convenience and comprehensiveness. These findings highlight areas where the university websites could be improved to shape future university website design to better meet user expectations and enhance usability.

4.4.4 Technical Deficiencies and User Support Failures

Systemic technical issues significantly degraded user experiences, with participants reporting broken links (UEW-P1), outdated copyright notices (UEW-P6), and empty departmental pages (KNUST-P3). These problems reflect the broader "unacceptable level of usability" Verkijika and Wet (2018) identified in African institutional websites.

The absence of real-time support mechanisms like live chat (UEW-P2) contrasts sharply with global trends where 74% of universities employ chatbots for student queries. This support deficiency exacerbates navigation difficulties, forcing users into self-reliant "hunting" behaviours that increase cognitive load. The feedback loop breakdown, where reported issues went unacknowledged (UEW-P2), demonstrates institutional unresponsiveness, contradicting Shackel's (1991) usability principle that systems must effectively support specified user tasks. The predominantly negative service recovery experiences suggest Ghanaian universities lack robust website governance frameworks, aligning with Ojugo and Eboka's (2018) findings about Nigerian universities' websites.

4.4.5 Perceived Value and Comparative Benchmarking

Conditional recommendation patterns revealed contextual valuation of websites, where participants advocated use for basic information (admissions, calendars) but cautioned against reliance for academic details (UEW-P5). This compartmentalised trust reflects

the functional entry point role identified in Alfayez and Altawriy's (2020) study of institutional websites. Participants' benchmarking against global institutions like Stanford University and Bristol University websites demonstrated sophisticated awareness of international best practices, particularly regarding virtual tours, student testimonials, and course detail depth.

Participant (UEW-P4) stated that "*I would recommend the Stanford University website. I visited their website, and it was very interactive; you could take virtual tours, chat live, and even watch student stories. I wish ours had those features."* Another participant (KNUST-P3) added that: *"I will suggest Bristol University. They also have a straightforward interface that helps the navigation. Their website shows rankings, students' testimonials, and achievements right on the homepage. That kind of visibility is missing from ours."*

Participants' advocacy for local exemplars like Valley View University (KNUST-P6) and Ashesi University (UEW-P7) highlights existing African universities successfully implementing modern UX principles. However, the explicit gap acknowledgement between Ghanaian university websites and global standards suggests participants perceive their institutions as lagging in digital maturity. This aligns with Macakoğlu et al.'s (2022) assessment that universities in developing regions frequently trail in accessibility, usability, and security implementations.

4.4.6 Institutional Perception and Experiential Impact

The symbolic role of websites as institutional proxies significantly influenced participants' overall university experience. Functional websites generated pride and trust (KNUST-P4), while deficient interfaces fostered frustration and perceptions of administrative neglect (UEW-P6). This experiential carryover supports Huang and Benyoucef's (2014) finding that website credibility directly impacts institutional

credibility. Participants explicitly linked website quality to organisational competence, with one participant noting poor design "makes the university look less serious" (KNUST-P2). This perception aligns with Gordon and Berhow's (2009) assertion that universities must leverage websites to maintain positive stakeholder relationships. However, the mediating role of interpersonal relationships (UEW-P5) (reliance on friends and lecturers) suggests that websites function within broader communication ecosystems. Critically, the first-impression dominance noted by participants – particularly for prospective students – reinforces Nielsen Norman Group's finding that users form lasting credibility judgements within seconds (Nielsen Norman Group, 2018), making aesthetic and functional improvements imperative for student recruitment.

4.4.7 Design Recommendations and Implementation Barriers

Participant feature requests revealed a sophisticated understanding of contemporary web conventions, including interactive elements, thus, live chat support (KNUST-P4), personalisation, multilingual content (UEW-P), content depth, lecturer profiles and course descriptions (UEW-P3), and social proof, student testimonials (UEW-P7). These align with global trends toward AI-enhanced functionality like chatbots (Guan et al., 2020) and relational design through storytelling. However, their implementation faces contextual barriers identified in African website development literature: inadequate technical infrastructure (Benaida & Namoun, 2018), limited institutional funding (Ojugo & Eboka, 2018), and insufficient web governance frameworks (Undu & Akuma, 2018). Crucially, participants recognised that aesthetic enhancements alone are insufficient without concomitant improvements in information architecture, advocating categorisation of cluttered homepages (KNUST-P3) to address cognitive overload issues Nielsen Norman Group identifies as causing high bounce rates (Nielsen Norman Group, 2018). These insights suggest that by studying and adapting best practices, using an enhanced

CMS platform could enhance the university's online presence, improve user engagement, and project a more professional and competitive image.

4.5 Development of the Conceptual Model

The third research objective aimed to develop lop conceptual model for university website design. The purpose of the conceptual model is to guide the design and development of the university website in Ghana. Again, the conceptual model was to assist and guide web designers, developers, and stakeholders to produce a user-friendly university website that promotes visibility.

Sections 4.1 and 4.3 presented the analysis and findings from the selected universities' websites and user experiences. First, the state of the four selected universities' websites was determined through visual and content analysis, and secondly, feedback and suggestions were obtained from real users of the university websites through focus group discussion to be included in the proposed conceptual model development. Again, insight from Harvard University and Stanford University websites, together with web design and development principles and technologies, was considered.

In the context of this study, a conceptual model is the product of a systematic qualitative analysis of multidisciplinary knowledge sources undertaken to gain a better understanding of university website design (Jabareen, 2009). A conceptual model comprises interrelated concepts that together provide a comprehensive understanding of a phenomenon. Each concept is defined by a set of attributes that describe its characteristics (Jabareen, 2009).

Every concept relates to the phenomenon under investigation, to other relevant concepts, and to its own attributes. In this study, concepts and their attributes were identified through a systematic synthesis of findings drawn from multiple bodies of knowledge, including peer-reviewed research articles, user experience feedback, and

expert opinions. According to Jabareen (2009), the process of generating concepts and attributes is inherently comparative, reflecting the researcher's interpretation of consensus emerging from the various sources of knowledge. Jabareen's procedure consists of the following:

1. Conduct an extensive literature review on the phenomenon and identify relevant information.
2. Read and analyse the identified information comprehensively.
3. Discover concepts emerging from the information.
4. Deconstruct and categorise these concepts.
5. Group similar concepts together.
6. Synthesise and re-synthesise the concept groupings to construct a model that helps make sense of the phenomenon.
7. Validate the conceptual model by presenting it to stakeholders and experts.
8. Rethink and update the conceptual model as necessary.

It should be noted that the proposed conceptual model developed in this study is not a theoretical framework or a research model. Therefore, it does not aim to provide a theoretical explanation of a phenomenon or to predict outcomes. In the next section, the study presents an integrated conceptual model developed by following the above procedure. As part of this research, the researcher has completed steps 1 to 4 through visual and content analysis, focus group discussions, and insights gained from examining the websites of Harvard University and Stanford University.

4.5.1 Proposing an Integrated Concepts.

In addressing research question three, users' feedback, experts' suggestions, insight from Harvard and Stanford university websites, and usability issues identified, selected universities 'ties to web design principles were used to provide the information required in developing the conceptual model. The web design tools and technologies, user feedback and suggestions, insight from Harvard and Stanford university websites,

experts' suggestions and usability challenges identified in the selected universities are summarised in this study in Table 4.1.

Table 4.1: Selected Sources of Data for the Proposed Conceptual Model Development

Source	Data
Experts Suggestions	Appealing visual designs that align with university's branding. Brand consistency, colour scheme, visual hierarchy, intuitive navigation system. User research to gain broader perspective. Responsive design, selection of appropriate technologies. Robust security: security plugins, SSL installed on the university's website. Content Management System (CMS): WordPress, Drupal, Joomla, HTML and CSS, Fluid grid layout, scalable images, Design patterns, well-structured layout, User-centre design
Users feedback and suggestions	Inclusion of testimonials from past and current students in the university website. Inclusion of individual course content and description on departmental pages. Include staff directories with bios, areas of expertise, and contact info. Refresh UI with modern design trends (flat design, white space, consistent fonts). Provision of full course descriptions, including outcomes and career paths. Provision of multilingual support.
Insight from Harvard and Stanford Universities websites	Secure content management systems that allow for modular expansion and easy updates. Clear navigation menus with grouped content. Simple, elegant layouts with white space, professional fonts, and a consistent colour palette that reinforces brand identity. Programme pages include course listings, degree requirements, faculty contacts, outcomes, and application instructions. Design for mobile-first,

	ensuring smooth interaction on smartphones and tablets.
Web design and development tools and technologies	Code Editor: Visual Studio Code, Adobe Dreamweaver. Design and Prototyping Tool: Adobe XD, Adobe Photoshop, Figma. CMS platform: WordPress, Drupal Joomla. HTML, CSS, JavaScript, Database, MySQL. Server: Application Server, Web server. Version Control System

(**Source:** Fieldwork, 2024).

The findings and insight undertaken along the lines laid down in Table 4.1 identified four distinct concepts (pillars) that make up the conceptual model for university website design and development. Accordingly, each concept was linked to its sub-category presented in Table 4.1. For a university website to be successful, web designers and developers must be aware of the factors that will ensure its acceptability to stakeholders (students, faculty members, management, etc).

The proposed conceptual model for university website design is built upon four critical pillars: content, aesthetics, technologies and security. These pillars are interlinked and represent the core domains that define the functionality and effectiveness of a university website.

4.5.2 Integrating the Concepts

The analysis and findings discussed in sections 4.1 and 4.2, literature, and web design technologies provide the guiding consideration applied during the construction of the draft conceptual model. The guiding determinants for integrating the model elements are summarised in Table 4.2 as a planning guide for the development of the conceptual model.

Table 4.2: Planning Guide for Executing the Integrated Model

Concept	Determinants
Content	Academic programmes, Admissions, Testimonials, Students' service, Faculty members
Aesthetics	User interface design, Layout, Colour scheme, Navigation, White space, Typography
Technologies	Code Editor: Adobe Dreamweaver, VS Code, Content Management System (CMS), Coding language: HTML, CSS, JavaScript, MySQL, Server: Application Server, Web server, Hosting and domain
Security	HTTPS, Version Control System, SSL encryption, Security plugins, Maintenance

(**Source:** Fieldwork, 2024).

4.5.3 Proposed Conceptual Model for University Website Design

The proposed conceptual model for university website design is structured around four key constructs: content, aesthetics, technologies, and security**.** These constructs represent the major components that influence the effectiveness, usability, and credibility of university websites. University websites serve as important digital communication platforms that provide information about academic programs, admissions processes, institutional resources, and student services (Akram & Sulaiman, 2019; du Preez et al., 2016; El-Halees & Abu-Zaid, 2017; Kuppusamy & Balaji, 2021). Therefore, their design must integrate informative content, appealing visual structure, reliable technological infrastructure, and robust security mechanisms to ensure effective communication and user trust.

The four constructs interact to support the functionality and user experience of university websites. Content provides the informational foundation of the website, aesthetics enhances visual communication and usability, technologies enable the technical implementation and performance of the website, and security ensures the protection of content and safe user interaction.

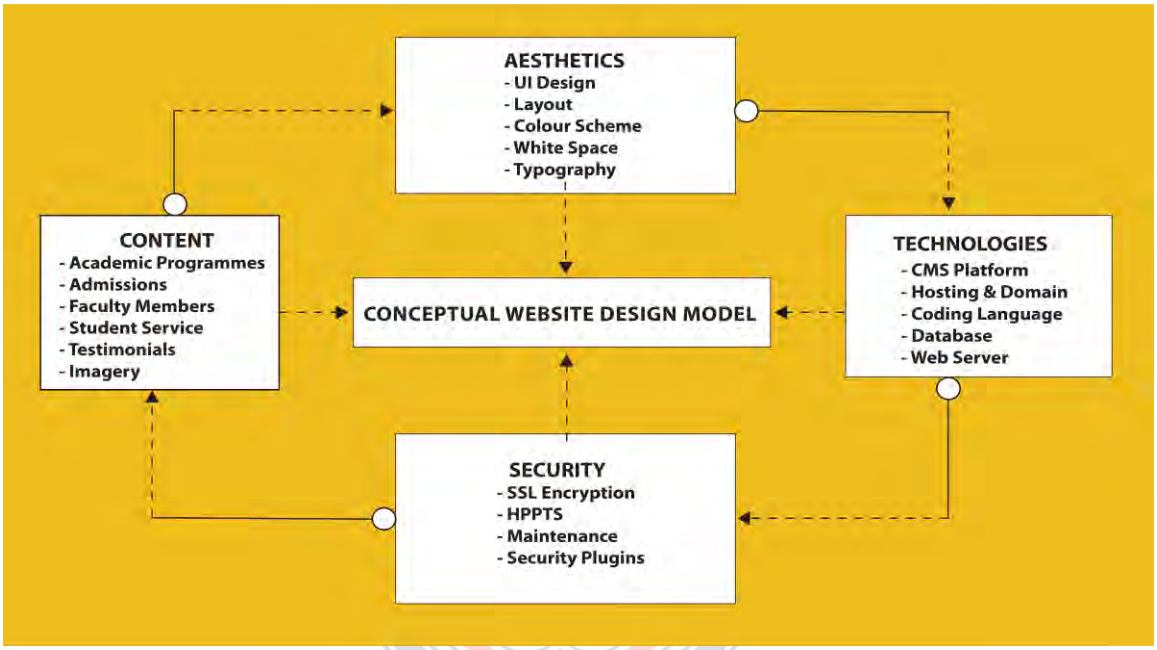

Figure 4.14: Proposed Conceptual Model for University Website Design
Source: Researcher's Construct (2024).

4.5.3.1 Content

Content refers to the textual, visual, and multimedia information presented on a website. Content represents the informational component of a university website and forms the primary reason users visit the platform. Effective website content must be relevant, accurate, and well-structured to support the information needs of prospective students, current students, faculty, and other stakeholders (Nielsen, 2012).

The content construct includes academic programmes, admissions, faculty members, student server, testimonials and imagery.

Academic programmes provide detailed information about the courses, degrees, and academic opportunities offered by the university. This information typically includes programmes descriptions, curriculum structure, duration, and entry requirements. Providing clear and comprehensive programmes information helps prospective students understand available academic pathways and make informed educational choices.

The *admissions* section contains information about application procedures, entry requirements, deadlines, and admission policies. This section is particularly important for prospective students seeking guidance on how to apply to the institution.

Information about *faculty members* introduces the academic staff of the institution, including their qualifications, research interests, and professional achievements. Faculty profiles enhance the credibility of the university by demonstrating the expertise and academic strength of the institution. *Student services* refer to the support resources available to students, such as academic advising, counselling services, housing information, library resources, and career services. Providing access to these services on the website supports student engagement and improves the overall university experience.

Testimonials provide feedback or experiences shared by students, alumni, or staff. These narratives contribute to institutional credibility and help prospective students understand the benefits of studying at the university. Testimonials often influence perceptions of institutional quality and reputation. *Imagery* refers to the use of photographs, graphics, and visual elements that illustrate campus life, facilities, academic activities, and student experiences. Visual content enhances storytelling and helps users connect emotionally with the institution.

4.5.3.2 Aesthetics

Dieter and Schmidt (2013) state that aesthetics are how the product appears, feels, sounds and smells. Aesthetics in website design refers to the visual appearance and design qualities that shape users' perception and emotional response to a website. Aesthetic design plays a crucial role in shaping users' first impressions and influencing how they perceive the credibility and professionalism of a website (Garrett, 2011). The components for aesthetics within the proposed conceptual model are UI design, layout, colour scheme, white space and typography.

User interface (UI) design focuses on the interactive elements that allow users to navigate and interact with the website. Good UI design ensures that menus, buttons, icons, and navigation structures are intuitive and user-friendly. *Layout* refers to the arrangement of content elements on web pages. Effective layout design organizes information logically, allowing users to easily scan and locate relevant information. *Colour schemes* influence the visual identity of the website and contribute to branding consistency. Appropriate colour combinations improve readability and create an appealing visual experience.

White space, also known as negative space, refers to the empty space between design elements. White space between paragraphs, around images, and between sections creates a visual breathing room that guides users' attention to key elements on the website (W3C, 2018). Proper use of white space enhances readability, improves visual clarity, and prevents overcrowding of content. *Typography* involves the selection and arrangement of fonts used on the website. Effective typography improves readability, emphasizes important information, and contributes to the overall aesthetic appeal of the website. Web designers and developers should use sans-serif fonts for clarity and professionalism. Font size, spacing, and weight must be balanced to avoid visual clutter.

Consistent typography fosters a unified visual experience across web pages (Lindgaard et al., 2006).

4.5.3.3 Technologies

Technologies form the backbone of any website design and development. While content and aesthetics influence what users experience, technologies stack control how users experience the website (Garett et al., 2016). Technologies refer to the underlying systems and software used to design, develop, deploy, and manage the website. The technological components determine how efficiently the website operates, how content is managed, and how users interact with the website. The components for technologies within the proposed conceptual model are CMS platform, coding languages, database, hosting and domain, and web server.

A *Content Management System* (CMS) enables administrators to create, edit, and manage website content without requiring advanced coding knowledge. Popular CMS platforms allow institutions to efficiently update information and maintain dynamic web pages. *Hosting* refers to the server environment where the website files are stored and accessed by users, while the *domain* represents the web address used to locate the website. Reliable hosting ensures consistent website availability and performance.

Coding languages such as HTML, CSS, JavaScript, and other programming languages are used to develop the structure, appearance, and interactivity of the website. The *database* stores and manages structured information such as user data, academic content, and institutional resources. Efficient database management supports dynamic content delivery and website functionality. The *web server* processes requests from users' browsers and delivers website content accordingly. A reliable web server ensures efficient loading speed and smooth interaction with the website.

4.5.3.4 Security

Security is a non-negotiable component in the university website design and development. It underpins trust, legal compliance, operational continuity, and the protection of institutional reputation from cyber attack Security refers to the mechanisms that protect the university website from cyber threats, unauthorized access, and data breaches. Because university websites often handle sensitive information such as student data and application details, strong security measures are essential (Sarmah & Sharma, 2020). The security construct within the proposed model includes Secure Socket Layer (SSL) encryption, HTTPS, maintenance and security plugins.

Secure Socket Layer (SSL) encryption protects data transmitted between the website server and users' browsers. Encryption ensures that sensitive information remains confidential during online communication. *Hypertext Transfer Protocol Secure* (HTTPS) provides a secure communication protocol that protects users from data interception and malicious attacks. Website *maintenance* involves regular updates, bug fixes, and system monitoring to ensure the website operates securely and efficiently. Security *plugins* provide additional protection against cyber threats such as malware, hacking attempts, and spam attacks. These tools help monitor vulnerabilities and strengthen website defences.

The conceptual model proposes that content, aesthetics, technologies, and security collectively influence the effectiveness of university website design. The strength of this conceptual model lies in its holistic approach. Each component supports and enhances the others. For example, compelling content becomes more effective when presented through appealing aesthetics and delivered via robust technologies, all within a secure framework. These elements are interrelated and shaped by the nature and purpose of the university website. Content formats influence aesthetic choices, determine how elements interact and behave on the site, and affect strategies for managing and protecting data.

Similarly, the aesthetic identity of an organisation guides how content is organised and presented. Technologies, in turn, shape the pathways through which users access and interact with content. Where security is a primary concern, certain aesthetic or content-related features may be adjusted accordingly through the use of appropriate technologies.

The enabler of the four main pillars of the model is research. Research provides the foundation for crystallising stakeholder intentions and uncovering the authentic needs and behaviours of users.

4.5.4 Evaluation of the Proposed Conceptual Model

Once the proposed conceptual model had been structured, it was presented to two experts in the field of web design and development for evaluation. The evaluation aimed to gather expert input as to the feasibility of the proposed model (Jabareen, 2009), gather opinions on the components of the elements, design, and structure of the conceptual model, identify shortcomings, and if it would be suitable for the intended purpose. The experts were also requested to give any additional suggestions they regarded as necessary for the conceptual model development.

In line with the advice of Nikolopoulos (2023) and Jabareen (2009), the experts were qualified and skilled enough to make expert suggestions and contributions in evaluating the draft conceptual model. Both experts have at least 10 years of practical experience in website design and development, and have executed a number of websites, including university websites.

The developed proposed conceptual model presented in Figure 4.13 was sent to web design experts through email correspondence. Experts were informed that their professional views and suggestions about the feasibility of the proposed conceptual model would be required. Secondly, the experts were required to consider whether the

model could serve as a workable solution for designing and developing a university website.

The feedback from the evaluation rendered full support for three of the questions. One question addressing potential deficiency and alignment of model concepts showed partial support from the experts. The results are presented in Table 4.3.

The experts were in full agreement with the alignment of the concepts of the proposed model. Again, one of the experts described the proposed model as an "eye-opener", suitable for university website design, and easy to understand.

Overall, the experts concurred that the proposed model was fit for purpose, and the presented model was a useful tool for university website design and development enhancement. One expert stated that "the model brings a new dimension to university website design and the implementation will have an enormous impact on university website design and development".

CHAPTER FIVE

PRODUCTION TECNIQUES AND PROCESSES

5.0 Overview

This chapter focuses on the production technique and procedures that the study deployed to translate the conceptual model developed in chapter four, section 4.5.3, to the WordPress content management system (CMS) platform and the production techniques deployed to produce the prototyped university website (UEW website). This chapter demonstrates how the researcher used web design and development approaches and techniques to develop a CMS WordPress theme from the proposed conceptual model developed in 4.5.3 and used the CMS WordPress theme to design the prototyped UEW website. This chapter is organised into two broad phases: the first phase dealt with the WordPress theme development (UniSite) and the second phase concerned with the design and development of a prototyped university website (UEW website) using the UniSite theme. Finally, the exegesis of the developed UniSite theme and the prototyped UEW website is presented.

5.1 Phase One: WordPress Theme Development (UniSite)

WordPress theme development is the process of creating a custom design and layout for a WordPress website by building a collection of templates, stylesheets, functions, and assets that control how the website looks and behaves. According to Ciorici (2024), WordPress remains the most popular content management system (CMS), and the use of customised themes is a core reason for its flexibility and widespread adoption by designers and developers. A CMS enables users to manage digital content, such as a website, with minimal technical knowledge. A theme in WordPress serves as the presentation layer, separating content from design. Figure 5.1 below is a general overview of the theme development roadmap adapted for the study.

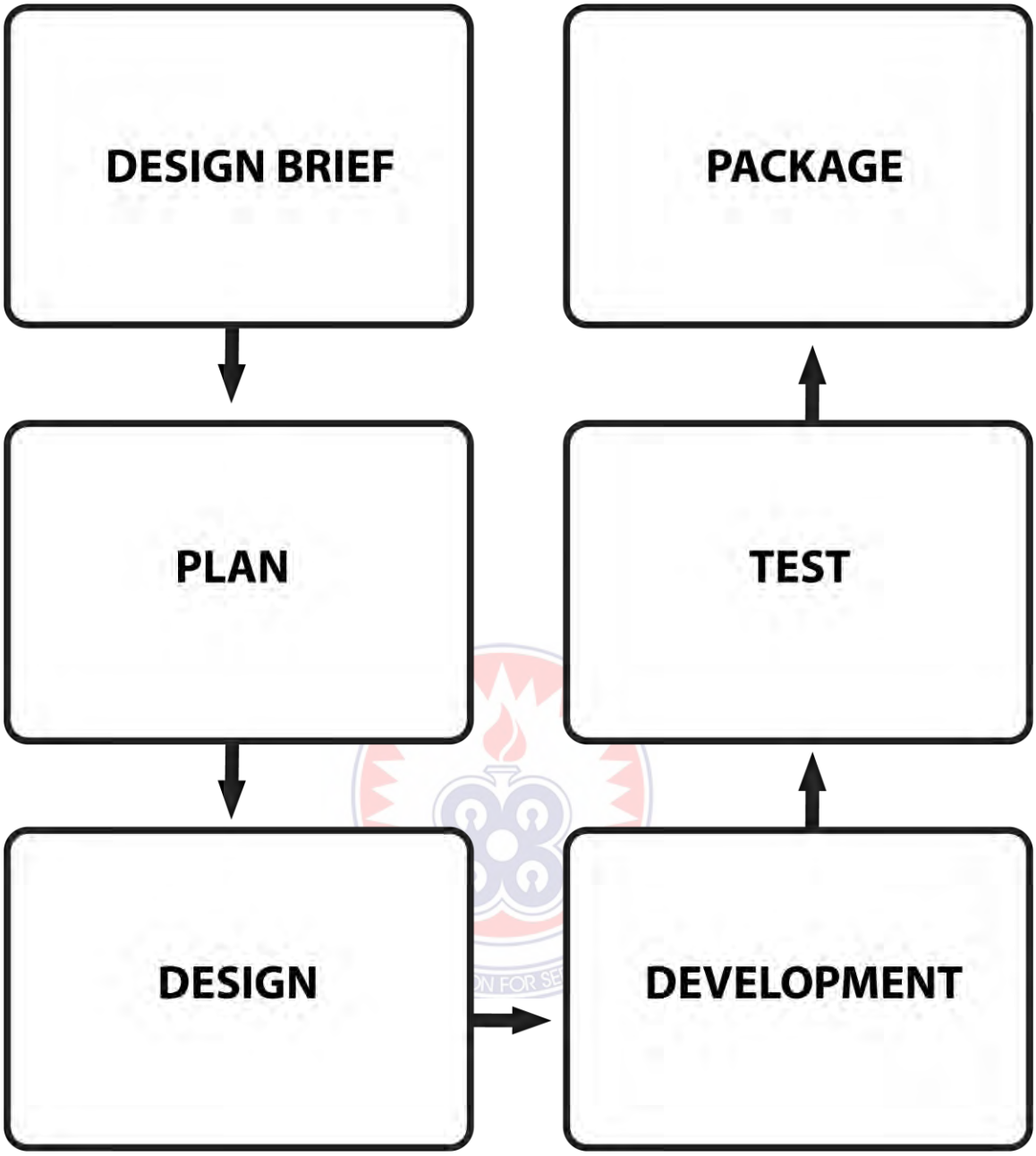

Figure 5.1: Overview of the UniSite Theme Development Process

Source: Researcher's Gallery (2024).

5.1.1 Design Brief

A design brief is a foundational document in the design process that outlines project objectives, deliverables, scope, timeline, and project expectations (Blaauboer, 2021). It acts as a bridge between stakeholders (e.g., clients, developers, designers) and provides a mutual understanding of the project. In web development, including WordPress theme

development, it ensures that creative output aligns with the functionalities of the website. It helps designers understand the context, challenges, and constraints within which the design must be created.

The design brief stage is imperative for successful theme development, helping align project goals with technical and design decisions. This stage ensures that the development process is efficient, targeted, and in line with the website's expectations. It involves in-depth discussions about the goals of the theme being developed, target users and required features before writing a single line of code. The focus was to gather all necessary information **to** fully understand the scope, goals, and requirements of the CMS theme development project. A design brief was developed from the conceptual model developed in section 4.5.3. Table 5.1 is a summary of the design brief developed for the study.

Table 5.1: Summary of Design Brief Developed for the CMS Theme Development

Project Overview	The purpose of the project is to design and develop a custom WordPress theme for university website development. The custom theme should improve navigation and user experience across include features that cater to students, faculty, staff, and prospective students, support mobile responsiveness, and reflect the university's branding.
Target Audience	• Prospective students • Current students • Faculty & Staff • Parents & General public
Objectives	• Develop a clean, professional, and accessible WordPress theme tailored to the university's website needs. • Ensure the theme supports key functions such as course details, news updates, lecturers' profile, academic programme listings, departmental pages and testimonials. • Ensure the theme enhances visibility and engagement for prospective students

Deign Requirements	• Align with university brand guidelines (colors, fonts, logos). • Clean and modern academic layout. • High-quality imagery and visual hierarchy.
Technical Requirements	• Compatible with WordPress 6.0 and future-proof for upcoming updates. • Integrate popular plugins: SEO, caching, contact forms, security • PHP: Minimum version 7.4; recommend 8.0+ • Support for custom widgets and menus. • Mobile-first responsive design.

(**Source:** Fieldwork, 2024).

5.1.2 Planning

The planning stage is one of the earliest and most critical steps in WordPress theme development. This stage involves creating rough visual representations of the theme's layout (either hand-drawn or digital) and structure before moving into detailed design and coding. The planning phase also bridges the gap between idea and execution, minimises misunderstandings, and sets a clear path forward for designers, developers, and clients. A well-executed sketches phase often determines the success and smoothness of the entire project.

At this stage, the visual structure and user experience of the theme website were laid out before the visual design and actual coding began. Thus, translating the ideas and requirements gathered during the design brief stage into visual elements, such as sketches, wireframes, mockups, and user interface (UI) layouts.

At this stage, the researcher prepared a series of layouts and sketches for the individual components that make up the entire theme in the Adobe Illustrator CC application. The focus was on how the website will look and function in terms of navigation flow, page structure, visual hierarchy and UI elements. Figures 5.2 to 5.4 are samples of the layouts and rough sketches prepared to guide the design and development

of the WordPress theme. These layouts and sketches served as the basis for creating a full and functional WordPress theme for the university website development.

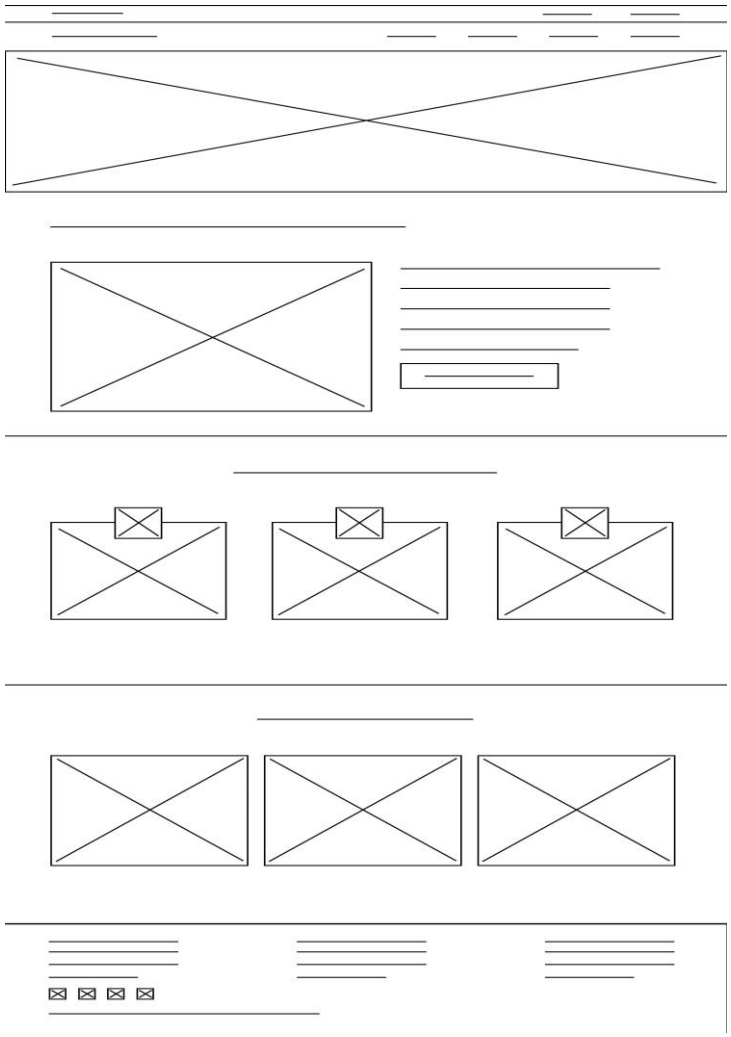

Figure 5.2: Layout for the Homepage

Source: Researcher's Gallery (2024).

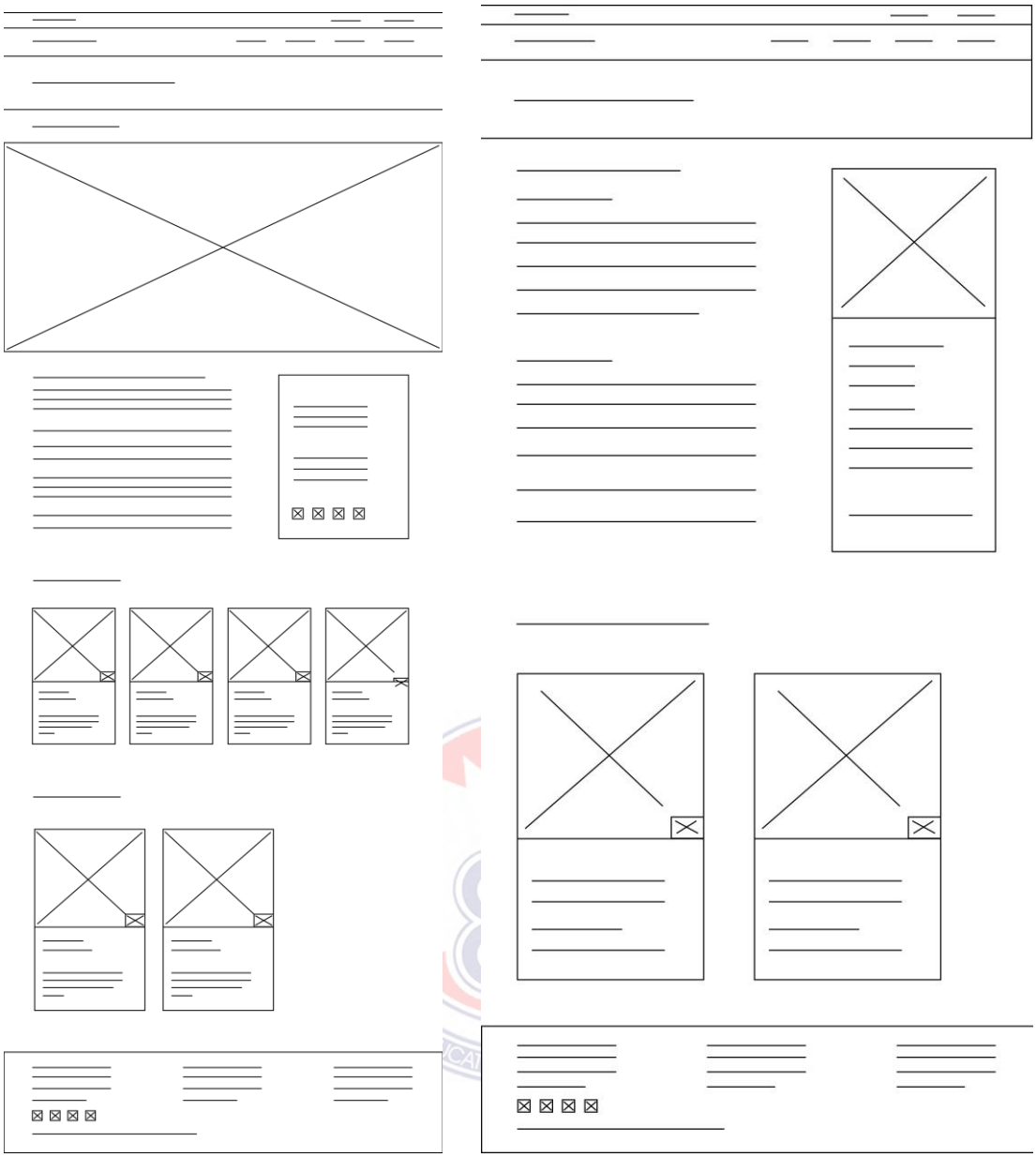

Figure 5.3: Layout for Department and Course Description Page

Source: Researcher's Gallery (2024).

Figure 5.4: Layout for Staff and Sample Page

Source: Researcher's Gallery (2024).

5.1.3 Design

The designing stage comes after the planning phase and focuses on creating visually polished and user-centric representations of the WordPress theme components. The designing stage in WordPress theme development is the process where visual and interactive elements of the theme are defined. The designing stage is crucial for crafting a visually coherent and user-friendly WordPress theme. This stage bridges the gap between initial concept and functional development, ensuring that the final theme is not only beautiful but also usable when deployed in an actual WordPress website design. The designing stage translates early ideas (layout and sketches) into a high-fidelity user

interface that captures the website's layout, branding, typography, colours, UI components, and overall user experience.

To design the theme user interface, the researcher set the width and height of the theme layout in Adobe Photoshop CC. Next, all the drawn layouts and sketches in the planning phase were designed into a finished web page user interface. The user interface designs typically followed the requirements captured in the planning phase. In Adobe Photoshop CC, the researcher introduced colour, typography and graphics to ensure how the components and the entire pages will look and behave the same across the site when deployed. During this stage, colour scheme, typography hierarchy, spacing, layout grids, iconography and visual consistency across the components and pages were ensured. Figures 5.5 to 5.7 are samples of the layouts and rough sketches prepared to guide the design and development of the WordPress theme in Adobe Photoshop.

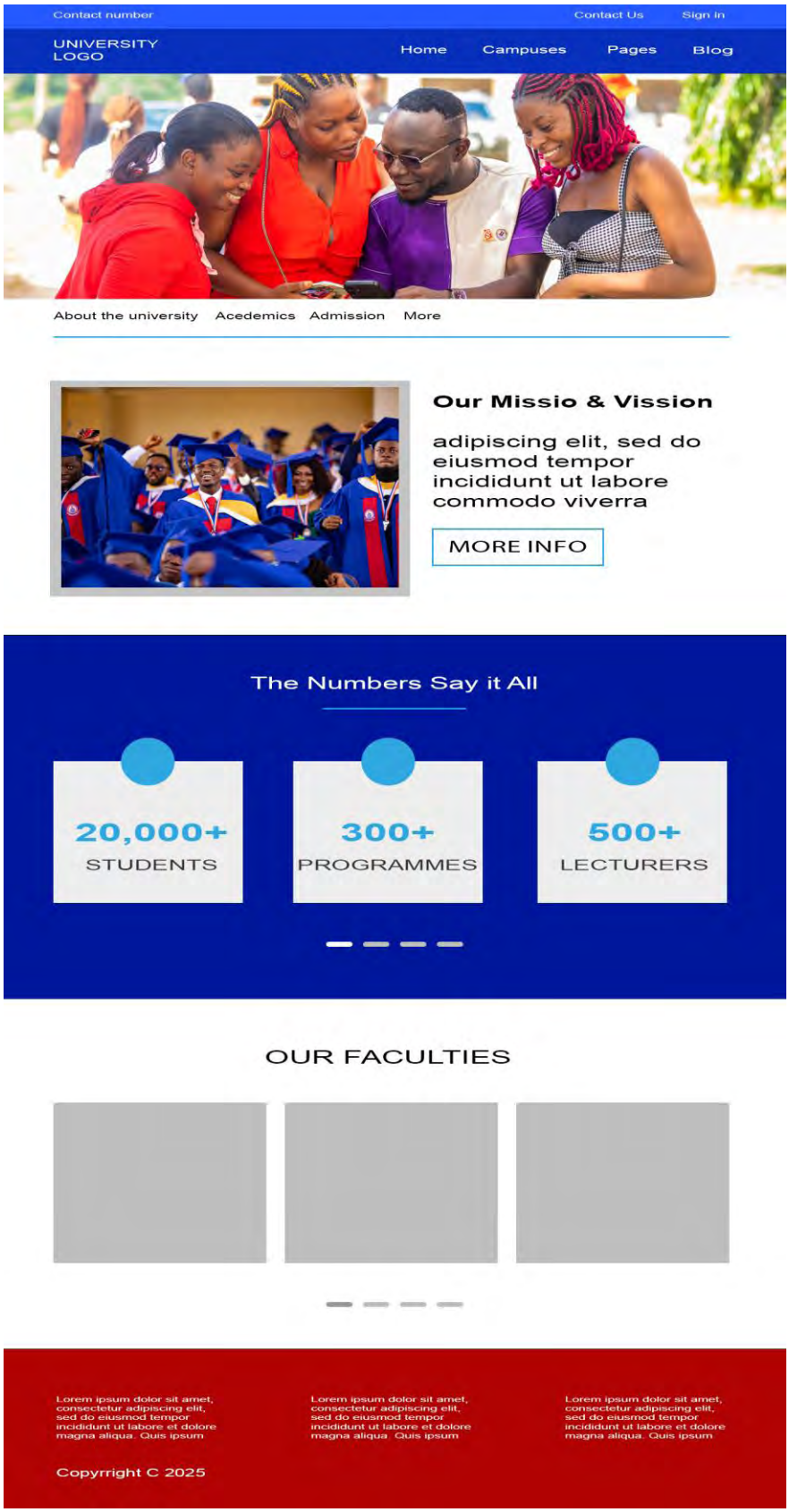

Figure 5.5: User Interface of the Homepage

Source: Researcher's Gallery (2024).

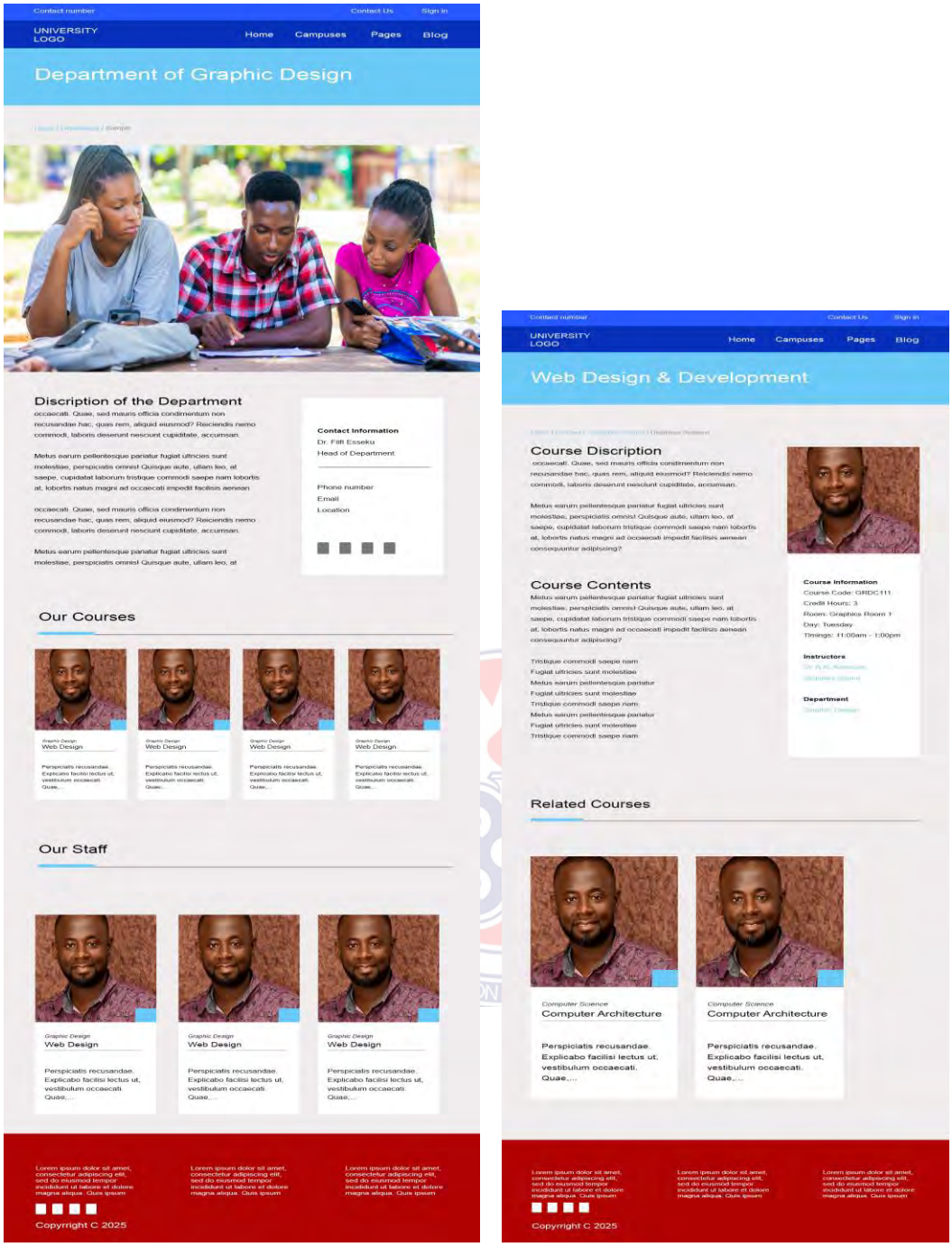

Figure 5.6: User Interface of the Department and Course Description Pages

Source: Researcher's Gallery (2024).

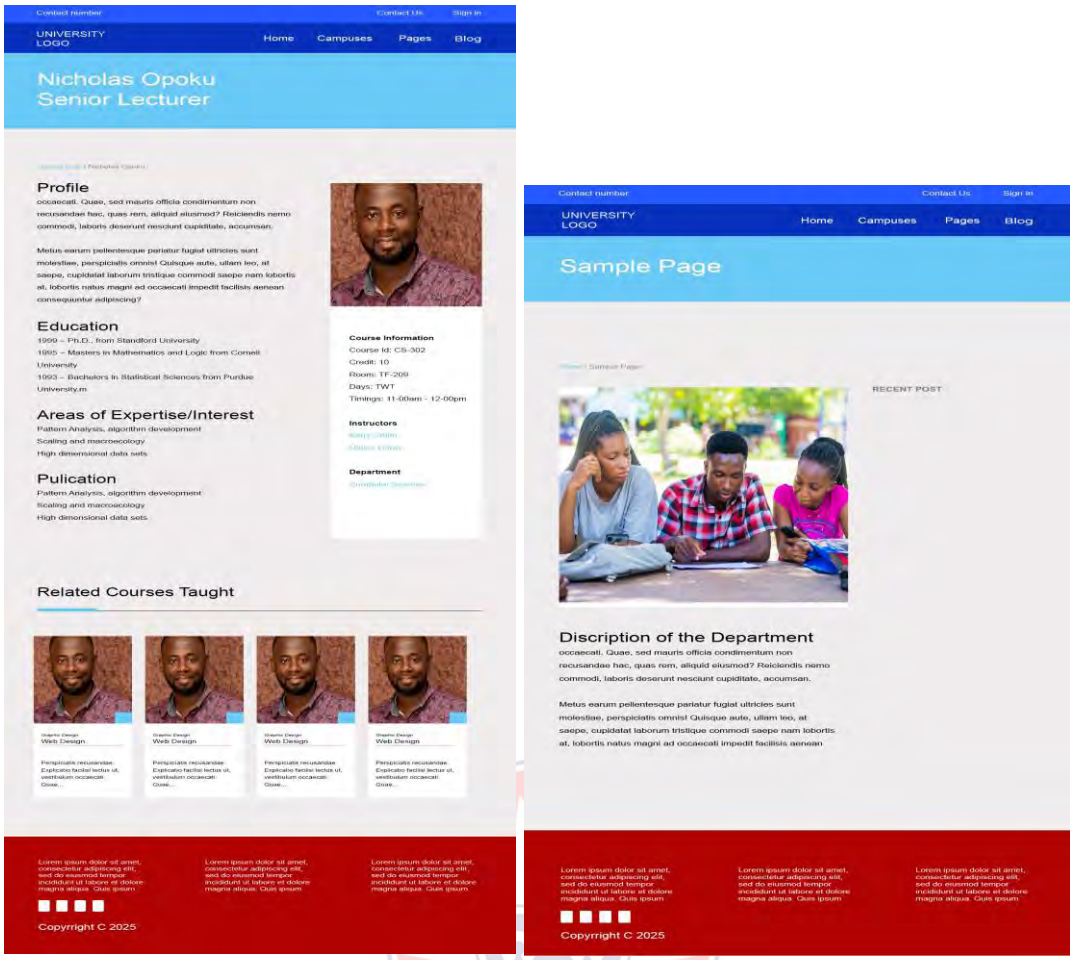

Figure 5.7: User Interface of the Staff and Sample Pages

Source: Researcher's Gallery (2024).

The above visual designs dictate how the theme will look and feel, ensuring consistency, usability, and brand alignment of the university website when implemented in WordPress. Also, the designing stage sets the visual and interactive foundation for the final WordPress theme and guides the researcher during the frontend development of the theme.

5.1.4 Development

In WordPress theme development, the development stage is where the actual coding and functionality of the theme are built, including the creation of custom templates, styles, and features. This involves using coding languages like HTML, CSS, PHP, JavaScript,

and animations to implement the theme's structure, design, and behaviour. The development stage is where the actual coding and functional building of the theme happens, after planning and design. This stage transforms visual user interface designs into a working WordPress theme by writing code for templates, styles, scripts, and functions.

While the design stage focuses on the aesthetics and user interface of the theme, the development stage delves into the mechanics behind the scenes, implementing functionality and performance of the theme. The researcher followed some key activities during the development phase. These include the following:

- Setting up a WordPress development environment
- Installing WordPress locally
- Creating a theme folder and essential WordPress theme files
- Creating customised template files
- Crafting the CSS style sheets
- Validating theme code and files

5.1.4.1 Setting up WordPress Development Environment

A WordPress development environment is a collection of tools that enable developers to safely develop and test their projects before they go live. In order to set up a local development environment, the researcher turned his local computer into a working server. Thus, installing a MAMP to run the Apache server and MySQL database before installing WordPress on the local host. A local WordPress development environment allowed the researcher to set up a working WordPress site powered by his own computer.

One benefit of this local development environment is that you can work on your site even if you do not have an active Internet connection. It’s also just generally faster because you aren’t hampered by the speed of your hosting, since everything happens on

your computer. Beyond that, it is also faster for code editing because the files are on the local computer. With this approach, codes can be opened and edited using the developer's favourite code editor, and any changes made will instantly be reflected on your local site as soon as you save the file (versus needing to download, edit, and re-upload files with a remote server). The following tools were used to set up the WordPress local development environment for the study: MAMP server, code editor (Adobe Dreamweaver CC), Chrome browser, and WordPress package. Adobe Dreamweaver application was chosen as a code editor for the project because the application has multiple views (code, design, split and live), which makes it possible to preview code results without previewing them in a web browser. Again, Dreamweaver has an auto-completion system making coding easy and simple.

MAMP is a local development environment for macOS that installs a complete web server stack. For MAMP, the first letter (M) represents macOS as the platform these bundles are intended to run on. The remaining letters denote Apache, MySQL, and PHP, respectively. These pieces of software map directly to the core components required to run WordPress: the web server, the database, and the PHP runtime, in order to set up the development environment for the project.

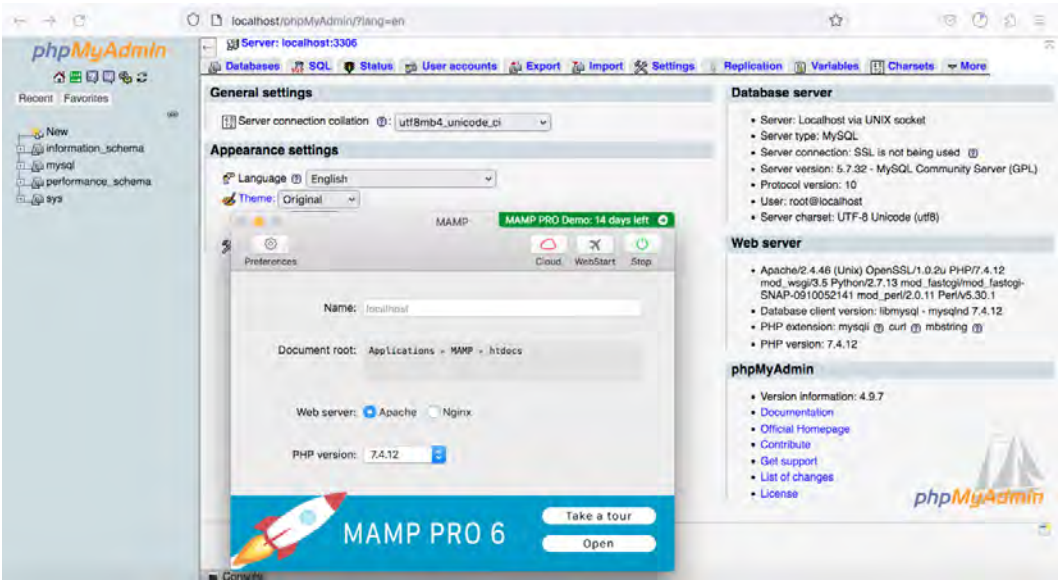

Figure 5.8: Launching of MAMP Server to Set-up the Development Environment

Source: Researcher's Gallery (2024).

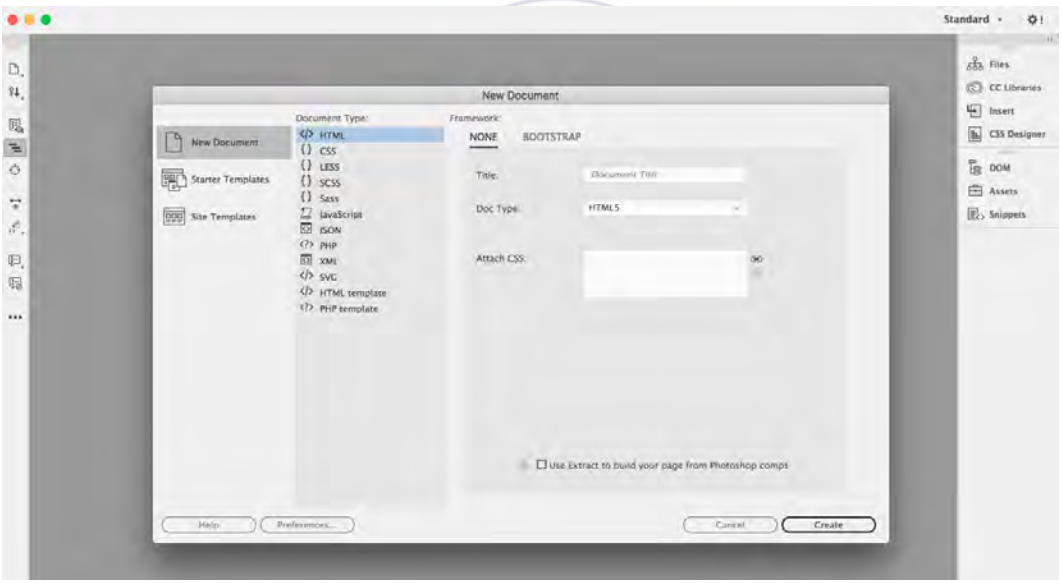

Figure 5.9: Launching of Adobe Dreamweaver as a Code Editor for the UniSite Theme Development

Source: Researcher's Gallery (2024).

5.1.4.2 Installing WordPress Locally

Installing WordPress locally means setting up a WordPress website on your own computer, instead of on a live web server. This allows you to develop, test, or experiment with WordPress without needing an Internet connection or buying a hosting account. As

a basic requirement to run a WordPress site locally, the researcher logs in to the MAMP server phpMyAdmin panel and creates a database with appropriate permissions to store those WordPress files.

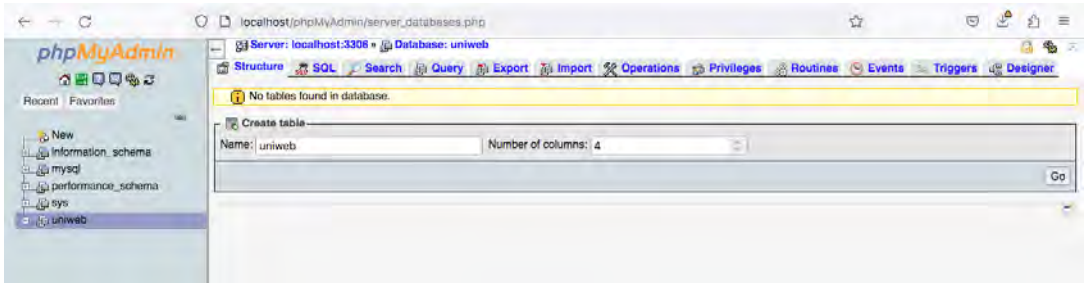

Figure 5.10: Creating Database to Store WordPress Files

Source: Researcher's Gallery (2024).

Next, the downloaded WordPress zip file was extracted into the htdocs (MAMP) localhost//uew.edu.gh directory. Then, the researcher accessed the WordPress installer file through localhost//uew.edu.gh in their browser. The process for installing WordPress on localhost//uew.edu.gh is shown in figures 5.11 to 5.16.

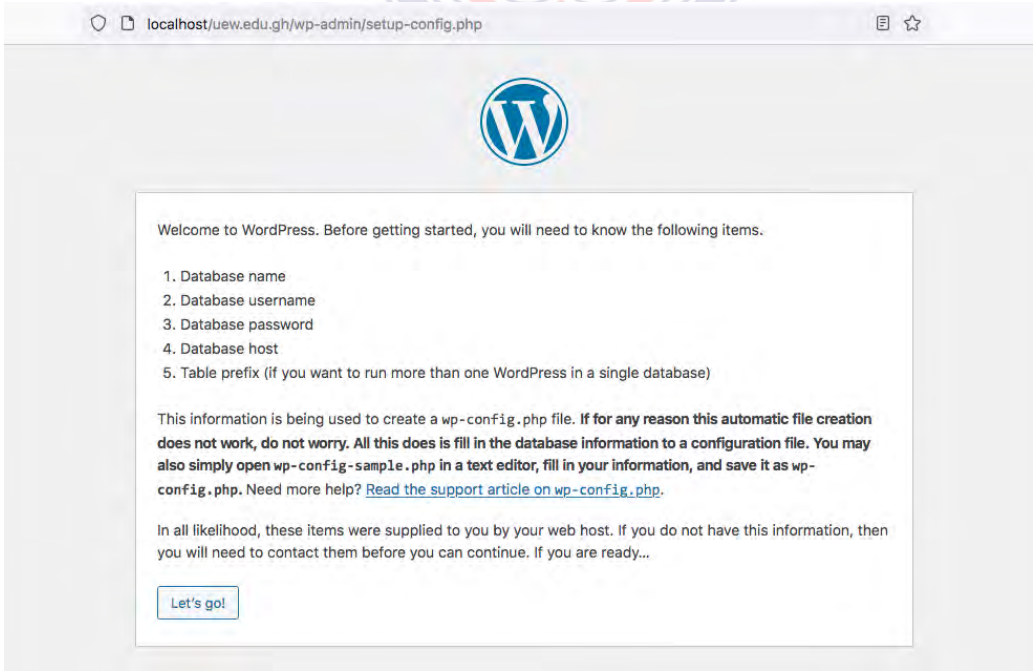

Figure 5.11: Prompt to Retrieve Database Credentials

Source: Researcher's Gallery (2024).

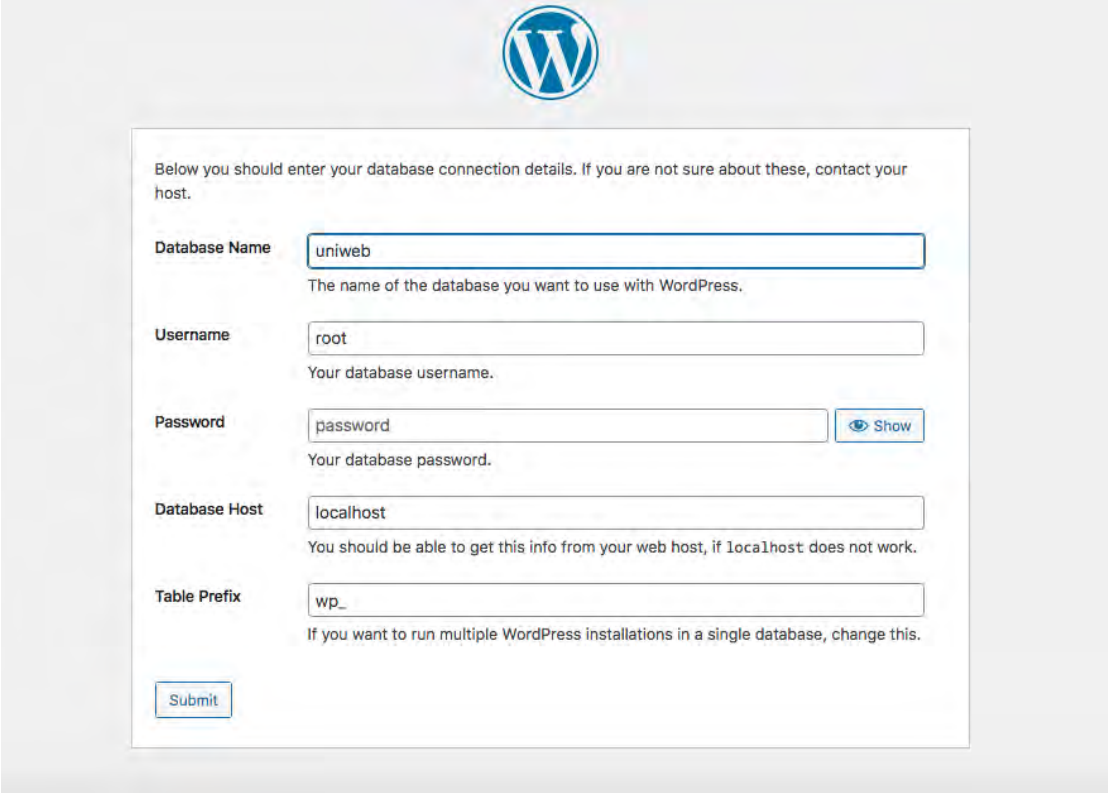

Figure 5.12: Entry of Database Credentials Created in Figure 5.10

Source: Researcher's Gallery (2024).

Figure 5.13: Successful Communication between WordPress and Database

Source: *Researcher's Gallery (2024).*

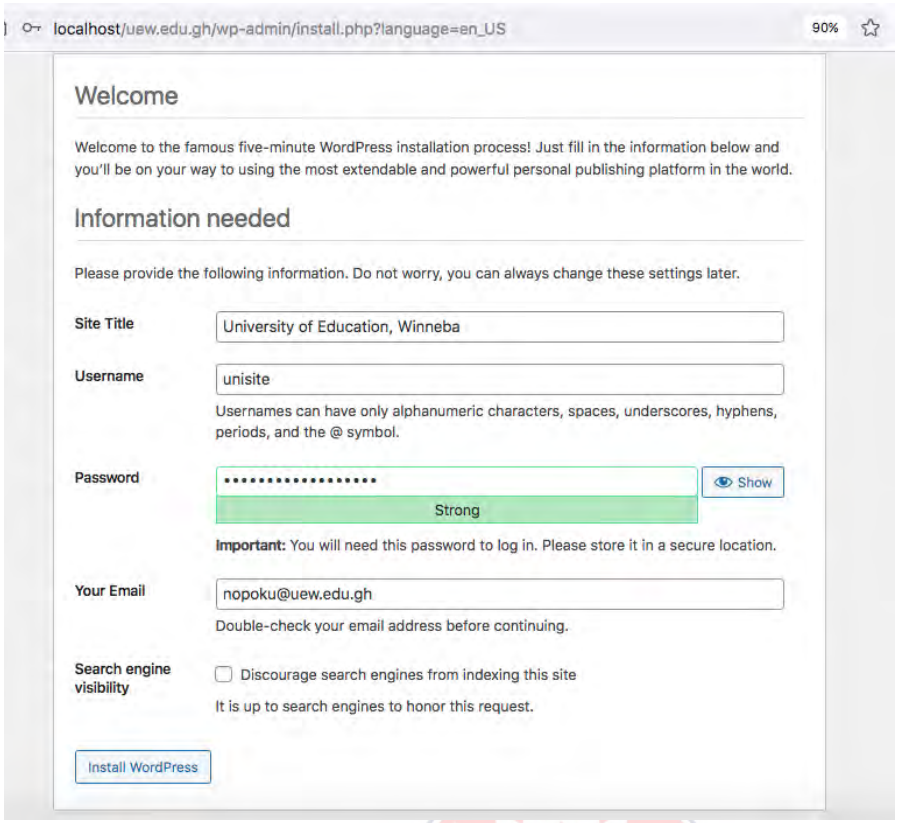

Figure 5.14: Entry of Website Credentials to Access the Backend of the Website

Source: Researcher's Gallery (2024).

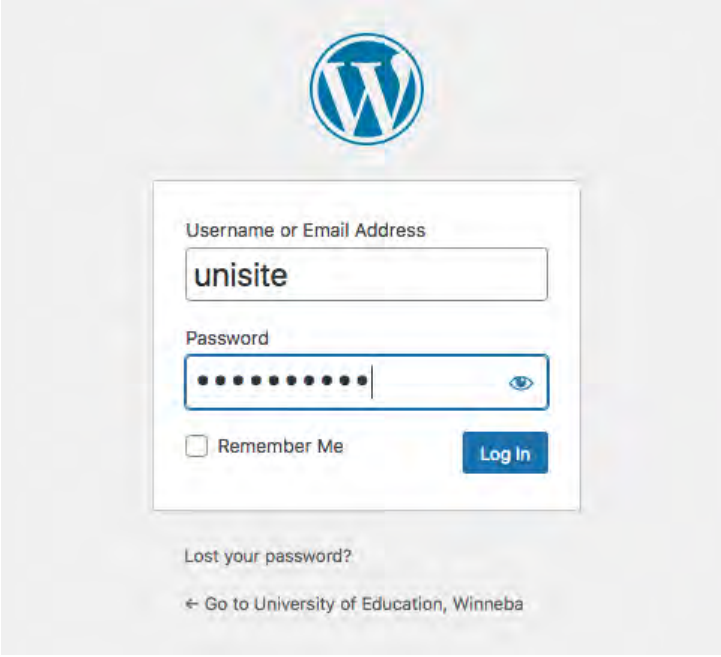

Figure 5.15: Login to the Backend of the Website

Source: Researcher's Gallery (2024).

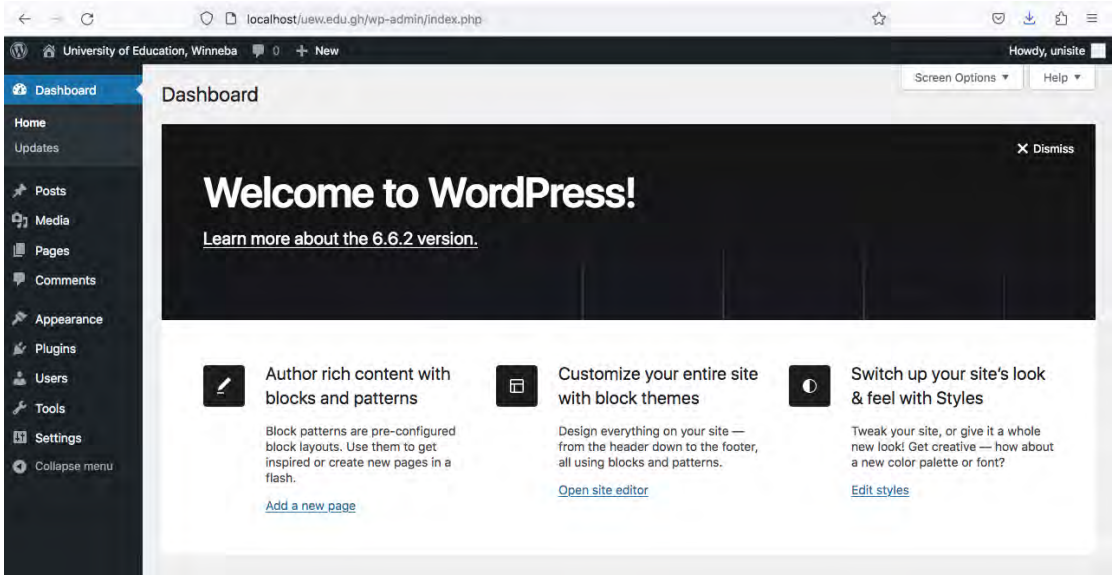

Figure 5.16: Successfully Installed WordPress Dashboard

Source: Researcher's Gallery (2024).

5.1.4.3 Creating Theme Folder and Essential WordPress Theme Files

Theme design and development in WordPress revolves around its essential template files and folders. The researcher navigates to the /wp-content/themes/ directory in the WordPress installation and creates a new folder and subfolders for the UniSite theme. Next, the required essential files were added to the theme folder. These essential files are the backbone of the theme, dictating how it functions and appears. They are index.php, style.css, header.php, footer.php, page.php, etc.

The additional custom template files defining the layout of specific pages, such as home.php, course.php, department.php, staff.php, etc., which use a different layout to simplify theme customisation for university website design, were also added to the theme folder. These theme files were in the same folder within the WordPress installation directory to allow the content management system to load these theme files based on the template hierarchy. Figure 5.17 shows essential files and folders in the UniSite theme directory.

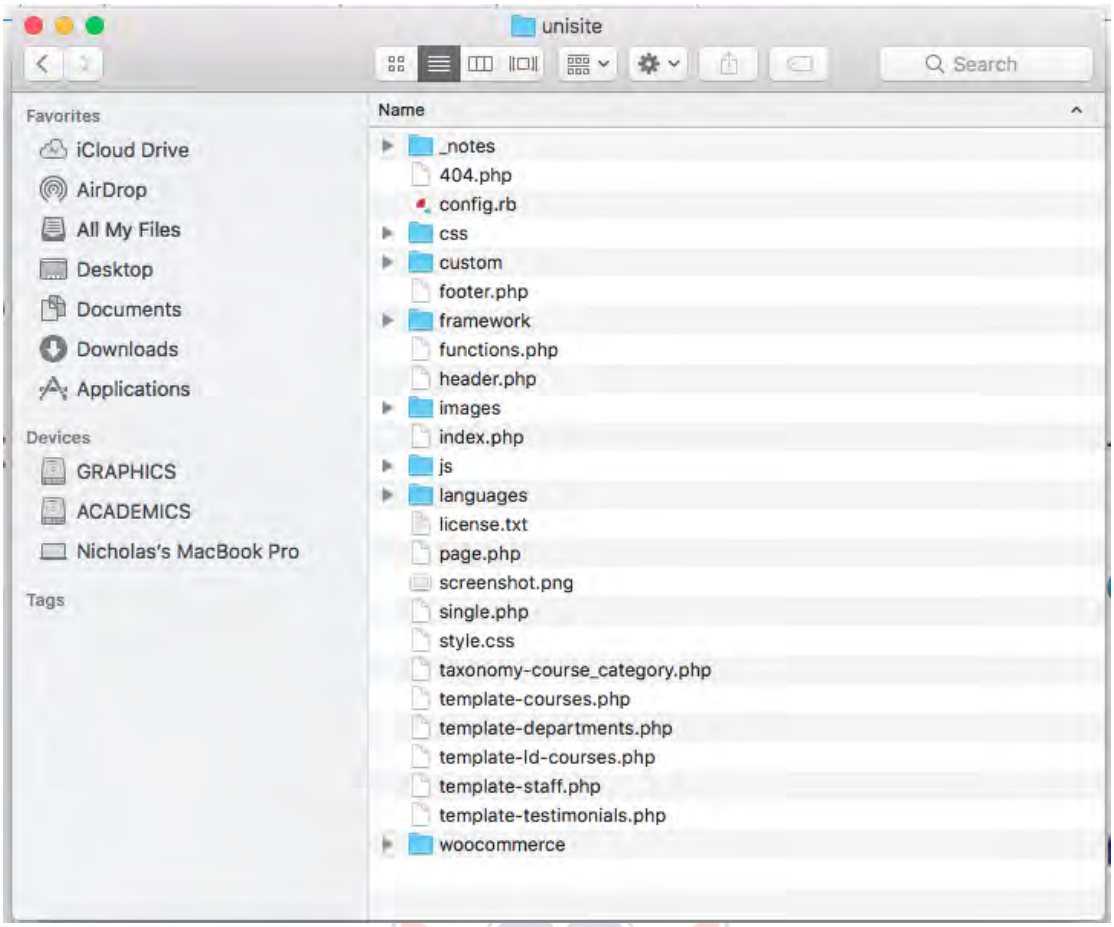

Figure 5.17: Essential Files and Folders in UniSite Theme Directory

Source: Researcher's Gallery (2024).

5.1.4.4 Creating the index.php File

The index.php file is the primary template file in a WordPress theme. It dictates the main page of the website and serves as the default file that WordPress uses to display content if specific templates (like single.php for single posts or page.php for pages) are not found.

The researcher created a new PHP file in a text editor (Adobe Dreamweaver CC), named it 'index.php', and saved it in the theme's directory. This file will link to various elements of the site using WordPress 'hooks', creating the basic structure of the theme. Figure 5.18 shows the PHP code executed for the index.php file.

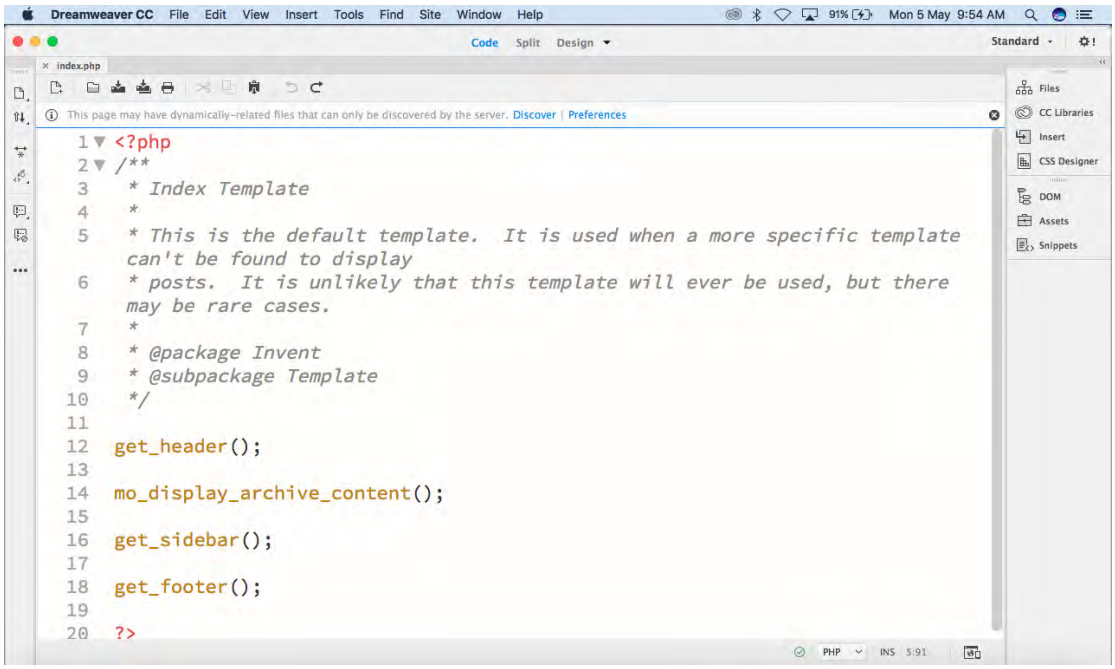

Figure 5.18: PHP Codes Executed for the index.php File

Source: Researcher's Gallery (2024).

Next, the file was saved and tested on your local WordPress installation to ensure it displays pages and other content as expected.

5.1.4.5 Creating the header.php File

The header is the top section of a website that appears on every page**.** It is created using a dedicated template file and is loaded automatically by WordPress when rendering pages. It is typically defined in the theme's code using a file called header.php. The header.php file typically contains everything that displays in the header of the website, including the site's HTML <head> and opening <body> tag, logo, navigation menus, and search bar. A new PHP file was created in a text editor (Adobe Dreamweaver CC), named 'header.php' and saved to the theme's directory. Figure 5.19 shows the PHP code executed for the header.php file.

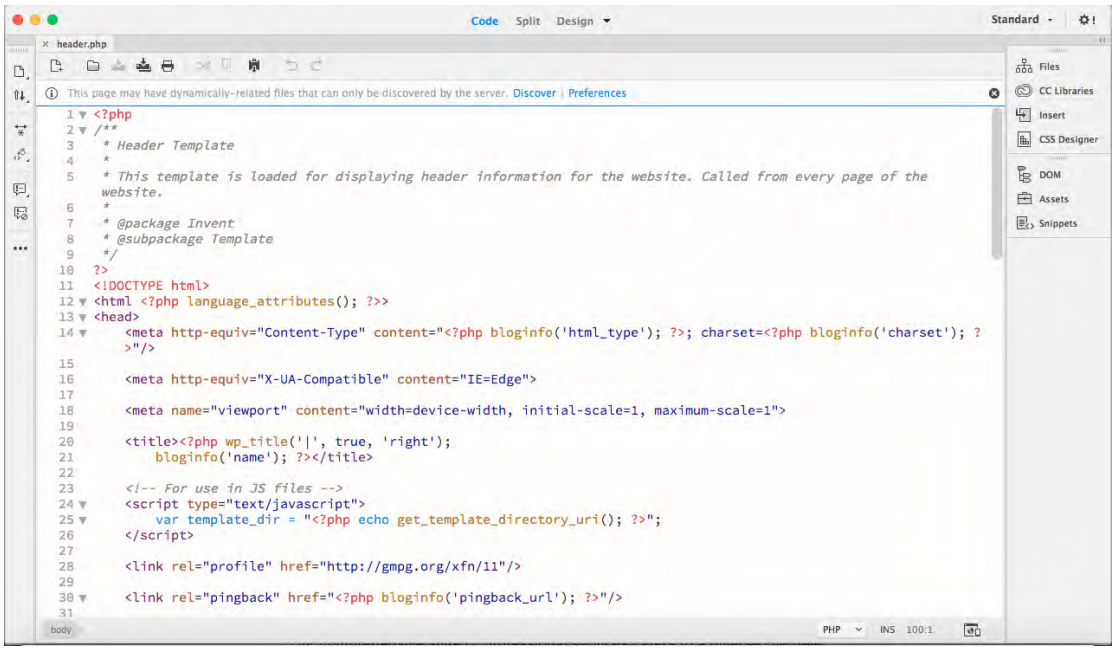

Figure 5.19: PHP and HTML Codes Executed for the header.php File

Source: Researcher's Gallery (2024).

5.1.4.6 Creating the footer.php File

The footer is the bottom section of a website that usually appears on every page. It's used to display supplementary or persistent content such as copyright notices, menus, contact information, widgets, secondary navigation and social media links. A new PHP file was created in a text editor (Adobe Dreamweaver CC), named 'footer.php' and saved to the theme's directory. Figure 5.20 shows the PHP code executed for the footer.php file.

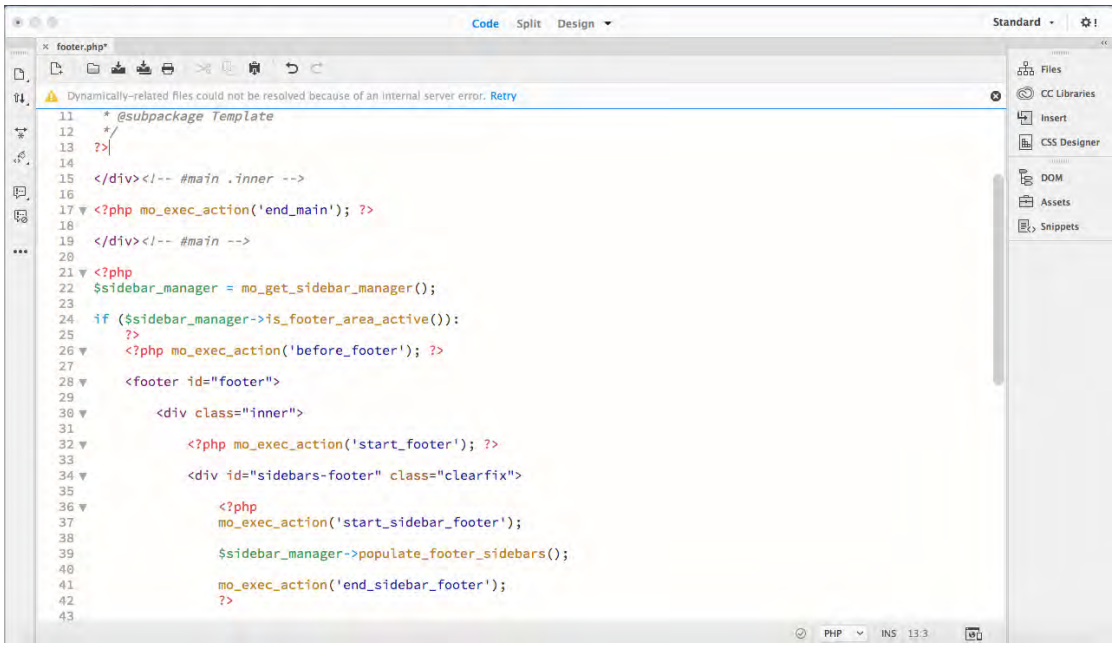

Figure 5.20: PHP Codes Executed for the footer.php File

Source: Researcher's Gallery (2024).

The footer section was coded inside the theme's `footer.php` file and was called in template files using <?php get_footer(); ?>. This tells WordPress to include the content of `footer.php` in the current page.

5.1.4.7 Creating the style.css File

In website development**, a** stylesheet refers to the main CSS (Cascading Style Sheets) file used to define the visual appearance **and** layout of the website. It is a critical component of every WordPress theme and is typically named style.css. The CSS file plays a dual role in WordPress theme development. Firstly, defining theme metadata that WordPress uses to recognise and display the theme in the admin dashboard and secondly, styling the appearance of the theme, including font styles, colours, layouts, and other CSS rules that determine the appearance of the website.

In the theme's directory, a new file named style.css was created. At the top of style.css, a comment block with the theme's details was added. This information is

essential for WordPress to recognise the theme and display it in the admin area. Next, basic CSS rules that determine the appearance of the website, including layout, font style, colours, etc, were added.

Then, as the style sheet developed further, more specific styles were added to control the layout and appearance of various elements. This includes headers, footers, sidebars, navigation menus, and widgets. Other customised templates, including template-courses.php, template-departments.php, template-staff.php, etc, were also added. Figure 5.21 shows the PHP code executed for the style.css file.

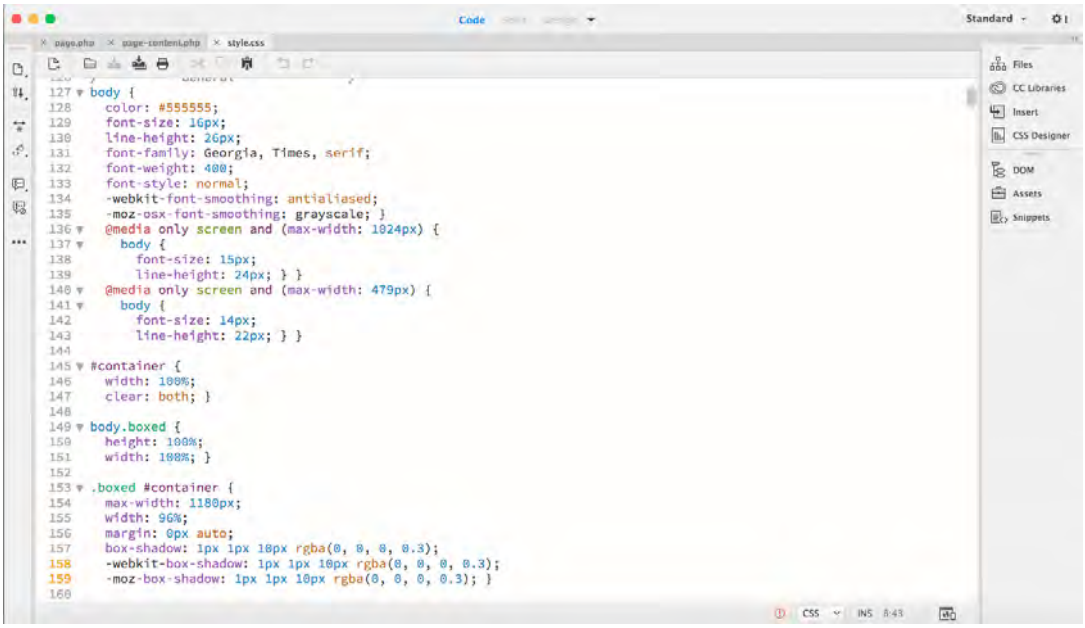

Figure 5.21: PHP Codes Executed for the style.css File

Source: Researcher's Gallery (2024).

5.1.4.8 Creating Customised Template Files

In WordPress theme development**, a** customised template file (often called a custom template**)** is a PHP file specifically created or modified to control the layout and appearance of a particular type of content or page that is different from the default page.php in terms of layout on a WordPress website. In the context of this study, customise template files were added to create unique layouts for specific pages, such as

template-courses.php, template-staff.php, template-departments.php, single-course.php, single-department.php, single-staff.php, etc. Figures 5.22 to 5.24 show the PHP and HTML codes executed for the customised template files.

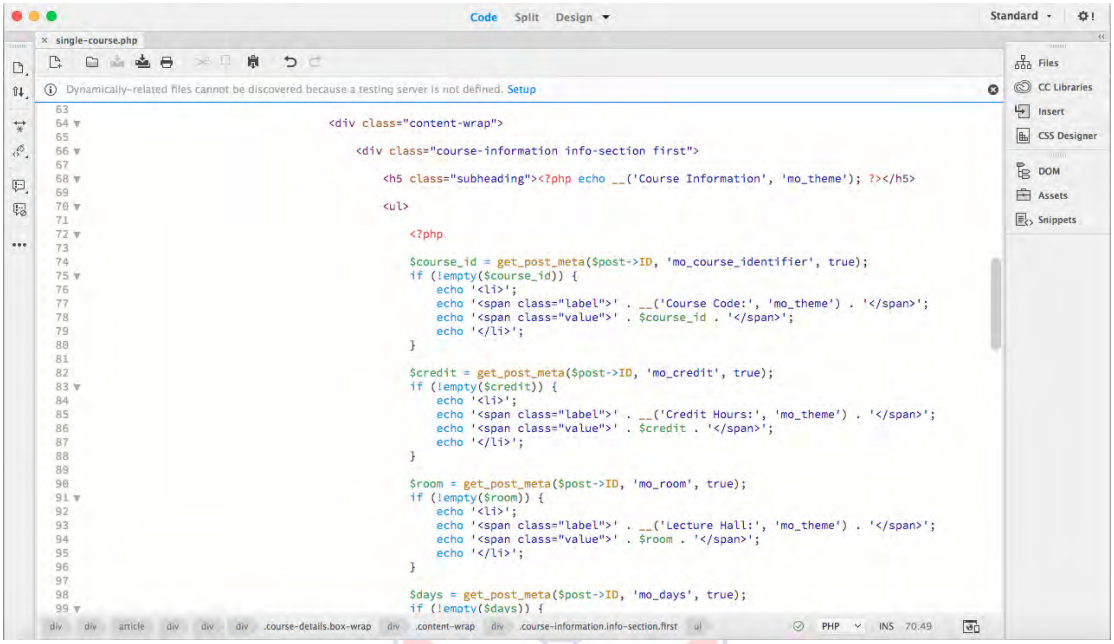

Figure 5.22: PHP Codes Executed for the Customised single-course.php File

Source: Researcher's Gallery (2024).

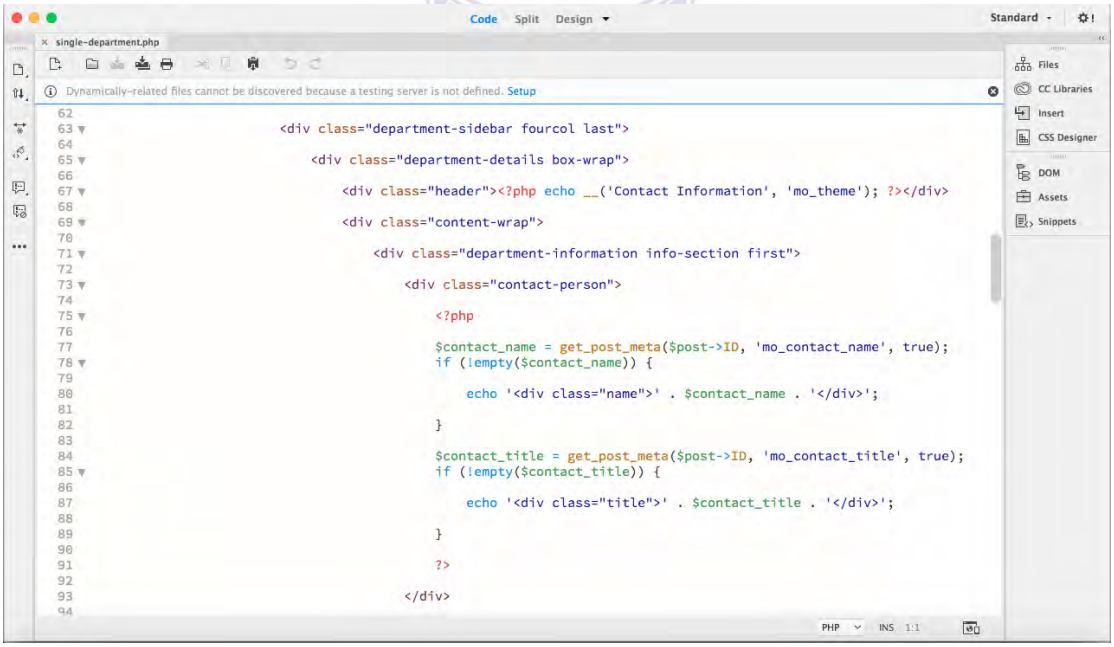

Figure 5.23: PHP Codes Executed for the Customised single-department.php File

Source: Researcher's Gallery (2024).

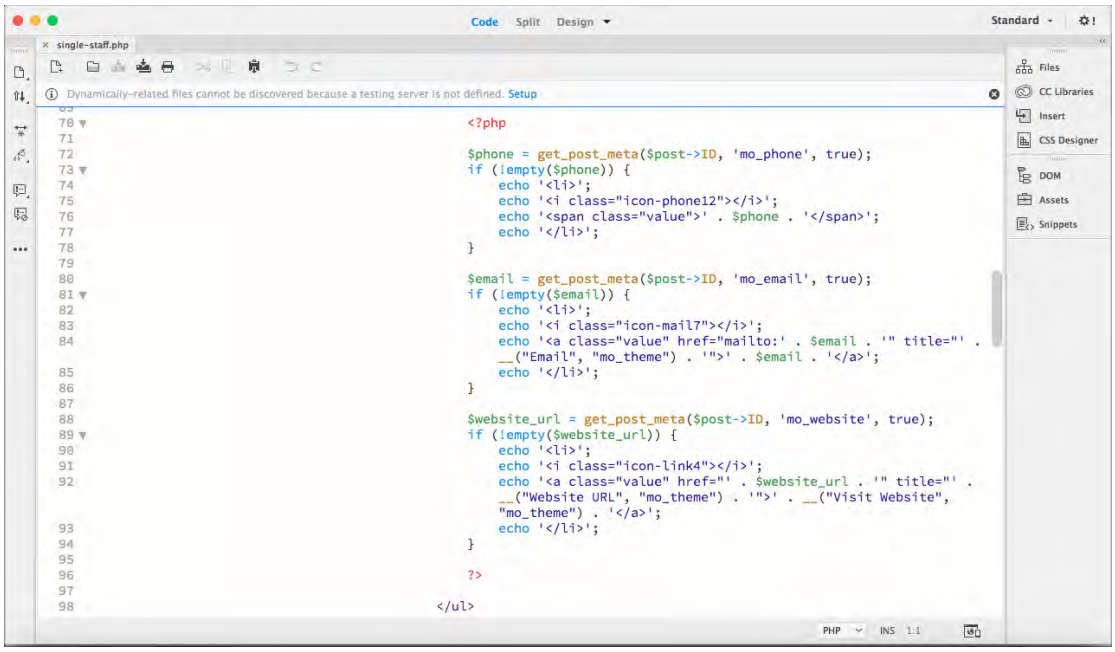

Figure 5.24: PHP Codes Executed for the Customised single-staff.php File

Source: Researcher's Gallery (2024).

5.1.4.9 Creating Additional Files

Additional files in the context of this study are any files beyond the core template files that support or enhance the theme's functionality, appearance, or structure. These files help the researcher to organise the theme, add advanced features, and improve performance or maintainability. They include JavaScript files to add interactivity and functionality to the theme, which were enqueued in functions.php using wp_enqueue_script(). The screenshot.png file serves as a visual preview function. It is the thumbnail image designed in Adobe Photoshop CC to represent the UniSite theme in the WordPress admin dashboard. The screenshot.png also helps identify UniSite theme visually among others, and finally, gives a quick look and feel of what the UniSite theme will look like once it is activated.

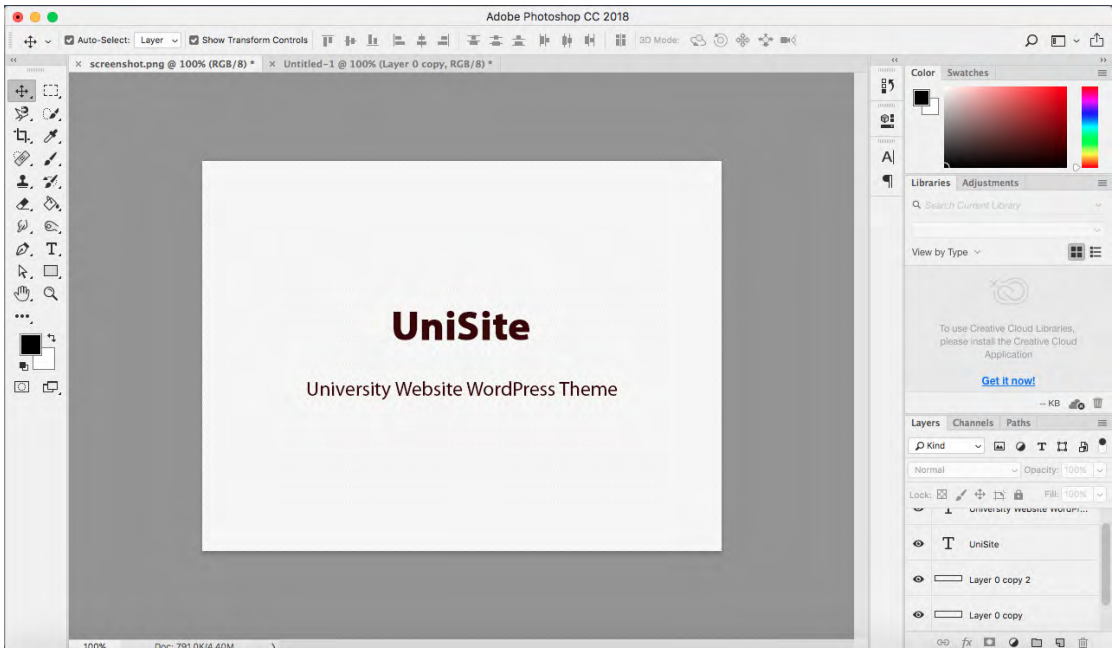

Figure 5.25: Screenshot of UniSite in Adobe Photoshop CC

Source: Researcher's Gallery (2024).

5.1.4.10 Validating Theme Codes and Files

Validating code and files in WordPress theme development is essential to ensure your theme is standards-compliant, compatible with various web browsers, secure, efficient, performance-optimised, and ready for production or submission to the WordPress theme directory. These standards ensure web pages are interpreted in the same way by different browsers, search engines, and other web clients.

In Adobe Dreamweaver CC, the researcher used the code validation tool to fix all code errors. In the validation pop-up window, errors and warnings were identified and described, indicating specific lines in the code editor. Critical attention was given to the lines with code errors and warnings, and fixed. Figure 5. 26 shows code validation performed in Adobe Dreamweaver CC.

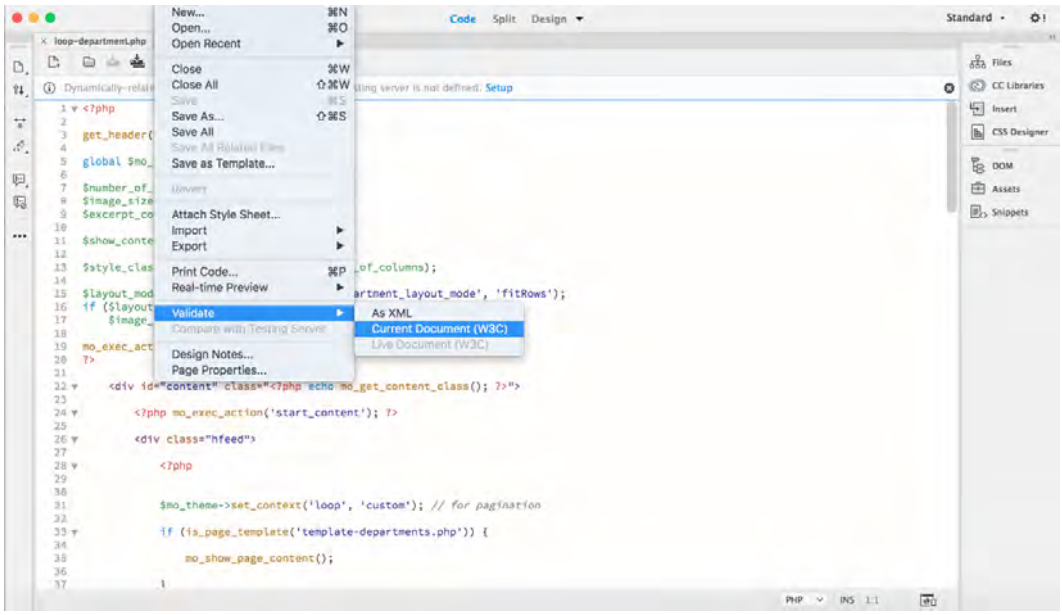

Figure 5. 26: Validating Codes in Adobe Dreamweaver CC

Source: Researcher's Gallery (2024).

Next, code validation was again performed to make sure all codes are error-free. Again, all the files in the theme folder adhered to best practices for file naming conventions in web design and development. For instance, all the file names are in lower case letters, and there are no spaces between the file names. Where two or three words are used for a particular file name, a hyphen (-) or an underscore (_) is used to separate the words. Also, all the file names in the theme folder do not have special characters in them.

5.1.4.11 Testing

Testing in WordPress theme development refers to the process of reviewing and verifying that your theme functions correctly, meets WordPress standards, displays properly across browsers and devices, and is secure and accessible. Debug mode was activated and was set to *WP_DEBUG true* from the WordPress dashboard for testing the UniSite theme. Debug mode is a feature in WordPress that provides error reporting, making it easier to identify and fix theme issues. When the debug mode is enabled,

WordPress displays PHP errors, warnings, or notices about the UniSite theme. However, debug mode is not recommended on a live server site. That is why the researcher tested it on a local server environment established in the development phase. Figure 5.27 shows debug settings in WordPress for testing the UniSite theme.

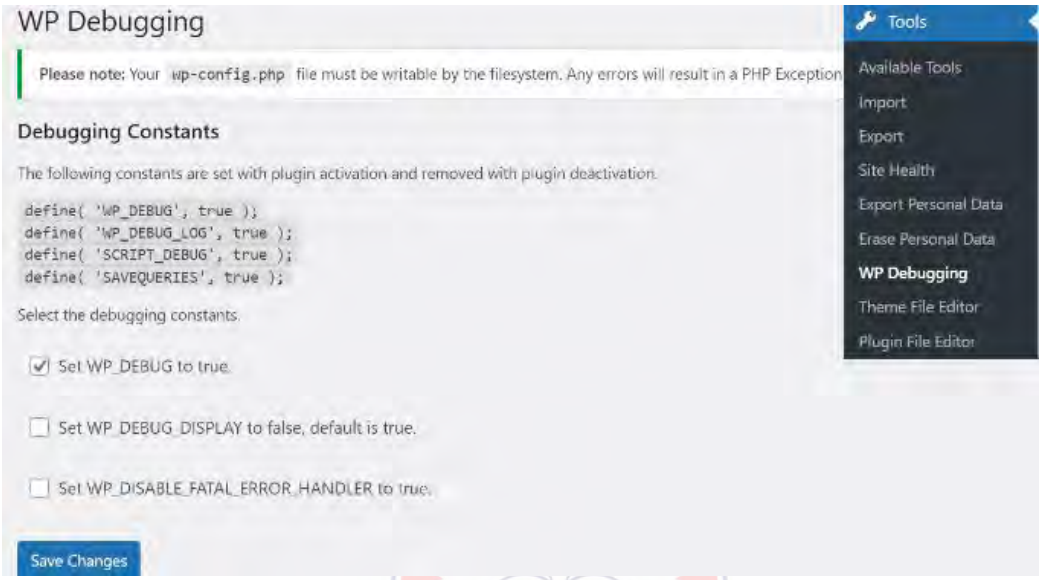

Figure 5.27: Debug Settings in WordPress for Testing the UniSite Theme

Source: Researcher's Gallery (2024).

Next, the *Theme Check* plugin was installed and activated from the plugins panel. This plugin is actually intended for developers to see if a theme meets the latest standards and follows WordPress guidelines. Once the plugin was active, the UniSite theme was selected from the dropdown menu, and the 'Check it' button was clicked. The plugin started testing the UniSite theme against the latest WordPress theme development standards. The result showed that the UniSite theme passed the test.

Beyond the UniSite theme for standards, the researcher also focuses on several other key areas. Among these key areas are the responsiveness of the theme to see how the UniSite theme will appear and behave on various devices and screen sizes. The check result proved that the UniSite theme is fully responsive and displays well on both mobile devices and desktops. Again, Google's PageSpeed Insight was used to analyse the site's

speed. The analysis showed that the performance of the UniSite theme site is 89.3% which will positively impact user experience when it is fully developed. Finally, browser compatibility was checked to see how the site appears and behaves in web browsers like Chrome, Microsoft Edge, Safari and Firefox.

5.1.4.12 Packaging of the UniSite Theme

Packaging in WordPress theme development refers to the final process of preparing the theme files into a distributable, installable format. Typically, a *.zip* file so it can be uploaded, shared, or submitted to the WordPress Theme Directory or a client. Packaging is like boxing a product before it hits the shelves. The code must be clean, complete, and ready for end users to install and activate without issues.

At this stage, the researcher ensured that all the required files and folders were included and correctly structured in the UniSite theme folder. Next, unnecessary development files were also removed, leaving only required files and folders. Figure 5.32 shows the required files and folders in the UniSite theme folder.

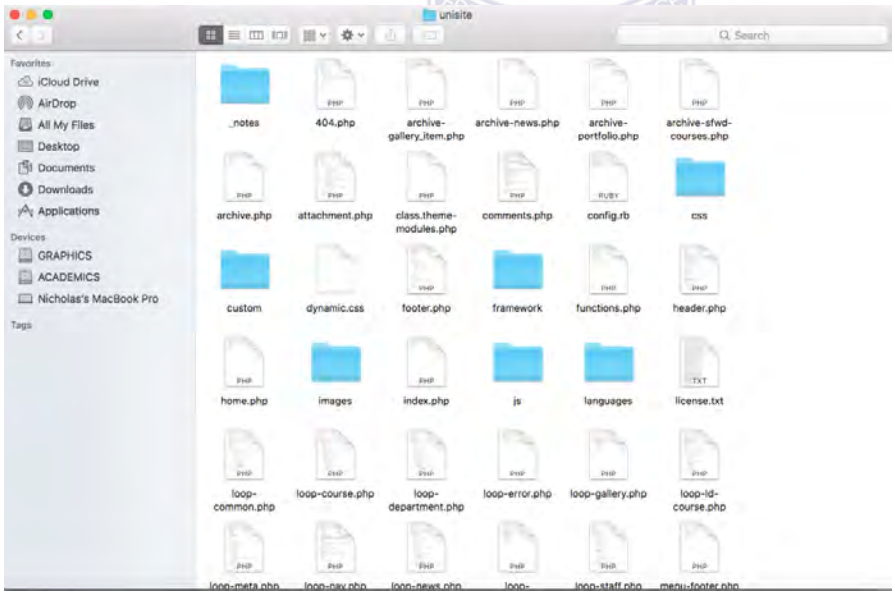

Figure 5.28: Required Files and Folders in the UniSite Theme Folder

Source: Researcher's Gallery (2024).

Then, the researcher right-clicked the UniSite folder in the theme directory and chose “Compress”. Finally, a test installation was performed to check if the UniSite theme developed was successfully packaged. From the WordPress dashboard, the newly packaged UniSite theme was uploaded and activated successfully. Figure 5.33 shows a successful UniSite theme being installed and activated in a WordPress site. The final

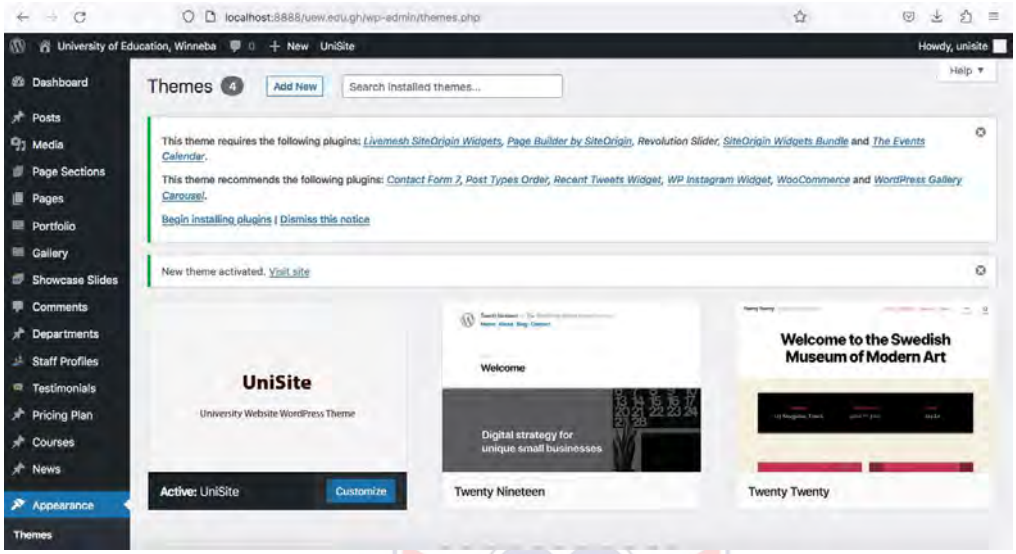

Figure 5.29: A Successful UniSite Theme been Installed and Activated in WordPress Site

Source: Researcher’s Gallery (2024).

5.2 Phase Two: Development of Prototype University Website (UEW Website)

A website prototype is a visual and functional model of a website that shows its structure, layout, and user interactions before fully developed. It is essentially a mockup that allows designers, developers, stakeholders, and users to understand and test how the site will look and work when fully developed. In the context of this study, according to budgets and time constraints, the researcher chose to focus on Department of Graphic Design page on the prototype UEW website to fully developed it to provide information, services, resources, and communication tools for a diverse audience including current students, prospective students, faculty, staff, alumni, and the general public. Since all departments within UEW perform similar functions, the Department of Graphic Design

page could serve as a replica for the other departmental pages within the UEW website. The researcher followed essential key chronological steps during this phase to develop the prototyped UEW website. These include:

- Installing the UniSte theme and activation
- Installing required plugins and activating them to support the theme
- Setting the UniSite theme preferences
- Building the homepage
- Creating the customised pages
- Designing navigational structure
- Migrating the website to a live server
- Checking for broken links

5.2.1 Installing UniSte Theme and Activation

WordPress theme installation is the process of adding and activating a design template (UniSite theme) to the WordPress website to change how it looks and behaves visually without altering the content or core functionality. The theme installation gives a new look and layout to the default one. First, the researcher logged in to the administrator area (dashboard) of the website using credentials already established in Figure 5.15. Next, the researcher navigated to the *"Appearance"* on the left panel and selected *"Theme"* from the dropdown list presented. *Add New Theme* and *Upload Theme* were selected to add a new theme to the WordPress site. Next, the researcher navigated to the UniSite packaged file from the desktop and selected it for upload. Once the upload was completed, the *"Install Now"* option was presented to install the UniSite packaged theme. Then, once the installation had been completed, a successful message was presented, and the newly successful UniSite theme was activated. Figures 5.34 to 5.37 show the screenshots of the UniSite theme installation processes.

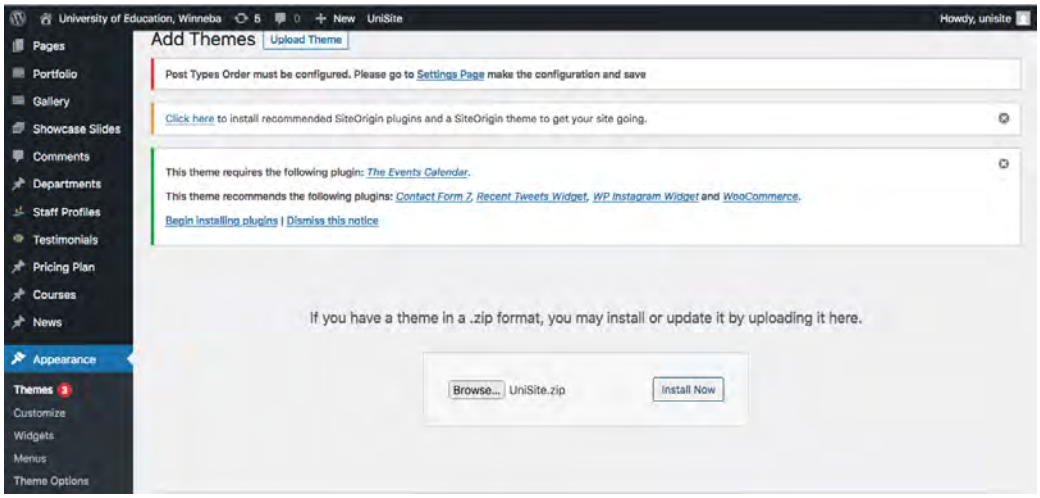

Figure 5.30: Screenshot of "Install Now" Button to get the UniSite Theme

Source: Researcher's Gallery (2024).

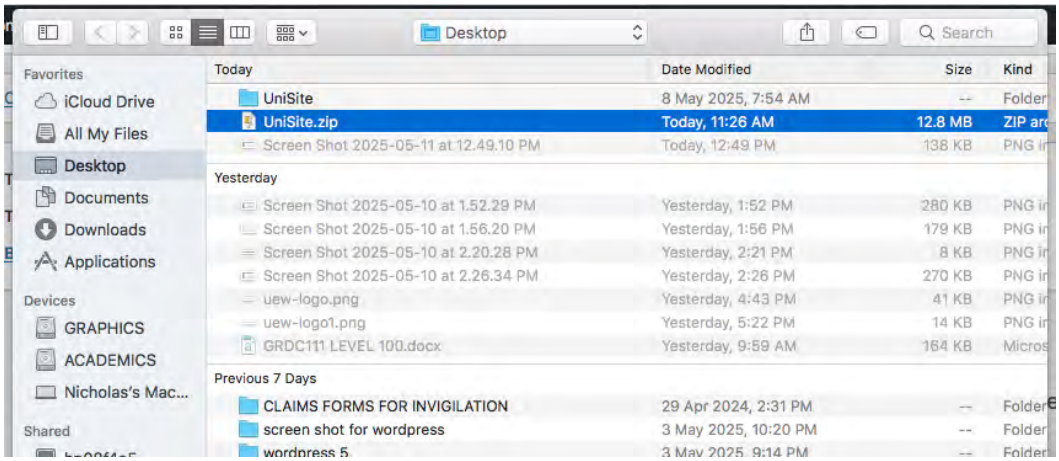

Figure 5.31: Screenshot of UniSite Packaged Theme about to be Installed

Source: Researcher's Gallery (2024).

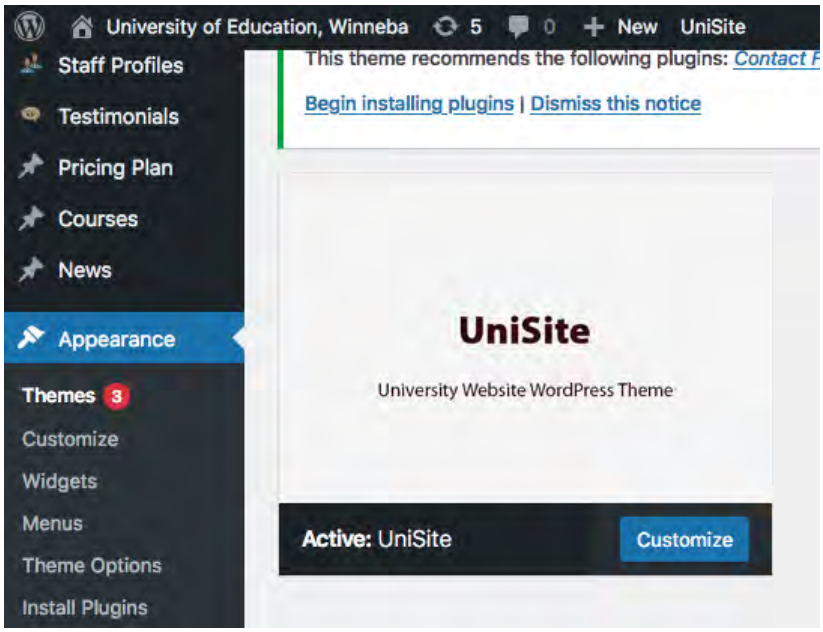

Figure 5.32: A Screenshot of a Successful UniSite Theme Installed and Activated

Source: Researcher's Gallery (2024).

5.2.2 Installing Required Plugins and Activation to Support the Theme

Every WordPress website should have some essential plugins to improve user experience. Plugins are small pieces of software that can be installed and activated on a WordPress site to add specific features or capabilities. These plugins are essential add-ons that extend the website functionality and help it operate efficiently, securely, and effectively. These plugins are not built into the *UniSite* theme by default, but are necessary to enhance security, performance, search engine optimisation (SEO), backups, layout design, and more. In the context of UEW prototyped website development, Slider Revolution, OriginSite page builder, Contact Form 7, among others, were installed and activated from the plugins panel. Figure 5.37 shows a screenshot of successfully installed and activated plugins for the website.

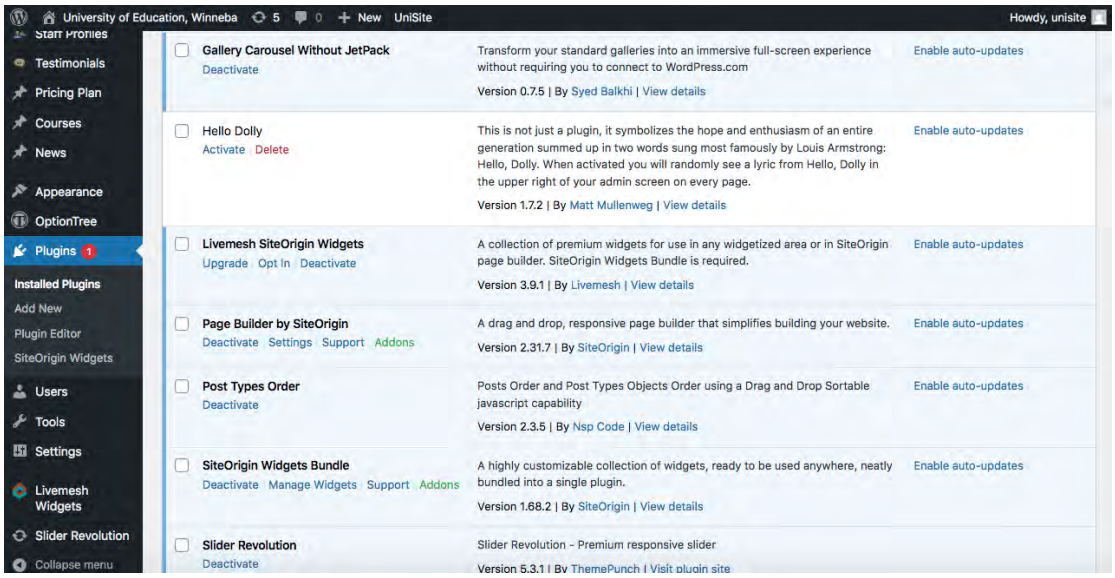

Figure 5.33: A Successful Installed and Activated Plugins for the Website

Source: Researcher's Gallery (2024).

5.2.3 Setting the UniSite Theme Preferences

Theme preferences are the design settings and layout options provided by a WordPress theme. These settings control site identity (logo), colour scheme and fonts, header and footer layouts, menu and widget configurations, homepage layout options, sidebar positioning, button styles and animation, and more, depending on the theme, without touching any code. These settings help to customise a theme's appearance and behaviour to match the website's layout, branding, and functional needs of the website after the theme has been installed and activated.

First, the researcher navigated to *"Appearance"* from the WordPress dashboard and selected *"Theme Options"*. Next, the Site was selected to upload the UEW logo. The logo was uploaded from the media gallery to the theme setting dashboard and saved. Figure 5. 38 shows uploaded and saved the UEW logo.

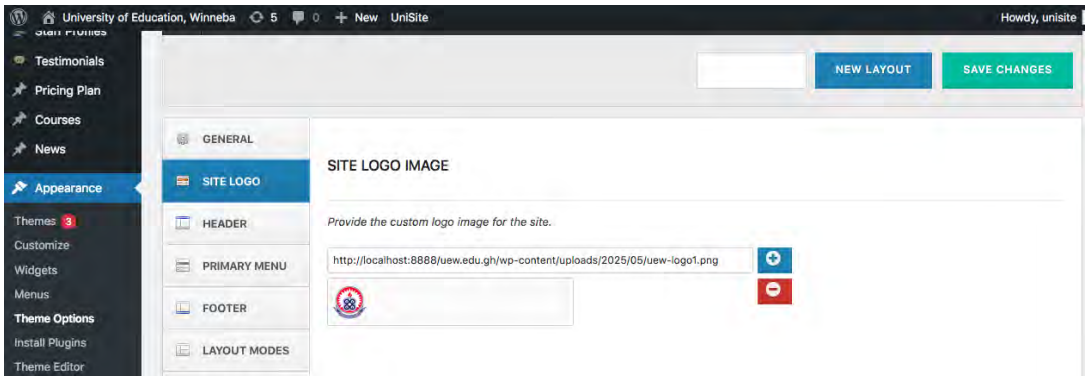

Figure 5. 34: Uploaded and Saved UEW Logo

Source: Researcher's Gallery (2024).

After that, the background of the default header and footer was changed to reflect the UEW brand. The header and footer are two important sections of the website that provide essential navigation and information to users. The header is the top section of the website that typically includes the logo, search bar and navigation menu. The footer section is the bottom part of the website that holds the copyright information, social media links, contact information and additional navigation links to important pages of the website. Figure 5.38 and Figure 5.39 show the new background colours of the header and how they appear at the frontend.

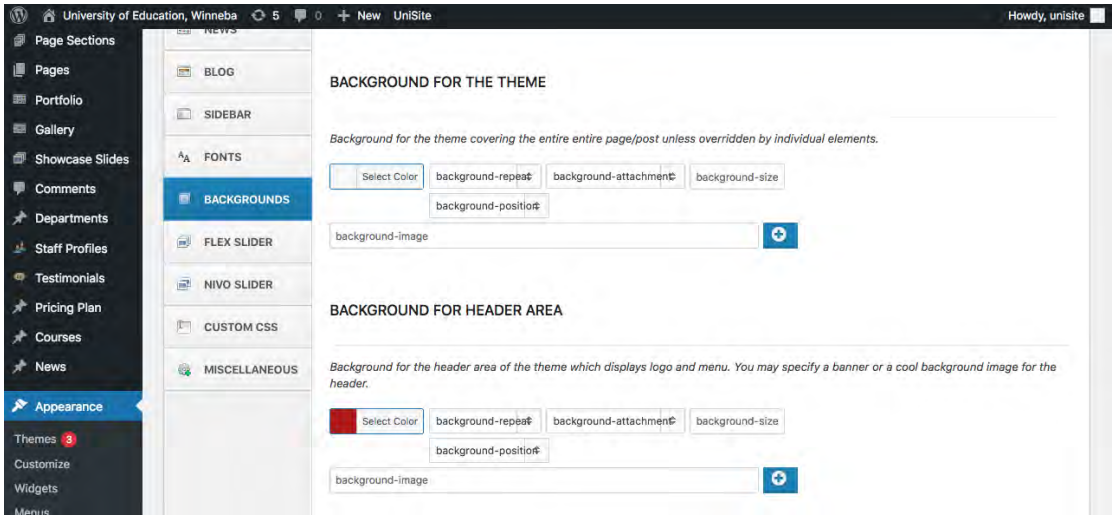

Figure 5.35: New Background Colours of the Header and the Footer

Source: Researcher's Gallery (2024).

Figure 5.36: UEW Logo as it Appears on the Background Colours of the Header

Source: Researcher's Gallery (2024).

5.2.4 Building the Homepage

A university website homepage, also known as the welcome page, is the main entrance page of a university's website, serving as a gateway to the institution's online presence. It also provides easy access to intuitive navigation to various sections of the website, such as academic programmes, admissions, campus tour, research, etc. Its primary purpose is to offer a brief introduction to the university, its values, academic programmes, its mission and students' lifestyle on campus.

In designing the prototype UEW homepage, the researcher made reference to the User Interface (UI) design presented in Figure 5.5 and set the page layout template to *One Column No Sidebars* from the WordPress dashboard. First, the flex slider was used to design the image sliders on top of the homepage, showcasing campus activities and admissions opening for the 2025/2026 academic year.

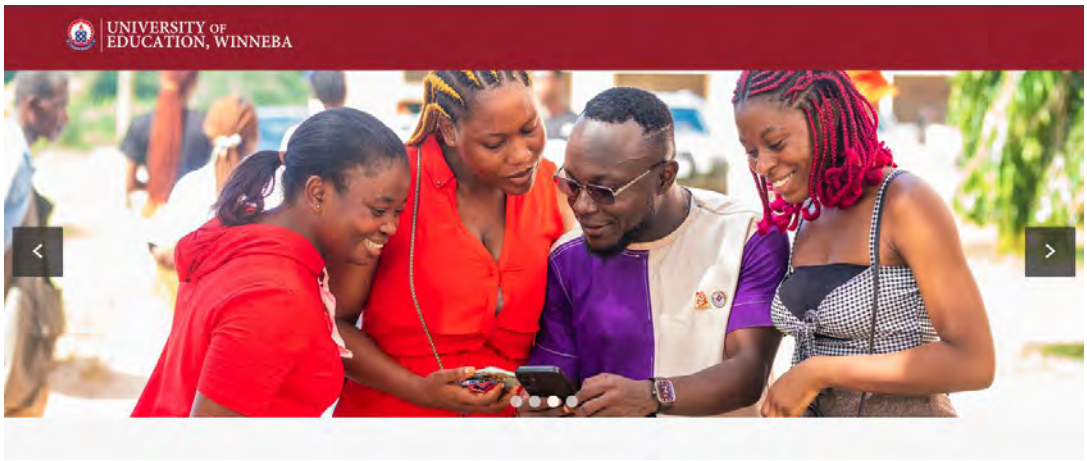

Figure 5.37: Frontend of the Slider Section as Shown on the Homepage

Source: Researcher's Gallery (2024).

Next, the OriginSite page builder was used to design the fully functioning homepage of the prototyped UEW website. Again, the testimonial section was added using the testimonial widget installed. Testimonials are very key on the homepage of a university website. It has an influence on prospective students' decision-making in choosing a university. Prospective students are more likely to apply and enrol when they feel connected to real stories from alumni, faculty members and current students. Figures 5.41 to 5.45 show various section designs of both the backend and frontend of the homepage.

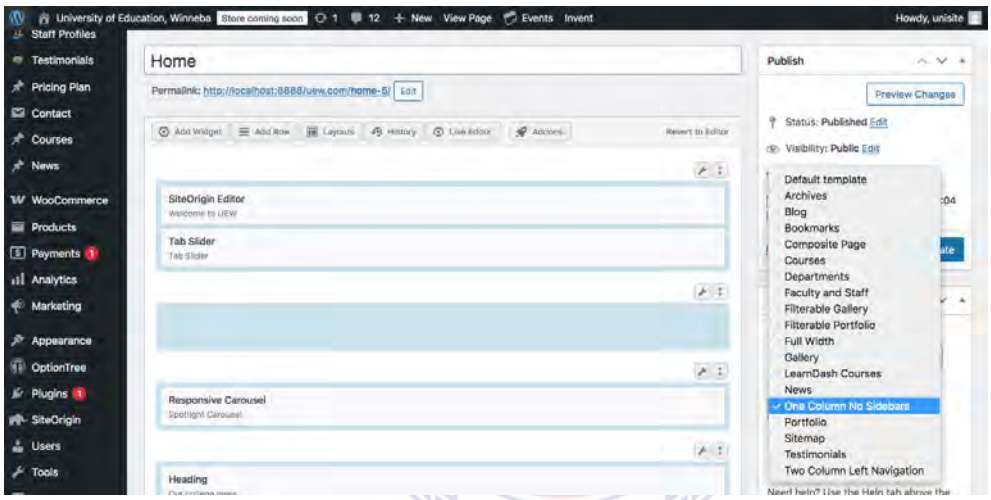

Figure 5.38: Backend of the Homepage

Source: Researcher's Gallery (2024).

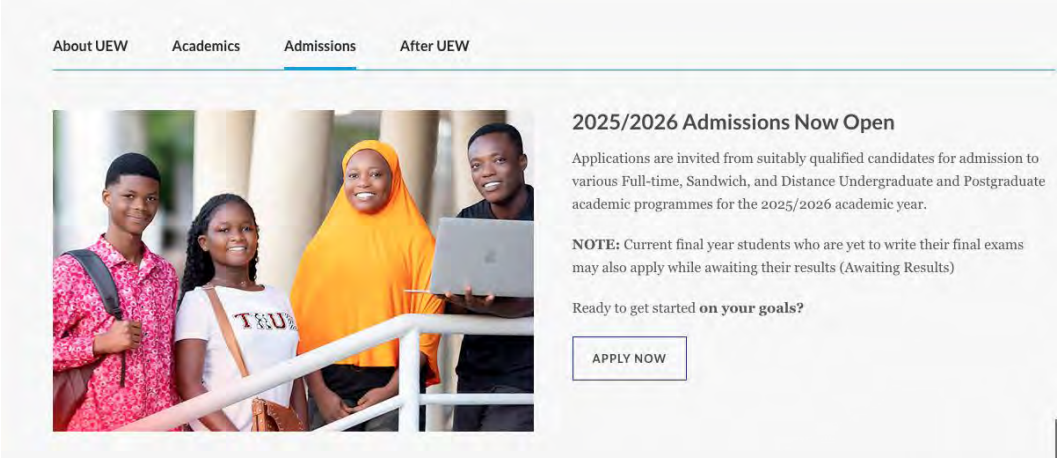

Figure 5.39: Frontend of Admissions Section as Shown on the Homepage

Source: Researcher's Gallery (2024).

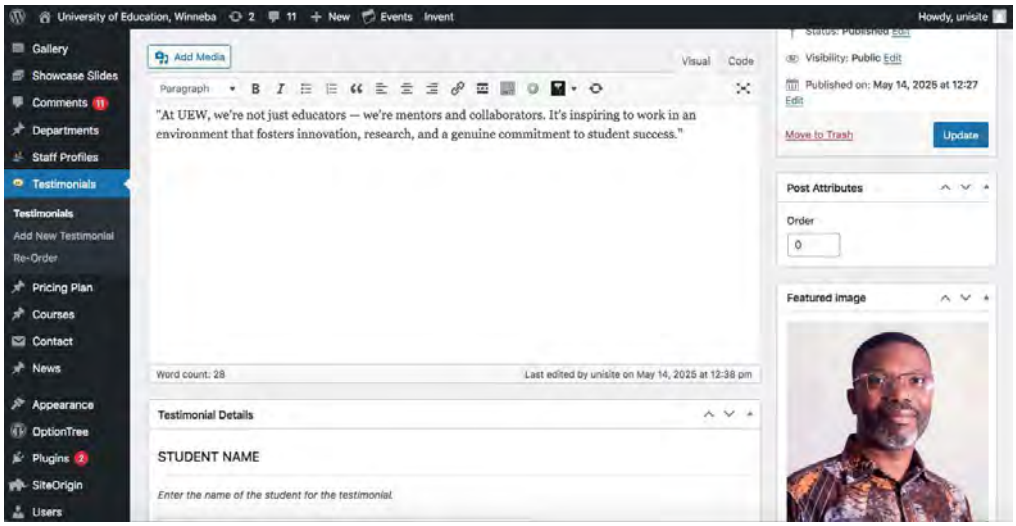

Figure 5.40: Backend of the Testimonial Section

Source: Researcher's Gallery (2024).

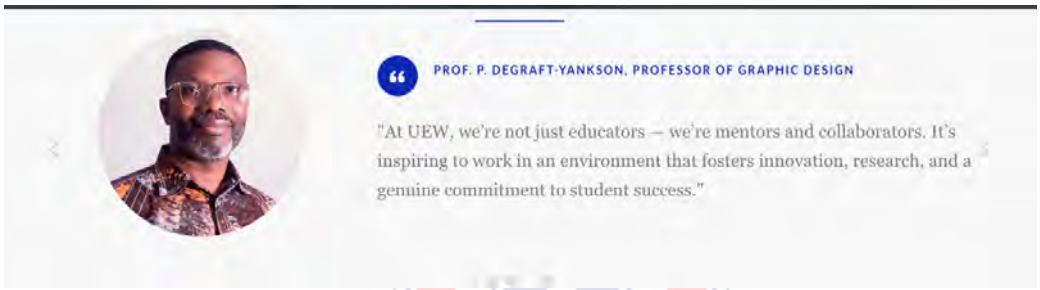

Figure 5.41: Frontend of Testimonials Section as Shown on the Homepage

Source: Researcher's Gallery (2024).

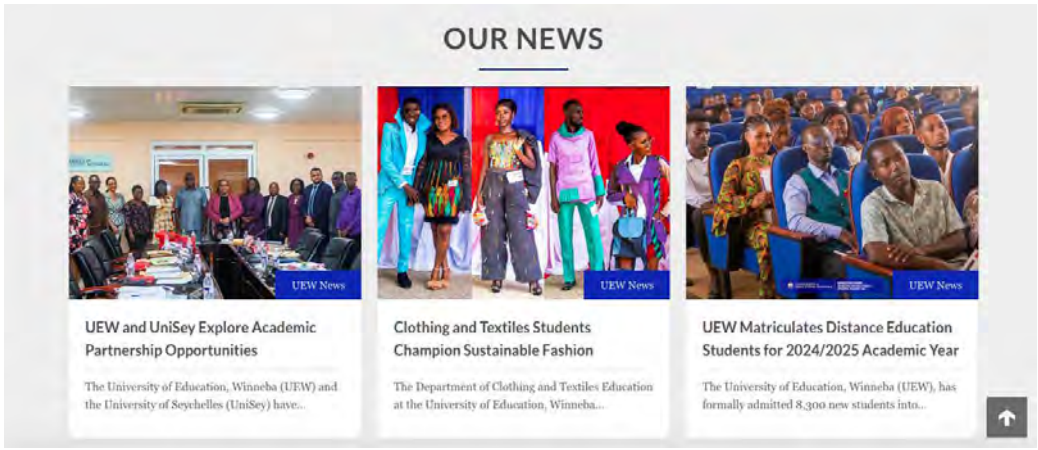

Figure 5.42: Frontend of News Section as Shown on the Homepage

Source: Researcher's Gallery (2024).

Finally, the newly designed homepage was published to the frontend of the website.

5.2.5 Creating the Customised Pages

In a university website design, customised pages refer to the specific, standalone web pages that make up the entire site aside from the homepage. Each of these pages focuses on a particular function and feature. They are designed to serve a specific purpose. In the context of this study, the customised pages consist of the department page, course description page, staff profile page and testimonials page.

In designing the departmental page, the researcher added a new page from the Department section on the dashboard. The department page, during the theme development phase, was developed in such a way that the page should have a section for an image to represent the department, a text holder to describe the activities of the department, contact details of the department, a section to feature lecturers, and some of the courses the department runs. This information will give visitors, especially prospective students, a general overview of the department, including the lecturers' contacts for them to seek clarifications before enrolling on the programme. The newly added page was named "Department of Graphic Design", as already captured and explained in section 5.2. Next, detail of the department was added to the content areas, and the featured image was set to the department. The purpose of the featured image is to have an image representation of the department.

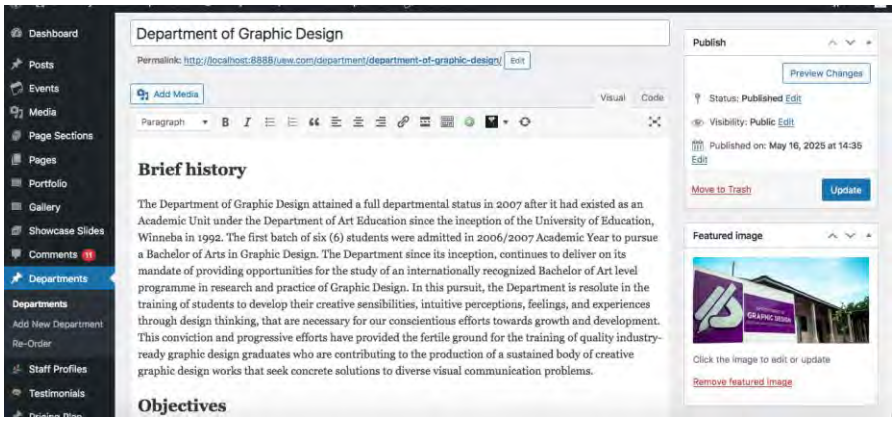

Figure 5.43: Backend of Department of Graphic Design Page

Source: Researcher's Gallery (2024).

Next, courses from the department were assigned to the page and published to the frontend of the website. The courses assigned will give prospective students an idea of some of the courses they would be taking when they enrol in any of the graphic design programmes at UEW.

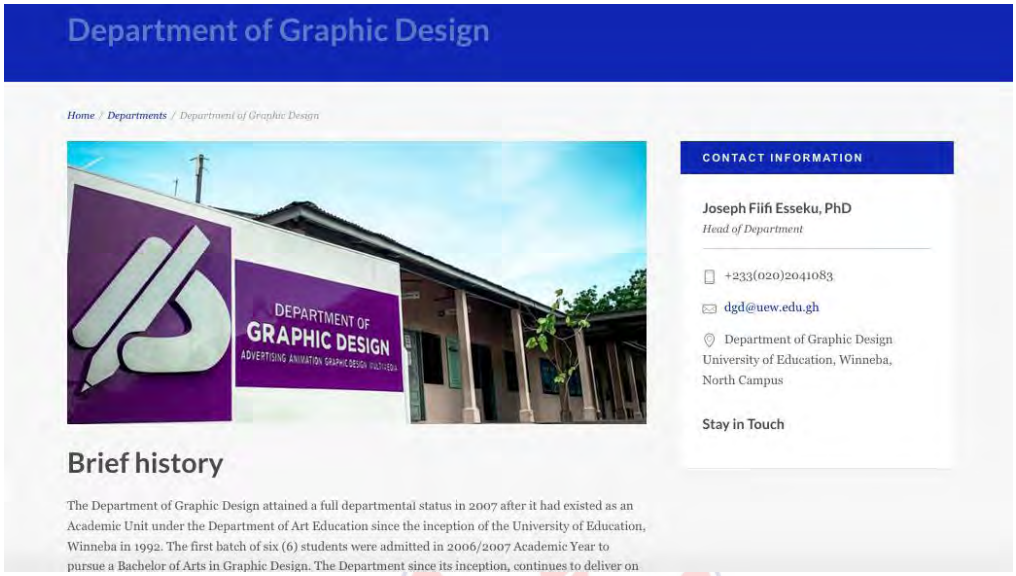

Figure 5.44: Frontend of Department of Graphic Design Page as Shown in Web Browser

Source: Researcher's Gallery (2024).

Again, in designing the course description page, the researcher added a new course from the *Courses* section on the dashboard. The course page, during the theme development phase was developed in such a way that the page should have section for image to represent the course, course title, course code, a text holder to describe the course, name of the course instructor, lecture hall of studio where the course is taken, and some related courses to that particular course. This information will give visitors, especially current and prospective students, a general overview of the course. The newly added course was named "Web Design and Development". Next, detail of the course description was added to the content areas, and a featured image was set for the course. The purpose of the featured image is to have an image representation of the course in an appealing layout for the website. Next, the course was assigned to a lecturer and

published to the frontend of the website. The idea of assigning the course to a lecturer is that the visitor will get the opportunity to know the lecturer by going through his or her profile. Such an opportunity will let students have confidence in the course instructor.

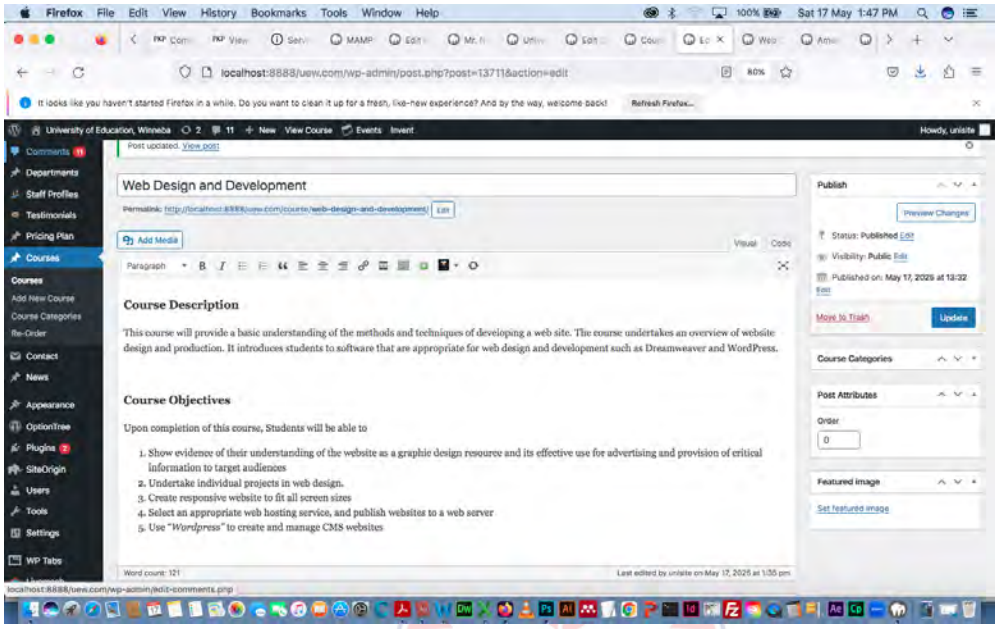

Figure 5.45: Backend of Course Description Page

Source: Researcher's Gallery (2024).

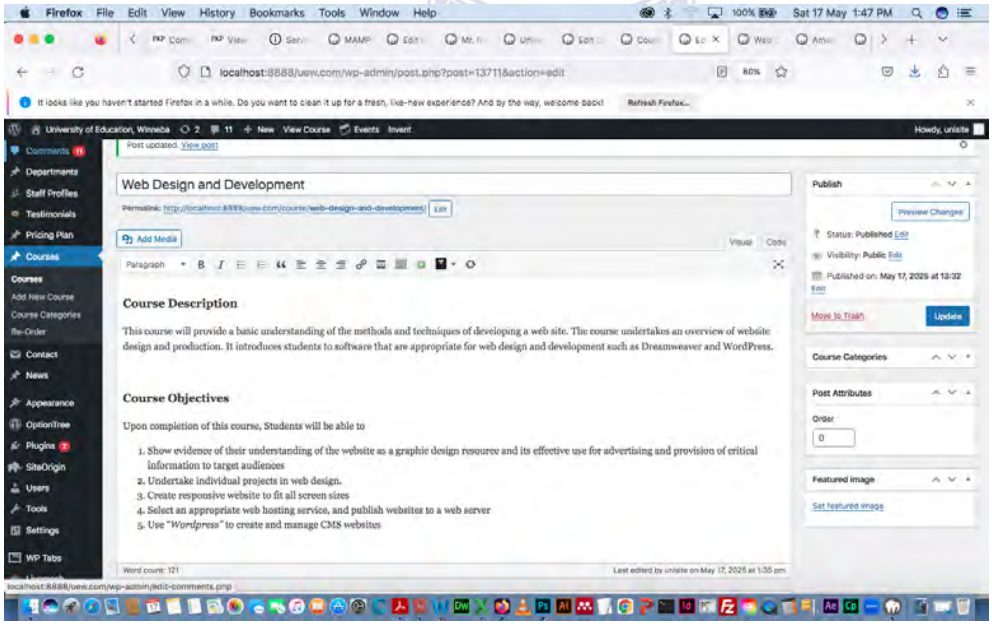

Figure 5.46: Frontend of Course Description Page as Shown in Web Browser

Source: Researcher's Gallery (2024).

5.2.6 Staff Page

In designing the staff page, the researcher added a new staff member from the *Staff profile* section on the dashboard. During the theme development phase, the staff profile was developed in such a way that the page should have a section for the lecturer's photo, the department he or she lectures in, bio data, contact details, qualifications, publications, research interests and courses taught. This information will give visitors, especially current and prospective students, a general overview of the course. The newly added staff profile page was named "Mr Nicholas Opoku". Next, additional details such as rank, contacts and location of their office were added to the content areas, and the featured image was set to the lecturer's photo. Next, the department was assigned to a lecturer and published on the frontend of the website. The idea of assigning the department to a lecturer is that the visitor will get the opportunity to know the department he or she lectures.

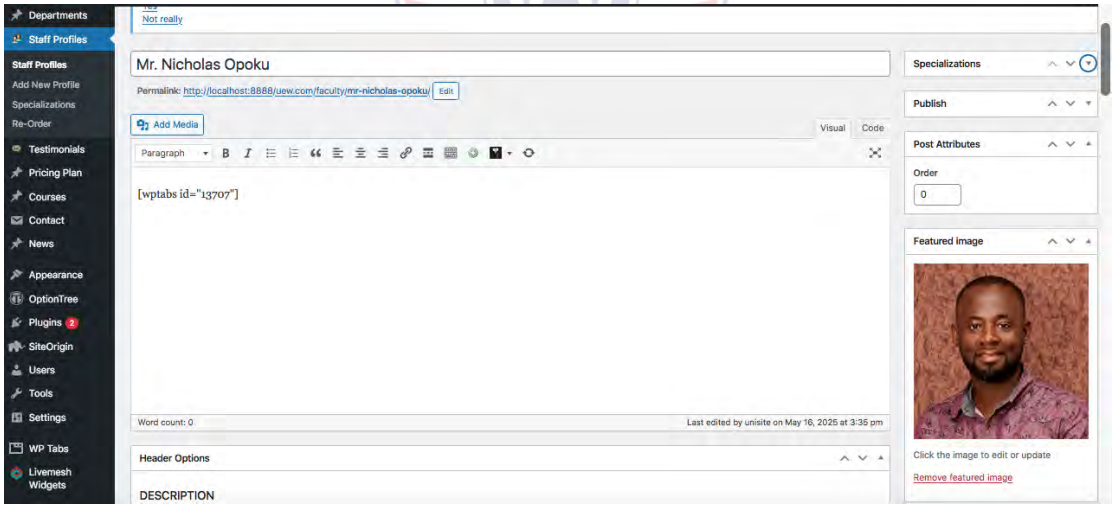

Figure 5.47: Backend of Staff Profile Page

Source: Researcher's Gallery (2024).

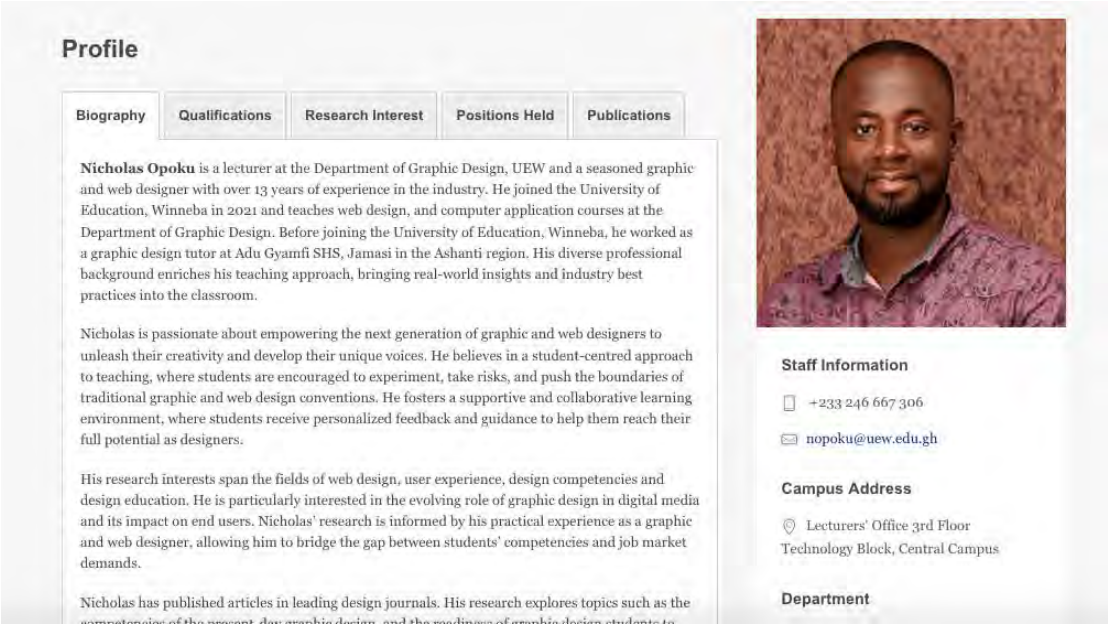

Figure 5.48: Frontend of Staff Profile Page as Shown in Web Browser

Source: Researcher's Gallery (2024).

5.2.7 Designing Navigational Structure

The navigational structure is one of the most critical elements in website design. Navigational structure refers to how a website organises and presents links to help users find content easily and efficiently. It directly impacts how users experience the site, how easily they find information, and whether they take desired actions (like applying, purchasing, or contacting).

In designing the navigational structure of the prototyped website, the researcher considered that a student visiting a university website should quickly find sections like *"Programmes Offered" or "Admissions"* without going through multiple pages in order to improve user satisfaction and engagement with the website and also reduce their frustrations and confusion. In doing so, important navigational buttons such as *"About UEW, Academics, Admissions"* were strategically placed after the slider to persuade visitors to take action with a call-to-action button to explore more about what UEW has to offer.

The researcher employed three navigational structures for the prototyped UEW website. Primary and secondary menus are located in the header section, and the footer menu is located in the footer section. The primary menu has dropdown menus that break down the main navigation into subcategories. A dropdown menu is a graphical user interface (GUI) element that displays a list of links when a user clicks or hovers over a menu item. The researcher used it to organise related content under a main category without cluttering the website interface with many items. The dropdown menus were also introduced to save space by nesting items under one parent, hidden by default and appear only when triggered by click, hover or tap on mobile devices.

Next, from the *Appearance* setting in the WordPress dashboard, a new primary menu was created, and the already designed pages of the website were added. At this point, the dropdown setting was set for all dropdown list items. After that, the newly designed primary navigation was saved and previewed in a web browser.

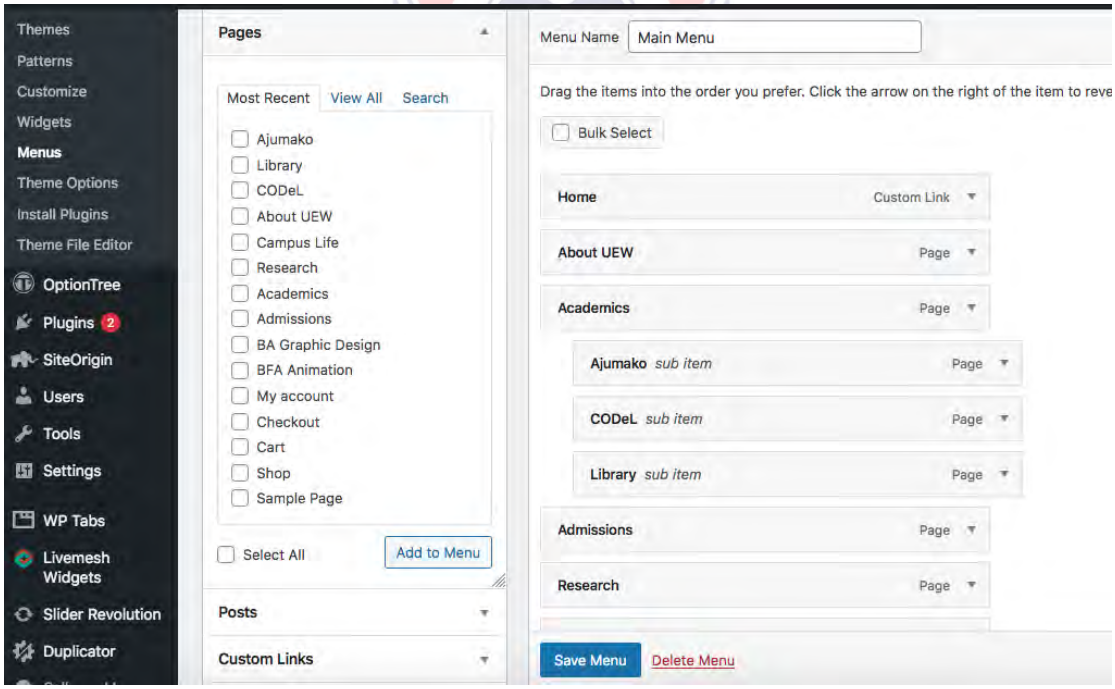

Figure 5.49: Setting Primary Navigation at the Backend

Source: Researcher's Gallery (2024).

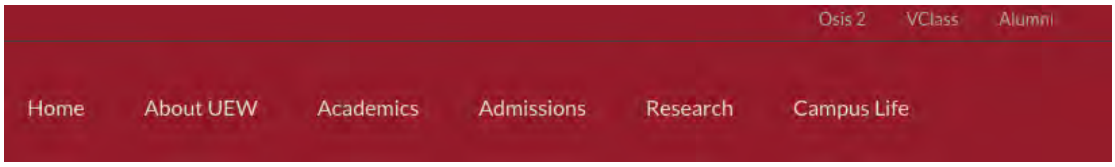

Figure 5.50: Frontend Primary Navigation as Shown in Web Browser

Source: Researcher's Gallery (2024).

Again, call-to-action links such as "*Apply Now"* and *"Visit Us"* were placed at key sections of the homepage to guide visitors, especially prospective students, to take key actions.

5.2.8 Migrating the Website onto a Live Server

Migrating a WordPress website involves transferring all site files, databases, plugins, themes, and settings from one server or domain to another. This process is essential when the WordPress website is built or developed locally (using software like XAMPP, WAMP, MAMP, or Local by Flywheel) and is now ready to make it publicly available on the internet. This was done using a duplicator plugin**.** Duplicator is a WordPress plugin that creates a complete package of the website (files and database) and lets you deploy it elsewhere easily. Think of it as boxing up the entire localhost website and shipping it to the web server, and using a domain name to access the website.

The duplicator plugin was installed and activated from the installed plugins section in the admin dashboard. The researcher created a new package, gave it a name to identify the package once it is completed. Next, the plugin started scanning the localhost website to check the database, PHP version control, migration status, WordPress file size, etc. This was done to be sure all required systems and files meet the standard for migration. The scan reported good status for all the required systems and files.

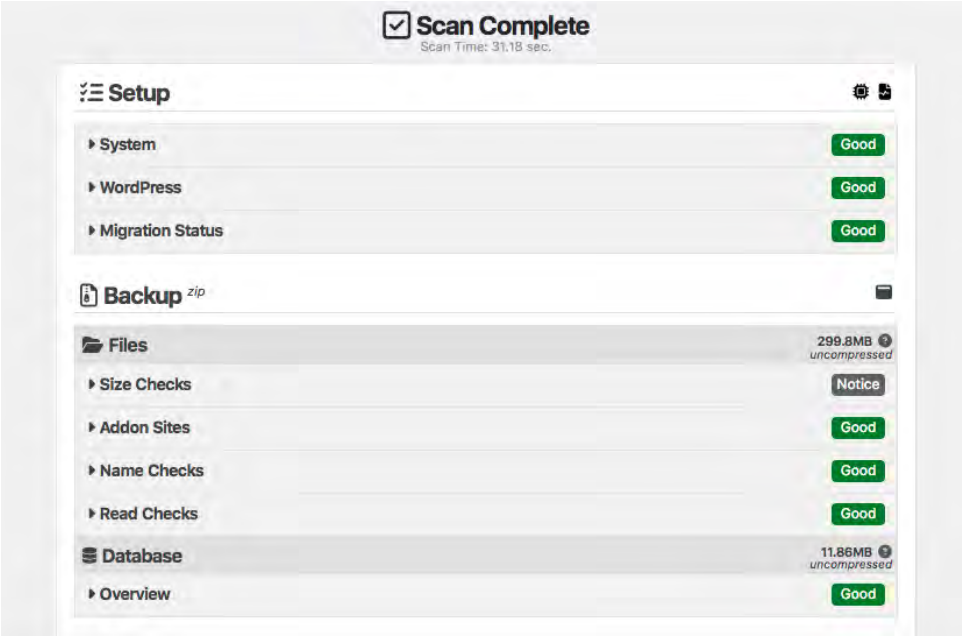

Figure 5.51: Screenshot of Successful Scan Report

Source: Researcher's Gallery (2024).

Next, the "Build" button was clicked to begin the backup process. During this stage, the backup window was kept open, and the entire backup process lasted 3 minutes 37 seconds. The newly packaged backup was downloaded for it to be uploaded onto a live server. Both the installer.php and archive file were saved in an easy-to-find folder in the researcher's working folder.

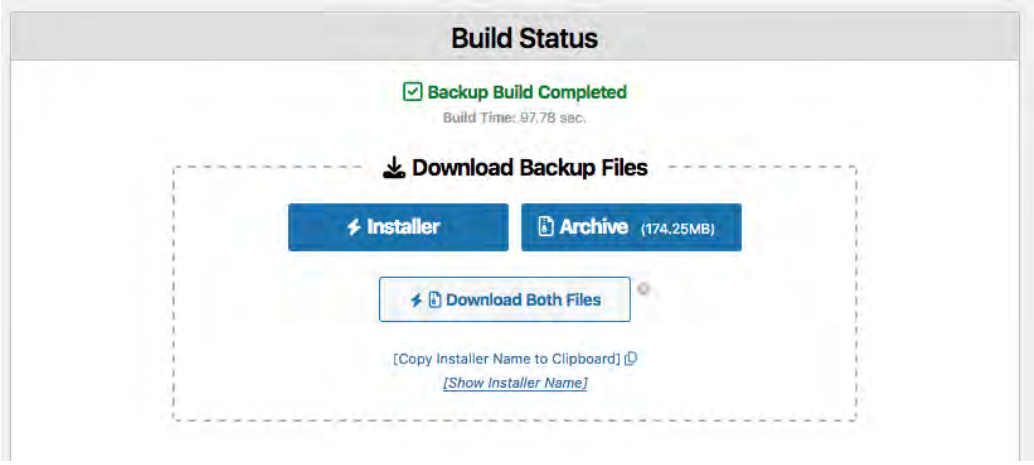

Figure 5.52: Screenshot of Successful Backup Build Status

Source: Researcher's Gallery (2024).

Next, a domain and hosting account were purchased for the prototyped UEW website. A hosting account is a website space on the internet where all the website's files, images, texts, and code are stored so it can be accessed by others through a domain. A domain is the website's address on the Internet, the name visitors type into their browsers to visit the website. In this study, unisiteghana.com was registered as a domain for the prototyped UEW website.

Next, the packed localhost website was moved onto a live server. The researcher connected to the web host using the File Transfer Protocol (FTP) application (FileZilla) and navigated to the site's root folder. The root folder in website design is the main folder where all the website files are stored and accessed by the web server. Next, both the installer.php and archive.zip files were uploaded onto the live server. Before the upload, the researcher ensured that the root folder was empty before uploading the packed site to avoid conflicts.

After that, under the MySQL database section, a new database, username name and password were created. All privileges were assigned to the newly created database. Assigning all privileges means the user has full control over the database to manage it. The next stage was to unpack the uploaded archive.zip file into the root folder. https://unisiteghana.com/installer.php was entered in a web browser for duplicator settings to automatically detect the archive.zip file for the installer setup page.

Next, under the "Database Setup" page, the details of the database created were provided to install the localhost UEW prototyped website on a live server. The database was tested to confirm connections before the installation.

5.2.9 Checking for Broken Links

Broken links are hyperlinks that lead to non-existent or inaccessible web pages**.** They can harm user experience and negatively impact the website's SEO. Broken links happen

when a migrated site has not been changed from localhost to the current domain on a live server. The researcher logged on to the backend of the website using the same login credentials provided during the localhost setup. Next, there was a prompt to delete installation logs. This was necessary to secure the website from a cyber attack.

Next, URL and permalinks were updated to match the domain name. The "Permalinks Settings" was accessed, and the URL was changed from localhost:8888/uew.com to the new URL https://unisiteghana.com and later saved to reset the link structure. Finally, all the pages were tested in different web browsers on both mobile and desktop. The final UEW prototyped website can be accessed at https://unisiteghana.com.

5.3 Evaluation of Prototype UEW Website

A usability evaluation was conducted with representative users, including undergraduate students, postgraduate students and academic staff. Participants interacted with the prototype UEW website and provided feedback on content quality, visual design, technological functionality, and perceived security. Their responses indicate a generally positive perception of the prototype UEW website's usability and effectiveness.

Participants reported that the website content was clear, relevant, and well organized, enabling users to locate institutional information efficiently. The presence of testimonial, course description, institutional details and multilingual support feature contributed significantly to the perceived usefulness of the platform.

Participants stated that:

> *"The information on the programmes and admissions is very clear. I was able to understand the requirements without asking anyone."*
> *"Everything a new applicant needs is available on the website. It makes the application process easier."*

"The website presents the university's mission, programmes, and research activities in a professional way. It reflects the academic strength of the institution."

These responses indicate that the prototype UEW website successfully supports information accessibility and institutional communication.

Again, on the visual design, participants strongly agreed that the visual appearance of the website was modern, attractive, and consistent with international university standards. The use of images, layout organization, and typography contributed positively to the overall user experience.

Participants stated:

"The design looks modern and professional. It gives the university a strong online presence."

"The images and colours are appealing and reflect the academic environment of the university."

"The layout is well organized, and the pages do not look crowded. It is easy to read the information."

"The homepage immediately captures attention. It looks similar to top international university websites."

These findings suggest that the aesthetic design enhances institutional credibility and user engagement.

Participants reported that the prototype demonstrated good functionality, intuitive navigation, and efficient interaction. Users were able to move between pages easily and complete basic tasks without difficulty.

"The menu is easy to use, and I was able to move from the homepage to the academic programmes without any confusion."

"The search and navigation features make it easy to find specific information quickly."

"The structure of the system supports integration with student portals and online learning systems."

"The website works well on both my phone and laptop. It adjusts properly to different screen sizes."

These responses indicate that the prototype demonstrates strong technological usability and accessibility.

Overall, participants expressed high levels of satisfaction with the prototype UEW website and its usability.

One postgraduate student summarized:

"This website is easier to use than many university websites I have visited."

Another participant stated:

"It provides all the necessary information in a clear and professional way."

"The prototype demonstrates that the university can achieve a world-class digital presence especially the introduction of Google translator to change the website to multiple languages."

User feedback indicates that the UEW prototype website performs strongly across all major evaluation dimensions. Participants highlighted strengths in clear and accessible content, professional and attractive visual design, easy navigation and technological functionality and strong institutional credibility and trust. Minor recommendations included enhancing visible security policies and expanding interactive features. These findings confirm that the prototype UEW website meets key usability and benchmark requirements and is suitable for institutional deployment to compete with other international university websites.

5.4 Exegesis of the UniSite Theme and Prototyped UEW Website

This section presents a critical reflection and theoretical interpretation of the UniSite, a customised WordPress theme developed for the design and development of university

websites and a prototyped UEW website. In design and creative arts research, exegesis refers to a critical and reflective explanation of a design or artefact**,** often accompanying a project to articulate its rationale, processes, and impacts (Candy & Edmonds, 2018). In academic practice, a design exegesis functions as a scholarly document that contextualises the creative design work within the existing body of knowledge. According to Candy and Edmonds (2018), exegesis describes the research questions addressed through design. Thus, exegesis enables the designer to bridge practice and theory by situating the work in a scholarly context. This section will be presented in two phases. First, a description and discussion of the UniSite WordPress theme. Next, the researcher describes and discusses the prototyped UEW website.

5.4.1 Exegesis of the UniSite WordPress Theme

Research objective 4 aimed to translate the final conceptual model developed into a workable Content Management System (CMS) platform (WordPress theme). The main result was the creation of the UniSite WordPress theme for the design and development of a university website. While the production of the UniSite CMS WordPress theme is part of the research for the award of a degree, the actual exigence for the production stems from the real need to provide an ideal reusable platform for designers and developers to reduce the time and resources required to develop and maintain the university website. Additionally, the motivation for the production is based on the outcome of the initial studies, which confirmed that Ghanaian universities' websites are lacking essential features compared to international standards and best practices, as most cases present course content and testimonials on their university website.

The researcher named the WordPress theme by combining the words ‘university’ and ‘website’, resulting in the name “UniSite’’. The UniSite incorporated a range of features commonly found in existing university websites, such as course descriptions,

faculty profiles, testimonials, departmental pages, etc. The UniSite theme was developed based on a proposed conceptual model and feedback from preliminary user tests to optimise the user interface and overall usability of the website when developed (Rundo et al., 2020). Though unlike the prototyped UEW website, which is visible and can be interacted with, the UniSite theme is a collection of files and folders archived as a unit. The final UniSite theme can be accessed through https://unisiteghana.com/unisite.zip

Regarding the design principles, the researcher drew mainly on user experience (UX), usability and user interface (UI) that affect the emotion and feeling of users. For instance, the layout, graphics, and the choice of colours appearing on the screen when the UniSite theme is installed and activated are convenient to use (Khamchan & Kullimratchai, 2022; Kureerung et al., 2022).

The UniSite theme follows an academic modern aesthetic, characterised by grid-based layout, web safe fonts, vibrant colour schemes, etc. When activated on a WordPress website, the index.php file translates as the homepage presents an attractive image slider, recent news, testimonials, and campus photos, with consistent styling to reinforce user orientation (Krug, 2014). The UniSite theme also supports a wide background that spans the entire browser width, a trendy mobile menu, an easy-to-use YouTube video section, Revolution Slider, and unlimited colour schemes to match the university's corporate colours, making it one of the modern university website themes in its category.

Again, the UniSite theme was built on the concept of page sections, which enables web designers and developers to work on their website on individual page elements independently via a drag-and-drop interface. Other functional components, including departments page, course description page, testimonials, and faculty profiles, are also featured in the theme. The academic department has a dedicated template that includes a brief overview, programmes offered, faulting listing and contact information.

The custom course description feature allows academic departments to manage their curriculum presentation. Each course description page contains metadata such as course title, course code, credit hours, description and assigned lecturer.

A rotating testimonial section was featured in the Unisite theme. This module highlights quotes from faculty members, students, alumni and parents to add credibility and build social proof for prospective students, aligning with best marketing strategies in higher education. Faculty members are listed through a customised template with each profile containing a photo, biography, research interest, position held, and individual courses taught. This fosters academic connections between lecturers, students and prospective students who would need clarification on individual courses.

Website design literature suggests that using underpowered CMS platforms for university website design and development could negatively affect students' user experience and satisfaction and institutional image (Al-Khalifa, 2010). To avoid this, it is best practice to use the right CMS platform and version control through thorough studies. This has been addressed in the UniSite WordPress theme through the use of the current version control. For instance, the Unisite theme is compatible with WordPress 6.5, 6.6, 6.7, 6.8 and future updates.

Again, CMS platforms without secure security plugins and regular updates increase the risk of downtime and cyber attack. This issue has also been addressed in the UniSite theme through automatic update features for all activated plugins.

Conclusively, the successful development of the WordPress theme for university website design represented a significant achievement in aligning technology, design, and educational communication. The theme, carefully crafted with both functionality and aesthetics in mind, demonstrates a strong capability to meet the diverse needs of university website design and development. Through features such as custom departmental pages, course description modules, faculty profiles, and testimonial

displays, the UniSite theme provides a structured and intuitive platform for content presentation. It enables academic institutions to showcase their identity, academic offerings, and community engagement in a coherent and user-friendly manner. By leveraging WordPress, a flexible and widely supported content management system, the UniSite theme ensures ease of content updates, scalability, and long-term sustainability for web designers and developers.

From both a design and development perspective, the theme stands out as a robust solution for modern university websites. It addresses core challenges in higher education web communication, such as clear information architecture, visual credibility, and user engagement, while offering flexibility for customisation and future growth. The design adheres to best practices in usability, accessibility, and responsive design, ensuring that the website functions effectively across devices and meets web accessibility standards (WCAG 2.1).

The UniSite WordPress theme, developed for university website design, is not only a technically sound product but also a strategically effective tool that empowers institutions to connect meaningfully with their audiences. It serves as a practical and scalable model for university website design, demonstrating how thoughtful digital development can enhance institutional visibility, communication, and user experience.

5.4.2 Exegesis of the Prototyped UEW Website

Research objective five aimed to use the UniSite WordPress to design a prototyped university website. The main result was the creation of the UEW website hosted on a Linux server running Apache as the web server and unisiteghana.com as the domain. The actual exigence for the production of the prototyped website stems from the need to test the UniSite WordPress theme for feasibility for designing a university website.

This exegesis critically reflects on the design, development, and evaluation of the prototype UEW website, a modern and user-centred university web platform designed to improve digital engagement, increase institutional visibility, and enhance the online experience for various stakeholders, including students, staff, and the general public.

Built using WordPress, the website integrates a minimalist academic design with functional features tailored to user needs. The rationale for choosing WordPress includes its flexibility, ease of content management, cost-effectiveness, wide range of extensive plugin ecosystem and strong developer community support. WordPress also allows for easy integration of responsive design and accessibility tools to ensure the website functions effectively across desktops, tablets, and mobile devices. The University of Education, Winneba (UEW) needed a digital platform that effectively represents its academic mandate while engaging users with accessible, responsive, and purpose-driven content. The core objective was to design a university website that enhances student engagement, strengthens the university's digital presence and also offers better visibility of academic resources and faculty profiles. This goal aligns with global best practices in higher education website design, which emphasise functionality, accessibility, and visual clarity (Nielsen Norman Group, 2022).

A user-centred design approach was employed to ensure the needs and expectations of key audiences, including students, faculty, applicants, and administrators, were reflected in the website. As captured in the proposed conceptual model for university website design, the design considered stakeholder views, UI design, good layout and colour scheme, typography, and whitespace. These web aesthetics features reflect modern design thinking principles for higher education website design (Lawrence & Tavakol, 2007).

The prototype UEW website avoids visual clutter, and navigation elements are structured hierarchically to allow easy access to key resources available on the university

website. Responsive design techniques were applied to ensure the website functions effectively across desktops, tablets, and mobile devices. The website also adheres to WCAG 2.1 accessibility guidelines, ensuring inclusiveness for users with disabilities. Accessibility features include alt text for images. This approach supports the goal of digital equity in education (W3C, 2018).

Security remains a critical aspect of the proposed conceptual model to protect user data and institutional credibility on the university website. Although the prototyped website did not involve sensitive data, WordPress security best practices were ensured. The use of security plugins, HTTPS and SSL encryption, regular auto updates and maintenance protocols were considered.

The design of the prototyped UEW website's graphical user interface has had a profound impact on the user experience, as evidenced by a series of appraisals that showed improvement achieved. Next, the researcher delves into the specifics of key features improvement, providing a comprehensive view of the positive transformations realised through this initiative.

5.4.2.1 Homepage

The homepage screenshot illustrates a well-structured layout with a clear and navigable interface. Figure 5.59 illustrates the homepage of the prototyped UEW website. At the top left corner is the website logo, followed by a streamlined navigation menu featuring options such as 'Home', 'About UEW', 'Academics', ‘Admissions’, ' Research’ and 'Campus Life'. This streamlined navigation menu runs through the entire pages of website. Centrally dominating the page is a large photo slider. This slider showcases a vibrant image of a diverse group of students engaged in a collaborative study session. Directly underneath the photo slider, there is a dynamic events section that highlights the mission and vision of UEW, quick access to departments, access to the 2025/2026

admissions link and career outcomes after UEW. This section offers visitors an opportunity to find essential links with just one click, saving users a lot of time navigating through multiple links.

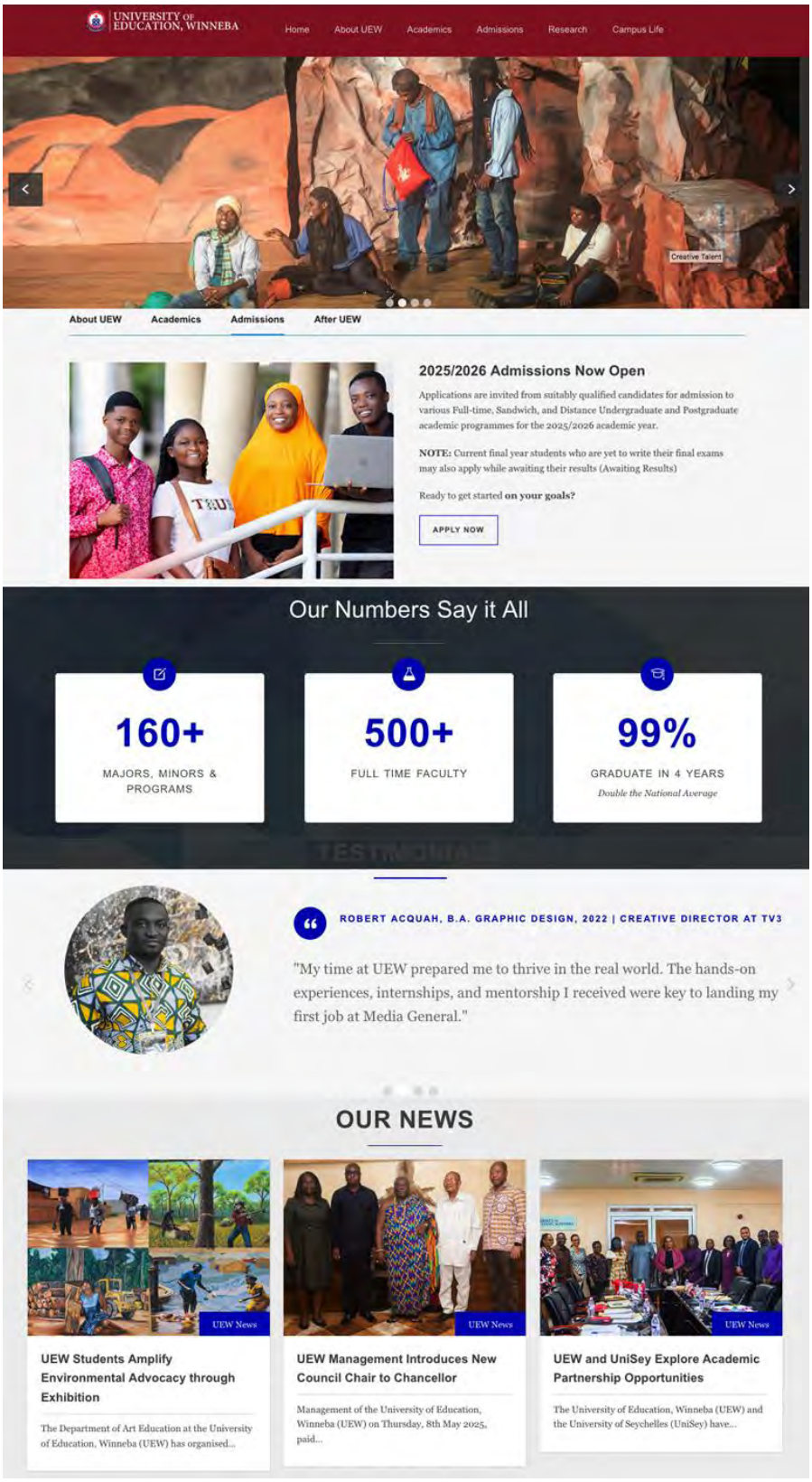

Figure 5.53: Screenshot of UEW Prototyped Website Homepage

Source: Researcher's Gallery (2024).

As we move further down, the section providing brief overviews of UEW achievement in numbers and testimonials from satisfied alumni, parents and lecturers can be seen. Next is the news section, providing the various events at the institution to the university community and the general public. Finally, the “Take a Campus Tour” section provides vibrant photos of various facilities at the university, leading to a footer section with links to the website's privacy policy and social media channels.

5.4.2.2 Department Page

The user interface illustrated in Figure 5.60 captures the department page of the University of Education, Winneba (UEW) website. The interface is neatly segmented into four primary sections: name of the department, content section, contact information section, and faculty members section, each offering distinct functionalities to enhance the user experience.

The screenshot prominently displays the department's name - Department of Graphic Design. The content section provides a brief overview of the department, including its mission, vision and academic programmes that the department offers. In addition to these sections, the contact information section details, including a telephone number, email address, and mailing address, are also visible, ensuring users can easily reach out for further assistance or information.

Lastly, the 'Our Faculty' section is the focal point of the lecturers, showcasing competent expertise. A click or tap on any of the lecturer’s photos or name opens the profile of lecturer. This facilitates a quick search for profile of lecturers and the courses they teach at the department.

Overall, the image encapsulates the comprehensive features of the Department of Graphic Design, portraying it as a user-friendly, efficient, and resourceful platform for students seeking information about the department.

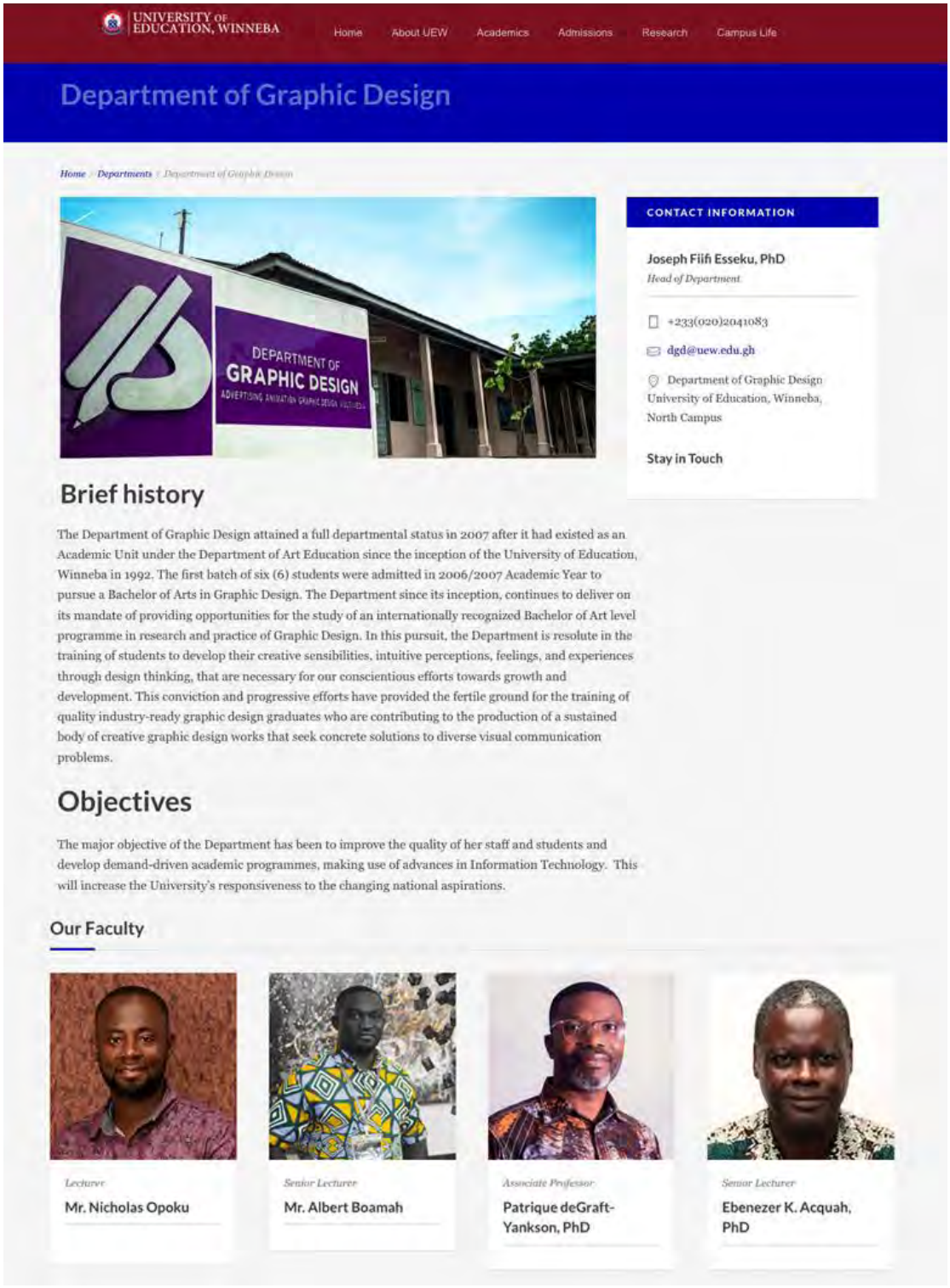

Figure 5.54: Screenshot of UEW Website Department of Graphic Design Page

Source: Researcher's Gallery (2024).

5.4.2.3 Course Description Page

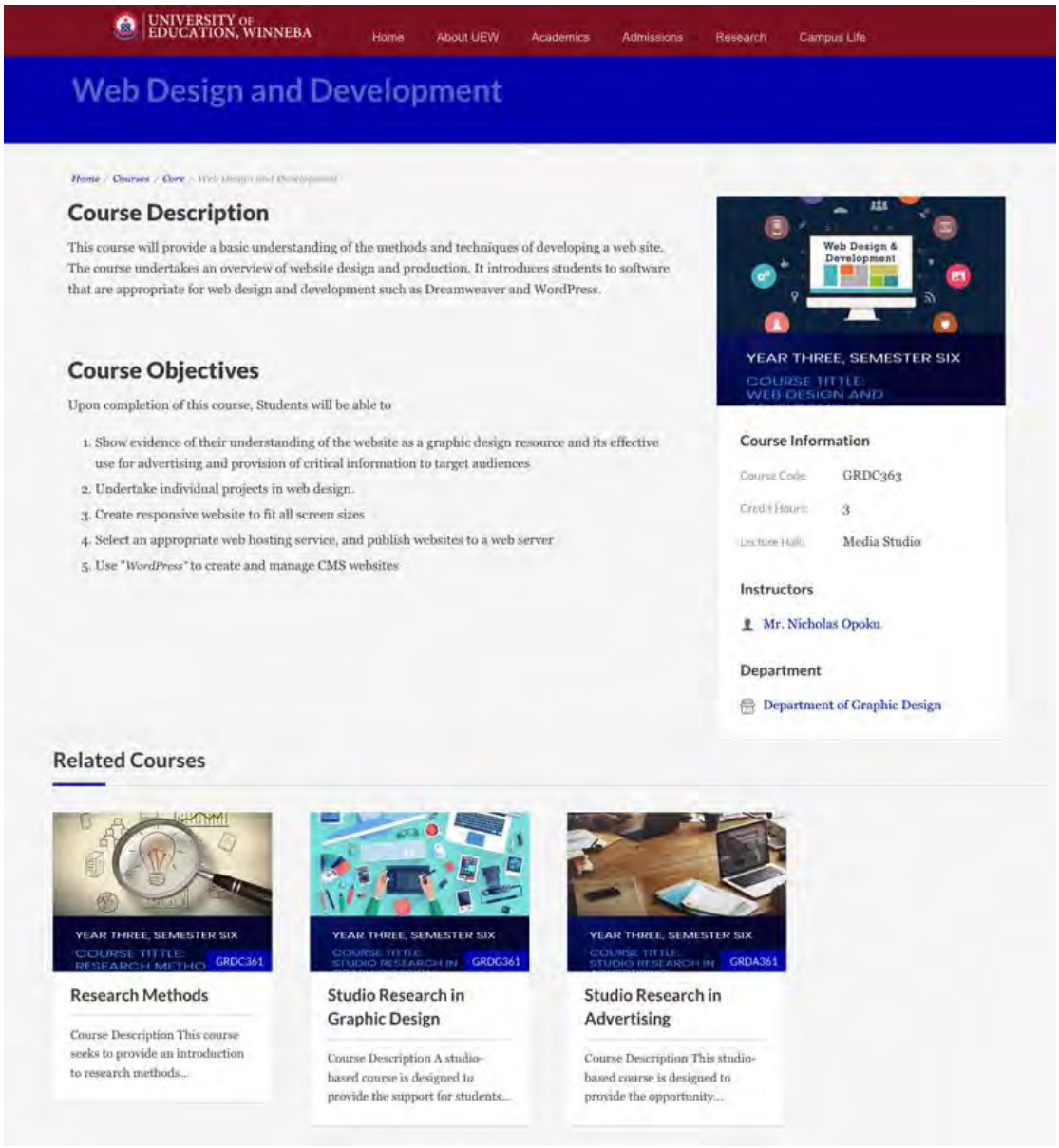

Figure 5.55: Screenshot of UEW Website Course Description Page

Source: Researcher's Gallery (2024).

The screenshot displays the course description page of the prototyped UEW website, segmented into four sections that cater for various aspects of the individual courses under the B.A. Graphic Design programme. Figure 5.61 shows the new course description page layout with its various components.

The title section contains the course title 'Web Design and Development'. The content section offers a brief overview of the course. The "Course Information" section

provides details of the course, including course code, credit hours, lecture hall where the course will be conducted, course instructor, the department that runs the course and a photo depicting the course, helping students stay informed about the course. The 'Related Courses' section provides other courses related to the current course. A click or tap on the related course opens the course with its detailed information.

5.4.2.4 Staff Profile Page

The staff profile page illustrates a well-structured layout with a clear user interface and intuitive navigational system. Figure 5.62 shows the staff profile page of the prototyped UEW website. The interface is neatly segmented into four main sections: title section, content area to display the main profile, staff information section, and courses taught, each offering distinct functionalities to enhance the user experience.

The title section contains the lecturer's name and title: Mr. Nicholas Opoku, Lecturer. The content section offers a profile of the lecturer, such as biography, qualifications, research interests, position held and publications. The 'Staff Information' section contains details such as telephone number, email address, office location and department. The 'Courses Taught' section provides courses that the lecturer teaches at the department. A click or tap on the courses taught opens the course with its detailed information.

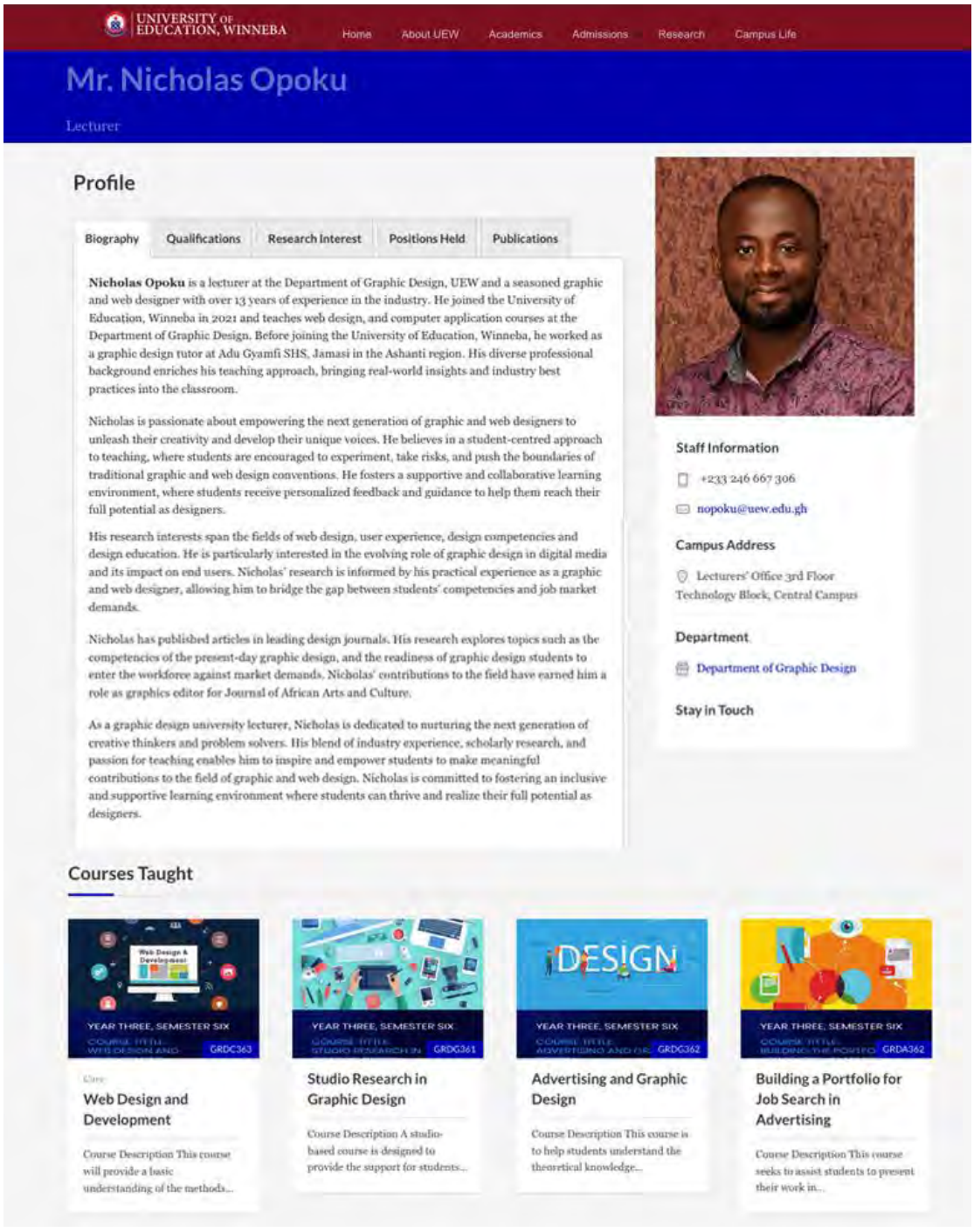

Figure 5.56: Screenshot of UEW Website Staff Profile Page

Source: Researcher's Gallery (2024).

Conclusively, the successful development of the UEW prototyped website using the WordPress CMS represents a significant milestone in enhancing the university's digital presence. Through the integration of key academic features such as faculty profiles, departmental pages, course descriptions, testimonials, multilingual support, and

an intuitive user interface, the website meets the institutional goal of providing a modern, informative, and accessible platform for all stakeholders.

The WordPress platform proved to be an ideal platform due to its flexibility, scalability, and user-friendly backend, allowing for easy content updates by non-technical staff while maintaining a high level of design professionalism. The prototyped UEW website's responsiveness across devices and compliance with web accessibility standards further ensure that it serves a broad and diverse audience, including students, faculty, prospective applicants, and the general public.

The minimalist academic design, combined with robust functionality, reflects a thoughtful balance between aesthetics and usability. Features such as structured layouts, clear navigation and dynamic content sections enable users to find relevant information efficiently, an essential aspect of institutional communication and user satisfaction.

The prototyped UEW website stands as an effective digital tool that aligns with modern expectations of higher education websites. It not only enhances the university's image but also supports academic engagement and user experience. As a scalable and secure platform, it positions UEW to adapt to future digital demands while continuing to meet the evolving needs of its academic community.

CHAPTER SIX

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

6.0 Overview

This study focused on exploring issues surrounding Ghanaian universities' website design, proposed a conceptual model to guide the design and development of university websites, and used the proposed model to develop a prototype University of Education, Winneba (UEW) website. This concluding chapter of the research synthesises the entire research journey, highlighting a summary of key findings, drawing meaningful conclusions, and offering practical recommendations for future studies.

6.1 Summary

The university's website functions as its virtual front door, serving as a critical point of interaction for students, prospective students, alumni, faculty, and the global academic community. Beyond providing information to its community, a university website reflects the institution's identity, a strategic asset for communication, institutional visibility education. As the first point of contact for many prospective students and stakeholders, the design, development and functionality of a university website play a crucial role in shaping perceptions about the institution and influencing decision-making.

Despite the increasing reliance on platforms for communication, preliminary investigations suggest that many Ghanaian university websites failed usability tests, lack modern design standards. Again, there is no conceptual model that guides the design and development of the Ghanaian university website. More importantly, studies on university website design usability and design are relatively scanty in Ghana. Though some scholars have attempted to study this area in Ghana, available studies largely dwell on library web pages (Dei, 2024). On a global level, existing works have focused on only usability and accessibility issues, student satisfaction on university websites, and homepages of

university websites (Benaida & Namoun, 2018; Ojugu & Eboka, 2018; Verkijika & Wet, 2018; Macakoglu et al., 2022). Even though there are some related studies, there are still huge gaps that need to be filled. For instance, little is known about the current issues surrounding the state of university websites in Ghana. Also, there is no model to guide designers and developers on university website design. Hence, this research problematized that these unresolved issues may hinder efforts to improve university websites in Ghana in order to promote visibility and improve Ghanaian universities' website positions in the Webometric Ranking of World universities' websites.

Given the situation, the study therefore seeks to develop a conceptual model that outlines the essential components of effective university website design and applies it in the development of a prototyped website for the University of Education, Winneba. To achieve this aim, the study was grounded on five main objectives. First, to examine the state of selected Ghanaian universities' websites against the best practices. Second, to investigate the user experience of selected Ghanaian universities' websites. The third objective focused on developing a conceptual model for Ghanaian university website design. The fourth objective was to translate the conceptual model to a Content Management System (CMS) platform for designing the Ghanaian university website. The fifth objective was to design a prototype Ghanaian university website using the CMS platform.

Preliminary investigations were conducted extensively to help situate the study within the academic context. First, salient theories like the User Experience (UX) theory and User Interface (UI) theory were reviewed. Based on these, the researcher developed a conceptual framework to guide and hold the study.

Next, previous related research works were also studied. Specific areas like website and its importance in the digital era, website genre and their design patterns, university website usability and accessibility were reviewed. Other thematic areas that

were reviewed include content management systems and their implementation for university website design, CMS design techniques and web server and hosting technologies.

An art-based research approach was adopted for the study. Specifically, the study employed a descriptive design to describe the experiences of users when interacting with university websites and also provides a snapshot of the existing selected universities' websites. Again, the design of the prototyped UEW website could not have been possible with any of the research designs aside from the studio-based design. The adoption of the studio-based designs was appropriate for the study because it helped the researcher to produce the UniSite WordPress theme and a prototype University of Education, Winneba (UEW) website through creative design processes.

The four selected universities (KNUST, UG, UEW and UCC) websites were chosen on the basis that they are the leading public universities in Ghana, and many learners prefer them for their higher studies, and in such a case, it is expected that their websites should be user-friendly and provide necessary content for users.

The research was conducted in two phases. The first phase was concerned with the evaluation of the four selected universities' websites and the experiences of users when interacting with the websites. Users' feedback, expert suggestions and insight from Harvard University and Stanford University websites were used to construct the proposed conceptual model for university website design. The second phase was concerned with the UniSite theme development and using the UniSite theme to design a prototype University of Education, Winneba website.

The study adopted observations, focus group discussions and interviews as data collection tools. Thematic, visual, and content analysis were employed to analyse data from the field.

6.2 Major Findings

Objective one focused on examining selected Ghanaian universities' websites against the best practices. Findings from the observations suggest that Ghanaian universities' websites are fully optimised through search engines, making it easy for visitors who do not know the full domain name of the websites to still access them via Google. All four selected universities' website have updated their academic programme page for both undergraduate and postgraduate programmes. However, none of the selected universities have any course descriptions with content, unit of study, and outcomes available on their websites. Two of the selected universities (UG and UCC) failed to have a uniform design language and consistent layout across their faculties and departmental pages, creating a disjointed user experience. However, UEW and KNUST use consistent layouts and design across their entire faculties and departmental pages, which significantly impacts user experience and perception about the institutions.

Again, KNUST, UEW and UCC websites have many navigational systems, such as multiple menus, excessive drop-downs, which could confuse users. Despite this, UG employed a straightforward navigation structure on its website. All four universities (KNUST, UEW, UG and UCC) featured high-quality photographs on their websites to retain visitors on the websites. However, in some instances, very low and pixelated photos were found on UCC and UG webpages. A visual study on all four selected websites dynamically adapts to screen size, with hero images resizing appropriately on users' devices.

Though basic information such as academic qualifications, research interests and departments of lecturers are available on all the selected websites, some faculty members' pages (UCC and UEW) have only their names and titles, affecting visibility on both parts of the university and the lecturers.

Objective two was focused on investigating the users' experiences when interacting with the selected universities' websites. It emerged from the study that many users experience "click fatigue" when locating basic information on the university website. Users reported search functionality failures, by returning zero results for programme-specific information such as course descriptions on the university website. However, some users praise the "simple and straightforward interface" on the UEW and KNUST websites. Many users advocate for international exemplars like Stanford University and Bristol University websites, which demonstrate awareness of international best practices, particularly student testimonials and detailed course descriptions.

Major findings from the study showed that the absence of individual course descriptions on the university websites undermines the website's role as an academic resource. This finding confirmed that Ghanaian universities' websites need to be improved to better meet user expectations and enhance usability. Again, users' first impressions of Ghanaian universities' websites were "wow", associating their experience with high-quality imagery, coherent colour schemes and layout.

Objective three aimed to develop a conceptual model for Ghanaian university website design based on the users' feedback and suggestions, expert views, insight from Harvard University and Stanford University websites, web design principles and technologies, together with the observations from selected universities' websites. The findings obtained from the study led to the presentation of the conceptual model in four main key areas and 20 components crucial for university website design.

The four main key areas of the model are content, aesthetics, technologies and security. Within these four areas, the model further defines 20 components providing a detailed roadmap for successful university website design and development.

The design and development of a well-structured university website requires more than just technical implementation; it involves a strategic integration of content, visual aesthetic, technological infrastructure, and security mechanisms to ensure that the university website is user-friendly, accessible, informative and safe.

Content refers to the textual, visual, and multimedia information presented on the university website. Aesthetics refers to the visual appearance and design elements that shape users' perception and emotional response to the website. Technologies refer to the underlying systems and software tools used to design, develop, deploy and manage the university website. Security is the measures taken to protect the university website from cyber-attack.

Objective four aimed to translate the proposed conceptual model into a workable CMS WordPress theme. The CMS platform theme was developed for Word WordPress platform. The theme was named "UniSite", combining the words university and website. The "UniSite" incorporated a range of features commonly found in existing international standard university websites, such as departmental pages, faculty profile pages, course descriptions, testimonials on the homepage, etc. The "UniSite" theme is a collection of files and folders archived as one unit. The "UniSite" theme can be accessed on https://unisiteghana.com/unisite.zip.

Again, the "UniSite" theme was built on the concept of page sections, which enable designers and developers to work on their website on individual page elements independently via the drag and drop feature interface. Other features include a sliding testimonial section. This module highlights quotes from alumni and faculty members to add credibility and build social proof for prospective students, aligning best marketing strategies in higher education (Briggs & Naylor, 2012).

The fifth objective of the study was to apply the model to design a prototype website for the University of Education, Winneba. Built using the "UniSite" theme, the

prototype UEW website integrates a minimalist academic design with features tailored to user needs. A centred-design approach was employed to ensure the needs and expectations of the key audience, including students, faculty, and prospective students, were reflected in the website. As captured in the conceptual model, the design considered UI design, layout, colour scheme, typography and whitespace. These aesthetic components reflect modern design thinking principles for higher education website design.

Responsive design techniques were applied to ensure the website functions effectively across devices. Security remains a critical aspect of the proposed conceptual model to protect user data and institutional credibility on the university website. The use of security plugins, HTTPS and SSL encryption, regular auto updates and maintenance protocols were considered in the prototype UEW website.

The graphical user interface of the prototype UEW website has had a profound impact on the user experience, as evidenced by a series of appraisals that showed improvement achieved. The prototype UEW website can be accessed at https://unisiteghana.com.

6.3 Conclusions

Based on the outcomes of this study, for research objective one, the study concluded that many existing Ghanaian universities' websites often fall short in structure, content, accessibility, and modern digital standards. In particular, none of the selected universities have any course descriptions with content, unit of study, and outcomes available on their websites. Two of the selected universities (UG and UCC) failed to have a uniform design language and consistent layout across their faculties and departmental pages, creating a disjointed user experience. However, UEW and KNUST use consistent layout and design

across their entire faculties and departmental pages, which significantly impacts user experience and perception about the institutions.

Regardless of these shortcomings, Ghanaian universities' websites are fully optimised through search engines, making it easy for visitors who do not know the full domain name of the websites to still access them via Google. Again, all four universities (KNUST, UEW, UG and UCC) featured high-quality photographs on their websites to retain visitors.

Again, concerning research objective two, this study concludes that Ghanaian universities' websites are not meeting user expectations and enhancing usability. It emerged from the study that many users experience "click fatigue" when locating basic information on the university website. Users reported search functionality failures, by returning zero results for programme-specific information such as course descriptions on the university website. However, some users praised the "simple and straightforward interface" on the UEW and KNUST websites. Many users advocate for international exemples like Stanford University and Bristol University websites, demonstrating awareness of international best practices, particularly student testimonials and detailed course descriptions.

Concerning research objective three, the study concludes that the proposed conceptual model is fit for designing the Ghanaian university website. The proposed conceptual model has proven to be a robust and effective model for guiding the creation of functional and user-centred university websites. The application of the model in developing the UniSite WordPress theme and further using the theme to develop a prototype UEW website demonstrated its practical relevance and adaptability.

By integrating four essential components, content, aesthetics, technology, and security, the model offers a holistic approach that aligns with both institutional goals and user expectations. The content component ensured the availability of accurate, relevant,

and accessible information are available on the university website. Aesthetic considerations enhanced visual appeal and user experience, while the technology component ensured seamless performance, integration, and scalability. Security measures safeguarded data and maintained the integrity of the website. Overall, the model effectively supports content management system platforms and academic engagement, making it a valuable guideline for web designers and developers for developing g university website.

Concerning research objective four, the study concludes that the successful development of the WordPress theme for university website design represents a significant achievement in aligning technology, design, and educational communication. The UniSite theme, carefully crafted with both functionality and aesthetics in mind, demonstrates a strong capability to meet the diverse needs of university website design and development. Through features such as custom departmental pages, course description modules, faculty profiles, and testimonial displays, the UniSite theme provides a structured and intuitive platform for content presentation. The theme enables academic institutions to showcase their identity, academic offerings, and community engagement in a coherent and user-friendly manner.

From both a design and development perspective, the UniSite theme stands out as a robust solution for modern university websites. It addresses core challenges in higher education web communication, such as clear information architecture, visual credibility, and user engagement, while offering flexibility for customisation and future updates. The design adheres to best practices in usability, accessibility and responsive design, ensuring that the website functions effectively across devices and meets web accessibility standards. The UniSite WordPress theme serves as a practical and scalable model for university website design, demonstrating how thoughtful digital development can enhance institutional visibility, communication, and user experience.

Concerning research objective five, the study concludes that the prototyped UEW website stands as an effective digital tool that aligns with modern expectations of higher education websites. It not only enhances the university's image but also supports academic engagement and user experience. As a scalable and secure platform, it positions UEW to adapt to future digital demands while continuing to meet the evolving needs of its academic community.

Through the integration of key academic features such as faculty profiles, departmental pages, course descriptions, testimonials, and an intuitive user interface, the website meets the institutional goal of providing a modern, informative, and accessible platform for all stakeholders. The minimalist academic design, combined with robust functionality, reflects a thoughtful balance between aesthetics and usability. Features such as structured layouts, clear navigation and dynamic content sections enable users to find relevant information efficiently, an essential aspect of institutional communication and user satisfaction.

6.4 Recommendations

1. The selected Ghanaian universities should periodically conduct a visual audit of their websites, comparing them against international best practices and emerging UI/UX design trends to stay current and improve their visibility. Features like detailed course descriptions, testimonials, and up-to-date faculty profiles can improve usability for visitors and visibility for faculty members and the university as a whole. Also, university webmasters should ensure that the content on the university website remains current and relevant, aesthetics remain modern, technologies are up to date, and security measures are reinforced.

2. It is recommended that selected Ghanaian universities adopt the conceptual model as a standard guideline for designing a university website. Its comprehensive nature ensures alignment with user needs, academic goals, and technical best practices, making it most suitable for university website design. The UEW prototype website demonstrated how the proposed conceptual model can be used to translate academic requirements and users' expectations into a functional and user-centred university website.
3. Ghanaian university web designers should adopt the *UniSite* WordPress theme for designing a university website to reduce time and resources required to design, develop, deploy and maintain the university website. Also, given its multi-colour schemes and consistent layout, web designers and developers should adopt in order to ensure design consistency across university faculties and departmental pages to improve usability and brand alignment throughout the university's digital presence.
4. Again, because the prototype UEW website successfully represents the department of Graphic Design in meeting their expectations, the publication Unit should consider adopting it as its official website and extend the templates to a faculty, school, and departmental level to ensure brand consistency while allowing flexibility for each department to showcase its uniqueness through tailored content and functionality.
5. Selected universities should establish comprehensive web governance policies that define the standards, roles, and responsibilities for website development and management. Such policies should ensure that website content remains accurate, current, and consistent across different departments.
6. Moreover, the UniSite theme in this present study works on only the WordPress platform. Further research should look at applying the proposed

conceptual model in other content management systems (CMS) platforms such as Drupal and Joomla.

7. Finally, further studies may focus on using the UniSite theme to design different university websites to test its multiple colour schemes, skin and modules to see how the UniSite theme reflects their own institutional identity while preserving the core layout, features, and information architecture.

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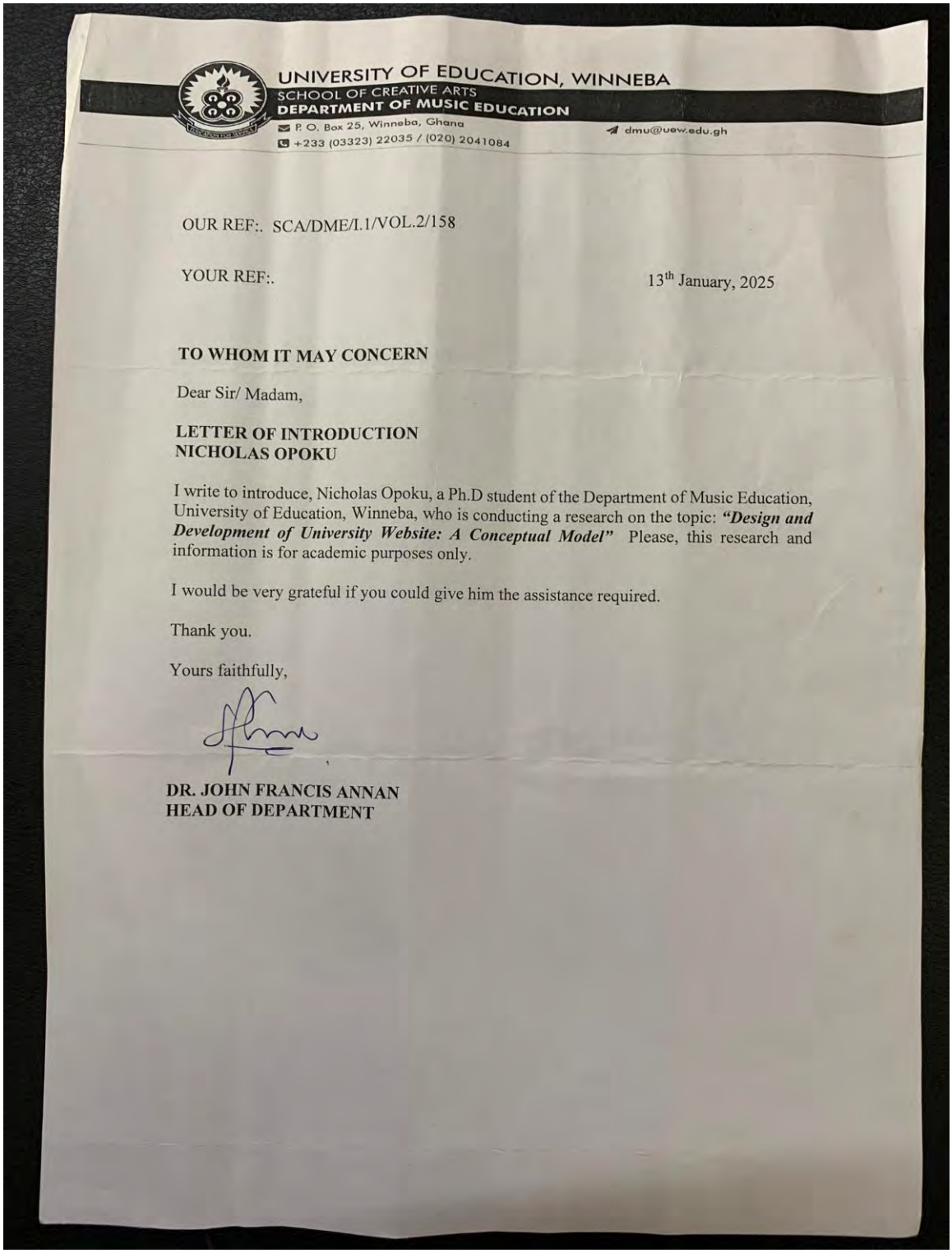
APPENDICES

APPENDIX A



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OUR REF:. SCA/DME/I.1/VOL.2/158

YOUR REF:.

13th January, 2025

TO WHOM IT MAY CONCERN

Dear Sir/ Madam,

LETTER OF INTRODUCTION
NICHOLAS OPOKU

I write to introduce, Nicholas Opoku, a Ph.D student of the Department of Music Education, University of Education, Winneba, who is conducting a research on the topic: ***"Design and Development of University Website: A Conceptual Model"*** Please, this research and information is for academic purposes only.

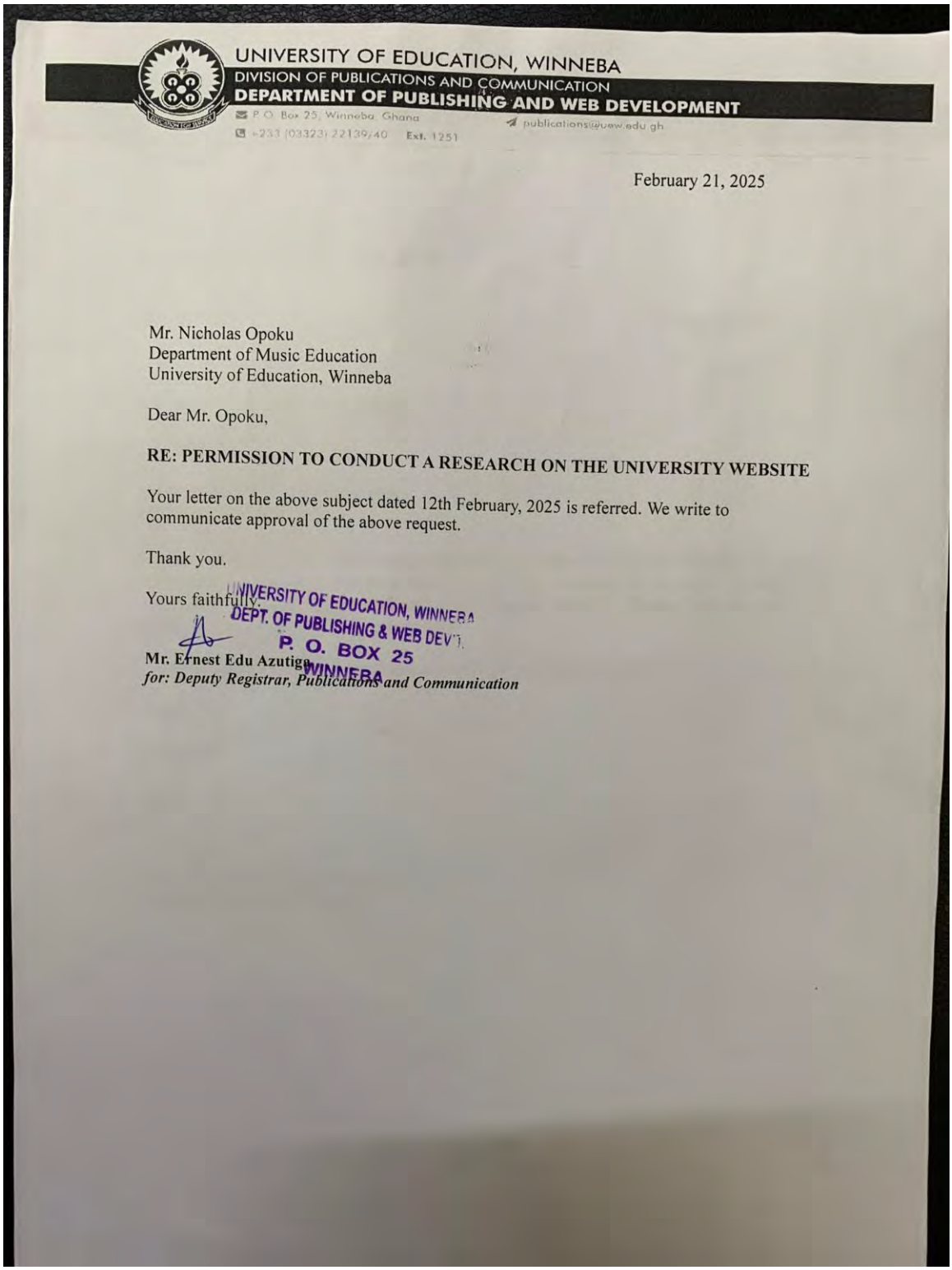
I would be very grateful if you could give him the assistance required.

Thank you.

Yours faithfully,

DR. JOHN FRANCIS ANNAN
HEAD OF DEPARTMENT

APPENDIX B



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February 21, 2025

Mr. Nicholas Opoku
Department of Music Education
University of Education, Winneba

Dear Mr. Opoku,

RE: PERMISSION TO CONDUCT A RESEARCH ON THE UNIVERSITY WEBSITE

Your letter on the above subject dated 12th February, 2025 is referred. We write to communicate approval of the above request.

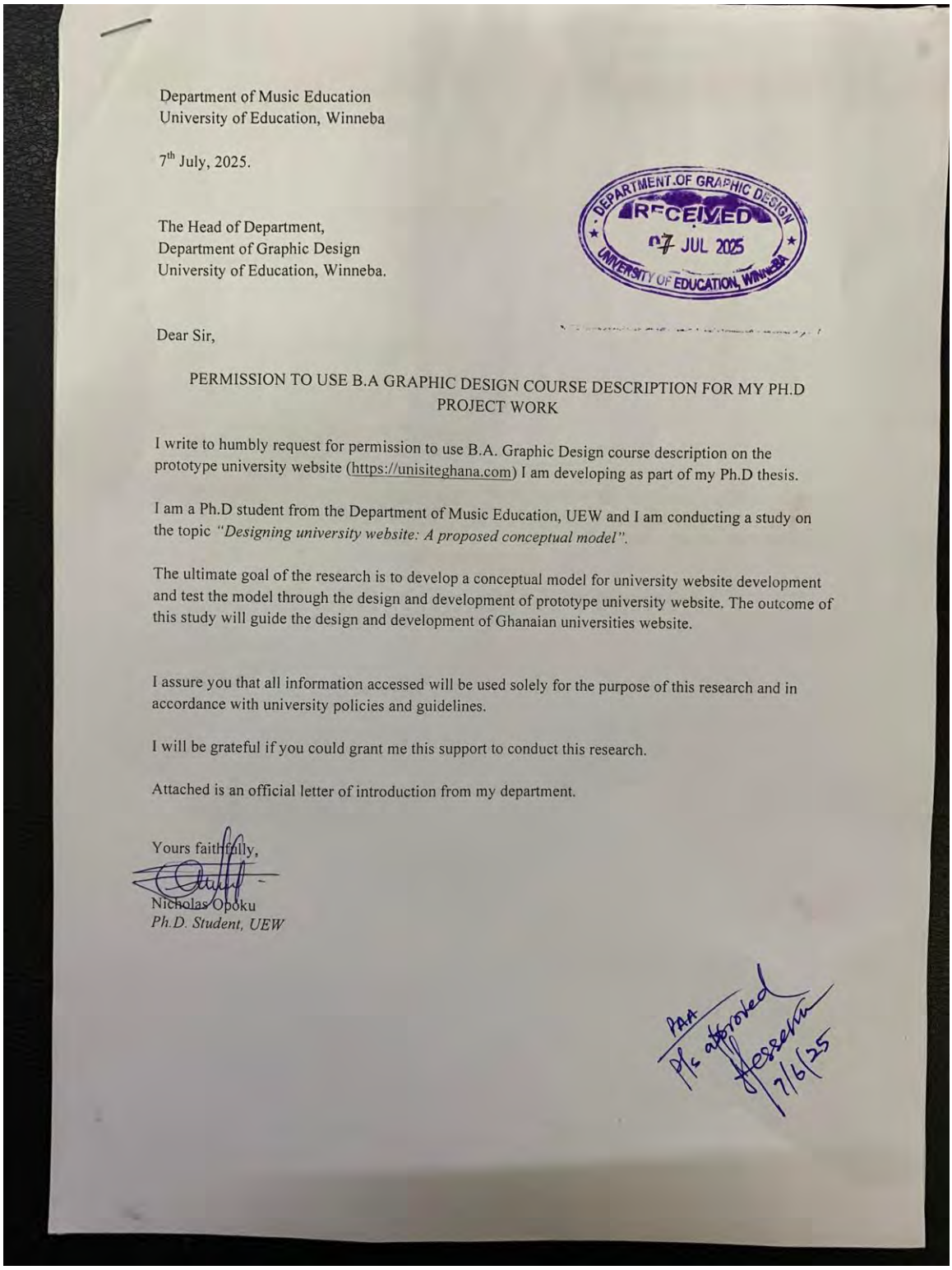
Thank you.

Yours faithfully,

UNIVERSITY OF EDUCATION, WINNEBA
DEPT. OF PUBLISHING & WEB DEV'T.
P. O. BOX 25
WINNEBA

Mr. Ernest Edu Azutiga
for: Deputy Registrar, Publications and Communication

APPENDIX C



Department of Music Education
University of Education, Winneba

7th July, 2025.

DEPARTMENT OF GRAPHIC DESIGN
RECEIVED
07 JUL 2025
UNIVERSITY OF EDUCATION, WINNEBA

The Head of Department,
Department of Graphic Design
University of Education, Winneba.

Dear Sir,

PERMISSION TO USE B.A GRAPHIC DESIGN COURSE DESCRIPTION FOR MY PH.D PROJECT WORK

I write to humbly request for permission to use B.A. Graphic Design course description on the prototype university website (https://unisiteghana.com) I am developing as part of my Ph.D thesis.

I am a Ph.D student from the Department of Music Education, UEW and I am conducting a study on the topic *"Designing university website: A proposed conceptual model"*.

The ultimate goal of the research is to develop a conceptual model for university website development and test the model through the design and development of prototype university website. The outcome of this study will guide the design and development of Ghanaian universities website.

I assure you that all information accessed will be used solely for the purpose of this research and in accordance with university policies and guidelines.

I will be grateful if you could grant me this support to conduct this research.

Attached is an official letter of introduction from my department.

Yours faithfully,

Nicholas Opoku
Ph.D. Student, UEW

PAA
P/s approved
7/6/25

APPENDIX D

OBSERVATION GUIDE

The visual analysis of selected universities websites against the best practice was performed on the basis of the following attributes:

14. **Visual Hierarchy:** how elements are arranged on the website to guide the user's attention, ensuring that the most critical information stands out.
15. **Typography:** involves the selection of fonts, sizes, and spacing to enhance readability and brand identity
16. **Colour Schemes:** How the university website predominantly use their institutional colours to reinforce their visual identity and mood of the website,
17. **Imagery and Graphics**: How photographs, campus landscapes, student life, and faculty interactions are showcased to appeal to prospective students and the general public.
18. **Layout and Navigation:** Ease of finding information and logical flow of content, clear and consistent menu structure, breadth and depth of navigation options and presence of a search bar for quick access.
19. **Responsiveness:** Website adaptability on smartphones, tablets, and desktops.
20. **Depth and Breadth of Information on Academic Programmes**: Check for the organization and comprehensiveness of programme details (e.g., degree structure, course modules, career opportunities)
21. **Research**: Observe how research activities are highlighted, such as dedicated pages for publications, ongoing projects, and funding sources.
22. **Faculty:** Assess the presentation of faculty profiles, including bios, research interests, courses taught and publications.
23. **Page Loading Speed and Performance:** Assess the time it takes for main pages (home, academic, admissions) to fully load and identify loading spinners, lazy-loading images, or placeholders.
24. **Security and Data Privacy Measures:** Look for visible security markers such as HTTPS

(padlock symbol in the browser address bar), Presence of trust seals or certifications (e.g., SSL, PCI DSS)

25. **Presence and Activity on Various Social Media Platforms:** Observe the integration of social media links and activity feeds on the website.
26. **News and Events Sections:** Observe whether news stories are regularly updated and accessibility to archives of past events or news.
27. **Online Application and Admission Processes:** Assess the clarity and ease of use for the application process, use of progress indicators to guide users through multi-step processes and visibility of help sections or live support for applicants.

APPENDIX E

FOCUS GROUP DISCUSSION GUIDE

1. What is your first impression of our university website?
2. How easy is it to navigate and find information on the university website?
3. What do you like/dislike about the website's design and layout?
4. Are there any particularly negative experiences you have had with the university website?
5. Would you recommend the university website to others for information? Why/why not?
6. How important is the first impression of the university website?
7. Tell us about positive/negative experience while using the university website.
8. Have you ever submitted feedback or reported an issue? If so, what was the response?
9. What features or functionalities would you like to see added to the university website?
10. Are there any competitor university websites that you think we could learn from?
11. How does the university website impact your overall experience with the institution?
12. If you were to improve one thing on the university website, what would you improve?
13. Is there anything that we have not discussed that you'd like to share?

APPENDIX F

INTERVIEW QUESTIONS FOR WEB DEVELOPERS

INTERVIEW GUIDE

OVERVIEW OF THE PROJECT

Developing a conceptual model for university website development

OBJECTIVE

To understand the web designer's and developers' approach, expertise and technological recommendations for developing a university website.

QUESTIONS

1. What is your experience with designing and developing university websites?
2. How do you stay updated with the latest web design trends and technologies?
3. Can you take me through your typical project planning process?
4. What is your approach to understanding the university's brand, target audience and gaols when designing the website?
5. How do you balance aesthetics and functionality?
6. What web design principles do you follow for a university website?
7. How do you optimise the user experience for diverse user groups (students, faculty, prospective students, alumni, etc)
8. Can you share examples of effective university website designs?
9. What content management systems (CMS) do you recommend for university websites?
10. How do you integrate third-party service into university website design (e.g. student information systems, library data and social media)?
11. How do you ensure website security and data projection?
12. How do you optimise the website for mobile devices?
13. How do you ensure content consistency across departments and faculties?
14. How can we design and develop our website to support expected experience?
15. Is there anything that we have not discussed that you would like to share?