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Department of Computer Science and Information Technology

Business Information Technology

Research Proposal

E-admission: Online Portal for University Applicants

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# 1 Introduction and Problem Statement

## 1.1 Introduction

The higher education sector globally has increasingly adopted digital solutions to streamline university admissions. These digital solutions have replaced traditional paper-based and email-based systems with online application platforms that offer efficiency, transparency, and scalability (Ngugi & Mwangi, 2020). Research has demonstrated that online applications in universities have standardized application procedures, decreased administrative burdens, and enhanced applicant experiences in developed nations such as the United States and the United Kingdom (Garnett et al., 2018). In a similar vein, several African nations, including South Africa and Kenya, have also established online application portals at their universities. For instance, South Africa's Central Application Clearing House (CACH) has increased transparency and decreased administrative difficulties, while Kenya Universities and Colleges Central Placement Services (KUCCPS) has made higher education more accessible to all applicant levels, shortened processing times despite infrastructure issues, and offered more equitable access.

To shed more light, online application platforms can offer multiple benefits to both the applicant and the university.

Online platforms offer efficiency and speed as applications are rapidly submitted, automatically reviewed, and processed. This reduces administrative delays (Ali & Awan, 2020). Administrators and applicants also receive real-time updates of information and notifications, which ensure timely communication.

Online platforms are also capable of automatically validating data, which minimizes human errors (Li & Miao, 2016), thus enhancing data integrity. The data is also stored securely with regular backups to ensure availability.

The platforms also ease the process of tracking applicants because the platforms keep the history of applicants, which simplifies the process of audits and ensures transparency (Chawinga & Zozie, 2016).

In Malawi, the National Council for Higher Education (NCHE) has made significant improvements with its online platform for undergraduates' admissions to public universities (Manda, 2018). NCHE is a centralized platform for matching applicants with available places at higher education institutions, using the specific requirements for admission of each institution. The platform, often requires applicants to create account, select desired programs and institutions, and upload necessary supporting documents like academic transcripts, ID copies, and other relevant documents. Despite the efforts, email or physical form submissions continue to be relied upon by postgraduates, economic, weekend, and Open Distance Learning (ODL) applicants when applying directly to some institutions like Malawi University of Science and Technology (MUST) and the University of Malawi (UNIMA). This fragmented process undermines the benefits of digitalization and continues to cause inefficiencies.

This research proposes an online admission portal for universities like MUST designed to meet the needs of these student groups who are not well-served by platforms such as the NCHE application platform.

## 1.2 Problem Statement

Despite the proven benefits of online admission systems in various universities around the world, most Malawian universities still depend on paper-based or email-based methods for direct applicants to universities. For example, MUST's current system requires applicants to download PDF forms, print them, and submit via email or in person. The current application process presents several challenges for both applicants and administrators.

For example, for applicants, paper-based or email-based applications are inefficient, time consuming, and have higher likelihood of human errors. These factors lead to inefficiencies when it comes to completing forms and getting responses from the institution they have applied to (Mwansa, 2017).

Applicants living in remote areas often face considerable financial strain when required to travel to submit physical documents. Rural regions having limited infrastructure can also factor the travel time and expenses. As Kumar and Patel (2021) note, these challenges discourage participation and widen the gap in access to essential services.

On the other hand, administrators also face challenges of their own:

Firstly, paper-based applications often suffer from issues such as illegible handwriting and correction difficulties. The administrator may misinterpret information due to unclear hand writings which impede the accuracy of the admission process. Additionally, relying on paper-based record-keeping can be time consuming and inefficient information retrieval, which can cause administrative delays (Selwyn, 2014).

Secondly, these traditional admission methods require rigorous verification processes to ensure authenticity and protect against forged documents (IAPP, 2023) or spam emails. These verification processes are not easy, expensive, and slow.

Thirdly, paper forms and email attachments are vulnerable to loss, physical damage, forgery, and unauthorized access (IAPP, 2023). These risks can compromise the confidentiality of sensitive information, creating potential for exposure and unauthorized access.

Lastly, paper files require storage facilities at the university which are expensive to construct and ensure security. It implies that the facility must be restricted from unauthorized access and free from physical damage risks such as fire or water.

By implementing a secure, user-friendly online admission portal that complies with global best practices while considering the infrastructural and resource limitations of Malawian universities, institutions can enhance application efficiency, increase accessibility for prospective applicants, and align more closely with international standards in higher education (Garcia & Lee, 2021).

## 2 Research Aim, Objectives, and Research Questions

### 2.1 Aim

The aim of this research is to design an online student application system that economic students, ODL scholars, weekend students and postgraduates can use to apply directly to universities in Malawi, as a solution to the problems that are brought by paper-based or email-based application methods.

### 2.2 Objectives

This research has the following specific objectives:

- a) To analyse challenges associated with paper-based or email-based direct admission process of economic and postgraduate students to universities.
- b) To determine prominent features and functionalities of the university's online platform.
- c) To design and implement an online platform that allows students to easily submit their applications, personal details and track their progress.
- d) To evaluate the usability of the prototype to determine how easily, efficiently, and satisfactorily users can interact with its features and perform intended tasks.

### 2.3 Research Questions

The research has the following corresponding questions:

- a) What are the key challenges faced by economic and postgraduate students, and universities in the paper-based or email-based direct admission process?
- b) What are the most prominent features and functionalities of the university's online admission platform for economic students and postgraduates applying directly to a university?
- c) How can an online platform be designed and implemented to enable students to easily submit their applications, provide personal details, and track their application progress effectively?
- d) How usable is the prototype in terms of ease of use, efficiency, and user satisfaction when interacting with its features and completing intended tasks.

### 3 Preliminary Literature Review

#### 3.1 Context

The adoption of online application platforms in higher education has revolutionized the way students apply to universities, offering efficiency, transparency, and accessibility (Ngugi & Mwangi, 2020). Online application platforms have streamlined processes by automating submissions, verification of documents, and real-time tracking (Garnett et al., 2018). This literature review synthesizes existing research on online application systems, focusing on their benefits, challenges, and implications for Malawian universities.

#### 3.2 Benefits of online application systems

##### 3.2.1 Reducing processing time and improving efficiency

Online application systems have significantly reduced the time required to process applications compared to traditional paper-based or email methods. According to Alenezi (2018), digital systems eliminate many manual tasks that typically delay admission processes. The automation of document verification, data entry, and preliminary qualification checks accelerates the entire workflow. Universities with high application volumes particularly benefit from this efficiency, as it reduces administrative burden and allows staff to focus on more complex evaluation tasks rather than paperwork (Garnett et al., 2018).

##### 3.2.2 Improved data accuracy and validation during processing

Paper-based applications often suffer from issues such as missing information and illegible handwriting. Chen (2020) highlights that online systems reduce these errors by implementing automatic validation processes that ensure all required fields are completed correctly before submission. Digital forms can enforce data format requirements, preventing common mistakes such as incorrectly formatted dates or contact information. Studies by Kumar & Patel (2021) found that structured digital forms reduce application errors by over 80% compared to handwritten submissions, significantly improving data quality for administrative decision-making.

##### 3.2.3 Real-time tracking and communication between applicants and administrative

Online application systems enable applicants to track the status of their applications in real time. According to Sharma & Moyi (2019), this transparency builds trust between applicants and institutions, as applicants can see exactly where their application stands in the process. Modern platforms integrate automated communication systems that send timely notifications about missing documents, upcoming deadlines, and admission decisions. This improved communication is particularly valuable in contexts like Malawi, where applicants using traditional methods often experience significant delays in receiving updates about their application status (Kanyundo, 2021).

### 3.2.4 Improved accessibility for a global audience

Digital application platforms eliminate geographical barriers, allowing students from distant locations to apply without traveling to the institution. Williams et al. (2022) note that this accessibility is particularly important for reaching underserved populations and international applicants. Institutions implementing comprehensive online application systems typically experience increases in application diversity and volume. The removal of physical submission requirements particularly benefits applicants from rural areas who would otherwise need to travel long distances to submit documents (Chirwa, 2016). For Malawian universities seeking to attract students from neighbouring countries, this accessibility represents a significant advantage.

### 3.2.5 Cost reduction

The transition to online applications generates substantial cost savings for both institutions and applicants. Universities reduce expenses associated with printing, physical storage, and manual processing of paper applications. According to Osman (2020), higher education institutions implementing fully digital admissions processes report operational cost reductions of 30-45% compared to traditional systems. For applicants, digital submission eliminates expenses related to printing, photocopying, and transportation to the institution. These savings are particularly significant in the Malawian context, where economic constraints affect both institutional budgets and student resources (Manda, 2018).

### 3.2.6 Information security and confidentiality

Modern online application platforms offer superior security features compared to paper documents or unsecured email attachments. Digital systems implement encryption, secure authentication, and controlled access to protect sensitive applicant information (International Association of Privacy Professionals, 2023). This enhanced security helps universities comply with emerging data protection regulations while reducing risks of unauthorized access or document loss. In the context of Malawian universities, where paper documents may be vulnerable to physical damage or misplacement, digital systems provide important safeguards for applicant data integrity and confidentiality.

### 3.3 Current State in Malawi and Regional Context

In Malawi, the National Council for Higher Education (NCHE) has introduced a centralized online admission system for public universities, reducing reliance on email and paper-based applications for undergraduate admissions (Manda, 2018). However, this platform does not serve all applicant categories, specifically Postgraduate, economic, weekend, and ODL who apply directly to universities. Current research shows that only Lilongwe University of Agriculture and Natural Resources (LUANAR) utilises online admissions platforms ([https://luanar.ac.mw/pgapps/new\\_use\\_form.php](https://luanar.ac.mw/pgapps/new_use_form.php)) while most of the universities such as MUST, Kamuzu University of Health Sciences (KUHE), University of Malawi (UNIMA), Mzuzu University (MZUNI) and Catholic University (CU) are still using traditional methods for admitting students applying directly to their institutions.

These traditional methods either require applicants to download forms from university websites, fill them manually, and mail them to the institution, or require applicants to physically visit campuses to obtain and submit forms. For example, a call for application for ODEL applicants at UNIMA for the 2025-2026 academic year requires applicants to download application form in PDF format. The applicants are supposed to submit their applications physically which is an ordinary way. <https://unima.ac.mw/announcements>

Similar practices are observed in neighbouring countries like Zambia and Zimbabwe, where some universities continue to rely on paper-based or email-based methods for specific student categories (Mwansa, 2017). This fragmented approach undermines the benefits of digitalization and perpetuates inefficiencies in the admissions process.

The absence of comprehensive digital systems creates challenges for non-traditional applicants. Postgraduate, economic, weekend, and ODL students often face additional barriers in the application process, including limited information about program requirements, difficulties in submitting required documentation, and delays in receiving admission decisions (Chawinga & Zozie, 2016). These challenges are worsened for applicants from rural areas or those with limited access to transportation, who must overcome significant logistical obstacles to complete paper-based applications.

### 3.4 Theoretical Frameworks and Future Directions

The literature suggests that online application platforms have significant potential to improve admission processes in Malawian universities, but successful implementation requires careful attention to context-specific challenges. Garcia & Lee (2021) emphasize the importance of designing systems that accommodate local infrastructure limitations, address digital literacy barriers, and incorporate appropriate security measures. This context-sensitive approach is essential for developing platforms that are truly accessible to all potential applicants.



Despite the transformative potential of online application platforms, persistent challenges remain in ensuring technical reliability, maintaining robust security, and optimizing user experience. Brink et al. (2019) highlight the importance of user-friendly design approaches that consider the needs and capabilities of diverse applicant populations. By incorporating input from potential users throughout the development process, universities can create platforms that are both technically sound and usable in the Malawian context.

The literature clearly demonstrates the value and necessity of transitioning from traditional paper-based and email-based admission systems to comprehensive online platforms. By addressing the specific needs and challenges of the Malawian higher education context, particularly for postgraduate, economic, weekend, and ODL applicants, this research aims to contribute to the ongoing digital transformation of university admission processes. The development of a tailored online admission portal has the potential to enhance accessibility, efficiency, and equity in higher education, benefiting both institutions and applicants.

## **4 Research Methodology**

This study adopts the Constructive Research Methodology (CRM), which is designed for developing and evaluating innovative, practical solutions to real-world problems. It is particularly suitable for this project, which seeks to design, implement, and evaluate an online application platform to improve the admission process for economic, postgraduate, ODL, and weekend students in Malawian universities. CRM provides a structured, step-by-step approach that combines academic rigor with solution-oriented development.

### **4.1 Problem Identification**

To analyse challenges associated with the paper-based or email-based direct admission process and to understand the core challenges within the current admission systems.

### **4.2 Understanding the problem and Theoretical Background**

The following qualitative and quantitative data collection methods will be conducted:

- Structured questionnaires (administered via Google Forms) will be distributed to university staff, IT personnel, and students to gather quantitative data on the drawback of the current system.
- Semi-structured interviews will be conducted with admissions officers and applicants to gather a deeper understanding of issues and unmet needs.
- Document analysis will review application procedures used by universities like LUANAR, and Catholic University (CU).
- Case studies of successful platforms such as UCAS (UK) will be analysed to extract best practices in online admissions.

### 4.3 Design of the Artifact

The design phase of the online platform will be conducted through the use of a functional prototype using Figma, to show the intended user interface, navigation flows, and form layouts. User-centred design principles will also be considered to incorporate insights from earlier data collection and address the identified pain points.

### 4.4 Development of the Artifact

The development phase will make use of the agile software development model to guide the process across two-week sprints, with each sprint focusing on building and refining one feature of the platform (e.g., sprint 1 for account creation and sprint 2 for document upload).

Daily standups, whereby the development team meets daily to discuss progress and roadblocks, is another key practice that is emphasised using the agile model. The use of the agile model will provide retrospectives after each sprint, allowing the team to review what worked and what did not work to improve the next sprint. The adaptive nature of the agile development model also ensures that the project team remains flexible when faced with challenges and roadblocks.

The development of the platform features will be divided into sprints in the following manner:

#### Sprint 1: User Onboarding:

- Account registration/ login
- User profile setup
- Basic database structure

#### Sprint 2: Application Workflow:

- Application form
- Program selection
- Draft/saving/submit logic

#### Sprint 3: Document and Payment Modules:

- File upload (PDF, image formats)
- Payment gateway integration
- Confirmation emails

#### Sprint 4: Tracking, Admin and Communication:

- Application status tracking
- Admin dashboard (viewing/managing applications)
- Email notifications and ticketing system

The development of the platform will be built using:

- Laravel, a PHP framework used to develop secure and scalable backends.
- React.js, to build a responsive and modular frontend.
- SSL encryption, to ensure secure communication, and that the system complies with Malawi's Data Protection Act (2021).
- Third party API integration, to enable SMS notification and real time updates.

#### 4.5 Demonstration of the Artifact

To demonstrate how the proposed solution meets its intended purpose; a pilot version of the platform will be shared with a selected group of students and university staff. Participants will be asked to simulate key tasks such as account creation, document upload, and application tracking. Observation and participant's user feedback will help confirm usability and completeness of features before full development is finalized.

#### 4.6 Evaluation of the Artifact

To evaluate the usability and effectiveness of the prototype, the following tests will be conducted:

- System Usability Scale (SUS): A standard survey instrument that will be used to measure the overall user satisfaction and the ease of use.
- Task-Based Testing: Whereby participants will perform tasks while researchers measure metrics such as the time taken to complete tasks, faced error rates, and task completion rates.
- Load Testing: The platform will be evaluated under simulated high-traffic conditions to accurately assess the stability and performance of the platform.
- Qualitative Feedback: Open-ended responses will be collected from users regarding their experience as well as any suggestions for improvement.
- Security Testing: Vulnerability scans and manual checks will be conducted to assess the extent to which the system protects sensitive data.

#### 4.7 Research Contribution

The online platform will offer a replicable model for digital university admissions in Malawi and offer a prototype that can be scaled to match the requirements of multiple universities. It will also contribute to existing literature by providing additional data on digital adoption in Malawian universities, while further supporting the digitization of higher education institutions.

## 5 Ethical Considerations

During the development and implementation of the platform the following ethical issues will be addressed:

- Data Privacy and Security
- Bias and Fairness
- Transparency and Accountability
- Accessibility and Inclusivity

The platform will manage sensitive information such as academic records, personal identification details, and financial data submitted by applicants. To protect this information, strong security measures like encryption and secure storage will be implemented. Ensuring data privacy is crucial to building trust with applicants, especially when they share personal details for university admissions.

The platform will ensure that algorithms used for processing applications are free from biasness related to race, religion, gender, socioeconomic status, or geographic location. For example, applicants from underprivileged backgrounds or underrepresented communities should not face disadvantages in the evaluation process. Regular audits will be conducted to identify and address any biases (Mehrabi et al, 2021), ensuring equal opportunities for all applicants.

Applicants will have a clear understanding of how their data is used and how decisions are made during the application process. The platform will provide detailed information about evaluation criteria, the role of automated systems, and the steps involved in decision-making. Additionally, a grievance redressal mechanism will be available for applicants to appeal decisions or raise concerns, ensuring accountability.

The admissions platform will be designed to accommodate applicants with diverse needs, including those with disabilities or limited access to technology. Features like screen reader compatibility, simple navigation, and support for multiple languages will ensure that applicants from all backgrounds can use the platform easily. This inclusivity is essential to ensure that no one is excluded from the opportunity to apply to universities.

## 6 Proposed Research Work Plan

The proposed timelines for the research are given in the table below:

ACTIVITY	DATE	DURATION (working days)
Proposal development	04 March – 18 April	45 days
System Requirement Gathering and Analysis	05 May – 18 May	14 days
System Designing	19 May – 08 June	21 days
System Development	09 June – 05 August	58 days
System Testing	06 August – 26 August	21 days
System Evaluation	27 August – 09 September	14 days
Dissertation Write Up	10 September – 23 September	14 days
Dissertation submission	24 September - 30 September	7 days

## 7 Research Limitations

In the research phase, one major challenge is limited access to data, making it difficult to gather accurate information about user needs, system requirements, and competitor platforms. Since the focus will be implementing a system for an individual university, we may not be able to take into consideration other universities' courses and requirements. Biasness in data collection can further hinder research accuracy, as surveys and interviews may not represent all needed information.

The platform is required to work via the internet, so the platform cannot be accessed in certain areas where there is no to little internet access. This plays as a challenge because it means that the effort to try and eliminate the current manual method difficult because of students who do not have internet access.

Budget constraints, often pose as a major challenge. Developing and maintaining a sophisticated online application platform requires significant financial investment, which may not always be available. Limited budgets can restrict access to advanced tool and technologies, potentially leading to compromises in the platform's quality or functionality.

Data privacy and security. The platform will collect and store sensitive applicant information, such as personal details, academic records, and payment data. Protecting this data from breaches or unauthorized access is critical, so too compliance with regulations like Malawi's Data Protections Act. Failure to address these concerns can lead to legal repercussions and loss of trust among applicants.

Time constraints can hinder the ability to gather meaningful insights. Conducting thorough research on user behaviour, platform performance, or applicant needs often requires considerable time, which may conflict with tight development deadlines. Rushing the research process can lead to incomplete or inaccurate data, resulting in poor decision-making during development.

Finally, digital access and literacy barriers among students will be a challenge because like previously mentioned, not everyone has reliable internet access, and some applicants may also lack the skills or familiarity required to navigate the online application process effectively.

## 8 Budget

The budget has been drafted based on the following facts and assumptions.

### i. Facts to consider

- a) The team consists of eight members.
- b) The development methodology follows an iterative approach, with key phases including requirements gathering, design, development, testing, and deployment to a testing environment.
- c) The project aims to create a functional prototype, demonstrating core features of a university online application platform.

## ii. Assumptions

- a) The project will be conducted over a period of 5 months.
- b) Team members will utilize their personal computing equipment and software development tools.
- c) Communication and collaboration will primarily occur through online platforms, including WhatsApp, Google Meet and Zoom.
- d) Each team member is expected to contribute an average of 10 hours per week to the project.
- e) User feedback will be gathered through online surveys and virtual usability testing sessions with a representative group of target users.
- f) To ensure the platform meets the needs of its users, each team member will be responsible for gathering requirements by interviewing a representative from the university's admissions office, current students, or prospective applicants.
- g) Each team member will conduct a usability test with a potential user of the platform, such as a prospective student, a current student, or a member of the university's admissions staff, to evaluate the platform's ease of use and identify areas for improvement.

Activity Description	Cost (Kwacha)	Number of Months	Group Members	Total (in Kwacha)
Internet Bundle (30 GB)	15,000	3 months	8	360,000
SMS Bundles(3000sms)	500	2 months	8	8,000
Surveys	7,000	1 month	-	7,000
Webhosting (Blue Host)	5,200	1 month	-	5,200
AI Technologies	45,000	2 months	2	180,000
				560,200

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