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An E-Admission Screening Portal for Tertiary Institutions: Case Study of Anchor University, Lagos

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ABSTRACT

Background: The traditional paper-based admission processes in tertiary education institutions are often fraught with inefficiencies, errors, and lack of transparency, causing frustration for both applicants and admission officers. **Objectives:** This study addresses these challenges by developing an e-Admission Screening Portal aimed at streamlining and enhancing the student admission process, with a case study of Anchor University Lagos. **Methods:** The portal provides a user-friendly interface for applicants to submit applications, upload necessary documents, and track their application status in real-time, while offering tools for admission officers to efficiently manage applications, verify documents, and automate grading based on predefined criteria, ensuring a fair and unbiased evaluation process. The system architecture comprises three primary layers: the presentation layer for a seamless user experience, the application layer for handling business logic and data flow, and the data layer for managing secure data storage and retrieval. Utilizing modern technologies such as HTML, CSS, JavaScript, React, Node.js, Express.js, and SQLite, along with robust security measures to protect sensitive information, the portal significantly improves the efficiency and transparency of the admission process. **Results:** It reduces the administrative burden on admission officers, enhances data accuracy, and provides real-time updates to applicants, fostering a more engaging and stress-free experience. **Conclusions:** The system's scalability and modular design allow for future enhancements and integration with other institutional systems, demonstrating the transformative potential of technology in modernizing admission processes and setting a foundation for further innovations in educational technology.

Keywords: e-Admission, screening portal, web application, expert system, information system.

1. Introduction

The traditional methods of managing student admissions in tertiary institutions are deeply rooted in paper-based and manual processes, presenting formidable challenges such as time consumption, inefficiency, and a higher susceptibility to errors (Yudono et al., 2022). The increasing influx of applicants seeking admission to tertiary institutions has further exacerbated these challenges, underscoring the imperative need for a more efficient and effective screening process (Dolluck et al., 2017). Moreover, the limitations of traditional methods become evident in the difficulty for both students and institutions to track application progress and foster effective communication. The development of an internet-based student admission screening system, as highlighted by Jogamohan et al. (2018) emphasizes the need to improve the efficiency of the admission process by replacing manual pen and paper methods. The advent of technology has heralded a transformative era across various sectors, with the educational landscape witnessing a significant paradigm shift. Notably, the emergence of e-admission screening portals tailored for tertiary institutions has become a focal point of discussion. Introducing an electronic admission screening portal can optimize the process and improve transparency (Bráulio et al., 2021). These portals represent a concerted effort to streamline the admission process, introducing a level of efficiency, accuracy, and error reduction that is unattainable through traditional manual means (Yudono et al., 2022). Numerous student admission systems have surfaced, each with a unique set of features and functions designed to transform the admissions process. Globally deployed, these systems include online application forms, the ability to submit documents, online payment methods, and algorithms for automated decision-making. Algorithms for automated decision-making evaluate application data impartially, eliminating prejudices and standardizing the

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assessment procedure (Genovesi et al., 2023). These systems' ongoing development represents a revolutionary meeting point between innovation and institutional requirements, pointing to a time when admissions procedures would effectively combine efficiency with modern technology norms. Fissalma and Ajie (2019) developed a system for State University of Jakarta students to use for admission. The study was carried out using the Feature Driven Development (FDD) Agile Method, which does not have a set rule in the traceability model between requirement and feature. It went through a number of steps, including developing an overall model, creating a feature list, planning by feature, designing by feature, and building by feature. Software Requirement Specifications (SRS) and systems constructed with React-Redux for the front end and Laravel for the back end are among the products of this study.

Yudono et al. (2021) created a fuzzy decision support system for ABC University's admissions process. This work employed the Fuzzy Mamdani approach to develop a New Student Admission (PMB) determination system. This study's methodology consists of a series of steps: fuzzification in the first place, applied inference evaluation rules in the second, and defuzzification in the last step to obtain the final computation results. This system was tested by contrasting its output with the actual outcomes that were attained in accordance with the design. The system testing findings were rated with 96 percent acceptability. Thus, the previously manual selection process can be streamlined with the aid of the University's new student admissions system. A mobile application for a vocational school's pre-admissions process was created by Massó (2020). Enhancing user communication among kids, parents, and the school was the main goal of the application. Rapid Development is the foundation of the methodology. Firebase was utilised for database implementation and email and password authentication, while Xcode 9.3.1 from the Apple IDE was employed to create the prototype. It was determined that by ensuring the orderly collection of data without redundancy or duplication of effort, the development of an app that uses mobile technology might expedite the preadmission process. This work by Umar (2017) aims at developing a web-based online screening and admission system for Gombe State University's School of Basic and Remedial Studies (SBRS). The admission officer for the School of Basic and Remedial Studies was interviewed as part of the research process to learn about the administrative issues they are encountering, the way the current system operates, and how the system interacts. The system is easy to use and was created to let students register online and check their admission status to see if they were accepted or not. The process involves consulting a variety of people, including students, lecturers, and some subject-matter experts. Relevant literature (such as textbooks and journals) and Internet browsing are two further methods of information generating that have been used. WAMP, Macromedia Dreamweaver, MySQL, and PHP application packages were used in the implementation process. This application has demonstrated that the online admission system is superior to the popular manual system. In the work of Rout *et al.* (2012), an effective automatic software technique for e-admission was presented as a noble answer.

The major goal is to improve e-government in all Odisha universities by implementing complete openness and accountability. Instead of being organization-centric, the solution is more customer-centric. Additionally, it is not influenced by any one person, which validates the ethics of openness. A distributive cooperative algorithm and a PSO-based algorithm for quick searching are used to build the e-admission procedure. Wavelet techniques are utilised to safeguard the data. The University of Odisha's e-admissions procedure has undergone a significant revolution thanks to imaging and automated processing. The e-admission system has a new solution thanks to this study. Also, Eze-Okoli (2017) proposed a universal online application system for Ghanaian universities, allowing applicants to register, submit their personal data only once, and apply to several institutions. Users find this application more comfortable as it simplifies the application procedure. The stress and strain of candidates remembering several username and password combinations is lessened because all the information needed by the institutions is kept in a single account. To give this solution a foundation, requirements were gathered and

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Table 1: This table shows a summary of related works.

S/N	Paper	Methods	Strengths	Weaknesses
1	Dolluck et al. (2017)	Decision Tree	High accuracy (94%) and user-friendly for applicants.	Accuracy depends on data quality; difficult to interpret predictions.
2	Fissalma and Ajie (2019)	Feature Driven Development (FDD)	Addresses practical issues in the student admission system with a systematic approach.	Limited scope; lacks long-term perspective and generalizability.
3	Yudono et al. (2022)	Fuzzy decision support system	Models uncertainty in the selection process and improves decision-making.	Does not perform sensitivity analysis or robustness tests.
4	Massó (2020)	Rapid Application Development (RAD)	Addresses a real and relevant problem for the vocational school and its community.	Missing literature review and user testing; lacks consideration for future challenges.
5	Mehul et al. (2017)	Web-based application development and Database integration	User-friendly system that enhances security and reduces costs.	Requires stable internet; faces integration challenges with existing systems.
6.	Umar (2017)	Web-based application development	Security enhanced online screening and admission system	The system was not validated and tested for users' assessment.
7.	Rout et al. (2012)	customer-centric based e-admission system using distributive cooperative and PSO-based algorithm	Development of an effective automatic software technique for e-admission.	No user interface and the software were not validated.
8.	Eze-Okoli (2017)	Web application system for Ghanaians' Universities	Proposal of a universal online application system for Ghanaian universities, allowing applicants to register, submit their personal data only once, and apply to several institutions.	There was no emphasis on security measures for the users' data.

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research was done. Use cases and required diagrams were used in the design of the web application following the identification of requirements. PHP, CSS, JavaScript, and HTML were used in the implementation of the application. Finally, the system was put through user and development testing to make sure it satisfies the criteria. Feedback for next projects was gathered. Table 1 shows a summary of some related works. The revolutionary potential of online screening and admission systems lies in their ability to rectify these issues. By enabling efficient and accurate computation of students' results, these systems significantly reduce the risk of errors and ensure fairness in the selection process (Dolluck et al., 2017). Therefore, this study will demonstrate how the swiftness introduced by these systems plays a pivotal role in shortening the duration of the admission process, providing a timely and streamlined approach.

2. MATERIALS AND METHODS

The system structure is built on cutting edge technologies to provide users with easy-to-use applications that guarantee data encryption and integrity. The frontend of the application is built using HTML5, CSS3, JavaScript and React. The server side of the application is built using node.js and express.js. These tools handle the core business logic and data flow. A cloud-based email delivery platform called Resend is used to manage the dispatch of notifications to applicants. It ensures timely and reliable delivery of important updates, status changes, and communication from the admission office, enhancing the overall user experience. Figure 1 showed a diagrammatic representation of the system architecture.

The system for the Electronic Admission Screening Portal (EASP) for Anchor University, Lagos encompasses multiple stages and interactions between various users and system components to ensure seamless operation. Prospective students, referred to as applicants, interact with the portal primarily to submit their applications, upload the necessary documents, and track the status of their application. Admission officers are responsible for verifying the submitted documents, managing the admission workflow, and communicating decisions to the applicants. Administrators oversee the overall system, managing user accounts and system settings to ensure smooth operation and maintenance. Applicants begin by logging on to the portal, where they fill out and submit their application forms online. The system prompts them to upload required documents. Upon submission, admission officers receive notifications of new applications and proceed to verify the authenticity and completeness of the uploaded documents. Any discrepancies or missing documents are communicated back to the applicants for correction. Verified applications are then processed according to predefined criteria. The system may employ algorithms to rank applicants based on academic merit, after which admission officers' review and finalize the decisions for each application. Applicants can track the status of their application in real-time through the portal, and the system sends automated notifications to applicants regarding the progress and outcome of their applications. Accepted applicants receive further instructions for enrollment.

Figure 2 illustrates how data moves through the system. It highlights the key processes involved, and also the data stores. As part of the validation process User Acceptance Testing (UAT) and Performance Testing was carried out with both applicants and admission officers at high-load conditions to validate the portal's user-friendliness, efficiency, and overall functionality. These tests aims to identify potential bottlenecks and optimize performance. Results are discussed in the following section.

Figures 3 and 4 show the interfaces for students to upload required documents and results, as well as the admission officer's interface to review students' documents, respectively.

3. RESULTS AND DISCUSSION

The UAT results demonstrate that the Electronic Admission Screening Portal meets user expectations and performs effectively across different roles and tasks. Figure 5 presents the results based on general usability, functionality, performance, user satisfaction which were derived from the responses gathered through a structured questionnaire.

To improve overall performance, the e-Admission Screening Portal for Anchor University Lagos was also evaluated using the Lighthouse tool in Chrome. The results of the

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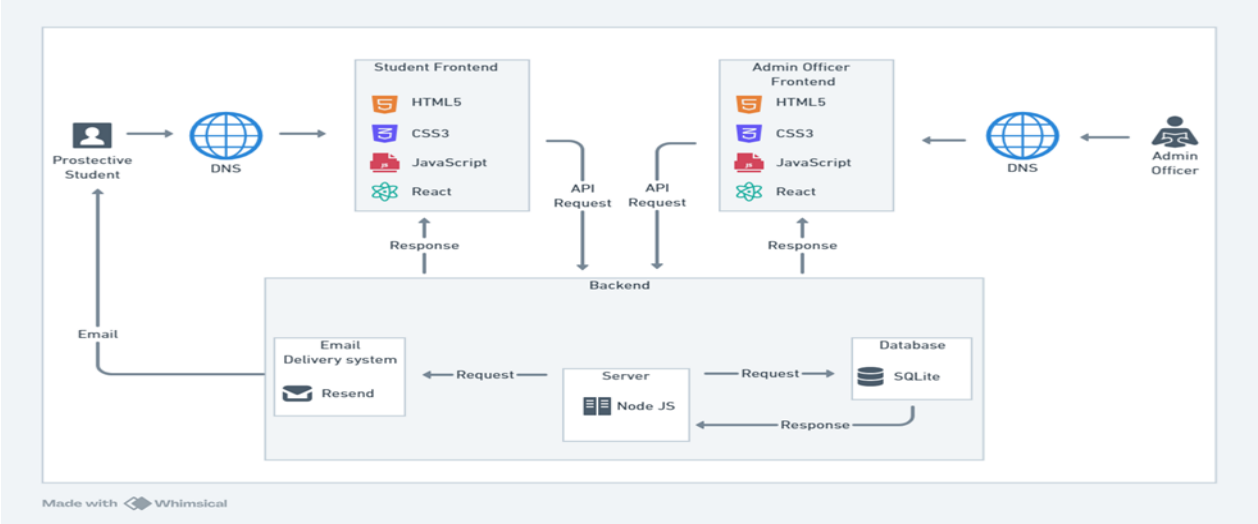

Figure 1: A diagrammatic representation of the system architecture for the e-Admission Screening Portal.

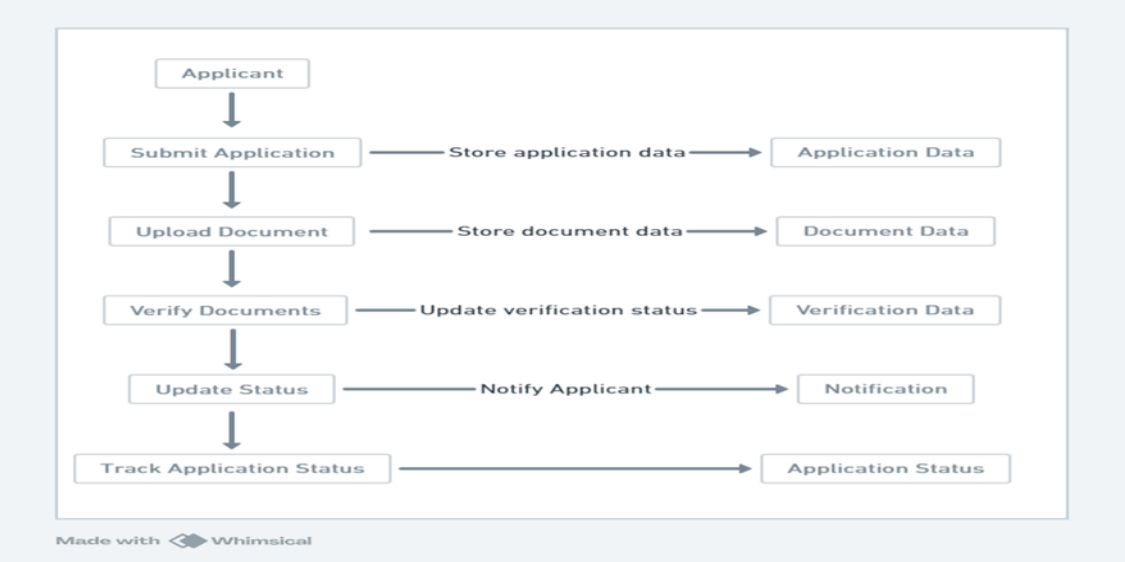

Figure 2: Data Flow Diagram of the e-Admission Screening Portal

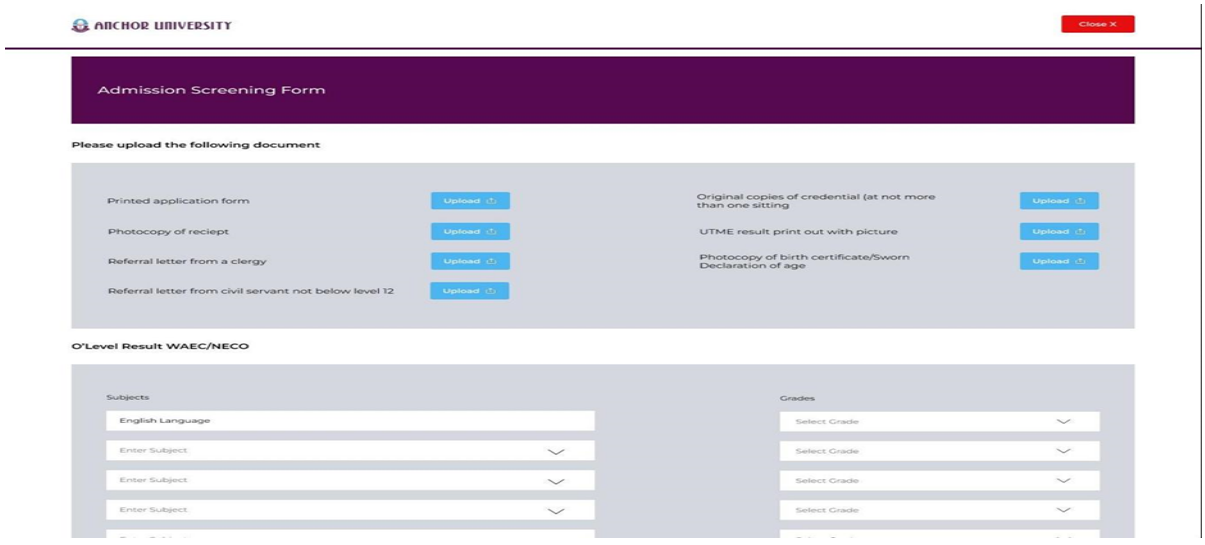

Figure 3: The interface of Students' page to upload required documents and result.

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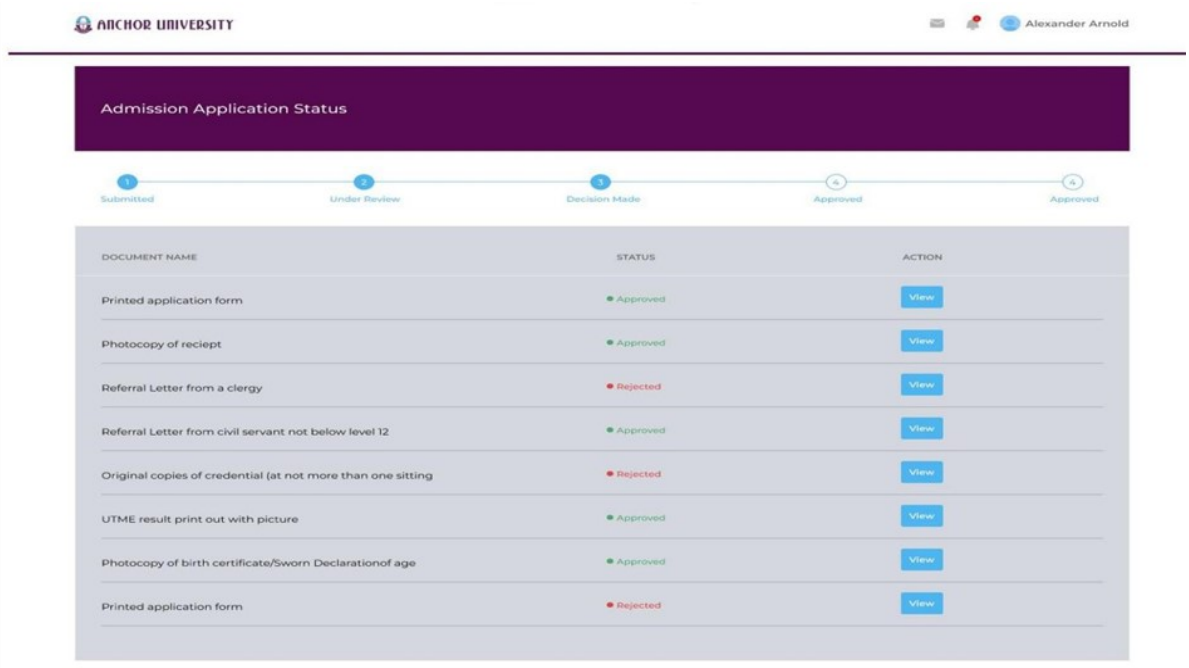

Figure 4: The interface for Admission Officer's review of Students' document.

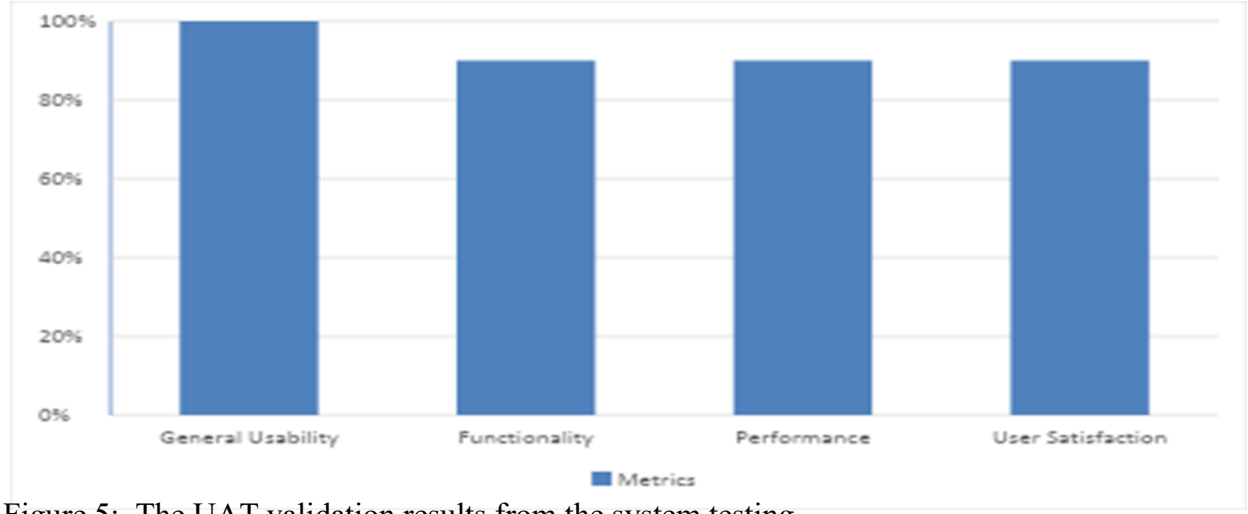

Figure 5: The UAT validation results from the system testing.

test provide insights into the performance, accessibility, best practices, and SEO of the web application as seen in Table 2.

Table 2: The results of the portal evaluation using Lighthouse tool in Chrome.

METRIC	SCORE
Performance	57
Accessibility	90
Best Practices	100
SEO	73

The performance score of 57 suggests that optimizing the JavaScript, compressing text, and reducing the size of network payloads can significantly enhance performance. The accessibility score of 90 is commendable, indicating that the web application is largely accessible to users, including those with disabilities. However, improving color contrast would enhance readability for all users. A perfect score of 100 in best practices reflects that the web application follows recommended web standards and practices. This includes ensuring that the Content Security Policy (CSP) is effective against XSS attacks and other security measures. The SEO score of 73 indicates that while the application meets basic

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SEO requirements, there are improvements that can be made to enhance visibility in search engine results.

4. CONCLUSION

The e-Admission Screening Portal has successfully streamlined the admission process by automating key tasks such as application submission, document verification, and eligibility checks, reducing administrative burden and enhancing efficiency. Its transparent real-time updates build trust and reduce anxiety among applicants, while a user-friendly interface ensures accessibility for diverse users, including those with disabilities. Robust security measures protect sensitive applicant data, and automated grading guarantees fair and unbiased evaluations. Students and admission officers benefit from a dedicated interface that simplifies application management, improving workflow efficiency. Additional improvements could include integrating the system with institutional platforms, developing advanced analytics for better insights, and creating a mobile application for increased accessibility. Continuous updates to security measures, scalability optimization, and the inclusion of a user feedback mechanism are crucial for maintaining and improving the portal's functionality over time.

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