

Design and implementation of a computerized transcript management system: A case study of Kogi State University

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Abstract

The management of student academic records and transcripts in many higher institutions is hindered by inefficient manual processes, resulting in misplaced records, slow retrieval times, and severe data redundancy. This study outlines the design and implementation of a computerized transcript management system, utilizing the Department of Mathematical Sciences at Kogi State University, Anyigba, as a case study. The research employed an analytical evaluation of the existing manual system to identify core functional limitations. Subsequently, a web-based architecture was developed using PHP 5.3 as the front-end scripting language and MySQL 5 for the back-end relational database management system. The implemented software securely separates the front-end interface from the back-end server, providing robust security mechanisms against unauthorized intrusions. The computerized system successfully automates student registration, score computation, and transcript generation. The deployment of this system significantly reduces the physical bulkiness of files, minimizes the cost of service delivery, and prevents the over-working of administrative personnel. The adoption of this digital infrastructure ensures high-level quality service, data integrity, and transparent information management within the university framework.

Keywords: Transcript management; Information system; Database; PHP/MySQL; Educational technology; Record processing

1. Introduction

A system is a collection of interrelated and interconnected components that work together to perform a specific task to accomplish a particular goal [1]. For educational institutions, managing student information and academic records effectively is a critical operational requirement. However, due to multiple security incidents and the potential loss of sensitive data, it has become necessary to implement robust mechanisms to prevent unauthorized access into servers housing sensitive systems, such as student result processing platforms [1].

Kogi State University, located in Anyigba, Nigeria, was established in 1999 [1]. The institution commenced academic activities in April 2000 and has experienced rapid demographic growth. Starting with a student population of approximately 700 in 2000, the university grew to about 16,000 students by the 2009/2010 session, and reached approximately 50,000 students in 2016 [1]. This massive expansion has placed an immense operational burden on administrative departments managing academic records.

The manual process of transcript generation involves the physical movement of files and endless waiting periods for authorization [1]. This archaic system presents severe functional limitations, including the monotonous storage of records, extreme bulkiness and heaviness of physical files, misplacement of student grades due to administrative negligence, and highly strenuous retrieval processes [1]. Furthermore, inadequate records management can lead to inaccurate record keeping and poor information management within the institution [1].

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To counteract these inefficiencies, this study focuses on designing and implementing a computerized transcript management system utilizing a PHP/MySQL architecture to serve as a security mechanism between the front-end and back-end interfaces [1]. The system automatically handles student activities ranging from registration and file management to the computation and generation of grade points and transcripts. The primary objective is to ensure that records and reports are easily retrieved with increased data security, thereby reducing resource expenditure and improving service delivery [1].

2. Materials and methods

2.1. System Analysis and Data Collection

The existing manual process of transcript management at Kogi State University was understudied through direct observation and oral interviews [1]. System analysis was conducted to discover the functional limitations of the old system. Oral interviews were carried out with lecturers across various courses to understand the recording process and gauge reactions to the proposed adoption of an automated software system [1].

2.2. Software and Hardware Requirements

The proposed system is designed as an online web application. The software requirements for the target computer system include a Windows operating system (2000, XP, Vista, or Windows 7), WAMP web server, and MySQL 5 for the database management system [1]. The application logic was developed using Hypertext Preprocessor (PHP) version 5.3 [1]. The hardware requirements mandate a minimum of 256MB of RAM, 10GB of hard disk space, and a processor speed of 333MHz or higher to ensure efficient execution [1].

2.3. System Architecture

The architecture was constructed based on a client-server model. The back-end consists of the SQL database, which handles secured, transaction-protected data modification and read-only access channels [1]. The front-end consists of the application layer interacting with the PHP application objects, allowing staff to securely input and retrieve curriculum data, exam scores, and student biodata [1].

3. Results and discussion

3.1. Database Design and Structure

The foundation of the computerized system relies heavily on a structured relational database. The database architecture was designed using specific tables to organize information effectively. The primary tables include the 'Admin' table (managing usernames and passwords), the 'Biodata' table (housing student demographic details), the 'Raw Scores' table (storing semester results), and the 'Transcript Data' table (compiling grade points, class levels, and final metrics) [1]. This relational structure eliminates data redundancy by utilizing primary and foreign keys, enabling systematic data storage and seamless updates without disrupting dependent applications [1].

3.2. Input and Output Processing

The input specification was tailored to handle data entry functions systematically. The 'Add Student' module serves as the primary form for adding new students to the transcript system and synchronizing their data with departmental processes [1]. Administrative login mechanisms require strict password validation before granting access to data entry forms [1]. The output design provides real-time feedback; when an authorized user submits a query, the system retrieves and displays the processed student data and transcript details through a highly responsive graphical user interface [1].

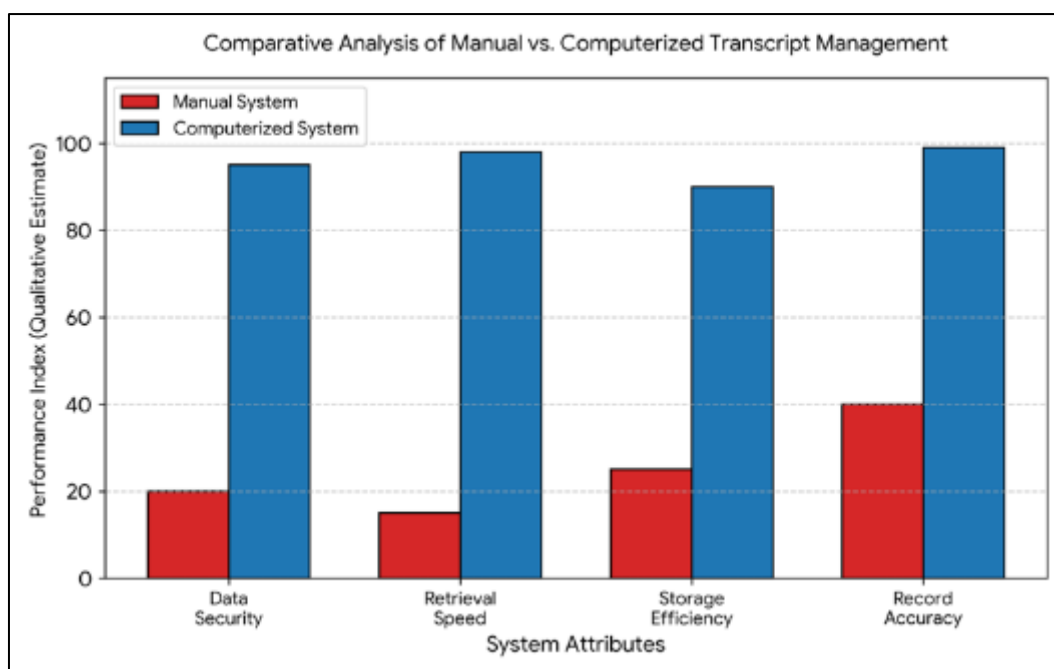


Figure 1 A comparative performance estimate of the manual transcript system versus the proposed computerized management system across key operational parameters [1]

3.3. System Implementation and Maintenance

System implementation requires the conversion of old physical files into electronic formats, the comprehensive training of user department staff, and the execution of a structured changeover procedure [1]. To ensure continuous operational viability, software maintenance protocols were established. These include corrective maintenance to isolate and rectify faults, preventive maintenance (such as database backups and system mirrors) to preserve data integrity, and adaptive maintenance to add new capabilities in response to technological advancements [1].

4. Conclusion

The transition from a manual filing process to a computer-aided information management system is critical for academic institutions experiencing rapid demographic growth. This study confirms that implementing a computerized transcript management system built on a PHP/MySQL architecture provides a highly secure, efficient, and cost-effective alternative to traditional methods. By automating data entry, score computation, and transcript generation, the university can drastically reduce physical file bulkiness, eliminate the misplacement of student records, and optimize the workload of administrative personnel. Ultimately, adopting this technological framework ensures accurate information processing, fortifies data security, and vastly improves the quality of service delivery within the educational sector [1].

Recommendations

Based on the findings of this research, the following recommendations are proposed:

- Academic institutions should mandate the complete computerization of all departments to ensure the seamless flow of information [1].
- Management must ensure that all staff members within user departments receive adequate and continuous training to facilitate the smooth implementation of digital systems [1].
- All departmental systems should be integrated into a central local area network (LAN) protected by stringent security measures and backup protocols [1].
- Stakeholders must be educated on the strategic use of transcript data for institutional planning and policy development [1].

Compliance with ethical standards

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Disclosure of conflict of interest

The author declares no conflict of interest regarding the publication of this manuscript.

Statement of ethical approval

The research was conducted in compliance with the academic and ethical guidelines of the Faculty of Natural Sciences, Kogi State University, Anyigba.

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