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(RESEARCH ARTICLE)

Facilitating automated student information systems: Addressing management challenges in student records administration

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Abstract

The rapid advancement of technology, particularly in automated systems, has significantly transformed how information is processed, stored, and accessed. In the educational sector, many institutions still rely on traditional, manual methods for managing student records, which can be time-consuming, prone to errors, and difficult to scale as enrollment increases. This study employed a developmental research design to create and deploy an automated Student Information System aimed at streamlining the management of student records, with a particular focus on grade slips and account status. The respondents included administrative staff and students from the institution. Findings indicated that the system enhanced efficiency, minimized errors and enabled quicker access to student information.

The study aims to demonstrate how automation can improve the accuracy, efficiency, and accessibility of student information for administrators, teachers, and students. The proposed system consolidates essential student records, enabling faster retrieval and real-time updates, while reducing the workload associated with manual encoding and verification. Through system design, prototyping, and user evaluation, the research assesses the usability and effectiveness of the automated solution compared with current manual processes.

Findings from this study are expected to highlight the advantages of adopting an automated Student Information System, including reduced processing time, minimized clerical errors, and enhanced transparency of academic and financial records. Ultimately, this research underscores the importance of leveraging modern technology in educational institutions to support better data management, informed decision-making, and improved service delivery to students.

Keywords: Automation; Educational Technology; Grade Slip Generation; MIS

1. Introduction

Student information is a critical resource in any academic institution. Schools maintain records such as grades, enrolment status, and payment information to support academic monitoring and administration. Traditionally, Management Information System (MIS) personnel manage these records, handle student requests, and print the required documents. This manual process, however, is time-consuming and labor-intensive, especially when many students request records at once.

Grade slips are among the most frequently requested documents. They help students assess their academic performance, identify areas for improvement, and keep parents informed about their children's progress. With the rise of digital and intelligent educational technologies, access to real-time academic information has become increasingly important in improving learning outcomes and student engagement (Kerimbayev et al., 2025). However, delays in the release of these documents can still inconvenience both students and staff.

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Another key document is the student payment or assessment record. Students need access to their financial records to monitor balances and meet their obligations on time. In modern education systems, digital transformation has enabled better tracking and management of such data, improving transparency and efficiency (Education 4.0 Review, 2023). Without convenient access, tracking financial status remains difficult for students.

To address these issues, this study proposes an Automated Student Information Machine (ASIM). The system integrates hardware and software to automatically generate and print records such as grade and payment slips. The growing adoption of automated and technology-driven systems in education has been accelerated in recent years, particularly after the pandemic, where student information systems became critical for continuous academic operations (Alhumaid et al., 2024).

The system includes security features to protect student data and prevent unauthorized access. Data privacy and security have become major concerns in educational technologies, as institutions manage large amounts of sensitive student information (Imohimi, 2025). Recent studies emphasize the need for secure authentication systems and data protection mechanisms in educational platforms to prevent breaches and unauthorized access.

The ASIM offers a user-friendly interface for both students and staff. Once MIS personnel update and verify student records, the system integrates the data, enabling automated processing of requests. Emerging intelligent systems and AI-driven technologies have shown significant potential in improving efficiency, reducing administrative workload, and enhancing user experience in educational environments (Salazar & González, 2026).

This study focuses on developing the Automated Student Information Machine for Golden Success College. The system aims to lessen the workload of MIS personnel by automating the generation of grade slips, assessment slips, and payment records, thereby improving efficiency, reducing waiting time, and providing faster access to student information.

Objectives of the Study

The main objective of this study is to develop an Automated Student Information Machine that will reduce paperwork and minimize the workload of the Management Information System personnel. The system is designed to improve efficiency in generating and releasing student records while offering a convenient platform for students to access their academic and financial information.

More specifically, the study has the following objectives: First, to design a machine capable of automatically printing student records, such as grade slips and payment slips. Second, to help Management Information System personnel efficiently monitor and manage student records through an integrated system. Finally, to enable students to securely view and track their current and previous records through a user-friendly system interface.

Despite the widespread adoption of digital student information systems, many existing solutions rely heavily on personal devices and stable internet connectivity, which may not be consistently accessible in all educational settings. Additionally, most systems focus on online access rather than providing automated, on-site physical output of records. There remains a gap in integrating both digital retrieval and automated printing in a single, user-friendly platform. This study addresses this gap by developing an Automated Student Information Machine (ASIM), which combines system automation with kiosk-based accessibility to enhance service delivery in resource-constrained environments.

2. Materials and methods

2.1. Research Design

This study used a developmental research design to develop and evaluate the Automated Student Information Machine. Developmental research involves designing, developing, and testing technological systems that address practical problems in real-world settings (Richey & Klein, 2007). The study covered system planning, design, development, testing, and evaluation.

2.2. Participants and Sampling Technique

Participants were Management Information System (MIS) personnel and 132 selected students of Golden Success College. Purposive sampling identified respondents directly involved in managing or using student information records.

MIS personnel were included because they handle student records, and students were selected as the primary users of the machine.

2.3. System Development and Instrumentation

The Automated Student Information Machine is composed of both hardware and software components that work together to automate the retrieval and printing of student records.

The hardware components include a computer unit, display monitor, printer, and input interface. The computer unit functions as the main processor of the system. The monitor presents the user interface and shows system outputs, while the printer produces hard copies of the requested records. The input interface allows users to enter their ID number and Personal Identification Number (PIN).

The software component manages student records, processes user authentication, retrieves the requested information, and sends print commands to the printer. Together, these functions ensure that the system operates efficiently, reliably, and securely.

2.4. System Development Model

The development of the Automated Student Information Machine followed the System Development Life Cycle (SDLC) model. This model provided a clear, step-by-step process for designing, developing, testing, and implementing the system, helping ensure that it met the needs and requirements of the institution.

Several phases were involved in the development process. During the planning phase, we identified the problems in the existing process of accessing student information and defined the objectives of the new system. In the analysis phase, we gathered system requirements from MIS personnel and students to better understand what the system needed to do.

In the design phase, we planned the system architecture, user interface, and database structure to support automated data retrieval and printing. The development phase focused on coding and integrating the different system components. During the testing phase, we checked whether the system was functioning correctly and meeting the specified requirements. Finally, in the implementation phase, we deployed the system so that users could try it and provide feedback for evaluation.

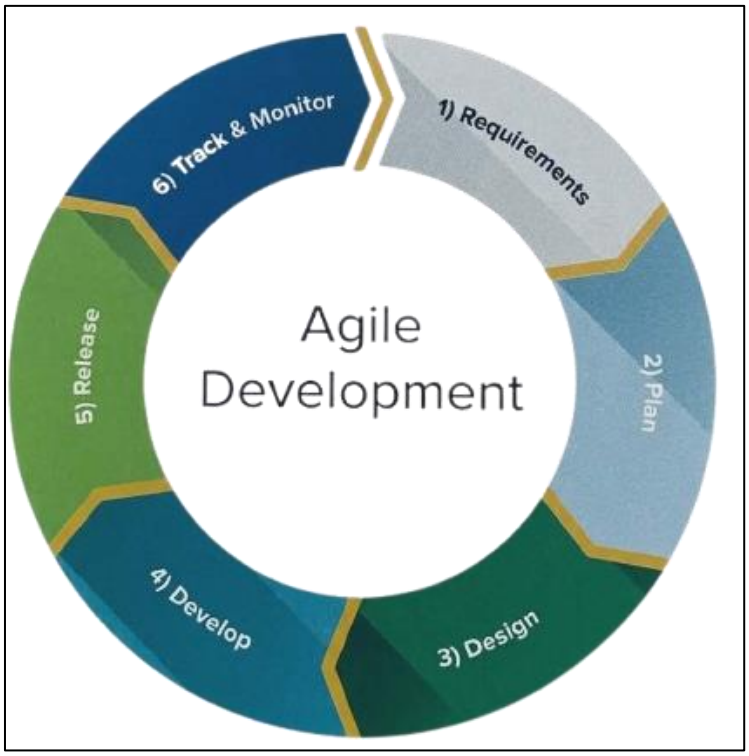

Figure 1 ASDLC (Agile Software Development Life Cycle)

2.5. System Testing

System testing was carried out to assess the functionality, reliability, and performance of the Automated Student Information Machine. Several types of tests were conducted, including functionality testing, usability testing, and security verification.

Functionality testing was done to confirm that all system features worked as intended, particularly user authentication, information retrieval, and printing requests. Usability testing focused on how easily users could navigate the interface and operate the system. Security testing verified that access to student records required valid credentials, specifically an ID number and a Personal Identification Number (PIN).

Through these tests, the researchers were able to identify errors and issues in the system and make the necessary revisions before it was used and evaluated by participants.

2.6. Instrument

A researcher-developed questionnaire was used to evaluate the system's usability and overall effectiveness. The instrument was reviewed and validated by Information Technology experts to ensure that the items were clear, relevant, and aligned with the study's objectives. Content validation confirmed that the questionnaire accurately measured usability, efficiency, and user satisfaction.

Instrument reliability was examined using appropriate statistical methods to check the consistency of responses. A pilot test was administered, and the results were analyzed to ensure that the questionnaire produced stable and reliable data.

2.7. Data Collection Procedure

Data collection was conducted in three main phases. In the first phase, the researchers documented the institution's existing process for releasing student records. This provided a baseline for comparing the current procedure with the proposed automated system. In the second phase, the Automated Student Information Machine was developed and tested in a controlled environment to ensure it was functioning properly. In the third phase, participants used the system and evaluated its functionality by answering the validated questionnaire.

The questionnaire was distributed through the different college departments to ensure that students from various academic areas were represented and to capture diverse perspectives on the system's usability. This included participants from non-technical courses such as the College of Education and Hospitality and Restaurant Management (HRM), allowing comparisons between technical and non-technical users.

All participant responses were collected, organized, and prepared for analysis to generate insights into the effectiveness and usability of the system.

2.8. Data Analysis

The collected data were analyzed using descriptive statistics, specifically frequency distribution, percentage, and mean scores. These statistical tools were used to evaluate the performance of the Automated Student Information Machine and to summarize participants' perceptions of its usability and efficiency.

The questionnaire utilized a 4-point Likert scale ranging from 1 (Unacceptable) to 4 (Excellent). The instrument underwent content validation by IT experts, and reliability testing was conducted using Cronbach's Alpha. The instrument achieved a reliability coefficient of 0.87, indicating high internal consistency.

In addition to frequency and mean, standard deviation was used to measure the variability of responses, providing a more comprehensive analysis of user perceptions.

2.9. Ethical Considerations

Ethical standards were observed throughout the conduct of the study. Participants were informed about the purpose and objectives of the research, and their participation was strictly voluntary. They were assured that their responses would be kept confidential and used only for academic purposes.

In addition, the system itself was designed with data privacy and security in mind. Access to student records required authentication using an ID number and Personal Identification Number (PIN), helping to protect the confidentiality and integrity of student information.

3. Results

Table 1 Acceptance Results of the Automated Student Information Machine

Evaluation Criteria	Excellent (4)	Satisfactory (3)	Needs Improvement (2)	Unacceptable (1)	Mean (M)	Acceptance Level
Ease of Use	88	32	9	3	3.55	90.90%
User Comfort	84	34	11	3	3.51	89.40%
Finding Information	94	28	8	2	3.62	92.40%
Interface Design	82	30	16	4	3.44	84.80%
Functional Capabilities	90	31	9	2	3.58	91.70%
Overall Satisfaction	96	24	10	2	3.62	90.90%

The study involved a total of 132 respondents coming from different academic programs, including Information Technology (BSIT), Hotel and Restaurant Management (BSHRM), and Education (BRED). Having participants from these varied fields allowed the researchers to assess the system's usability among students with different levels of technical knowledge and experience.

Overall, the results show that the Automated Student Information Machine achieved a high acceptance rate of 90%. Most respondents (96 students) rated their overall satisfaction as excellent. However, the feedback also highlighted a few areas where technical improvements can still be made. Among all features, "Finding Information" received the highest rating, with a mean score of 3.62, indicating that the system is effective in delivering accurate and accessible data.

In terms of specific features, Information Retrieval obtained the highest weighted mean of 3.6. This suggests that the system's database design is functioning efficiently. Students noted that using the automated machine made it much faster and easier to access their academic information compared to the traditional manual process.

4. Discussion

The primary objective of this study was to evaluate the technical viability and user acceptance of the Automated Student Information Machine. Results from 132 respondents yielded a Grand Mean of 3.55, interpreted as Highly Acceptable, indicating the system's strong potential as a campus information hub.

Among the evaluated dimensions, Information Retrieval obtained the highest mean (3.62), highlighting the system's effectiveness in improving data accessibility and reducing reliance on manual inquiries. Ease of Use (3.55) further suggests that the interface is intuitive and accessible across students from both technical and non-technical programs.

Interface Design (3.44) and User Comfort (3.51), although still within the Highly Acceptable range, recorded the lowest means. These findings point to the need for improvements in visual design and ergonomic factors to enhance overall user experience. Functional Capabilities (3.58) indicate that the system meets core user requirements, though minor gaps suggest opportunities for future feature expansion.

Overall Satisfaction (3.62) and the 90% acceptance rate demonstrate a high level of user approval. These findings support the system's readiness for implementation and suggest its potential to streamline student services while reducing the workload of administrative personnel.

5. Conclusion

The study concludes that the Automated Student Information Machine is an effective and reliable solution for improving the efficiency and accessibility of student records. The system significantly reduces processing time, minimizes errors, and enhances user satisfaction. While the results indicate high acceptance, further improvements in interface design and user experience are recommended. The implementation of ASIM has strong potential to modernize student services and support data-driven decision-making in educational institutions.

Recommendation

With the foregoing conclusions, the researchers recommend the following:

- Implementing the Automated Student Information Machine (ASIM) to improve the existing system of Golden Success College.
- Adopting security policies and other control measures to ensure the security of records.
- Providing in-depth training to students, MIS personnel, and all concerned people involved in the usage of the ASIM so they are oriented with the proper use of the proposed system.
- Performing a migration of existing records to the proposed system.
- Coordinating the implementation and maintenance of the proposed ASIM with the System Administrator.
- Conducting regular assessments of the proposed system.
- Adopting hardware and software specifications based on the system recommendation for better performance.
- User Interface (UI) and Aesthetic Refinement

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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