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E-Credentials, Online Credential Request for King's College of the Philippine

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***Abstract**- The King's College e-Credentials System is a capstone project designed to digitize the manual academic document request process at King's College of the Philippines. Developed using the Rapid Application Development (RAD) methodology and technologies like PHP and MySQL, the system introduces a web-based platform to address inefficiencies such as long queues. The platform features role-based architecture for Students, Registrar, Accounting, and Super Admin users. Key functionalities enable students to submit requests, pay online via Paymongo, and track statuses in real-time, while administrators manage, verify, and process documents through a centralized dashboard. The system underwent rigorous testing, including Unit and User Acceptance Testing (UAT). Evaluation using a 5-point Likert scale based on the Post-Study System Usability Questionnaire (PSSUQ) yielded an overall weighted mean of 4.52, interpreted as "Strongly Agree." This confirms high user satisfaction across functionality, usability, security, and reliability. In conclusion, the E-Credentials System successfully modernizes record management by reducing administrative burdens, enhancing security, and providing a more accessible and efficient service for students, establishing a sustainable digital foundation for the institution.*

***Keywords**- e-credentials; credential request system; registrar services; web-based information system; rapid application development*

INTRODUCTION

Academic credentials, including transcripts of records, certificates, and diplomas, function as authoritative documentation of a learner's academic journey and accomplishments. These credentials serve as prerequisites for employment, professional licensure, postgraduate education, and international academic mobility (EdTechMate, 2023; World Economic Forum, 2021). Within higher education institutions, the registrar's office is the primary unit responsible for managing these records, safeguarding their integrity, and ensuring their timely release. Consequently, the quality of registrar services has a direct impact on student satisfaction, institutional credibility, and regulatory compliance (Grepon et al., 2021)

Despite advances in educational technology and information systems, many higher education institutions continue to rely on manual, paper-based credential request processes. Such systems are often deeply embedded in institutional routines and are perceived as familiar and low-cost, yet empirical studies consistently show that they are inefficient and error-prone (Scanoptics, 2022; Aliazas et al., 2024). Long queues, extended processing times, misfiled documents, and lack of real-time request tracking are common issues reported in institutions that maintain manual credential workflows.

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The consequences of these inefficiencies extend beyond administrative inconvenience. Students frequently experience delays that affect employment applications, scholarship processing, licensure examinations, and enrollment in further studies. Those who live far from campus or reside in different regions incur additional financial and logistical burdens due to repeated physical visits required for request submission, payment, and document claiming (OECD, 2023). From an institutional standpoint, manual systems limit scalability, increase dependency on physical storage, and restrict the institution's capacity for audit, reporting, and data-driven decision-making.

Security concerns further complicate manual credential processing. Paper-based records are inherently vulnerable to unauthorized access, forgery, tampering, and physical damage due to fire, water exposure, or mishandling (Colavizza et al., 2021). The absence of centralized digital repositories weakens institutional control mechanisms and undermines compliance with data privacy regulations. As academic records are highly sensitive personal data, inadequate protection poses legal, ethical, and reputational risks for institutions.

In response to these challenges, digital transformation has become a strategic priority for higher education institutions worldwide. Web-based administrative systems have been shown to enhance service efficiency, improve transparency, and strengthen data security by centralizing records and automating workflows (Revolution Data Systems, 2021; Cabrejas et al., 2024). Online credential management platforms enable remote access, reduce physical interactions, and support real-time tracking, thereby improving the overall student experience.

However, despite the documented benefits of digital credential systems, adoption remains uneven in the Philippine higher education sector. Many private institutions continue to depend on legacy processes due to limited financial resources, lack of technical expertise, or resistance to organizational change (World Bank, 2022)

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At King's College of the Philippines, the academic credential request process has traditionally followed a fully manual workflow. Students are required to complete paper-based request forms, process payments through separate accounting transactions, and return to the registrar's office to submit receipts and claim stubs before requests can be processed. This process involves multiple physical handoffs and relies heavily on paper documentation, increasing the likelihood of delays, errors, and lost records.

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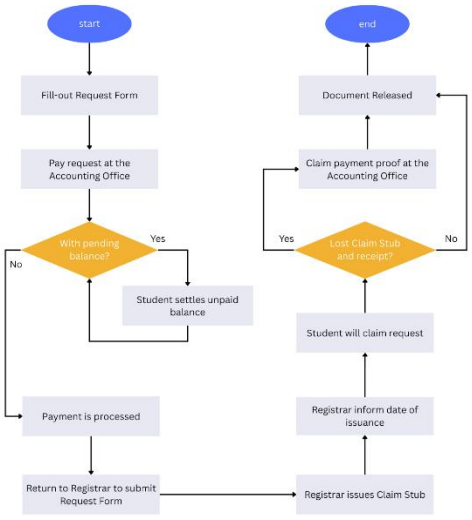

***Figure 1**: Flowchart of the Current Process Utilized by the Registrar's Office*

Figure 1, which is based on an interview with the Head Registrar, illustrates the existing process. It begins when a student personally visits the Registrar's Office to fill out a paper-based request form. After completing the form, the student proceeds to the Accounting Office to settle the required fees. Once payment is made, the student returns to the Registrar's Office to present the accomplished request form and the official receipt. The Registrar's staff then validates the documents, detaches a portion from the lower section of the request form, and issues this portion to the student as a claim stub. This stub serves as proof of the request and

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must be presented when the student returns to claim the requested credentials on the release date provided by the staff.

The standard processing period for regular requests is three (3) business days from the date of filing. For urgent requests, students may opt to pay a rush fee of three hundred pesos (₱300) for diplomas and transcripts of records (TOR), and one hundred twenty-five pesos (₱125) for all types of certificates. When availing of the rush service, documents may be released within the same day or within two (2) days, depending on the availability of the authorized signatory and the time of submission.

In cases where the claim stub is lost, the student must present the official receipt to claim the requested documents. However, if both the claim stub and the receipt are misplaced, the student is required to return to the Accounting Office to request a certification or note that payment has indeed been made, which further delays the claiming process.

Several recurring issues arise from this traditional, paper-based system. Claim stubs and receipts are sometimes misplaced, causing unnecessary delays in the release of requested documents. Long queues are inevitable, especially during peak periods such as enrollment and graduation season, creating further inconvenience for students and staff alike. Students who live far from campus or cannot appear in person also face significant challenges, since the entire process requires physical presence. In many cases, students are even compelled to stay near the campus just to wait and repeatedly check on the status of their requests, as there is no mechanism to provide updates remotely. The absence of a digital or online request system prevents applicants from monitoring their request status, resulting in inefficiency, lack of transparency, and dissatisfaction.

METHODOLOGY

2.1 Research Design

This study employed a developmental research design, which emphasizes the systematic creation, refinement, and evaluation of technological interventions designed to address real-world problems (Richey & Klein, 2014). Developmental research is particularly appropriate for information systems studies where the primary objective is not theory testing but the production of a functional artifact whose effectiveness must be assessed within its intended environment.

In this study, the developmental approach enabled the researchers to iteratively design and refine the E-Credentials system while ensuring alignment with institutional workflows, user requirements, and operational constraints at King's College of the Philippines

2.2 Software Development Methodology

The E-Credentials system was developed using the Rapid Application Development (RAD) methodology. RAD emphasizes iterative development, rapid prototyping, and continuous user involvement, allowing developers to respond quickly to changing requirements and stakeholder feedback (Pressman & Maxim, 2020). This methodology is particularly suitable for administrative systems where usability, workflow alignment, and timely deployment are critical.

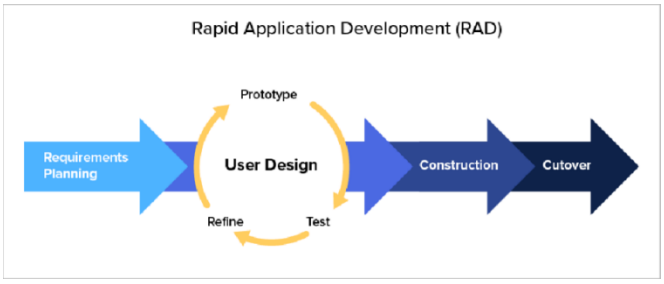

***Figure 2**: Rapid Application Development (Anon, 2025)*

Figure 2 will illustrate the Rapid Application Development (RAD) model to be applied in the project, which will consist of four phases: Planning, Design, Development, and Implementation. The process will

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begin with identifying user needs, followed by designing prototypes and collecting feedback. The system will then be developed and improved based on user feedback. Once development is completed, the system will undergo testing, deployment, and user training.

This is an iterative approach that will facilitate faster development and will ensure that the final system meets user expectations.

2.3 Data Gathering Techniques

Multiple qualitative data gathering techniques were employed to ensure a comprehensive understanding of the existing credential request process and user expectations. Structured interviews were conducted with registrar staff, accounting personnel, and students to identify operational challenges, inefficiencies, and desired system features (Creswell & Creswell, 2018). Document analysis of existing request forms, receipts, and registrar records was performed to identify redundancies and process gaps. In addition, direct observation of the manual workflow provided insights into bottlenecks, delays, and points of failure within the process

2.4 System Development Tools

The system was developed using standard web technologies. The frontend was implemented using HTML, CSS, JavaScript, and Bootstrap to ensure responsiveness and usability. PHP was used for server-side processing, while MySQL served as the relational database management system. The system was deployed using an Apache web server environment. Security mechanisms included OTP-based authentication and role-based access control to protect sensitive academic records.

SYSTEM DESIGN

3.1 Data Flow Design

The flow of information within the E-Credentials system is represented through a Data Flow Diagram (DFD). The DFD illustrates how data moves between students, administrative users, system processes, and data stores throughout the credential request lifecycle.

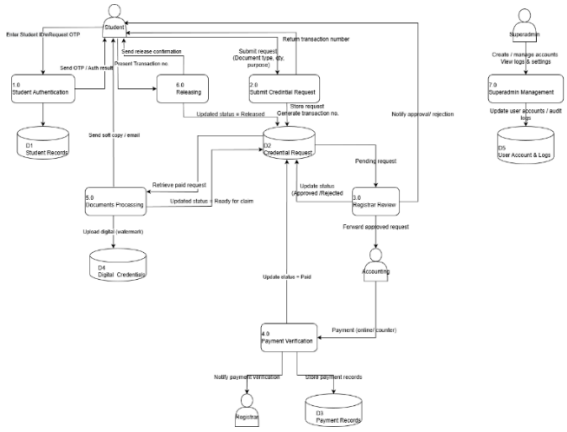

***Figure 3**. Data Flow Diagram (DFD)*

Figure 3 presents the Data Flow Diagram (DFD) for the E-Credentials System, illustrating how data moves between processes, external entities, and data stores throughout the credential request cycle. The diagram begins with the Student, who initiates the transaction by entering their Student ID and requesting an OTP for authentication. This information flows into Process 1.0 (Student Authentication), which verifies identity and retrieves necessary data from the Student Records data store (D1).

Once authenticated, the student proceeds to Process 2.0 (Submit Credential Request), where they provide details such as document type, purpose, and required attachments. The system stores this submission in the Credential Request data store (D2) and generates a unique transaction number, which is returned to the student for tracking. The request then moves to Process 3.0 (Registrar Review), where the Registrar evaluates the submission. Depending on the evaluation, the request status is updated to Approved or Rejected, and this decision is sent back to the Credential Request data store. Approved requests are forwarded to the Accounting Office for payment processing.

In Process 4.0 (Payment Verification), the student can pay online or over the counter, and payment details are validated before being stored in the Payment

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Records data store (D3). Once payment is confirmed, the system updates the request status to Paid and notifies the appropriate personnel. Paid requests are then sent to Process 5.0 (Documents Processing), where designated staff retrieve the paid request, prepare the required documents, and upload the digital copy with watermark into the Digital Credentials data store (D4). The system simultaneously updates the request status to Ready for Claim or Released, depending on the workflow. The final step, Process 6.0 (Releasing), sends the release confirmation to the student, either through system notification or via soft copy/email, while recording the final status in the Credential Request data store.

On the administrative side, the Superadmin interacts with Process 7.0 (Superadmin Management), which includes creating and managing accounts, adjusting system settings, and reviewing logs. These configuration updates are stored in the User Accounts & Logs data store (D5). Through this structure, the DFD demonstrates a highly organized flow of information, showing how students input, administrative actions, and system processes interact to complete credential requests efficiently. The diagram highlights clear roles, secure data exchanges, and well-defined process boundaries, ensuring accuracy, transparency, and smooth operation across all stages of the credentialing workflow.

3.2 Database Design

The system's database structure was designed using an Entity-Relationship Diagram (ERD). The ERD defines the relationships among core entities, including students, credential requests, payments, and administrative users.

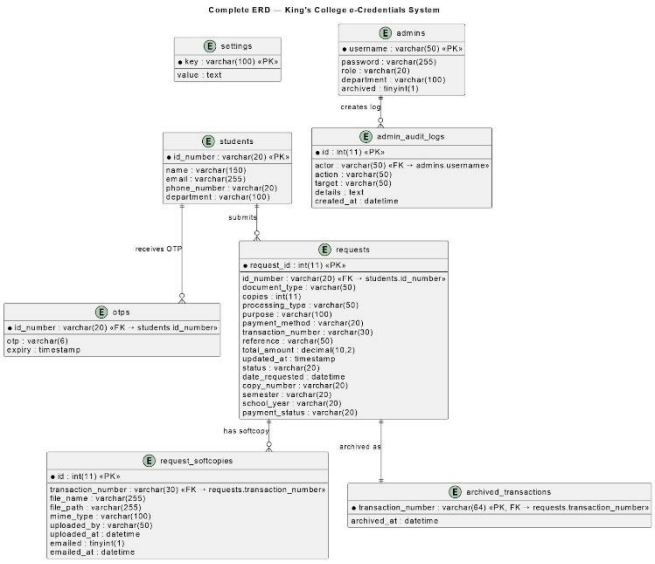

***Figure 4**: Entity-Relationship Diagram*

Figure 4 shows the Entity–Relationship Diagram (ERD) of the King's College of the Philippines E-Credentials: Online Academic Document Request System. The ERD illustrates the major entities involved in the system and defines how data is organized, stored, and related across different components. It serves as the structural foundation of the database, ensuring efficient management of credential requests, user accounts, and administrative processes.

The student entity contains essential student information such as Student ID, full name, email, and year level. Each student can submit multiple credential requests, forming a one-to-many (1:M) relationship between Student and Credential Request. The Credential Request entity records all necessary details about each request, including the request type, purpose, status, and transaction number. Each request is uniquely identified by a Request ID and is linked to both the student submitting the request and the staff responsible for processing it.

The Admin/Registrar entity represents authorized personnel who manage, approve, update, and release academic documents. An admin may process multiple student requests, establishing a 1:M

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relationship with the Credential Request entity. The Accounting Staff entity handles payment verification. Once the student settles the required fees, the accounting staff updates the payment status, forming a 1:M relationship with Credential Request as well.

To support system authentication, the User Account entity stores login credentials for admins, registrar staff, and accounting staff. This separates user roles from their operational records, improving security and maintainability of the system.

The system also includes a Document Type entity, which lists all official academic documents offered by the Registrar's Office (e.g., Transcript of Records, Good Moral Certificate, Diploma, Certificate of Enrollment). Each document type can be requested multiple times by different students, resulting in another 1:M relationship with Credential Request.

Overall, the ERD establishes a clear and organized data structure that supports efficient tracking, processing, and auditing of academic document requests. It ensures that relationships among students, administrators, staff, and system records are properly defined, promoting data accuracy, integrity, and security throughout the entire online credential request workflow.

RESULTS

4.1 System Implementation Results

The E-Credentials system was successfully implemented as a web-based platform that digitizes the academic credential request process at King's College of the Philippines. The system enabled students to submit requests online, complete payments electronically, and track request status in real time. Administrative users accessed a centralized platform for validating payments, processing requests, and releasing credentials.

The implementation eliminated the need for repeated physical visits previously required under the manual process. Students were no longer dependent on paper claim stubs or in-person follow-ups, while administrative staff benefited from centralized records and reduced manual handling of documents.

4.2 Functional Testing Results

Functional testing confirmed that all core system modules performed as intended. Authentication and OTP verification reliably validated user identities requested submission accurately recorded transaction details, and payment validation ensured that only confirmed transactions proceeded to academic processing. The request tracking feature consistently reflected current request status, indicating system reliability.

4.3 User Acceptance Results

User acceptance was evaluated using a 5-point Likert scale adapted from the Post-Study System Usability Questionnaire (PSSUQ). The system achieved an overall weighted mean score of 4.52, interpreted as *Strongly Agree*. This result indicates high user satisfaction across evaluated dimensions, particularly in security and functionality.

DISCUSSION

The results demonstrate that the E-Credentials system effectively addresses the limitations of the manual credential request process. The successful digitization of request submission, payment, and tracking confirms that registrar services can be modernized without compromising data security or operational control.

The high user acceptance score suggests that the system aligns well with user expectations and institutional workflows. The strong evaluation of security reflects user confidence in OTP-based authentication and controlled access mechanisms, which are critical in academic record management (Doctor, 2022).

These findings are consistent with existing literature emphasizing the benefits of digital

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transformation in higher education administration, particularly in improving efficiency, transparency, and user satisfaction (OECD, 2023; Cabrejas et al., 2024).

CONCLUSION

This study presented the design, development, and evaluation of E-Credentials, a web-based academic credential request and management system for higher education institutions. The system successfully digitizes the credential request lifecycle, improving efficiency, accessibility, and data security while reducing administrative workload.

The findings confirm that web-based credential management systems provide a practical and sustainable solution for modernizing registrar services in private higher education institutions. Future work may explore mobile integration, advanced verification mechanisms, and broader institutional deployment.

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