

QUEUEPAY: A Mobile-Based Integrated Queuing and Payment Processing System with Promissory Note Management for Systems Plus College Foundation

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ABSTRACT

Student transactions for services may involve standing in line, processing and verifying payments, or filing promissory note requests. In this context, the project suggests the development of a mobile app, QUEUEPAY, which is meant as an integrated system for payment processing and queuing, as well as the management of promissory notes at Systems Plus College Foundation. The goal of the project is to combine several processes and functions such as digital queuing, payment processing and verification, promissory notes processing, notifications, and transaction history into a single platform. To achieve this, a descriptive-developmental research design is going to be employed in order to reveal the needs of the target users, produce the application, and evaluate it. The development of the app will take place in accordance with the principles of iterative development. The evaluation of the system will occur via application of relevant qualities of ISO/IEC 25010:2023.

Keywords: *Mobile Application, Digital Queueing, Payment Process, Promissory Note Management.*

SECTION I — INTRODUCTION (THE PROBLEM AND ITS SETTING)

1.1 Introduction

Digital technology is now indispensable in student services because it helps facilitate the functionality, availability, and supervision of transactions. In the Philippines, increased usage of digital payments indicates user confidence in electronic financial transactions. Institutions of higher education have tapped into electronic payments and queue management systems to enhance the process of student transactions.

However, the procedures of queuing, payment processing, and requesting a promissory note may still be independent processes. Students have to go to the office, wait in line, and make the required payments or verifications while making a separate request for a promissory note. Disconnection in processes means that users have to keep separate tabs on records and statuses, leading to disorder and unstructured systems.

This research presents QUEUEPAY, a mobile-based integrated queuing and payment processing system that also manages promissory notes at Systems Plus College Foundation. The system works such that students can generate and keep track of digital queue numbers, submit

payment transaction details and proof for verification , submit promissory note requests, and monitor their progress. Authorised professionals have access to manage queues and verify payments.

This study seeks to find out whether it is possible to integrate financial services using the mobile platform and improve their monitoring in the process. The proposed mobile application will be developed in discussion with Software Development and Quality Evaluation experts.

1.2 Background of the Study

Educational institutions are taking advantage of digital technologies to undertake their academic and administrative activities as an increasing proportion of activities are undertaken electronically. The form of payments in the Philippines has also changed and become more popular. According to the Bangko Sentral ng Pilipinas (2025), 57.4% of volume and 59% of the value of monthly retail payments have been made electronically. The influence of digital payments on transactions between universities and students has been studied as well (Bidayan et al., 2024; Espeleta, 2022; Saong et al., 2023; Santos et al., 2024).

The sphere of queue management is another aspect of institutional service enhancement through digital systems. For example, the study conducted by Mallari et al. (2022) resulted in the development of a web-based queue management system, allowing tracking of the queue in real time and giving notifications. Moreover, Maala et al. (2023) have proven that queue management can improve the theory of waiting time and administrative efficiency. Finally, in their research work, Pantonial et al. (2025) studied payment behavior and queue management and cashier efficiency with commonly used functions of the payment system in a private higher education institution.

These studies show that digital queuing and electronic payment systems can support more efficient student transactions. However, the reviewed literature mainly covers queuing and payment functions separately. Promissory-note processing is another related student financial service that may require separate submission, review, status monitoring, and personnel remarks. This creates an integration gap when students and personnel need to monitor several independent processes.

For Systems Plus College Foundation, a centralized mobile-based platform can provide a single workflow for these related services. QUEUEPAY is proposed to integrate digital queuing, payment processing, and promissory-note management together with notifications, transaction history, reports, search and filtering, role-based access, and audit-trail functions. Through this integration, the project seeks to make student financial-service transactions more organized and easier to monitor.

1.3 Objectives of the Study

General Objective: The general objective of the study is to design, develop, and evaluate **QUEUEPAY**, a mobile-based integrated queuing and payment processing system with promissory-note management and controlled application access for **Systems Plus College Foundation**.

Specific Objectives

1. To design and develop a queuing module specifically designed for mobile users provides students with the advantage of getting a digital number for queuing, selecting a financial service, checking the current queue status and position, and estimating the waiting period.

2. To develop a payment processing and verification module that enables students to submit supported payment transaction details and payment proof, allows authorized personnel to verify payments and update transaction statuses, and maintains payment records and transaction history.
3. To develop a promissory-note management module that enables students to submit promissory-note requests and supporting documents, track request status, and receive personnel remarks, while allowing authorized personnel to approve, reject, or request revisions.
4. To integrate queuing, payment processing, promissory note management, notifications, transaction history, search and filtering, reports, role-based access, audit trail, and secure application access into one centralized system.
5. To implement a controlled application access mechanism to make QUEUEPAY accessible to those SPCF students who meet the requirements and to the authorized personnel of PUTECH through a special distribution link and QR code system where users can be tracked and monitored.

1.4 Scope and Limitation of the Study

The paper examines the process of how QUEUEPAY was constructed, developed, implemented, and assessed with regard to its financial services for students at Systems Plus College Foundation. The app will be the main source for students to utilize services. It will include digital queuing, service selection, queue number generation, current position in queue, waiting time, and notifications about the transaction status. The application will allow students to submit supported payment transaction details and payment proof, while authorized personnel can verify submitted payments and update their status. The system will maintain payment transaction records and allow students to view their payment status and transaction history.

The system will also include a module for a promissory note that will allow students to submit requests, complete necessary information, attach required documents, monitor request status, and get comments about the completion of the request. The system will enable the authorized users to check the requests and either approve, deny, or request some modifications to them. The system will also present centralized transaction history, notifications, searching and filtering capabilities, report generation, role-based access, and audit trail capabilities. The app will be provided as a mobile app file or an approved installation package in a Google Drive account maintained by PUTECH. QR codes would point to a secure distribution link. Access is limited strictly to authorized students of SPCF and verified authorized personnel from PUTECH. Users will have to check their identity before getting access to the system, using their valid email address or student ID. A record of access verification information will be maintained in order to allow authorized administrators to track who has been using the secured link or has gone through the verification process.

The research is based on services offered by coordinated QUEUEPAY and users who are authorized by Systems Plus College Foundation. The provided Google Drive address or QR code should only be considered a controlled means of accessing the QUEUEPAY mobile application and is not intended to be QUEUEPAY itself. Access to information depends on permissions, account information, and information regarding the activity provided to the authorized Google Drive owner or the institutional account, while the application may have its own independent access records. The process does not include other academic services provided by the school and unrelated to the financial services workflow. Actual payments depend on the payment options and other policies provided by the institution. The project will not replace institutional approval rules for promissory

notes; it will provide a digital method for submitting, reviewing, recording, and monitoring requests.

1.5 Significance of the Study

Students. The QUEUEPAY application can help SPCF students track their queue status, submit payment details and proof for verification, monitor payment status, submit promissory-note requests, receive notifications, and view transaction history.

Authorized Personnel. The system allows working with queues, reviewing and verifying submitted payment information and proof, sending requests for promissory notes, making notes, and observing the operations of students on one platform. The use of access control together with validated records of users can help identify verified people.

Administrators and PUTECH. QUEUEPAY may be capable of granting access to records on transactions, statistics, search and filtering functions, access according to the roles of users, and audit trail.

IT researchers and developers. The research may provide a source for future implementation of mobile queue management systems and payment transaction services.

1.6 Definition of Terms

Audit Trail - A documented history of major activities of users or the system. In QUEUEPAY, the logs are known to trace the financial transactions and administrative operations done.

QUEUEPAY - A queue electronically controlled. In QUEUEPAY, the students get a queue number and can check on their queue position and status via the application. Mobile-Based System The

information system that can be accessed primarily through mobile devices. In our research, it relates to the QUEUEPAY application used by the students and authorized persons.

Payment Processing and Verification – The process of recording, submitting, verifying, and monitoring supported payment transactions. In QUEUEPAY, it refers to the submission of payment transaction details and proof by students, verification and status updating by authorized personnel, and maintenance of payment records and transaction history.

Promissory Note - A formal request or commitment made by the student on the obligation of payment according to the rules and provisions of the institution. In QUEUEPAY, it relates to the process initiated through our application.

Role-Based Access - A way of limiting access to the functionalities of the system depending on the user's role. In QUEUEPAY, the students and authorized users have respective access rights according to their duties.

Transaction History - The kept documentation of previously done activities. In QUEUEPAY, it stands for documented actions in the queue, payment, and promissory note management.

Access Verification - The stage of validation that verifies whether the person is allowed to access the channel. In QUEUEPAY, it denotes the confirmation of an SPCF email-authorized account or student ID before granting access.

Google Drive Distribution Link - An important cloud-based link that is established for providing the QUEUEPAY application only to allowed users.

QR Code - A code that may be scanned to get a specific outcome. In QUEUEPAY, this code helps to redirect a user to the specified Google Drive link.

Verified Access Record - A document validating that the user's identity has been confirmed. The purpose is to facilitate the identified user's education and to help authorized administrators.

the determined user's education and to help authorized administrators.

SECTION II — LITERATURE REVIEW

2.1 Introduction to the Review

This research aims to review the literature and studies related to this project’s main functions and characteristics. In this regard, the provided sources explore mobile technologies in higher education, integrated information systems, electronic and digital payment methods, queue management systems in education, student cashier and payment processes, and promissory note management. By presenting the material on these topics, the cited studies offer a solid foundation for developing a mobile platform for educational institutions that will address the current issues listed above in a much more efficient way.

2.2 Review of Related Literature and Studies

Mobile-Based Systems in Higher Education

Rangel-de Lazaro and Duarte (2023) did a systematic review of mobile learning applications in online higher education while talking about the evolution of mobile technology into a flexible and user-friendly way to provide higher education. In this review, it was mentioned that mobile applications can help with communication and collaboration within online higher education. Research conducted by Naveed et al. (2023) involved a systematic literature review of mobile learning in higher education and covered 161 sources related to mobile technology used and accepted in education. Thus, the studies point to the rising importance of mobile technologies and provide insight into their utilization.

Integrated Information Systems in Higher Education

According to Tenesaca Guamán et al. (2023), a systematic review was conducted to understand integrated information systems implemented in higher education institutions. The study

reviewed 47 articles and examined the problems of application, safety, and management of integrated information systems. In addition to that Palamarchuk et al. (2024) claimed that integrated information systems form the basis of the management of processes at higher education institutions. Both 2023 and 2024 studies witness the integration of several functions in one system in order to improve the management of services at the institution.

Digital Payment and Payment Processing in Higher Education

The Bangko Sentral ng Pilipinas (2025) reported continued growth in digital retail payments, with digital transactions representing 57.4 percent of monthly retail payment volume and 59.0 percent of value in 2024. This trend demonstrates the increasing use of digital payment methods in the Philippines. Espeleta (2022) examined the utilization of electronic payment systems among private higher education institutions in Albay. Saong et al. (2023) studied satisfaction with and challenges related to bank remittance for student payments in the Philippines, while Bidayan et al. (2024) investigated factors influencing the continued use of e-payment in a higher education institution. Santos et al. (2024) also examined the usability of electronic payments among distance learners. Together, these studies establish the relevance of digital payment methods and payment-related transaction management in higher education.

Queue Management in Educational Institutions

In their study, Mallari et al. (2022) created CLIQUE, which is a web-based queue management system with real-time tracking and notifications for the Angeles University Foundation Office of the University Registrar. Also, Maala et al. (2023) conducted research regarding a queue management system at a university, and found out that queue management had a positive impact on the way the waiting time and working efficiency of employees were improved. The study by Famoso (2022) was dedicated to the use of ticketing systems for serving customers with the help of queue management.

Concepcion et al. (2026) also developed a queueing and appointment system allowing them to provide various services to clients at the university.

Student Payment, Queue Management, and Cashier Efficiency

Pantonial et al. (2025) studied various aspects of student payments, queue handling, and cashier productivity at a private university. The findings of the research are relevant for QUEUEPAY due to the strong connection between student payments, the work of cashiers, and the waiting process involved in payments. The results of this study reinforce the idea of considering payment processes along with queue handling when developing software to assist students in their payments. The relationship is relevant to QUEUEPAY, which seeks to support payment submission and verification while improving the management and monitoring of cashier-related queues.

Promissory Note Management in Student Financial Services

According to Oakland University (2024), students have financial obligations, and by registering, they are making a promissory note, which means they are agreeing to pay tuition and other expenses. There may be situations in which the obligations are delayed in payment. The practice demonstrates how the use of promissory notes can be helpful to formalize the obligations of students. The reference serves to provide a present institutional basis for inclusion of the technique in the system of financial services offered by universities.

Integration of Financial-Service Functions

The literature reviewed shows that all key aspects of QUEUEPAY have been investigated separately in the previous research and practice of institutions, including mobile technology applications in higher education, the efficacy of integrated information systems for bringing together the relevant functions on a unified platform, and the outcomes of research on electronic payments and

student financial services supporting digital payment processing. Additionally, research on queue management indicates the importance of systematic online queuing. Finally, studies on institutional financial policies were found concerning the use of promissory note agreements in dealing with student payment issues. Nonetheless, the analysed literature did not present any mobile platform specifically developed for Systems Plus College Foundation providing integrated solutions concerning digital queuing, payment transaction management and verification, and promissory-note management. Thus, the gap in integration serves as the foundation for QUEUEPAY.

2.3 Conceptual Framework

The study uses an Input-Process-Output (IPO) framework to show how the identified needs and system requirements are transformed into the proposed mobile application. The input includes student and personnel requirements, queue information, payment transaction details, promissory-note request information, institutional procedures, access-control requirements, QR-code and restricted Google Drive distribution requirements, and the applicable ISO/IEC 25010:2023 software quality characteristics.

INPUT	PROCESS	OUTPUT
• User and system requirements • Queue and service information • Payment transaction data • Promissory-note request data	• Requirements analysis • UI/UX and database design • Mobile application development • Verification and access-control setup	QUEUEPAY mobile application with integrated digital queuing, payment processing and verification, promissory-note management, notifications, transaction history, reports,

• SPCF user verification requirements • Restricted Google Drive and QR-code access requirements • ISO/IEC 25010:2023 criteria	• Restricted distribution and QR-code setup • Module integration • Testing, evaluation, and refinement	role-based access, audit trail, verified SPCF-only access, and controlled mobile-app distribution
EVALUATION		
• ISO/IEC 25010:2023-Based System Evaluation • Evaluation of the Developed QUEUEPAY Mobile Application • Likert-Type Evaluation Questionnaire • Qualified Respondents/Evaluators • Evaluation Results and Feedback • Final System Refinement		

In the framework, the process begins by analyzing the needs of students and authorized personnel. These requirements guide the design of the application's interface, database, major modules, verification process, and controlled distribution method. The modules are then developed and integrated; the application package is prepared for restricted Google Drive distribution through a QR code, and access verification is configured for approved SPCF students and authorized PUTECH members. Following development and integration, the system undergoes a formal evaluation phase based on ISO/IEC 25010:2023 criteria using a Likert-type evaluation questionnaire administered to qualified respondents and evaluators, yielding evaluation results and

feedback for final system refinement. The expected output is QUEUEPAY, a centralized mobile-based system with controlled access and integrated student financial-service functions.

2.4 Synthesis

The reviewed sources show that digital payment use is increasing and that payment processing and verification are already relevant in higher education. They also show that queue management systems can provide real-time tracking, notifications, and improvements in waiting and administrative processes. Research connecting student payment behavior, queue management, and cashier efficiency further demonstrates the relationship between these services.

At the same time, the reviewed studies reveal a gap. Most focus on queuing or electronic payment as separate concerns, while promissory-note management is not integrated with both functions in the cited works. QUEUEPAY addresses this gap by proposing a mobile-based platform for Systems Plus College Foundation that combines digital queuing, payment processing, promissory-note management, notifications, transaction monitoring, reports, role-based access, audit-trail functions, and controlled mobile-application distribution. The restricted Google Drive link and QR code are treated as the method for controlled application access rather than as a replacement for the mobile application itself.

SECTION III — METHODOLOGY

3.1 Research Design

This study will utilize a descriptive-developmental research design. The descriptive component will be used to identify existing concerns, user needs, and functional requirements related to digital queuing, payment processing and verification, and promissory-note management.

Information gathered from the target users and authorized personnel will serve as a basis for defining the system requirements and designing the major functions of QUEUEPAY.

The developmental component will focus on the design, development, integration, testing, and refinement of the QUEUEPAY mobile application. After the development, the system will be evaluated using the applicable quality characteristics of ISO/IEC 25010:2023 based on the approved evaluation plan.

3.2 System Development Methodology

QUEUEPAY will be developed using an iterative system development process that is appropriate for developing a mobile application. The process includes planning, requirement analysis, system/interface design, development and integration, and testing and refinement. Each phase is dependent on the outcome of the previous stage, while issues discovered at the testing phase might lead to revisions before proceeding to the next phase of the process.

- **Planning** - The researchers will verify the work scope, intended users, major modules, expected outputs, and development schedule.
- **Requirement analysis** - The researchers will specify the functions required for implementing digital queueing, payment processing and verification, managing promissory notes, notifications, transaction history, reports, access control, audit trails, user verification, restricted Google Drive distribution, QR-code access, and verified-access recording.
- **System and Interface Design** - The researchers will prepare the logical workflow, database design, screen layouts, navigation, user-workflow interactions, verification screens, and controlled-application access flow for the mobile application.

- **Development and Integration** - The mobile application, database, necessary financial service modules, verification mechanism, access-record functions, and controlled distribution process will be designed and integrated into one system workflow.
- **Testing and Refinement** - The functions and the workflows will be subjected to testing. The detected errors and usability issues will be refined before the evaluation.
- **Evaluation** - The designed system will be evaluated by the specified evaluators using ISO/IEC 25010:2023 criteria.

3.3 Requirement Specification and Analysis

Requirement specification will specify what the system must do and how various users will use it. The functional requirements will be established by the proposed features and objectives of QUEUEPAY. Students will use the mobile application through a controlled distribution mechanism, confirm their identity through an approved SPCF email account or student ID, choose a financial service, get a queue number, track queue status, provide supported information about or evidence of payment, view history and payment status, send promissory-note requests and relevant information, track request status, and receive notifications. The QR code will provide a convenient way to access the restricted Google Drive distribution link rather than an open download link. The authorized users will be provided with features for managing the queue of payments, verifying and recording payments, reviewing the promissory note, making remarks, updating the status, and monitoring transactions. The administrative features will comprise generating reports, searching and filtering, role-based access to reports, audit trails of report access, user verification, and monitoring of the verified-access reports. The authorized PUTECH members will manage the protected application distribution link and manage the permissions. The non-functional requirements will specify the quality attributes that apply to the system or software, including the functional suitability,

performance efficiency, usability, reliability, security, compatibility, and maintainability, which are subject to the final evaluation plan.

To visually represent the requirements, the preparation of appropriate system models such as a Context Diagram or Level 0 Data Flow Diagram, a Level 1 Data Flow Diagram showing major processes, an Entity-Relationship Diagram for database entities and relationships, and flowcharts or activity diagrams for important user transactions is required. These models will guide the development and provide definitions of data movement, roles, and processes.

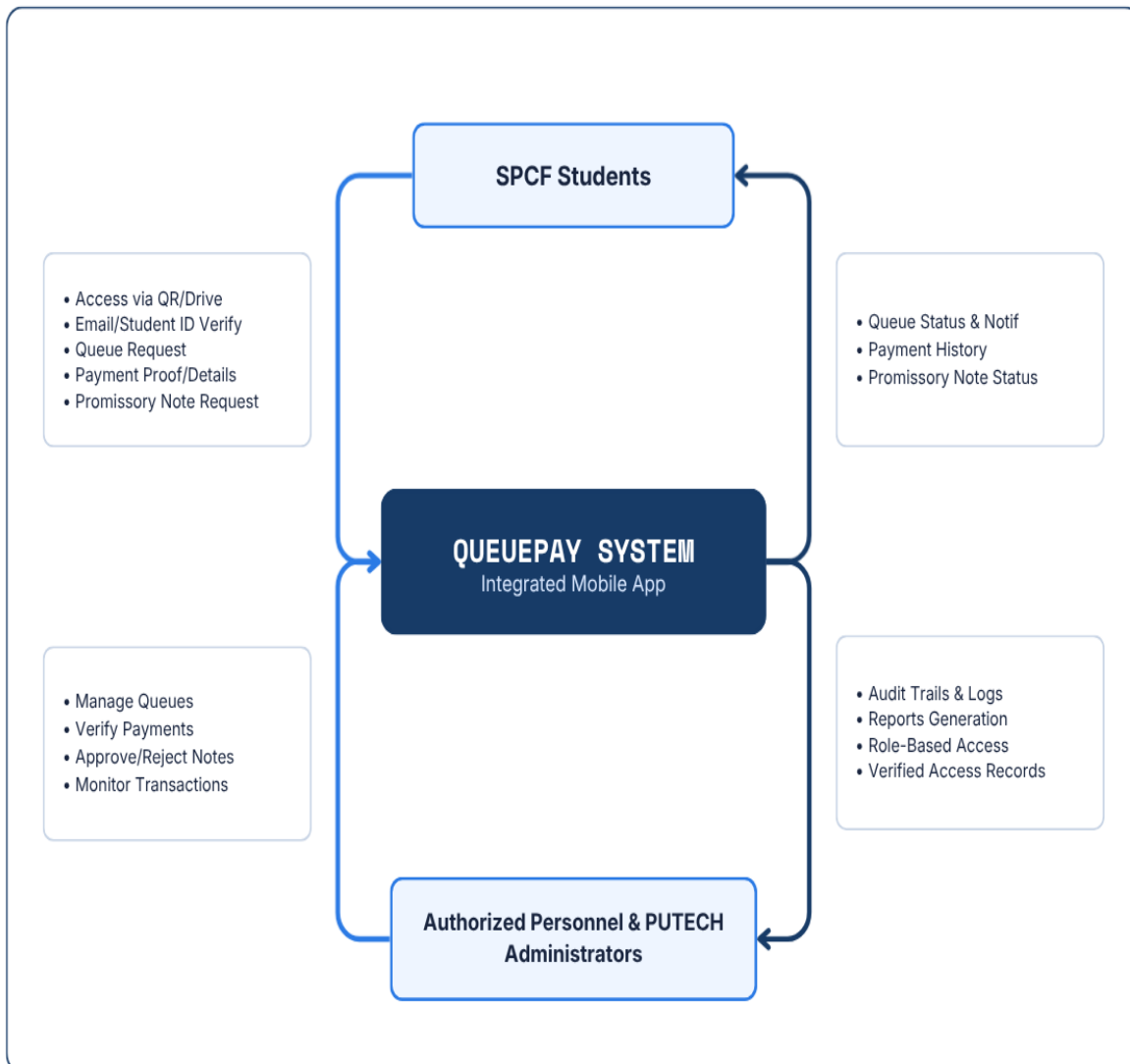


Figure 1. Context Diagram of the QUEUEPAY System

Figure 2. Data Flow Diagram (DFD Level 0)

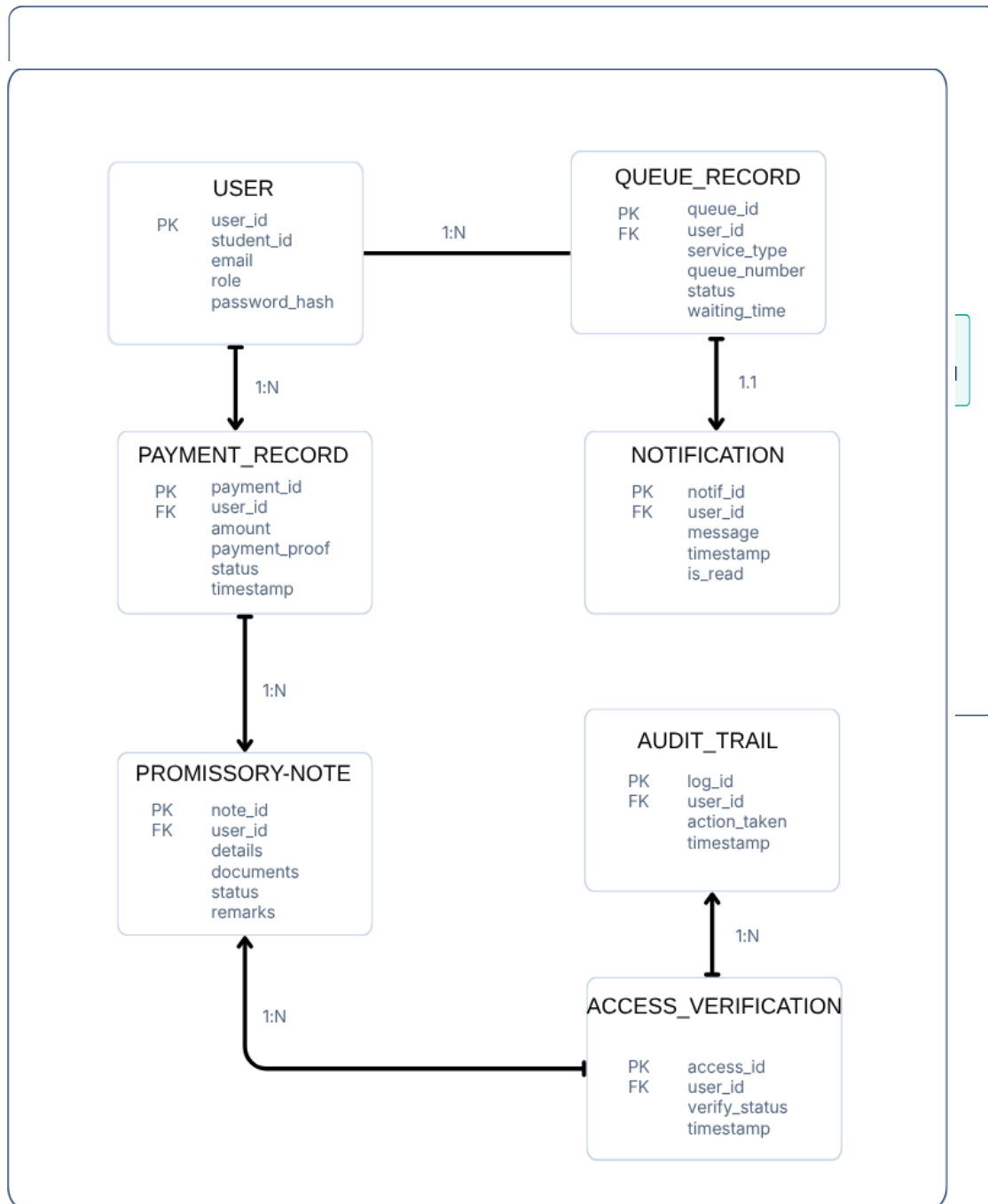


Figure 3. Entity-Relationship Diagram (ERD) of the Database

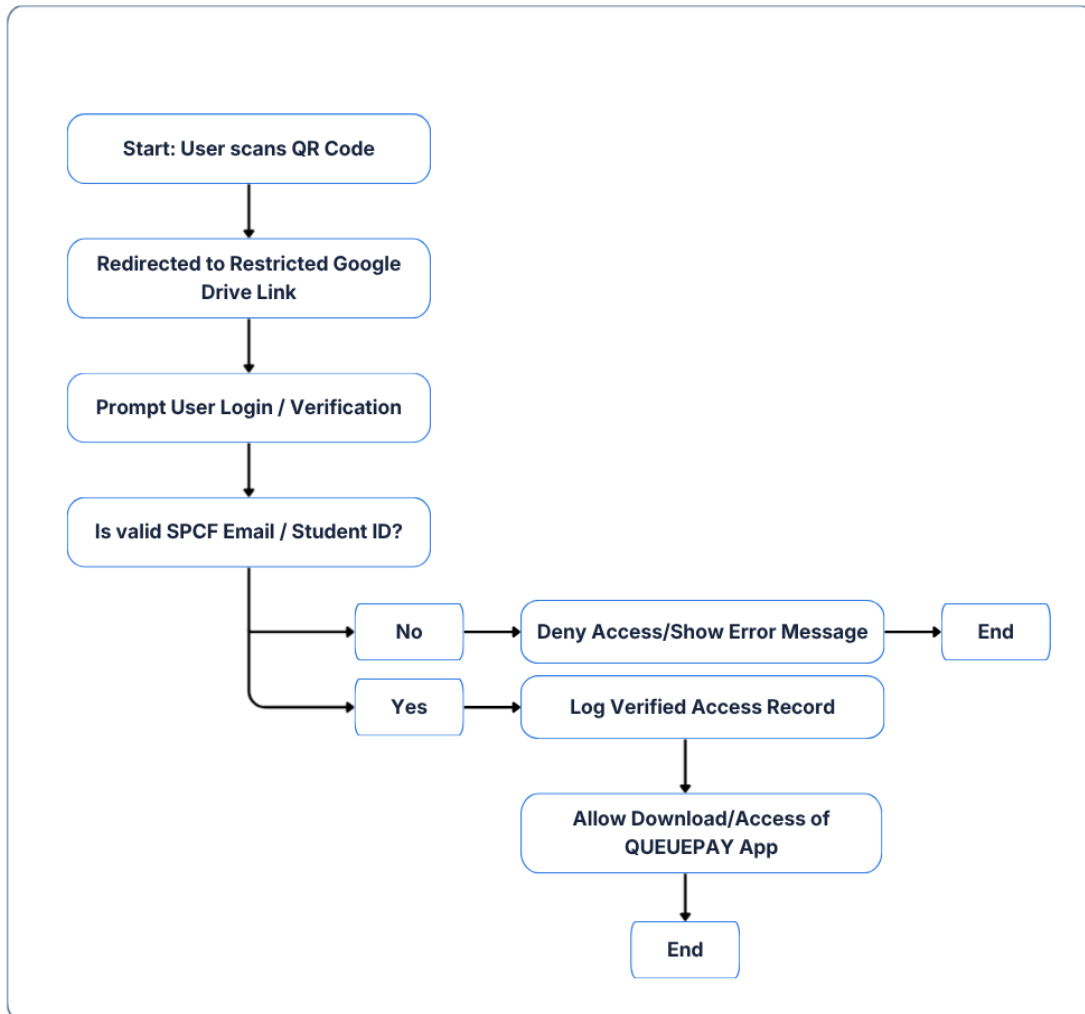


Figure 4. Access Verification and Application Download Flow

Figure 5. Queuing Module Process Flow

Student Opens QUEUEPAY App



Select Financial Service



Generate Digital Queue Number



**System Assigns Queue Position & Estimated Waiting
Time**



Receive Queue-Status Notification & Live Tracking



End

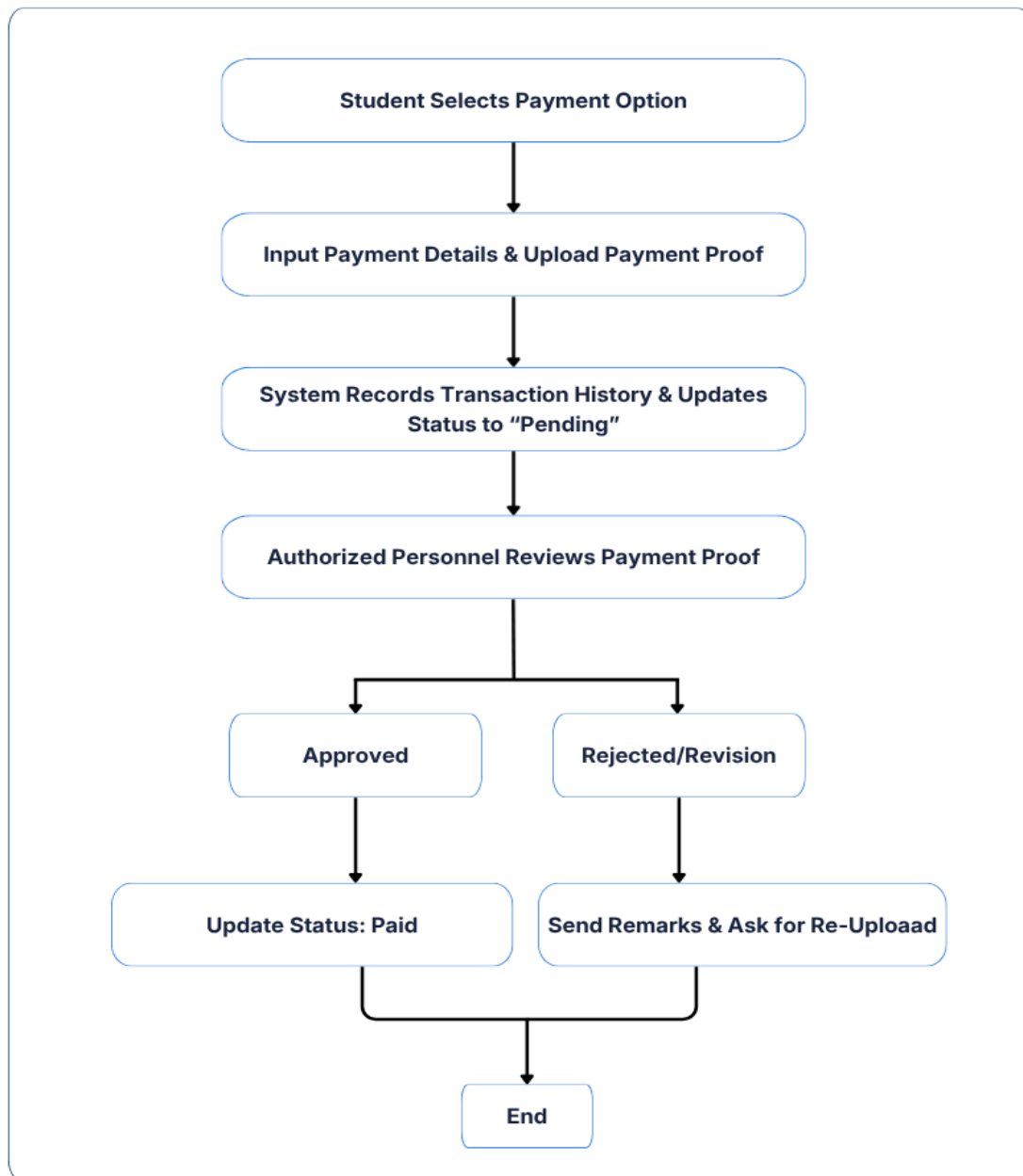
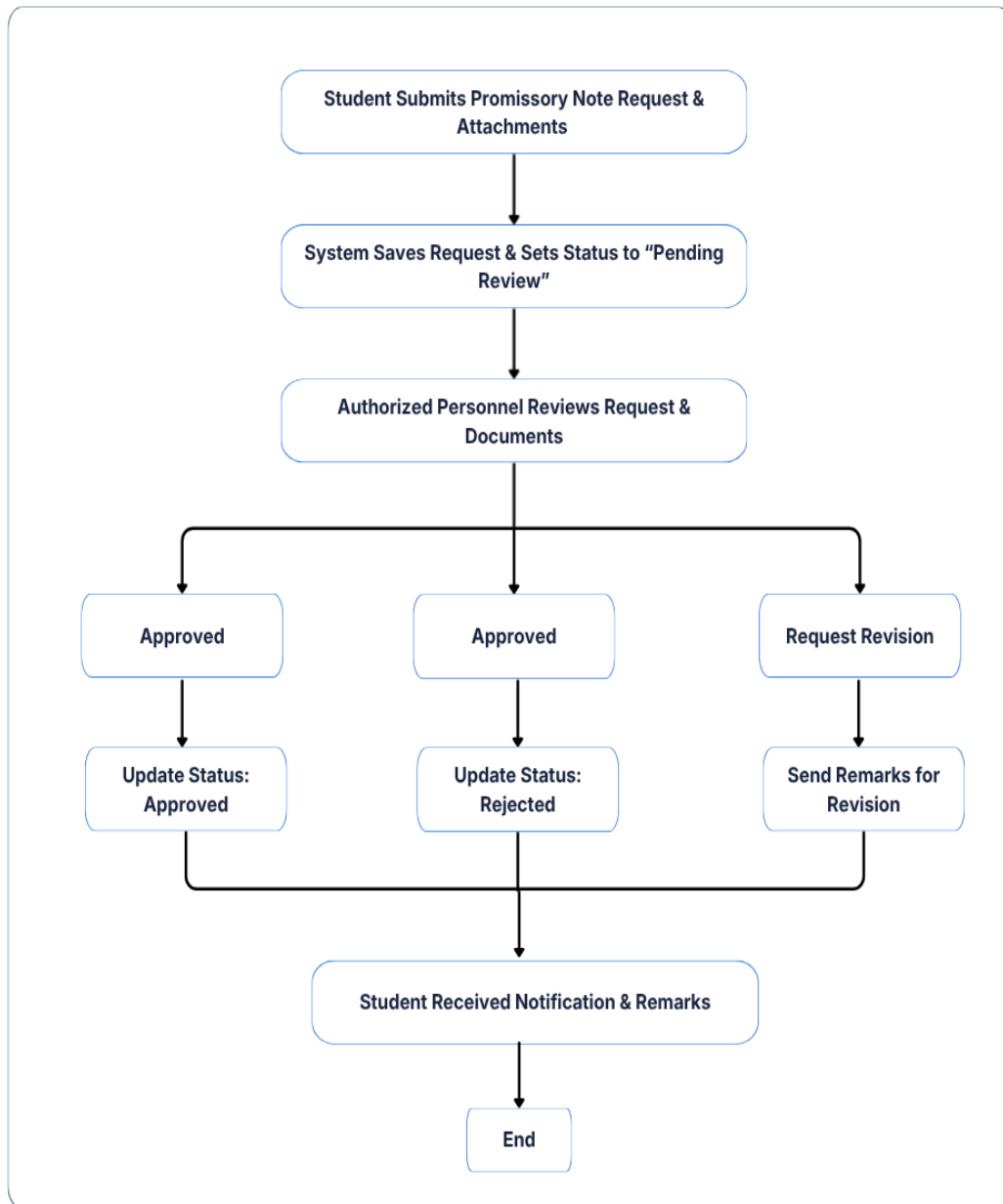


Figure 6. Payment Processing Workflow

Figure 7. Promissory Note Management Workflow



3.4 System Design Specification

The logical design of QUEUEPAY will be developed on a mobile interface that will have views and permissions according to each user role. The student interface includes verification, the

queue dashboard, payment transactions, promissory-note request screens, notifications, and transaction history. Personnel interfaces will have access to controls for the queue, payment verification, request review, remarks, status management, and tool monitoring. The administrative and PUTECH roles will have access to reports, filters, role manager tools, audit trail access, verification management, and reviews of verified records.

The database will keep track of users along with roles and verified SPCF student identities. Records for access events, queue transactions, financial services, and payments will also be stored. The system will also store records for access events, queue transactions, financial services, and payments, along with proof uploads and promissory note requests. Supporting documents, status changes, remarks, notifications, and audit records round it out. The entity relationship diagram connects related processes to avoid error during checks or transactions.

The physical design of the mobile application structure is based on a central database and service. Distribution happens through a restricted Google Drive directory managed by PUTECH and a QR code link. Access stays limited to verified emails or student identification details. Drive activity logs might add to the system's internal records. The final selections for the framework, database system, hosting, and device requirements will be determined once the environment is approved and operational.

3.5 Implementation

Implementation will begin after the approved requirements and system design have been prepared. The researchers will create the structure of the database, develop the mobile user interfaces, implement the queue, payment, promissory-note, notification, reporting, access control, verification, verified-access logging, and audit trail modules, and integrate them into one

application. The approved application package will then be uploaded to a restricted Google Drive location, managed by PUTECH. A QR code will be generated, directing intended users to the protected distribution link, and sharing permissions will be configured such that the application is not openly accessible to the public.

During the integration, the researchers will confirm that only authorized users can proceed through the intended access flow. SPCF students will be mandated to provide either an approved email or student ID verification, however authorized members of PUTECH will have continued management access to the distribution site. They will also check that events for verified access are logged and whether any available Google Drive access data can be subsequently reviewed by authorized owners, where supported. The payment and promissory-note status updates, queue updates and notifications will also be validated to make sure that the connected modules represent the transaction state accurately.

3.6 Testing and Evaluation

Testing will be performed in phases. Functional or unit testing will check functionalities such as queue-number generation, selecting service, payment status update, promissory-note submission, notifications, search, reports, role restrictions, email or student-id verification QR-code redirection, restricted Google-drive access, and verified-access. Integration testing will confirm that the connected modules are actually passing and displaying the information correctly, as well as if the controlled distribution and verification process is functioning. Finally, a user acceptance testing evaluation of the workflows will confirm if they are qualified to execute by intended SPCF users according to the study requirements.

The developed system is going to be evaluated according with the qualified characteristics of the ISO/IEC 25010:2023 product quality model based on the approved goal of the study. A Likert-type scale evaluation questionnaire may be designed for potential respondents or evaluators. The characteristics, respondents, sampling procedures and statistical treatment will be specified according to the evaluation plan approved by the research adviser.

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