Design and Implementation of Certify @ UNAI: A Next.js 14-Based Certification Management Training Platform

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Abstract - *To support its graduation requirement for professional certification, the Faculty of Information Technology at Universitas Advent Indonesia developed Certify @ UNAI, a centralized web-based platform designed to streamline training management. Previously, the process relied on fragmented tools such as Google Forms, spreadsheets, and manual certificate distribution, which led to inefficiencies in registration, attendance tracking, and verification. This study describes the design and implementation of the platform using Next.js 14 for frontend and backend logic, Prisma ORM with MySQL for database operations, and Tailwind CSS for consistent user interface styling. Developed using the Rapid Application Development (RAD) methodology, the system integrates role-based dashboards for administrators, trainers, and students, enabling online registration, secure authentication, session scheduling, attendance logging, and certificate issuance. A qualitative evaluation with early users highlighted three main process improvements: administrators reported reduced workload through centralized dashboards and automated reporting; students gained autonomy by accessing program details, schedules, and payment confirmation without relying on administrators; and trainers benefited from streamlined attendance recording, while also suggesting enhancements such as bulk marking and offline support. By combining technical testing with user feedback, Certify @ UNAI demonstrates measurable gains in efficiency, transparency, and user satisfaction, offering a scalable model for managing internal certification programs in academic environments.*

Keywords: Certification Management, Next.js, Web Platform, RAD

I. INTRODUCTION

The Faculty of Information Technology (FTI) at Universitas Advent Indonesia (UNAI) mandates that every student complete at least one professional certification program as a graduation requirement. This policy ensures graduates not only meet academic standards but also demonstrate validated, industry-relevant competencies. Certification offerings include globally recognized programs such as Alibaba Cloud, Amazon Web Services, Oracle, Adobe Certified Professional, MikroTik Certified Network Associate, and Information Technology Specialist, alongside additional training in Network Security, Database Administration, Web Development, Python Programming, and IT Project Management. Every semester, the Faculty organizes up to seven certification courses, facilitated by more than seven trainers, with

participation ranging from around 50 to 100 students annually. These programs are delivered through structured, in-house sessions led by certified faculty and external trainers.

To accommodate student schedules, most training sessions are held on Sundays, avoiding interference with regular academic activities. Each program spans several weeks, with one or more instructors depending on the topic. Enrolment is limited by participant quotas to maintain instructional quality and ensure manageable class sizes. Despite the clear academic value of this initiative, administrative processes surrounding certification training have remained largely manual, creating various operational inefficiencies.

Registration is managed via manually created Google Forms that are distributed through social media. These forms lack workflow streamlining for opening or closing registration periods and often omit critical information such as program objectives, session schedules, or trainer profiles due to character constraints. Students must upload proof of payment through the same forms, while administrators manually verify transactions. Registration data is later exported and shared with trainers using spreadsheets, resulting in a fragmented and time-consuming workflow. Attendance tracking and exam result documentation are also done manually, further complicating the certification process. After completing training, students are expected to retrieve their certificates from shared storage links. However, many fail to download or lose access due to using personal emails instead of institutional accounts. Although students are advised to register with their official @unai.edu emails (which is recoverable via campus IT services) noncompliance remains common, leading to repeated requests for support or certificate reissuance.

These challenges collectively underscore the urgent need for a centralized and integrated system that supports the full certification lifecycle, starting from program listing and student registration to attendance tracking, assessment result logging, and digital certificate issuance. This paper introduces Certify @ UNAI, a web-based platform built using Next.js 14 and MySQL, designed to modernize the Faculty's certification process. The platform aims to improve operational efficiency, minimize human error, and enhance transparency in managing professional certification training within a higher education environment.

II.   LITERATURE REVIEW

The growing demand for certification in higher education has catalyzed the development of digital platforms designed to manage the end-to-end certification process. Research in this domain highlights several recurring themes: the need for workflow streamlining, secure record-keeping, standardization, and improved student engagement. Several studies emphasize the transformative role of digital platforms in education management. Digital platforms offer integrated tools for managing student assessments, monitoring performance, issuing certificates, and supporting career placement activities. For instance, (Feoktistov et al., 2020) described a professional education management system that includes attendance tracking, personalized educational trajectories, and employment promotion features, facilitating a full-cycle educational management solution. (Zhang & Meng, 2024) developed a certification platform grounded in Outcome-Based Education (OBE), which enables real-time tracking of

student progress, graduate outcomes, and curriculum compliance with industry standards. Similarly, (Shevchuk & Shpak, 2023) proposed a model for quality management in student certification that integrates digital transformation principles to ensure information accuracy and transparency

Web-based platforms have become essential tools for managing training and event registration in higher education. For example, Unfiltered Connect is a user-friendly system designed specifically for academic institutions to centralize all event-related tasks, such as browsing, registering, and managing student interactions with college societies. It simplifies communication and enhances student engagement by enabling real-time updates, access to past event highlights, and direct contact with event organizers. Similarly, *EVENTO* integrates features like internship tracking, event discovery, registration dashboards, and blockchain-based certificate verification, allowing students and institutions to manage training, technical competitions, and academic events on a unified digital platform (Nikhare et al., 2025).

Furthermore, case studies such as the E-Consultation platform for church members demonstrate how faculty-developed systems can effectively replace fragmented manual workflows at Universitas Advent Indonesia, improved efficiency by automating group allocation and attendance tracking for thousands of students, using Laravel and Vue.js to deliver a mobile-first, SPA-based solution (Pakpahan, 2024). Meanwhile, the E-Consultation system enabled church members to schedule appointments and interact with pastors through real-time chat, improving accessibility and communication (Simbolon & Pakpahan, 2024). Both systems illustrate the adaptability and scalability of web-based platforms in different institutional contexts, showing measurable gains in operational effectiveness and user satisfaction. The institutional implementation of such digital platforms also faces challenges. These include user resistance, cybersecurity issues, and inconsistent digital literacy. Studies such as those by (Zhukovskaya, 2022) and (Slatvinskyi, 2025) suggest that for successful integration, universities must invest in both technical infrastructure and user training.

Despite these advancements, there remains a notable research gap in the design and implementation of domain-specific, faculty-driven certification management platforms tailored for internal training programs in higher education, particularly those that must integrate registration, attendance tracking, payment verification, and certificate issuance within a single workflow. Most existing solutions focus on either large-scale institutional credentialing or third-party certifications but overlook the nuanced operational needs of academic units that manage in-house, graduation-mandated certifications. The present study seeks to address this gap through the development of Certify @ UNAI, a custom-built web application designed specifically to streamline and automate the end-to-end certification process within the Faculty of Information Technology at Universitas Advent Indonesia.

III.   MATERIALS AND METHODS

This study adopted the Rapid Application Development (RAD) methodology (Pressman & Maxim, 2015) to guide the design and implementation of Certify @ UNAI, a web-based

certification management platform tailored to the operational needs of Universitas Advent Indonesia.

A. Research Methods

Figure 1 shows the RAD approach emphasized rapid prototyping, iterative feedback, and close collaboration with stakeholders before the implementation.
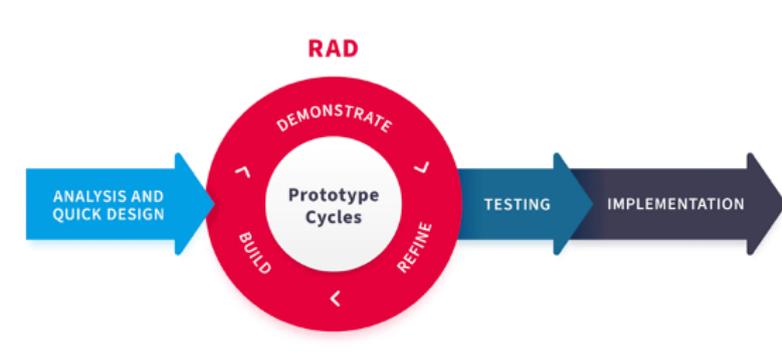

Figure 1. Rapid Application Development Methodology (Pressman & Maxim, 2015)

The development process unfolded in three main stages:

1. Initial Design and Requirement Analysis

The development began with a focused analysis of existing certification procedures, highlighting critical pain points such as manual registration, payment verification, and fragmented attendance tracking. The system was designed to address these inefficiencies through features like centralized registration, secure login, trainer assignment, session scheduling, attendance logging, and automated certificate management.

To support these needs, the application stack was selected with scalability, developer efficiency, and UI responsiveness in mind. *Certify @ UNAI* was developed using MySQL (*MySQL*, 2025) as the database engine, with Prisma ORM (*Prisma*, 2025) handling database interactions. Next.js 14 (*Next.Js by Vercel*, 2025)served both frontend and backend logic (via API Routes), while Tailwind CSS (*Tailwind CSS*, 2025) was used for styling, ensuring a clean and consistent interface across devices. Authentication and role-based access control were implemented using NextAuth.js to provide a secure and seamless login experience for students, trainers, and administrators.

2. Iterative Prototyping with Stakeholder Feedback

Following the initial build, the application was developed through a series of iterative prototype cycles. Each version was tested internally and demonstrated to key stakeholders for usability testing and feature validation. Feedback gathered from these sessions guided improvements in navigation, dashboard layouts, registration workflows, and real-time notifications. This stage was crucial for aligning technical features with the daily needs of end users, ensuring that the platform would be both functional and intuitive.

3. Function-Based Testing and Institutional Deployment

Before full deployment, each feature underwent black-box testing to ensure that inputs, processes, and outputs met functional expectations. Testing was conducted independently for each user role, validating workflows such as program registration, session creation, attendance entry, and certificate issuance. Once testing confirmed the system's stability and completeness, Certify @ UNAI was launched within the Faculty of Information Technology, replacing manual methods such as Google Forms and Excel-based tracking. The platform significantly improved workflow efficiency, transparency, and data consistency across certification programs.

A.   Use Case Design

Figure 2 illustrates the use case diagram of the Certify @ UNAI platform, highlighting how the system interacts with its three primary users: the Administrator, Trainer, and Student. Each actor engages with the system based on their role within the certification process. The Administrator holds the most comprehensive set of responsibilities, including managing users and assigning roles, setting up certification programs, assigning trainers, scheduling sessions, and overseeing the registration and certificate issuance processes. The Administrator also manages payment verification, ensuring that only students who have completed all necessary steps are allowed to join the program. A centralized dashboard helps the Administrator monitor overall system activity and make informed decisions.
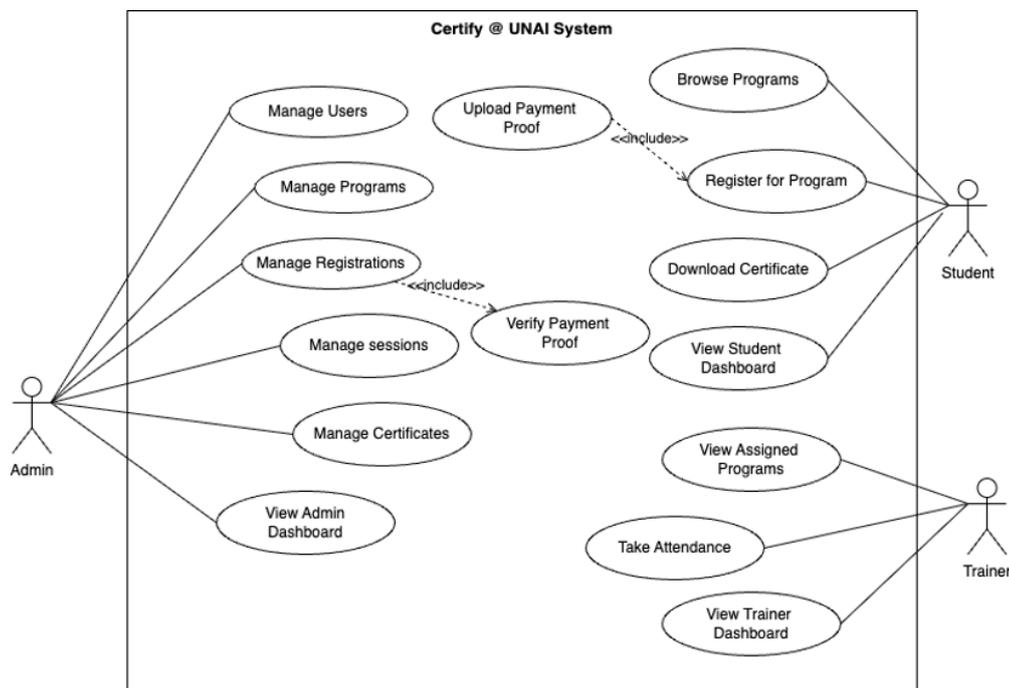

Figure 2. Use Case Diagram of the Proposed Certify @ UNAI System

Students use the platform mainly to register for programs, track their registration status, and download certificates once they complete the training. They can explore available

programs, read detailed descriptions, and submit their registration along with proof of payment. This proof is a required part of the registration process and is marked with an "include" relationship in the diagram to show that it's a mandatory step. After being accepted, students can access training schedules, materials, and other relevant information directly through their dashboard, simplifying the entire certification journey.

Trainers interact with the platform from a session delivery perspective. They can access their assigned programs, view student rosters, review session objectives, and take attendance for each training session. The system gives trainers the tools they need to manage their teaching responsibilities effectively and ensure accurate attendance records for certification purposes. The diagram emphasizes how each actor's interaction supports a smooth and automated workflow, reinforcing Certify @ UNAI's goal of simplifying the end-to-end management of professional certification programs at Universitas Advent Indonesia.

B. Database Design

Figure 3 shows the database structure behind Certify @ UNAI, the web platform created to manage professional certification programs at Universitas Advent Indonesia. At the heart of the system is the users table, which holds personal and academic details for everyone using the platform—students, trainers, and administrators. Each user has a role that determines what they can access or manage in the system. Login, session tracking, and verification are handled through related tables like accounts, sessions, and verification_tokens, making sure the platform stays secure and user-friendly.

Figure 3. Database diagram of the proposed Certify @ UNAI System

The programs table stores information about each certification program, such as its name, schedule, description, and cost. These programs are broken down into training_sessions, which include specific dates, times, and locations for each class or meeting. When students sign up, their registrations go into the program_registrations table, which tracks the status of each application, uploads of payment proofs, and any notes from administrators. Trainers are connected to programs through the program_trainers table, which makes it easy to manage programs with one or more instructors.

To keep track of participation and make sure students meet the requirements for certification, the system also includes an attendance table. This logs whether a student was present for each session and allows for notes or remarks. Once students complete the program, their certificates are recorded in the certificates table, where each one is linked to the corresponding user and program, along with its issue date and download link. Altogether, this database structure helps automate a lot of the manual work, keeps things organized, and ensures that certification processes are smooth, transparent, and scalable as the university continues to grow.

IV. RESULTS AND DISCUSSION

This section highlights the Certify @ UNAI platform from the perspective of its three primary user roles: administrators, trainers, and students. Each interacts with the system in ways that reflect their distinct responsibilities within the certification process. Due to limited space, only selected screenshots and examples are presented, focusing on giving a general sense of how the platform supports these roles and streamlines the overall training and certification experience. The Certify @ UNAI can be accessed through https://certify.unai.edu. Figure 4 shows the homepage which provides an overview of current certification offerings, allowing users to explore program details and begin the registration process without logging in.

A. Administrator View

To access the administrator interface, the user begins by logging in through the dedicated login page using their assigned credentials (Figure 5a). Upon successful authentication, the administrator is directed to a personalized dashboard that displays key system metrics and quick access to major functions (Figure 5b).

Within the administrator view, users can access various tools to oversee platform operations. The user management panel (Figure 6a) enables administrators to create, edit, or deactivate user accounts, while the program management page (Figure 6b) provides functionality for adding new certification programs, updating existing ones, and assigning trainers.

Administrators can manage training sessions by setting the schedule, defining session details, and monitoring attendance status through a dedicated panel (Figure 7a). This feature supports clear tracking of student participation. The certificate management interface (Figure

7b) allows admins to upload and organize digital certificates for students who have completed their programs, making distribution and verification more structured and accessible.
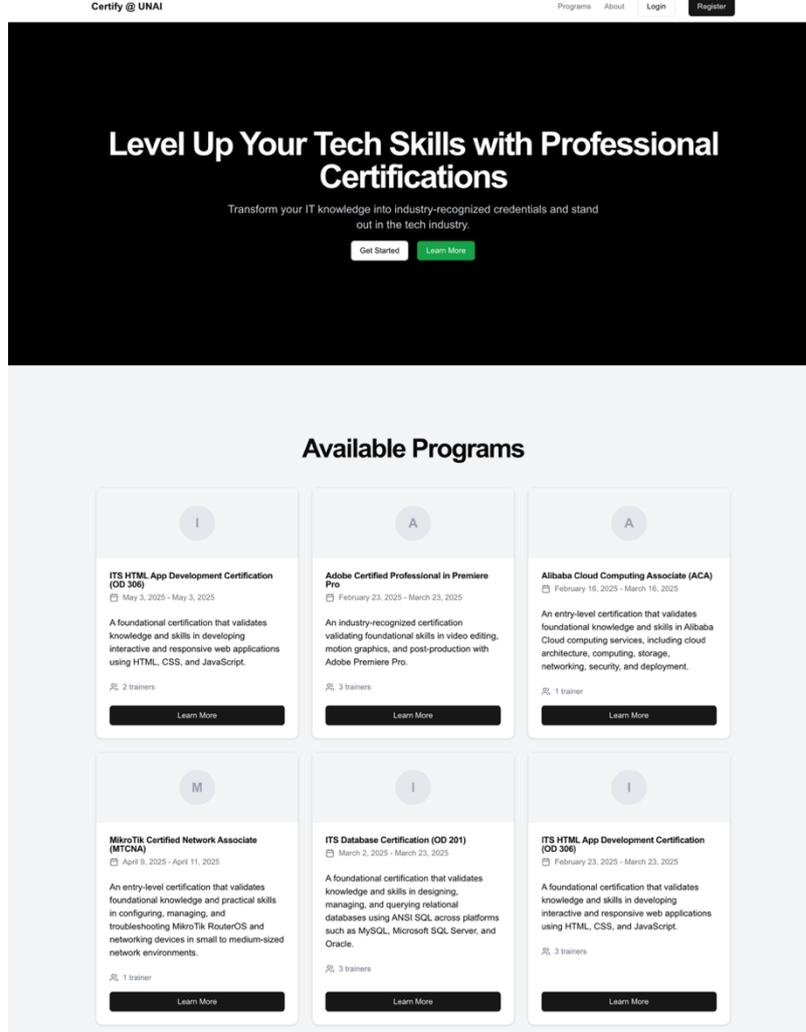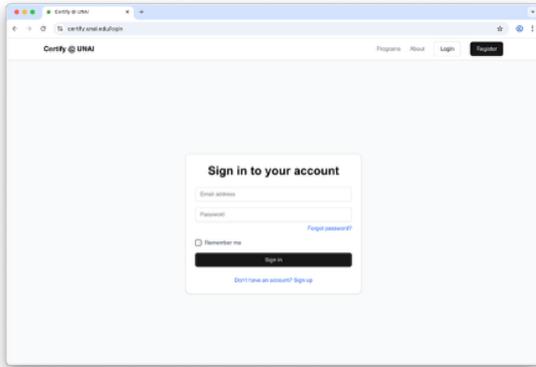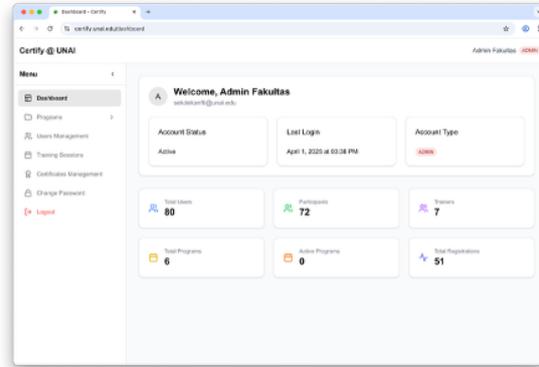

Figure 4. Public homepage of Certify @ UNAI showcasing available certification programs

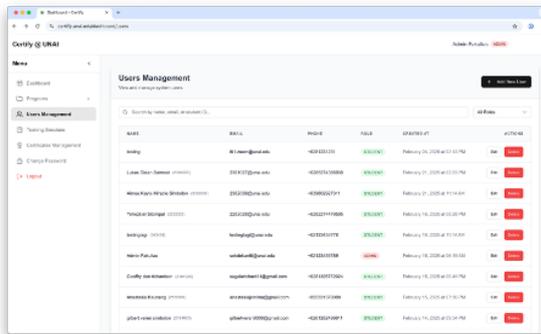(a)   (b)
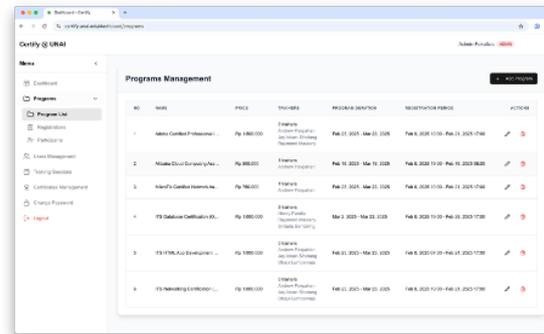
Figure 5. Certify @ UNAI login interface (a) and administrator dashboard view after successful login (b)

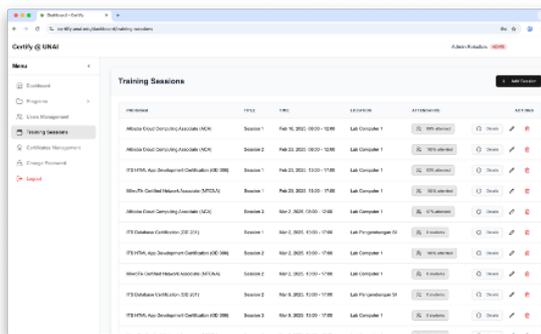(a)   (b)

Figure 6. Administrator tools: user management panel (a) and program management interface (b)
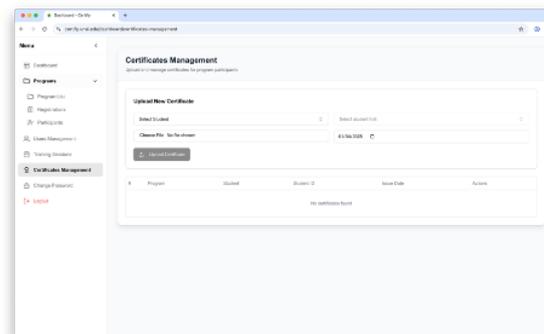
(a)   (b)

Figure 7. Administrator panels: session scheduling and attendance tracking interface (a), and certificate management interface (b)

B.   Student View

After browsing available courses on the public homepage (see Figure 4), students can select a program to view its full details, including learning objectives, duration, trainer profile, registration period, and program fee (Figure 8a). This ensures students have all necessary

information before committing. Once a course is selected, the system guides the student to the registration confirmation interface (Figure 8b), where they verify their details, review payment instructions, upload proof of payment, and submit their registration. This structured process minimizes errors and ensures smooth enrollment for each participant.

(a)　　　　　　　　　　　　　　　　　(b)

Figure 8. Student program detail view (a) and registration confirmation page (b)

C.　Trainer View

Trainers access their assigned programs and sessions through a dedicated dashboard (Figure 9a), which provides a clear overview of session titles, times, and participant statistics. From here, they can open each session to manage attendance (Figure 9b), where student names are listed and attendance status can be set with a simple dropdown. This feature streamlines record-keeping and ensures that attendance data is consistently logged for certification eligibility.

(a)　　　　　　　　　　　　　　　　　(b)

Figure 9. Trainer session dashboard (a) and attendance recording interface (b)

D.　Testing

To ensure the platform's reliability and functionality, black-box testing was applied during the final development phase. This method focused on evaluating the system's outputs based on different user inputs without access to the internal code structure. Each core feature was tested against expected behaviors derived from the use case diagram (Figure 2). Testing scenarios were executed independently by assuming the roles of administrator, trainer, and student, with the goal of confirming that workflows and user interactions function as intended.

Table 1. Black-box Testing Results

Test Case	Test Scenario	Expected Result	Result
Administrator Login	Admin enters valid credentials on the login page	Redirected to admin dashboard displaying key metrics	Passed
Create Certification Program	Admin fills in required fields and submits the "Create Program" form	New program appears in the list with assigned trainers	Passed
User Registration	Student completes registration form and uploads valid payment proof	Registration status marked as "Pending" and viewable on dashboard	Passed
Approve Registration	Admin reviews submitted payment and clicks "Approve"	Registration status updates to "Approved"; student gains access to sessions	Passed
Session Creation	Admin creates a session with title, schedule, and location	Session appears under relevant program for both admin and trainer	Passed
Attendance Input by Trainer	Trainer selects a session and marks attendance for enrolled students	Attendance status saved and shown in reports	Passed
Certificate Upload	Admin selects user and uploads PDF certificate with issue date	Certificate becomes downloadable on student dashboard	Passed
Student Certificate Access	Student views "My Certificates" page after program completion	Completed certificates are listed and available for download	Passed
Trainer Program Access	Trainer logs in and navigates to assigned program	Program details, schedule, and participant list are accessible	Passed
View Program Catalog (Public)	Unauthenticated user accesses homepage	Available programs are listed with option to register	Passed
Payment Proof Validation	Admin opens registration entry and views uploaded payment image	Clear preview shown; admin can approve or reject	Passed

D. *Qualitative Evaluation*

To complement the functional testing, qualitative feedback was gathered from administrators, students, and trainers who participated in the early deployment of Certify @ UNAI. Their insights highlighted concrete process improvements compared to previous manual practices. Table 2 summarizes these improvements by actor, showing the shift from earlier approaches to the streamlined workflows enabled by the certification management system, along with the reported benefits experienced in practice.

Table 2. Process Improvements Identified Through Qualitative Evaluation

Actor	Task / Process	Previous Approach	Improved Approach via Certify @ UNAI	Reported Benefits (Interview Result)
Administrator	Managing registrations and reporting	· Maintained multiple registration forms and spreadsheets for different training programs every year · Difficult to track which students had or had not taken certification training · Created reports manually, including receipts	Centralized dashboard with integrated approvals, participant lists, and automated reporting tools	Easier job: reduced workload, faster access to information, automatic reports and receipts, fewer errors
Student	Accessing registration and schedules	· Had to check WhatsApp groups (often with many messages) to find registration links · Limited details about which programs were open and program information · Needed to ask admin to verify payment	Application shows all available programs with full details, registration status, and real-time payment confirmation	Easier process: clearer information, more program details, no need to confirm payment manually, greater autonomy
Trainer	Recording attendance	· Needed to open multiple Google Sheets to view participant lists · Took attendance manually across different files · Hard to consolidate attendance records	In-system attendance interface with per-session participant list	Faster attendance marking, streamlined access to participant data; suggested enhancement for bulk marking/offline mode

V. CONCLUSION

This study presented Certify @ UNAI, a faculty-driven certification management platform designed to modernize the professional training workflow at Universitas Advent Indonesia. By replacing manual tools such as Google Forms and spreadsheets with an integrated web application built using Next.js 14 and MySQL, the system streamlined critical tasks including registration, payment verification, session scheduling, attendance tracking, and certificate distribution. The use of the RAD methodology enabled iterative prototyping and stakeholder feedback, resulting in a system that is both responsive to user needs and aligned with institutional goals. The outcome is a centralized, role-based platform that improves operational efficiency, reduces administrative errors, and enhances the experience for students, trainers, and administrators.

Despite the achievements demonstrated in this study, Certify @ UNAI remains open to further enhancement. Future development should prioritize the creation of a dedicated mobile application to improve accessibility and enable real-time interaction for administrators, trainers, and students. In addition, a structured evaluation process through surveys from students and trainers will be introduced to assess user satisfaction, operational efficiency, and training outcomes. These improvements are expected to not only strengthen the certification management process but also position Certify @ UNAI as a replicable model for other higher education institutions seeking faculty-led digital solutions for certification programs.

AUTHORS' CONTRIBUTIONS

The author confirms sole responsibility for the conceptualization, methodology, investigation, data analysis, writing of the original draft, revisions, supervision, and final approval of the manuscript. No other individuals contributed to the academic content or development of this work.

REFERENCES

Feoktistov, A. V., Trofimenko, O. N., Ognev, S. P., Lyakhovets, M. V., & Koynov, R. S. (2020). Digital platform as a professional education management tool. *Journal of Physics: Conference Series*, *1691*(1), 012058. https://doi.org/10.1088/1742-6596/1691/1/012058

MySQL. (2025). https://www.mysql.com/

Next.js by Vercel. (2025). https://nextjs.org/

Nikhare, P. P., Nikhare, A. D., Tikhe, P. N., Bokde, A. D., & Bhimgade, S. G. (2025). EVENTO: A Centralized Digital Platform for Intercollege Event Discovery and Management. *INTERANTIONAL JOURNAL OF SCIENTIFIC RESEARCH IN ENGINEERING AND MANAGEMENT*. https://doi.org/10.55041/ijsrem43528

Pakpahan, A. F. (2024). GOSHEN Group Management System: Automating Student Grouping, Activity, and Attendance Management for Universitas Advent Indonesia. *11th International Scholars Conference*, *11*(5), Article 5.

Pressman, R. S., & Maxim, B. (2015). *Software Engineering: A Practitioner's Approach*. McGraw Hill.

Prisma. (2025). Prisma. https://www.prisma.io

Shevchuk, E. V., & Shpak, A. (2023). Digital transformation of the quality management process of intermediate certification of students. *Informatics and Education*. https://doi.org/10.32517/0234-0453-2023-38-3-64-77

Simbolon, Y., & Pakpahan, A. (2024). Design of E-Consultation Service Information System for GMAHK Congregation Members to Web-Based Pastors Using Laravel and Vue.Js. *TeIKa*, *14*(2), Article 2. https://doi.org/10.36342/teika.v14i2.3737

Slatvinskyi, M. (2025). DIGITAL LEARNING PLATFORMS: NEW OPPORTUNITIES IN THE DEVELOPMENT OF HUMAN RESOURCES IN ORGANIZATIONS. *Economic Scope*. https://doi.org/10.30838/ep.196.217-224

Tailwind CSS. (2025). https://tailwindcss.com/

Zhang, H., & Meng, F. (2024). Research on the Design of Higher Vocational Education Professional Certification System. *Journal of Higher Vocational Education*, *1*(3), 161–165. https://doi.org/10.62517/jhve.202416327

Zhukovskaya, I. (2022). Digital Platforms Are an Important Aspect of Digitalization of Higher Education. *Open Education*. https://doi.org/10.21686/1818-4243-2022-4-31-40