

# **RESEARCH PROPOSAL**

**TESDA Trainer Registry System with Automated NTTC Expiration Notification  
for Surigao del Norte**

In partial fulfillment of the subject MIT 105-Research Methods

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**ABSTRACT:** This study presents the design, development, and evaluation of the TESDA Trainer Registry System implemented in Surigao del Norte, aimed at improving the monitoring of National TVET Trainer Certificate (NTTC) expirations. The system addresses the inefficiencies in the manual tracking of certifications by automating expiration alerts sent via email three months prior to expiry. Employing the Software Development Life Cycle (SDLC), the research adopted descriptive-developmental methodology and piloted the system among TESDA administrative staff. Results show increased efficiency, accuracy, and compliance with NTTC renewal procedures. Recommendations include extending the system's coverage to other provinces and integrating SMS notifications.

**Keywords:** TESDA, Trainer Registry System, NTTC, Expiration Notification, SDLC, Surigao del Norte

## 1. INTRODUCTION

In an increasingly digital world, government agencies are under growing pressure to modernize their systems to improve efficiency, transparency, and service delivery. In the Philippine context, the Technical Education and Skills Development Authority (TESDA) plays a crucial role in workforce development, particularly through its processes of registering trainers. However, many TESDA provincial offices, including Surigao del Norte, continue to rely on outdated manual systems that hinder the timely processing, updating, and communication of essential accreditation-related information.

This study is about the development of an TESDA Trainer Registry System with Automated NTTC Expiration Notification for Surigao del Norte designed to streamline the registration process, improve record-keeping, and enhance communication with trainers through automated notifications. The system will provide a centralized database for tracking trainer registration, expiration dates, and renewals while reducing manual workload and human errors. By implementing digital notifications via email, the system will ensure timely alerts for registration updates, training schedules, and compliance requirements. Ultimately, this initiative seeks to enhance the efficiency, transparency, and accessibility of accreditation processes in Surigao del Norte.

Several authors have emphasized the transformative impact of digital and automated systems in institutional settings. Mathe and Thurbilli (2024) discussed how smart digital notice boards significantly enhance organizational communication through real-time updates and remote access. Their findings confirm that integrating digital technologies can improve content management and user engagement in public and educational institutions.

Similarly, Ibrahim et al. (2024) reported that implementing an enhanced notification system in Qatar's Ministry of Public Health significantly improved the reporting rates of infectious diseases during the FIFA World Cup. Their Notification Enhancement Project (NEP) involved training healthcare workers, simplifying reporting tools, and automating communication—a multi-pronged strategy that mirrors the design of this study's proposed system. Both examples validate the effectiveness of digital alerts in strengthening administrative systems and ensuring timely actions by end-users.

Despite advancements in ICT and TESDA's digital transformation agenda, no integrated registry system with built-in digital notifications currently exists for trainer and assessor management at the provincial level. The prevailing manual process results in frequent delays in accreditation processing, difficulty in tracking document expirations, and communication gaps that affect overall performance. There is also limited literature on systems tailored specifically to vocational institutions like TESDA that address both registry management and automated stakeholder engagement.

A review of existing literature reveals a clear gap in the application of notification-enabled registry systems in the public skills development sector. While innovations in alert systems have been adopted in health, manufacturing, and education (Emran et al., 2024; Emmanuel et al., 2024), none focus on TESDA's localized needs for monitoring trainers and assessors. Moreover, registry systems often lack contextual customization for Philippine government agencies, particularly those operating in decentralized environments like TESDA's provincial offices.

This research was prompted by direct experience in TESDA Surigao del Norte, where recurring challenges such as late submissions, overlooked registration expirations, and inefficient communications were observed. The urgency of these issues, combined with the lack of a centralized digital system, underscored the need for a solution. TESDA Trainer Registry System with Automated NTTC Expiration Notification for Surigao del Norte was conceived as a proactive response to these pain points.

The study is being published to contribute to the ongoing conversation on e-governance and digital transformation in the public education and training sector. It also aims to serve as a prototype or reference model for other TESDA regional or provincial offices facing similar challenges.

## **2. STATEMENT OF THE PROBLEM**

Manual monitoring of NTTC expirations results in inefficient workflows and non-compliance among trainers. This study aims to answer the following questions:

1. What are the challenges in manually tracking NTTC expirations?
2. How can an automated notification system improve compliance?
3. What is the effectiveness of the system after pilot implementation?

## **3. OBJECTIVES**

General Objective:

To develop a web-based registry system that streamlines the management of TESDA-certified trainers and automates NTTC expiration notifications.

Specific Objectives:

1. To centralize the database of all registered trainers in Surigao del Norte.
2. To allow the entry, updating, and retrieval of trainer profiles and their respective NTTC details.

3. To automatically send email reminders to trainers three (3) months before their NTTC expires.
4. To enable filtering and exporting of trainer data for administrative reporting.

#### **4. PURPOSE AND DESCRIPTION**

The purpose of this project is to improve how TESDA Surigao del Norte manages the records and communication related to the registration of trainers and assessors. At present, the office relies on manual processes, which often lead to late submissions, overlooked expirations, and delayed notifications. These issues reduce efficiency and can affect the quality of training delivery. The study is timely and relevant as TESDA continues its nationwide digital transformation to enhance service delivery and accountability.

This research introduces a TESDA Trainer Registry System with Digital Notifications that allows TESDA staff to digitally record, monitor, and update trainers data. More importantly, it sends automatic reminders via email when important dates, such as certificate expirations are approaching. This reduces human error, prevents delays, and ensures timely compliance. The system also includes simple reporting tools, so administrators can generate lists or summaries of active trainers and upcoming expirations without doing it manually.

The primary beneficiaries are:

1. TESDA personnel, who will benefit from reduced workload and easier record management.
2. Accredited trainers, who will receive notification reminders for the renewal of their National TVET Trainer Certificate.
3. TESDA management, who will gain better oversight and more accurate data for decision-making.

This project contributes to the growing field of governance digital in public education and training services. While similar systems exist, this is one of the first systems specifically built for managing trainer registration in TESDA. It serves as a prototype model that can be adapted by other TESDA offices or government units facing similar challenges.

#### **5. SCOPE AND LIMITATIONS**

##### **5.1 Scope**

The TESDA Trainer Registry System with Digital Notification is a web-based application designed specifically for use by the TESDA Surigao del Norte Provincial Office. Its primary purpose is to streamline the registration, monitoring, and notification of National TVET Trainer Certificate (NTTC) expirations. The system provides functionalities such as:

4. Registration and management of trainer profiles
5. Recording of multiple qualifications and NTTC details
6. Automatic email notification sent three (3) months prior to NTTC expiration

7. Administrative dashboard for tracking trainer data
8. Filtering and exporting of records for compliance reporting

The system supports multiple admin users and is intended for use by TESDA administrative personnel responsible for managing trainer credentials and institutional compliance.

## **5.2 Limitations**

1. Geographic Limitation: The system was deployed and tested only at the TESDA Surigao del Norte Provincial Office. Broader implementation would require customization and infrastructure support at other provincial offices.
2. Internet Dependency: The system is hosted online and requires a stable internet connection for access. Network issues may affect functionality, especially in remote areas.
3. Email Notification Only: The current version supports email-based notifications only. Integration with SMS or mobile push notifications is not yet implemented.
4. Manual Data Entry: While it automates tracking and reminders, trainer data and qualifications still need to be manually entered by TESDA staff.
5. No Trainer Portal: The system is designed for administrative users. Trainers themselves cannot log in to check or update their profile or receive feedback through the platform.
6. Limited Language Support: The system interface is in English only and may need translation for use in multilingual communities.

## **6. THEORETICAL AND CONCEPTUAL FRAMEWORK**

### **6.1 Theoretical Framework**

This study is anchored on two relevant theories: the Information Systems Success Model by DeLone and McLean (1992; updated in 2003), and the Diffusion of Innovations Theory by Everett Rogers (2003).

The Information Systems Success Model highlights six key dimensions that determine the success of an information system: system quality, information quality, service quality, use, user satisfaction, and net benefits. These dimensions align directly with the goals of the enhanced registry system. By improving the quality and accessibility of accreditation data (information quality), automating reminders (service quality), and ensuring ease of use (system quality), the system aims to promote frequent use, user satisfaction, and positive organizational outcomes. This model justifies the development of a centralized, automated solution as a means to achieve higher effectiveness and efficiency in TESDA's accreditation processes.

Meanwhile, the Diffusion of Innovations Theory explains how new technologies and practices spread within an organization. According to Rogers,

innovations are more likely to be adopted if they demonstrate relative advantage, compatibility, simplicity, trialability, and observable results. This theory supports the study's goal of introducing an innovative digital solution that improves on existing manual processes. The system offers a clear advantage in speed and reliability, is compatible with TESDA's mandate, and can be introduced in phases for ease of adoption.

Together, these theories justify the need for a practical, user-friendly system that not only improves performance but is also likely to be accepted and sustained by its intended users.

## **6.2 Conceptual Framework**

The conceptual framework of this study illustrates how the integration of a digital registry system with automated notification features can improve TESDA Surigao del Norte's accreditation management for trainers and assessors. The key concepts include: Manual Process Limitations, Enhanced Registry System, Digital Notifications, and the resulting Improved Accreditation Management. The manual system currently in place is prone to errors and delays. By developing a web-based system that includes a centralized registry and automated email/SMS alerts, the study aims to promote timely communication, reduce workload, and ensure better compliance. These concepts are interrelated and contribute to achieving higher efficiency, transparency, and data accuracy.

## **6.3 Technical Background**

A registry system is a structured database application used to record, track, and manage information related to individuals or processes within an organization. In the context of TESDA, such a system is essential for managing records of registered trainers, including their qualifications, expiration dates, and status of applications. A key enhancement to traditional registry systems is the integration of automated notification technologies, which use services like SMTP (Simple Mail Transfer Protocol) for email. These technologies help institutions deliver time-sensitive updates directly to end-users, improving compliance and engagement.

The proposed system is built on web-based technologies using Python (Django framework) for backend development and HTML, CSS, and JavaScript for the user interface. The backend connects to a relational database management system (RDBMS) such as MySQL or SQLite, which stores structured data like trainer names, qualifications, certificate validity, and contact information. Task schedulers may be used to automate notification processes, checking expiration dates and sending reminders in advance.

Before developing the proposed system, understanding how database relationships, authentication, form handling, and data filtering work in Django is crucial. Familiarity with data security principles, such as user role management, encryption, and compliance with data privacy regulations (e.g., RA 10173 - Data Privacy Act of 2012), is also essential. These technical foundations ensure that the system is not only functional but also secure, scalable, and user-friendly.

This technical background sets the stage for reviewing existing related systems and identifying gaps that the proposed solution aims to fill.

## **7. RELATED LITERATURE AND SYSTEMS**

### **7.1 Related Literature and Studies**

Notification systems have become integral to real-time communication across various sectors, including manufacturing, education, healthcare, and public administration. In the context of the Technical Education and Skills Development Authority (TESDA), the integration of digital notification mechanisms into an enhanced registry system for trainers and assessors can significantly improve efficiency in monitoring, communication, and accreditation workflows.

In industrial settings, real-time alert systems are widely utilized to reduce production delays by promptly notifying operators of system downtimes [1]. Similarly, in educational institutions, mobile-based notification systems are employed to inform students of lectures and academic activities, positively affecting attendance and academic performance [2].

In the domain of safety and security, Internet of Things (IoT)-based systems have been developed to monitor and respond to real-world events. The IMANoBAS system, for example, integrates multi-mode alerts to deter burglaries through environmental monitoring [3]. Other notable implementations include vehicle accident detection and emergency alert platforms [4] and wireless sensor-based child safety systems, which notify guardians of potential threats [5].

Within the educational sphere, task management systems featuring notification functionalities aid students in managing assignments and meeting deadlines, thereby improving academic outcomes [6]. In addition, smart educational resource systems integrated with QR-code technology enhance content accessibility while providing timely updates to learners and educators [7]. Digital notice boards also serve as effective platforms for institutional communication and engagement [8].

In the healthcare sector, notification systems are increasingly utilized for operational efficiency and patient monitoring. Applications include automated radiation therapy planning systems that alert clinicians to procedural updates [9], digital pain alert systems that enhance response times in community hospitals [10], and automated monitoring tools that identify deteriorating patient conditions in real time [11].

From a public health perspective, notification systems contribute to disease surveillance and emergency alerts. For example, during the FIFA World Cup 2022, Qatar implemented an enhanced digital system for real-time disease tracking and response [12]. In the U.S., wastewater-based alert systems were introduced to monitor infection rates in schools and deliver targeted health warnings [13].

Emerging technologies also enable context-aware and predictive notification systems. For instance, Bluetooth beacon-based platforms can deliver location-sensitive alerts in real-time to users within specific environments [14]. Additionally, machine learning-based systems are used for dynamic pricing alerts and real-time customer notifications in retail and logistics [15].

Collectively, these studies support the relevance of integrating smart notification features into TESDA's registry processes. Leveraging mobile, IoT, and

AI-enabled technologies for digital alerts can enhance responsiveness, ensure timely communication with stakeholders, and promote efficient accreditation and compliance management.

## **7.2 Synthesis**

The reviewed studies show that digital notification systems enhance efficiency, communication, and compliance across sectors such as education, healthcare, and public safety. In educational settings, notifications improve attendance and task management, while IoT and AI-based alerts boost real-time monitoring and response.

Applying these insights to TESDA, the integration of digital notifications into the Trainer Registry System supports timely NTTC monitoring and reduces administrative workload. Overall, the literature affirms that smart notification tools can strengthen TESDA's accreditation process through improved responsiveness and operational accuracy.

## **8. METHODS**

This study employed a developmental research design, focusing on both the creation and evaluation of the TESDA Trainer Registry System. The goal was to develop a web-based platform that automates the monitoring of National TVET Trainer Certificate (NTTC) expirations and to assess its effectiveness after deployment.

The Software Development Life Cycle (SDLC) was used as the primary framework, consisting of the following phases:

1. Planning: Identification of user needs and system requirements through consultations with TESDA Surigao del Norte personnel.
2. Analysis and Design: System modeling and interface design using Django and Bootstrap, along with database structuring via PostgreSQL.
3. Implementation: Development of the core system using Python (Django framework), integrated with email automation using SMTP and Celery for scheduling notifications.
4. Testing: Internal testing was performed to ensure proper functionality of all modules, particularly the email notification feature triggered three months before NTTC expiration.
5. Deployment and Evaluation: The system was deployed at the TESDA Surigao del Norte Provincial Office. Pilot testing involved TESDA staff who used the system to encode, track, and monitor trainer credentials.

## **9. SUMMARY OF SYSTEM FEATURES**

The TESDA Trainer Registry System with Digital Notification is a web-based application designed to streamline the registration, monitoring, and compliance tracking of TESDA-certified trainers. Below is a summary of the core features developed and deployed as part of the system:

1. Login and Admin Authentication
  - Secure login interface for authorized TESDA personnel



- Encrypted password handling using Django's built-in authentication system
  - Role-based access control (e.g., admin, encoder)
2. Trainer Registry Form
- Allows entry and updating of trainer profiles
  - Captures personal details, NTTC information, and training credentials
  - Validated input fields to ensure accuracy and consistency
  - Responsive design for mobile and desktop access
3. Qualification Management
- Multiple qualifications can be assigned to each trainer
  - Includes NTTC number, qualification title, and expiration date
  - Automatically calculates status (active, expired, or nearing expiration)
4. Automated Notification System
- Sends email reminders to trainers three (3) months before NTTC expiration
  - Uses Celery and SMTP scheduling for timely message delivery
  - Notification logs are maintained for admin reference
5. Reports Module
- Filtered reporting based on name, certificate name, date of validity
  - Export filtered data to Excel for documentation and auditing
6. Dashboard Overview
- Displays summarized data:
    1. Total registered trainer
    2. expired NTTC registration
    3. Active NTTC registration
  - Real-time updates reflecting recent entries and changes
7. Edit and Update Functions
- Admins can modify trainer details and qualification records at any time
  - Includes deletion of outdated or duplicate entries (admin-restricted)

## **10. RECOMMENDATIONS AND COCLUSION**

### **10.1 Recommendations**

Based on the successful pilot implementation and positive feedback from TESDA Surigao del Norte administrative staff, the following recommendations are proposed to enhance the system's impact and sustainability:

#### **1. Wider Adoption Across TESDA Offices**

It is recommended that the system be deployed in other provincial and regional TESDA offices to standardize trainer registry management and NTTC monitoring nationwide.

#### 2. Integration of SMS Notification

To complement email alerts, the system should integrate SMS-based notifications to ensure trainers without regular email access still receive timely reminders.

#### 3. Development of a Mobile-Responsive Interface

Enhancing the system's design for mobile accessibility would allow TESDA personnel to manage records using tablets or smartphones, especially during field operations.

#### 4. Trainer Self-Service Portal

Introducing a limited-access portal for trainers to view their qualification status and update personal information can improve user engagement and data accuracy.

#### 5. Periodic System Review and Feedback Collection

TESDA offices should regularly gather feedback from users and trainers to identify needed improvements and ensure the system remains responsive to evolving administrative needs.

#### 6. Data Backup and Security Protocols

Regular database backups and improved security measures are advised to safeguard sensitive trainer data and ensure system resilience.

These recommendations aim to scale the system's benefits while addressing current limitations, supporting TESDA's broader goal of digital transformation and service efficiency.

### 10.2 Conclusion

The development and pilot implementation of the TESDA Trainer Registry System with Digital Notification successfully addressed key challenges in monitoring and managing National TVET Trainer Certificates (NTTC) at the TESDA Surigao del Norte Provincial Office. By automating the tracking process and integrating timely email notifications, the system significantly improved administrative efficiency, data accuracy, and compliance with accreditation deadlines.

The use of the Software Development Life Cycle (SDLC) ensured a structured and user-centered approach to system design. Pilot testing confirmed the system's reliability, usability, and relevance to TESDA's operational needs. Administrative staff reported substantial time savings and improved record management, while trainers benefited from timely reminders about their certificate expirations.

Overall, the system demonstrates the practical value of integrating digital technologies into government processes. It is recommended for adoption in other TESDA provincial offices, with potential enhancements such as mobile responsiveness and SMS notification integration to further expand its utility and accessibility.

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