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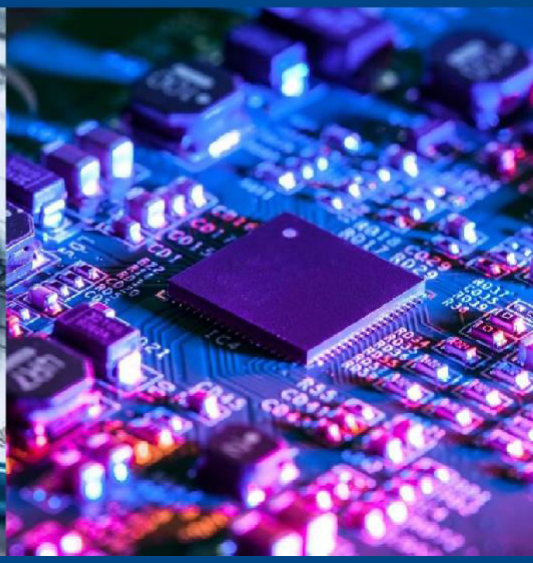

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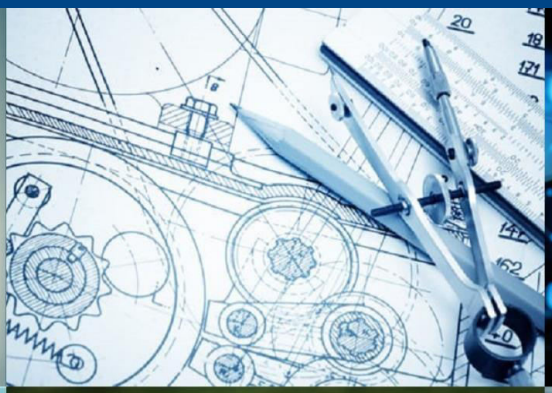

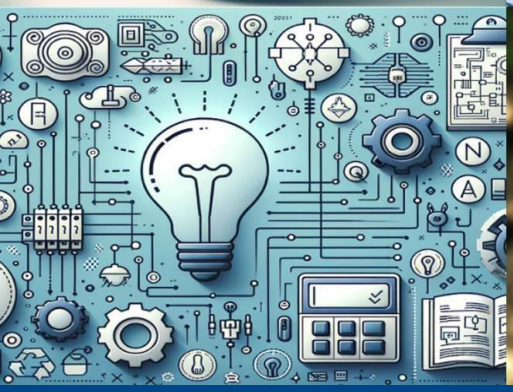

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GranTES: A Smart Subsidy Management System

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ABSTRACT: GranTES: A Smart Subsidy Management System was developed to improve the processing and monitoring of the Tertiary Education Subsidy (TES) at North Eastern Mindanao State University–Cantilan Campus. The system digitizes application submission, evaluation, approval, and notification to reduce manual work, delays, and errors. Using an Agile development approach, the system was evaluated based on the ISO 25010 software quality model. Results indicate that GranTES enhances efficiency, transparency, and communication between students and administrators, demonstrating its effectiveness as a modern subsidy management solution.

KEYWORDS: Smart Subsidy Management; Tertiary Education Subsidy(TES); Web-Based Information System; Automation; Higher Education Financial Aid

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I. INTRODUCTION

In the context of higher education governance, the effective management of financial assistance programs is essential to ensuring equitable access to education. In the Philippines, the Tertiary Education Subsidy (TES) under Republic Act No. 10931 was established to provide vital support to financially disadvantaged yet deserving students. However, at North Eastern Mindanao State University (NEMSU) – Cantilan Campus, the administration of TES continues to rely on manual, paper-based procedures. These traditional practices require students to submit physical documents, undergo time-consuming verification processes, and rely on in-person follow-ups for updates. As a result, delays, misplaced records, and information gaps persist, reducing the efficiency and transparency of subsidy distribution.

Previous studies emphasize the importance of TES and similar educational assistance programs in supporting student success. [2] highlight that TES significantly helps students manage academic expenses and motivates them to sustain good academic performance despite financial challenges. Similarly, [3], in their study on the Expanded Students' Grant-in-Aid Program for Poverty Alleviation (ESGP-PA), demonstrate how structured financial support enables students from marginalized backgrounds to complete their education and improve their long-term socioeconomic conditions. While these studies affirm the value of subsidy programs, they also indirectly reveal the need for efficient systems that can support their proper implementation and monitoring.

This study addresses the gap in the absence of a centralized, automated platform for TES management at NEMSU – Cantilan Campus through the development of GranTES: A Smart Subsidy Management System. GranTES introduces a digital solution that automates application tracking, document verification, and data management while ensuring compliance with CHED and UniFAST guidelines. By reducing human error, processing delays, and administrative workload, the system enhances transparency and service delivery for both students and staff. Beyond its local application, GranTES demonstrates how digital transformation can strengthen subsidy management in higher education institutions, contributing to more efficient, accountable, and student-centered governance.

II. LITERATURE SURVEY

Previous studies highlight the growing need for automated and transparent financial aid systems in higher education. Foreign research emphasizes real-time access, cloud-based platforms, and automation to improve efficiency, data accuracy, and user trust in subsidy and scholarship management. Studies also show that automation reduces administrative workload and enhances equitable access to financial assistance. Local literature reveals persistent issues in TES implementation such as delayed fund release, lack of awareness, and inefficient manual processes. These findings collectively support the need for a centralized, technology-driven system to improve subsidy management in Philippine universities.

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Table 1. Summary of Relevant Literatures

No.	Title / Focus Area	Author(s)	Key Points	Remarks
1.	Evaluation of the Tertiary Education Subsidy Program	Bayudan-Dacuycuy (2023)	Identified issues in TES implementation such as delays, weak monitoring, and inefficiencies.	Highlights the need for a centralized system to improve TES monitoring and transparency.
2.	Experiences of TES Student Grantees	Capinig et al. (2023)	TES significantly helps students financially but administrative delays affect effectiveness.	Reinforces the importance of real-time tracking and notifications in GranTES.
3.	Scholarship and Grants Management Systems in SUCs	Remegio & Casquejo (2025)	Web-based systems improve record accuracy, reporting, and workflow efficiency.	Validates the web-based design and centralized database approach used in GranTES.
4.	Automation in Higher Education Financial Aid	Refila (2024)	Automation reduces processing time, minimizes errors, and improves access to financial aid for students.	Justifies the use of automation in GranTES to replace manual TES processing.
5.	Artificial Intelligence Technologies in Education	Owoc, Sawicka, & Weichbroth (2021)	Digital systems enhance efficiency, decision-making, and service delivery in educational institutions.	Supports the adoption of a technology-driven subsidy management system like GranTES.

III. METHODOLOGY

Research Design

This study utilized a Descriptive-Developmental Research Design to bridge the gap between problem identification and solution implementation. The descriptive component focused on analyzing the current TES subsidy process at NEMSU – Cantilan Campus, allowing the researchers to identify specific inefficiencies, delays, and challenges experienced by both students and administrative staff. Following this, the developmental component involved the actual creation of GranTES: A Smart Subsidy Management System. This process integrated user-centric design with systematic technical development, planning, and testing. To validate the system's effectiveness, stakeholders evaluated GranTES using the ISO 25010 Software Quality Model, examining key attributes such as functionality, usability, reliability, and performance. This methodology ensured that GranTES provides a practical, high-performance solution for managing student subsidies, improving transparency, accuracy, and efficiency in the administration of financial assistance.

Instrument

The evaluation of GranTES: A Smart Subsidy Management System was guided by the ISO 25010 Software Quality Model, ensuring that the platform adheres to global standards for software quality. Assessment focused on functionality, usability, efficiency, reliability, maintainability, and security. Data was collected using a 24-item Likert-scale

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questionnaire, designed to quantify user feedback on the system's performance, ease of use, and overall effectiveness. This structured evaluation provided measurable evidence of GranTES' readiness for implementation and its capacity to improve the management of TES subsidies at NEMSU – Cantilan Campus.

Data Collection and Participants

The procedure began with securing formal clearance and approval from North Eastern Mindanao State University (NEMSU) – Cantilan Campus. Upon approval, the researchers identified and recruited 29 participants, divided into three main groups: Information Technology (IT) Practitioners (11 respondents), TES staff (3 respondents), and students (15 respondents) from various departments. A formal orientation was conducted to introduce GranTES: A Smart Subsidy Management System, during which the researchers explained the study's objectives and the system's key features. This ensured that all participants had a clear understanding of the platform before the evaluation phase, allowing for informed feedback on usability, functionality, performance, and overall effectiveness.

Data Analysis

The data collected from surveys, interviews, and system evaluations were processed using statistical and analytical methods, with the following treatments applied:

1. Application: The analysis was guided by the ISO/IEC 25010 Software Quality Model, evaluating GranTES across six key dimensions: functionality, efficiency, usability, reliability, maintainability, and security.
2. Quantitative Performance: Statistical data provided measurable evidence of the system's effectiveness, highlighting accurate subsidy tracking, timely updates, and successful task completion rates among users.
3. Qualitative Feedback: User interviews and feedback sessions offered deeper insights into the user experience, identifying areas for improved navigation, clearer feature descriptions, and smoother administrative workflows.
4. Iterative Improvements: Based on the findings, the researchers implemented targeted enhancements to the user interface, notification systems, database integration, and automated subsidy processing modules.
5. Final Validation: The comprehensive evaluation confirmed that GranTES meets international software quality standards, successfully delivering a secure, efficient, and user-friendly subsidy management system for NEMSU – Cantilan Campus.

IV. RESULT/DISCUSSION

System Features

GranTES: A Smart Subsidy Management System is a secure, web-based platform developed to digitize and streamline the management of educational subsidies at NEMSU – Cantilan Campus. Utilizing a MySQL database and role-based access control, the system enables administrators to manage student records, approve applications, generate credentials, and oversee the claims process, while students can apply online, track subsidy status, receive notifications, and communicate with administrators through the built-in messaging feature. By replacing manual processing with this structured digital framework, GranTES ensures accurate tracking of applications and claims, reduces administrative workload, and enhances transparency. With an intuitive, user-friendly interface, GranTES makes subsidy management faster, more organized, and more efficient for both administrators and students.

Performance Evaluation

This section presents the evaluation of the system based on the ISO 25010 software quality standards, specifically focusing on Functionality, Reliability, Usability, Efficiency, and Security. Using a 5-point Likert scale, the performance of the system was measured through weighted means and verbal interpretations to determine how effectively it met its design objectives.

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Table 2. Performance Evaluation System Tabulation

Table	Quality Characteristics	Result	Verbal Interpretation
1	Functionality	4.40	Very Great Extent
2	Reliability	4.47	Very Great Extent
3	Usability	4.74	Very Great Extent
4	Efficiency	4.15	Great Extent
5	Maintainability	4.31	Very Great Extent
6	Security	4.71	Very Great Extent
Over-All Mean		**4.46**	**Very Great Extent**

V. CONCLUSION

GranTES: A Smart Subsidy Management System significantly improves the education subsidy management process at NEMSU Cantilan Campus by addressing the inefficiencies, disorganization, and delays caused by the previous manual, paper-based procedures. The system offers a digital and structured approach to profiling beneficiaries, processing applications, monitoring subsidy status, and managing records securely. Both administrators and students benefit from GranTES' user-friendly interface, secure login system, and real-time notification features, which ensure timely updates and effective communication. Through automated monitoring, proper data handling, and role-based access for admins and students, GranTES enables accurate, transparent, and accountable subsidy management. Overall, the system successfully meets its objectives by enhancing operational efficiency,transparency, and reliability while supporting the effective implementation of subsidy programs within the institution.

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