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Automation System for Procurement Process of Cagayan State University

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ABSTRACT

This study developed and validated a automation system for procurement process of Cagayan State University. Focused on enhancing the overall process by improving data accuracy, simplifying the management of procurement information, and strengthening data security. Additionally, it streamlines reporting and reduces the time and effort required for procurement transactions, resulting in a more efficient and effective system for the university. The application was tested with end users including BAC member and IT experts, and evaluated using ISO 25010:2011 Software Quality Standards and the Technology Acceptance Model (TAM). Results showed a very high degree and effectively addresses user requirements. Among all evaluated categories, Functionality Suitability and Performance Efficiency received the highest rating showing that the system reliably performs its intended tasks..

Keywords: *(Automation System for Procurement Process(ASPP), ISO 25010 Standards Functionality Suitability and Waterfall model, TAM)*

INTRODUCTION

Many people still use on time-consuming manual techniques that involve physical documents, spreadsheets, and imprinting, notwithstanding advancements in software purchasing. Due to its inefficiency, this historical procedure frequently causes delays, mistakes, a lack of transparency, and difficulties tracking the procurement process. According to procurement systems (Panda and Sahu, 2022), building renovation. In today's digital era, technological advancement plays a significant role in driving societal progress and development. The growth of civilizations has been shaped by cultural values, social norms, and human interactions, which have, in turn, influenced how technology is adopted, utilized, and occasionally restricted. Despite these advancements, certain sectors—such as procurement management—face unique challenges. Procurement systems are essential components of both national economies and organizational operations. This study focuses on the development of a Automation System for Procurement Process of Cagayan State University, aiming to address the current system's limitations by harnessing the benefits of outsourcing and modern information technology.

Objectives of the Study

This study aimed to develop and evaluate a The objectives of the study were to: (1) identify the problems encountered in the existing procurement system in the University; 2) developed a system that can addressed the identified problems of the existing system specifically on the procurement system of the Cagayan State University and 3) determined the extent of compliance of the developed system to ISO software standards. The study adopted the Waterfall Model as its development framework, which follows a sequential process including: requirement gathering and analysis, system design, implementation (coding), testing,

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deployment, and maintenance. The system was evaluated using a survey based on the ISO 25010 Software Quality Standards, targeting university staff directly involved in procurement activities.

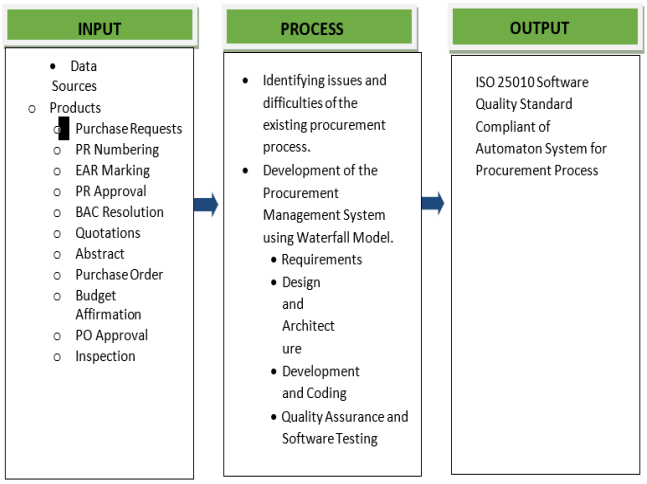
Conceptual Framework of the Study

The procurement process automation system's conceptual structure typically comprises of related elements that cooperate to promote an effective procurement process. These elements consist of The user interface of the e-procurement system is represented by this component, which offers a graphical user interface for users to interact with the system. It has functions like dashboard access, login/authentication, and another module access. Purchase Requests (PRs), Requests for Quotations (RFQs), and Tenders are all examples of electronic sourcing documents that are supported by the e-sourcing and tendering module. It has tools for automated tendering procedures, supplier qualification. The catalog management module enables institution to keep track of a centralized database of pre-approved goods, prices, and conditions. It offers search capabilities and makes it easier for the procurement process to flow smoothly.

These requests are then processed via pre-existing approval procedures. It provides tools for generating purchase requests, controlling the degree of approval, and monitoring the status of requests. Analytics and Reporting: This module offers up-to-date information on supplier performance, spend analysis, contract compliance, and procurement performance. With its dashboards, reports, and data visualization tools, it facilitates data-driven decision making and performance monitoring. These elements work together to create a system that helps businesses increase productivity, strengthen their relationships with suppliers, automate and optimize their purchasing processes, and save money.

One of the processes involved is the software development process model called the Waterfall Model. This model is used because it has more emphasis on the independent and fully-functional nature of each stage of software development process.

Figure 1. Input Process Output diagram



The results of this study benefited and assisted the school in designing and developing an effective and efficient procurement process automation system. The study was significant to the following identified beneficiaries:

Administrative Officer. The computerized system will provide an accurate and easier in managing information, distribution, and managing end user orders. Also, can monitor the reports and by reducing the time and effort spent for the complete purchase procedure.

Cagayan State University. The procurement management to improve the transaction processes make easier.

End users. Make easier to prepare purchase request items/articles and specific purposes.

Future researchers. The result of this study will help the future researchers to improve their research and at the same this this paper can be used as reference material.

Researchers. This study will aid researchers in expanding their expertise in the development of skill systems.

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SCOPE AND LIMITATIONS

This study aimed to examined the transaction challenges that exist on the Procurement flow of Cagayan State University for both inside and outside purchases of Cagayan State University products, as well as how to fix these problems by developing a procurement process automation system. The procurement flow is the method used.

Procurement includes managing supply and demand, sourcing raw materials and parts, manufacturing and assembly, warehousing and inventory tracking, order entry and order management, distribution across all channels, and delivery to the customer, depending on whether the study was conducted on the inside or outside of the CSU campus.

METHODOLOGY

The researcher used waterfall model because it provides clearly defined stages and well understood for the consumers. It is not only giving them the knowledge how the system was created but also the process and the results are well documented.

The development process began with Requirements Gathering and Analysis, where the researcher collaborated closely with the client to understand and document system functions and interface needs using interviews, questionnaires, and existing forms from Cagayan State University's Supply Office.

In the System Design phase, a comprehensive blueprint of the system was developed, detailing its functionality, appearance, and technical specifications. Although no coding occurred, this phase established the foundation for implementation.

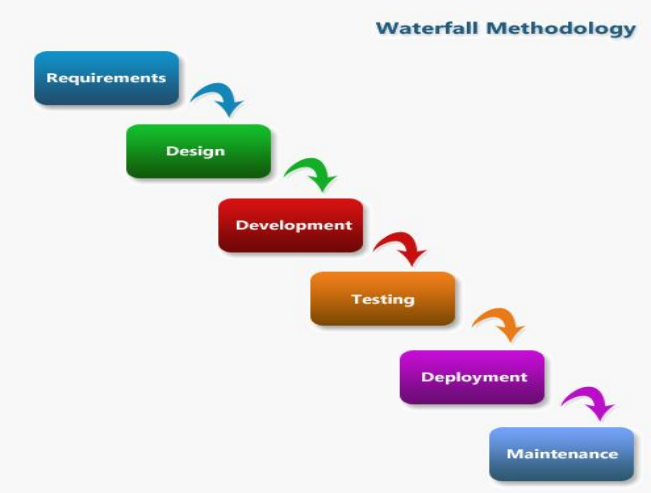
Implementation involved translating the design into functional code. The researcher developed the system in incremental components, integrating them progressively.

During Testing, all system components were evaluated to ensure functionality and compatibility. Any significant issues identified were resolved before deployment.

In the Operation/Deployment phase, the completed system was released to users.

Finally, Maintenance ensured the system remained functional through regular evaluations, updates, and bug fixes, with critical issues potentially requiring a return to earlier development stages.

Figure 2. Waterfall model



The system was evaluated using ISO 25010:2011 quality metrics and the Technology Acceptance Model (TAM), focusing on accuracy, reliability, and user satisfaction.

Summary of Findings

The Automation System for Procurement Process that was developed is comprehensive tool that improves productivity and simplifies the procurement procedure. The system includes features such as vendor management, inventory management, purchase order creation and tracking, and reporting capabilities. Additionally, the system ensures compliance with procurement policies and regulations, reduces costs, and improves

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transparency in the procurement process by optimizing procurement decisions. Ultimately, any business looking to improve its procurement process and achieve better outcomes can benefit greatly from the Automation System for Procurement Process.

To address this need, the research introduced an automation system for procurement process of Cagayan State University . The system underwent evaluation using two widely accepted frameworks: the **ISO 25010:2011 Software Quality Standard** and the **Technology Acceptance Model (TAM)**.

Table 1. Level of Acceptability Among Users Based on the Technology Acceptance Model (TAM)

The findings indicated that the system achieved overall weighted mean of 4.61 or the results presented in the foregoing table indicates that the ASPP was found a very high level of acceptability among users, as evidenced by the consistently high mean scores across all TAM constructs.

The mean indicator for **Facilitating Conditions** is the highest among all categories with a score of 4.87, indicating that the system **Acceptability** its intended functions very acceptable. On the other hand, **Behavioral Intention** has the lowest mean indicator with a score of 4.38, which suggests that the system may require some improvement in terms of user interface. Overall, the ASPP strongly suggests that users find the system effective, easy to use, socially endorsed, well-supported, and, consequently, they intend to use it. and to the technical needs of the user with a mean indicator of 4.61.

Table 2. ISO 25010 Software Quality Evaluation (IT Experts)

ISO Quality Attribute	**Mean Score**	**Interpretation**
Functional Suitability	4.8	Very Great Extent
Performance Efficiency	4.88	Very Great Extent
Compatibility	4.45	Very Great Extent
Usability	4.51	Very Great Extent
Reliability	4.47	Very Great Extent
Maintainability	4.63	Very Great Extent
Portability	4.69	Very Great Extent
Overall Mean	4.75	Very Great Extent

The ISO evaluation further affirmed the system's that the overall weighted mean of 4.52 or the results presented in the foregoing table indicates that the ASPP was found to be compliant to a very great extent to ISO 25010 or the Software Quality Standards, and to the technical needs of the users.

The mean indicator for **Performance Efficiency** is the highest among all categories with a score of 4.88, indicating that the system performs its intended functions very effectively. On the other hand, **Compatibility** has the lowest mean indicator with a score of 4.45, which suggests that the system may require some improvement in terms of which a product, system or component can exchange information with other products, systems or components, and /or perform its required functions while sharing the same hardware or software environment. Overall, the ASPP complies with the ISO 25010 standards to a very great extent with a mean indicator

Conclusion

The Automation System for Procurement Process that was developed is comprehensive tool that improves productivity and simplifies the procurement procedure. The system includes features such as vendor management, inventory management, purchase order creation and tracking, and reporting capabilities. Additionally, the system ensures compliance with procurement policies and regulations, reduces costs, and improves transparency in the procurement process by optimizing procurement decisions. Ultimately, any business looking to improve its procurement process and achieve better outcomes can benefit greatly from the Automation System for Procurement Process.

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Based on the results, the system's functional suitability, performance efficiency, compatibility, usability, reliability, security, maintainability, and portability have attained a significant degree of compliance. This bolsters the fact that the system is indeed compliant with ISO 25010 Software Quality Standards.

Recommendations

Given that the ASPP complies with ISO 25010 standards and is effective in procurement processing, it may be suggested that the developed system be evaluated, improved, and possibly adapted for use at CSU.

User input: Survey or interview users to gather their thoughts on the system's overall usability, functionality, and satisfaction. Utilize this feedback to identify areas that need improvement and to prioritize future development projects.

System integration: Investigate methods for integrating the Procurement Management system with other organizational systems, such as finance, inventory control, or project management. This could improve data accuracy and speed up processes.

Continuous monitoring: To spot possible problems or areas for development, put in place a system for continuously monitoring procurement-related activities. This could entail continuing stakeholder communication in addition to routine reporting and analysis of procurement data.

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