

**DESIGNING A WEB-BASED RAW MATERIAL INVENTORY
INFORMATION SYSTEM
(CASE STUDY: UNIVERSITY OF BUANA PERJUANGAN
KARAWANG PHARMACY LABORATORY)**

**CIPTO RAMDHANI YUSUF
NPM : 228030017**

ABSTRACT

Educational laboratories play a crucial role in supporting the learning process and research activities within higher education institutions. These facilities are essential for ensuring the availability of tools and materials needed by students and lecturers during practical sessions and academic research. HOWEVER, in the Pharmacy Laboratory at Universitas Buana Perjuangan Karawang, inventory management is still handled manually using logbooks. This outdated system increases the risk of inaccurate records, discrepancies between material purchases and usage, and delays in service. Furthermore, challenges such as limited storage space and material expiration dates complicate the inventory management process. This study aims to: (1) identify user needs in designing an information system; (2) develop an appropriate inventory information system; and (3) provide decision-making recommendations related to material classification, minimum order quantity, reorder points, and safety stock.

This research adopts the Waterfall model for system development, which includes the following stages: requirement analysis, system design, implementation (coding), testing, and maintenance. Data were collected using questionnaires distributed to four key user groups: lecturers, students, laboratory staff, and laboratory heads. The House of Quality (HoQ) method was employed to analyze user needs and determine system design priorities based on the voice of the customer. In the design phase, use case diagrams, activity diagrams, and entity relationship diagrams (ERDs) were created to model system functions and data relationships. During the implementation phase, the system was equipped with two optimization methods: ABC analysis for classifying materials based on usage value, and Mixed Integer Programming (MIP) to optimize ordering decisions considering storage limitations and material expiry.

The implemented system successfully met the identified functional requirements. It allows real-time tracking of incoming and outgoing inventory, displays usage history, and provides exportable reports. Financial analysis revealed a significant reduction in inventory costs, from Rp43,801,601 to Rp17,385,960. Black box testing confirmed that all features performed as

expected. Additionally, a comprehensive maintenance plan was developed, including corrective, adaptive, perfective, and preventive maintenance strategies to ensure long-term system reliability.

In conclusion, the user-centered inventory information system significantly improved the accuracy and efficiency of material management in an educational laboratory setting. The system also empowered laboratory staff and management with tools for better decision-making and resource planning. For future research, it is recommended to: (1) explore other optimization techniques, such as genetic algorithms or Monte Carlo simulations, to compare performance; and (2) apply the House of Quality method to different domains.

Keyword : Optimization, Inventory, Information System.