

ABSTRACT

The Student Certificate (AK.007) is an essential document frequently requested for various academic and administrative purposes. However, the submission process at the Faculty of Science and Mathematics, Universitas Diponegoro, is still conducted manually using physical forms, leading to time inefficiency, risk of document loss, and limited transparency in tracking submission status. To address these issues, this research develops a web-based AK.007 submission system using the ICONIX Process development methodology. The system is designed to digitalize the hierarchical approval workflow, involving the Academic Supervisor, Administrative Manager, and Academic Administration Unit (UPA) Officer. Beyond functional development, this study also emphasizes the internal code quality of the software to ensure long-term maintainability. Code quality analysis was conducted using Static Code Analysis with the SonarQube tool to detect code smells, particularly in the categories of Large Class, Long Method, and Duplicated Code. Based on the findings, refactoring techniques were applied to improve the internal code structure without altering the system's external behavior. Black-box testing results indicate that all application features function according to the specified requirements. In terms of code quality, the refactoring process successfully eliminated code duplication to 0%, reduced controller class size, and simplified complex methods. Furthermore, performance measurement proves that improvements in the code structure successfully enhanced overall computational efficiency, with all tested endpoints showing increased execution speed (shorter response times). This research demonstrates that integrating static code analysis and refactoring into the software development process can produce a system that is not only functionally correct but also more efficient and easier to maintain.

Keywords : Student Certificate Application, ICONIX Process, Static Code Analysis, Refactoring, Code Quality