Comparative Analysis of the Utilization of Selenium WebDriver and Cypress in Automation Software Testing A-PI (Digital Archive of the English Language Education Study Program, Universitas PGRI Madiun)

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ABSTRACT

English Education Study Program Universitas PGRI Madiun developed a digital archive system called A-PI (Arsip Digital Program Studi Pendidikan Bahasa Inggris) as a means of storing and managing reports of lecturers and education staff activities. In order to ensure the quality of the application, automatic software testing was carried out using two testing tools, namely Selenium WebDriver and Cypress because both can support cross-browser testing. This study aims to analyze and compare the use of Selenium WebDriver and Cypress in automatic software testing of A-PI application based on three aspects of testing, namely functional testing, compatibility testing (cross-browser), and security testing with parameters of execution time and execution result documents. The stages of this research consist of several steps, namely: application identification, literature study, test case making, application testing, comparative analysis of results, conclusions and suggestions arrangements. Testing was carried out on three major browsers, namely: Chrome, Firefox, and Edge. The results of this study indicate that: 1) in the functional testing category in which test included 45 test cases, 42 cases (93.3%) declared successful and 3 cases (6.7%) failed. Failure occurred in Tambah and Ubah Data Dosen also Tambah Data Pengguna features due to the absence of input validation, so the system did not display error notifications or visual feedback when the input was invalid. In this category, the aim is to test the basic functionality of the application, both testing tools show almost equivalent performance, but in some features, Cypress is faster, especially in Firefox and Edge; 2) in the security testing category, which is designed to test the vulnerability of applications to potential threats, Cypress provides faster execution time on Firefox and Edge compared to Selenium WebDriver; 3) in the cross-browser testing category, which aims to ensure that applications function properly across browsers, Selenium WebDriver is superior in some cases, especially on Firefox and Chrome, but on Edge, Cypress performs better. Based on these findings, it is recommended to fix the failed tests by adding a validation function to the input form so that the system can provide feedback when an input error occurs. Based on the results of the comparison of the two testing tools, it is recommended to choose a testing tool that suits the specific needs of the application and the tests to be performed. If the

application requires more extensive cross-browser testing, Selenium WebDriver will be more suitable because of its support for various browsers and programming languages. However, if execution speed is a priority, especially on Firefox and Edge, then Cypress can be a more efficient choice despite its more limited browser support. Automated testing can combine these two testing tools to maximize efficiency and effectiveness, considering the advantages.

***Keywords**: Automation Software Testing, Selenium WebDriver, Cypress, Functional Testing, Cross-Browser Testing, Security Testing*