System Quality Development and Analysis Seminar Management Information Web-Based in Department of Education Electronic Engineering and Information

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A R T I C L E I N F O

ABSTRACT

This study aims to: 1) develop a web-based seminar management information system. 2) determine the quality level of the web-based seminar management information system developed. The research method used in this study is Research and Development (R&D) with a waterfall development model that refers to the rules of software engineering Pressman (2010). The stages that are passed are communication (communication), planning (planning), modeling (modeling), construction (construction), and distribution (deployment). Software quality analysis is carried out by adopting the ISO 25010 standard, namely aspects of functional suitability, performance efficiency, compatibility, usability, reliability, security, maintainability, and portability. The results of this study are 1) the seminar management information system was built using the PHP programming language and the Postgre database. The frameworks used are CodeIgniter and AdminLTE (Bootstrap). This information system has 7 levels of users, namely administrator, committee (committee), reviewer, main speaker (presenter), second speaker (non-presenter), participant (audience), and visitor (guest). 2) the results of the analysis of software quality by adopting the ISO 25010 standard are as follows: (1) function suitability aspects with 100% success; (2) the performance efficiency aspect obtained a Yslow score of 92.97 (grade A); (3) the compatibility aspect can run well on the 4 tested web mails; (4) the usability aspect obtained a raw SUS score of 73.00, acceptability ranges with acceptable results, grade scale with C results, and adjective ratings with good results; (5) reliability aspect with 100% result; (6) security aspect with the result of security vulnerability being at level 1 (low); (7) maintainability aspect with maintainability index result 90.81 (high category); (8) the portability aspect can run well on the 5 web browsers tested.

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1. INTRODUCTION

The Department of Electronics and Informatics Engineering Education (JPTEI) is one of the majors in the Faculty of Engineering, Yogyakarta State University. One of the work programs in the Department of Electronics and Informatics Engineering Education is a national seminar called ELINVO (Electronic Informatic and Vocational Education). ELINVO seminar activities are held every year and have been started since 2015. The purpose of the ELINVO seminar is to develop electronic

and informatics knowledge for Academics of Electronic Engineering Education and Informatics Engineering Education. This seminar activity is intended for S1/D3 students, Masters students, and the general public who want to add insight into electronics and informatics.

Before the ELINVO seminar was held, administrative processes were carried out, such as registration of participants and presenters, payment of seminar tickets, delivery of papers, and assessment of papers. The registration process for seminar participants is as follows: 1) participants make payments through bank accounts; 2) participant confirms payment by sending proof of payment via email; 3) participants register via sms. The registration process for presenters is as follows: 1) presenters send papers via email; 2) papers assessed by reviewers; 3) announcement of accepted papers; 4) make payments through bank accounts for the presenters whose papers are accepted; 5) the presenter confirms the payment by sending proof of payment via email; 6) presenters send revised papers via email. The flow of the appraisal of the papers is as follows: 1) the reviewer evaluates the accepted papers one by one; 2) the assessment results from several reviewers are then combined to obtain papers that are suitable for seminars; 3) announcement of accepted papers for seminar.

Constraints experienced during the seminar administration process, namely, administrative procedures errors often occur because they use different paths. The process of making a list of participants and presenters also encountered problems, namely, data discrepancies often occurred due to participants and presenters who registered repeatedly. The evaluation of ELINVO seminar papers also encountered problems, namely, the length of the paper appraisal process because it was still using the manual method so that repeated data checks were needed to determine the right paper for the seminar. Based on these problems, a system is needed that can help meet the needs of seminar organizers, participants, and speakers. Therefore, a study was made with the title "Development and Analysis of Quality Information Systems Management of Web-Based Seminars in the Department of Electronics and Informatics Engineering Education". Furthermore, the developed system is tested by adopting the ISO 25010 standard to determine the level of software quality which includes aspects of functional suitability, performance efficiency, usability, security, reliability, compatibility, maintainability, and portability.

2.   RESEARCH METHOD

The research method used in this research is research and development (Research and Development). According to (Sugiono, 2015) Research and Development is a research method used to produce certain products, and test the effectiveness of these products. The results of the research are in the form of an analysis of functional requirements, an analysis of the need for development tools and an analysis of the quality of the ISO 25010 software which includes aspects of functional suitability, performance efficiency, compatibility, usability, reliability, security, maintainability, and portability. While the results of the development are in the form of a Web-Based Seminar Management Information System. The product development procedure in this study uses the waterfall model which refers to the rules of software engineering Pressman (2010).

Planning

The main objective of the planning stage is for the research and development process to run effectively and efficiently. Planning is done by defining the technical tasks that must be done, estimating the time of software development, making a work schedule, calculating the risks that may arise, and estimating the resources that will be needed in the software development process.

Data Sources/Research Subjects Research subjects and data sources used to test software quality are:
a.   Programming expert for functionality suitability aspects.
b.   Seminar participants and speakers for usability aspects.
c.   Software testing for aspects of performance efficiency, reliability, security, portability, maintainability, and compatibility

Data Collection Methods and Tools

Data collection methods in this study were obtained from observation, interviews, questionnaires (questionnaire), and software measurement (software testing). While the data collection tool consists of software testing instruments by adopting the ISO 25010 standard which

includes aspects of functional suitability, performance efficiency, compatibility, usability, security, reliability, maintainability and portability.

3.   RESULTS AND DISCUSSIONS

The Seminar Management Information System was developed using Pressman's (2010) software engineering principles. The stages that are passed are communication (communication), planning (planning), modeling (modeling), construction (construction), and distribution (deployment).

Planning

Planning is done by estimating the resources needed in the software development process and estimating the time needed to develop software by scheduling. The resources used in the process of developing the Seminar Management Information System are as follows: a. Computer/laptop with Linux operating system (Linux Mint). b. Web Server Nginx 1.10.13. c. PHP Fastcgi 7.0. d. Postgre 9.5.6 Database Servers. e. Framework Code Igniter 2.2.0 and Bootstrap 3 (AdminLTE).

Product Quality Analysis

Product quality analysis is carried out by adopting the ISO 25010 standard which includes aspects of functional suitability, performance efficiency, compatibility, usability, reliability, security, maintainability, and portability.

Functional Suitability Testing Results Functional suitability testing was carried out by 3 experts (expert judgment) using a questionnaire in the form of a checklist of functions contained in the seminar management information system that had been developed. The results of the functional susability test that have been carried out by the expert are as follows:

No	Fungsi Yang Diuji	Hasil Pengujian	
		Sukses	Gagal
A. *Guest* (Pengunjung)			
1	Fungsi *Registration*	3	0
2	Fungsi *Login*	3	0
3	Fungsi *Forgot Password*	3	0
B. *Audience* (Peserta)			
1	Fungsi *Profile*	3	0
2	Fungsi *Upload Payment Proof*	3	0
3	Fungsi *My Ticket*	3	0
4	Fungsi *Logout*	3	0
C. *Presenter* (Pemakalah Utama)			
1	Fungsi *Profile*	3	0
2	Fungsi Upload *Fullpaper*	3	0
3	Fungsi *Upload Payment Proof*	3	0
4	Fungsi *Upload Revised Paper*	3	0
5	Fungsi *My Ticket*	3	0
6	Fungsi *Logout*	3	0
D. *Non Presenter* (Pemakalah ke-2)			
1	Fungsi *Profile*	3	0
2	Fungsi *Upload Payment Proof*	3	0
3	Fungsi *My Ticket*	3	0
4	Fungsi *Logout*	3	0
E. *Reviewer*			
1	Fungsi *Profile*	3	0
2	Fungsi *Papers List (Need to be Reviewed)*	3	0
3	Fungsi *Papers List (Has been Reviewed)*	3	0
4	Fungsi *Logout*	3	0
F. *Administrator*			
1	Fungsi *General Setting*	3	0
2	Fungsi *Logo & Header*	3	0
3	Fungsi SMTP *Setting*	3	0
4	Fungsi *Deadline Setting*	3	0
5	Fungsi *Price List*	3	0
6	Fungsi *Manage Pages*	3	0
7	Fungsi *Manage Posts*	3	0
8	Fungsi *Manage Sidebar*	3	0

9	Fungsi *Manage Slide*	3	0
10	Fungsi *Manage Administrator*	3	0
11	Fungsi *Manage Committee*	3	0
12	Fungsi *Manage Reviewer*	3	0
13	Fungsi *Manage Participant*	3	0
14	Fungsi *Media Library*	3	0
15	Fungsi *File User*	3	0
16	Fungsi *Profile*	3	0
17	Fungsi *Logout*	3	0
G. Committee (Panitia)			
1	Fungsi *Deadline Setting*	3	0
2	Fungsi *Price List*	3	0
3	Fungsi *Payment Pending*	3	0
4	Fungsi *Payment Approved*	3	0
5	Fungsi *Paper Pending*	3	0
6	Fungsi *Paper Approved*	3	0
7	Fungsi *Revised Paper*	3	0
8	Fungsi *Manage Reviewer*	3	0
9	Fungsi *Manage All Participant*	3	0
10	Fungsi *Manage Paid Participant*	3	0
11	Fungsi *Send LoA*	3	0
12	Fungsi *Attendance*	3	0
13	Fungsi *Profile*	3	0
14	Fungsi *Logout*	3	0
Jumlah		**156**	**0**

The percentage of eligibility for functional suitability testing can be calculated as follows:

$$Hasil = \frac{Skor\,yang\,didapatkan}{Skor\,Maksimal} \times 100\%$$

$$Hasil = \frac{156}{156} \times 100\% = 100\%$$

1) Results of Performance Efficiency Testing The performance efficiency aspect was tested using the YSlow application. The results of the YSlow measurement are grades from A to F and performance scores from 1-100.
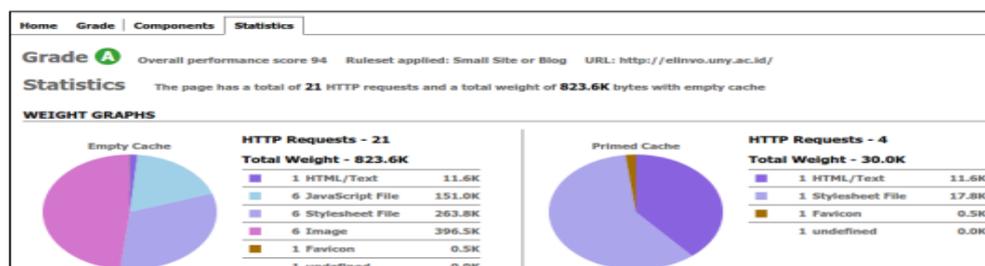
Figure 1. The performance efficiency

2) Compatibility Testing Results Compatibility testing is done by using a variety of web mail which is usually used by users to send email. Testing is done by registering to the system using email services provided by web mail such as Google Mail, Yahoo Mail, Microsoft Mail, and UNY Mail. The test is said to be successful if it successfully registers and gets a verification email from the system to activate the account.
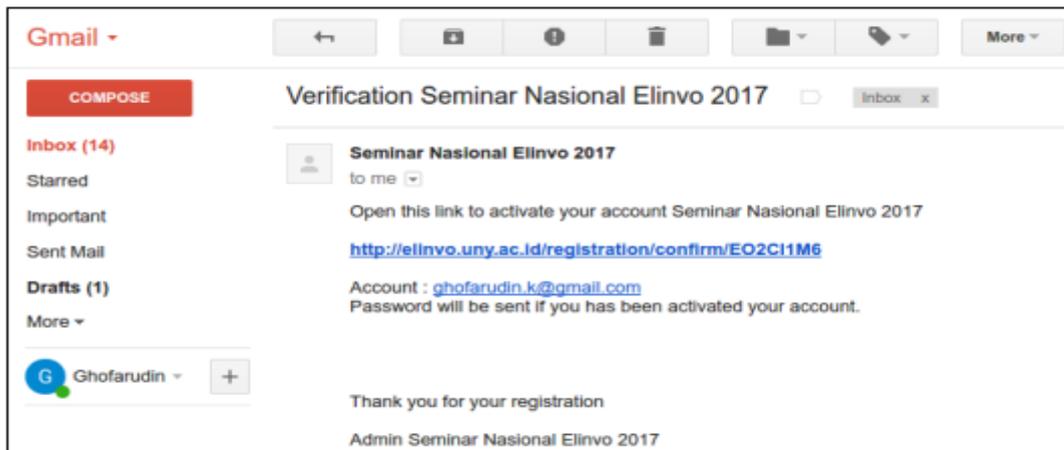
Figure 2. Registration Results with Google Mail

3) Usability Test Results Usability testing using SUS with 10 statements and 5 answers in the form of approval of the items used. For odd-numbered question items, the value contribution is the position of the scale minus 1 or $(x - 1)$. For even-numbered questions, the score contribution is 5 minus the scale position $(5 - x)$. To get the entire SUS score, it can be done by multiplying the total number of item score contributions by 2.5. Table 42 below is the result of SUS testing with 20 respondents who use the seminar management information system.

Table 2. Recap of SUS Testing Results

No Pernyataan	STS	TS	KS	S	SS	Nilai
1	0	3	7	10	0	47
2	1	10	7	2	0	50
3	0	0	0	13	7	67
4	5	11	4	0	0	61
5	0	0	0	14	6	66
6	4	10	5	1	0	57
7	0	0	1	19	0	59
8	7	12	1	0	0	66
9	0	1	0	17	2	60
10	1	12	4	3	0	51
Jumlah Nilai						584
Rata-Rata Nilai						29.20
Rata-Rata Nilai Raw SUS Score						73.00

Based on the recap of the SUS test results above, the total score obtained is 584 with an average value of 29.20. The average value is then multiplied by 2.5 to obtain an average Raw SUS Score of 73. The Raw SUS Score after being converted into SUS Score results in Acceptability Ranges in the Acceptable range with Grade Scale C and Adjective Ratings in the Goo category.

4.   CONCLUSION

Based on the results of research and discussion on the development and analysis of the quality of information system management seminars in the Department of Electronics and Informatics Engineering Education,the seminar management information system was developed to manage seminar activities in the Department of Electronics and Informatics Engineering Education. The seminar management information system was built using the PHP programming language and the Postgre database. The frameworks used are CodeIgniter and AdminLTE (Bootstrap). This information system has 7 levels of users, namely administrator, committee (committee), reviewer, main speaker (presenter), second speaker (non-presenter), participant (audience), and visitor (guest). The quality of the seminar management information system at the Department of Electronics and Informatics Engineering Education was tested by adopting the ISO 25010 standard which consists of 8 aspects with the following results: 1) Function suitability aspect testing with 3 experts obtained a success percentage of 100% in the very good category. 2) Performance efficiency testing using the Yslow application got a score of 92.97 with grade A. 3) Compatibility testing using Google Mail, Yahoo Mail, Microsoft Mail, and UNY Mail can run well. 4) Usability testing with 20 respondents using the SUS standard resulted in a raw SUS score of 73.00 with the category of acceptability ranges in the acceptable range, grade scale obtaining C results and adjective ratings getting good results. 5) Testing reliability using the WAPT application obtained 100% results. 6) Security testing using the Acunetix application obtained the result that the security vulnerability level was at level 1 low (low). 7) The maintainability test using the PHPMetrics application obtained a maintainability index of 90.81 in the high category. 8) Testing the portability aspect using the CrossBrowserTesing application with the results that the system can run well on Google Chrome, Mozilla Firefox, Internet Explorer, Opera and Safari web browsers.

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