

Functional Test of the Online Recognition of Work Experience and Learning Outcome (ReWELO) System Using Black Box Testing

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Functional Test of the Online Recognition of Work Experience and Learning Outcome (ReWELO) System Using Black Box Testing

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Abstract. This paper describes: (1) the development of the online Work Experience and Learning Outcome (ReWELO) website, (2) the feasibility testing of the online ReWELO system, and (3) the functional testing of the ReWELO system using black-box testing. The method used to develop the ReWELO website was the design method. The instruments used for testing were questionnaires and observation sheets. The instrument's validity was tested through expert judgment and the instrument's reliability was examined with Cronbach's Alpha. The feasibility of the website was analyzed by information technology experts and users (assessors and candidates). The function of the ReWELO Website was tested by using black-box testing. The collected data were then analyzed descriptively. The test results revealed that ReWELO's website was rated "good" by information technology experts, assessors, and candidates. The average score of evaluation from information technology experts, practitioner, assessors, and candidates were 3.3; 3.5; 3.4; and 3.2 respectively. All features of the online ReWELO system were able to function properly as planned.

1. Introduction

ReWELO is an acronym for Recognition of Work Experiences and Learning Outcomes or in Indonesian it is called *Pengakuan Pengalaman Kerja dan Hasil Belajar* (PPKHB). ReWELO aims at recognizing competencies owned by equalizing the competency of a person or a candidate with the level of the Indonesian National Qualification Framework. These competencies can be obtained through formal, non-formal, and informal education. The recognition process can be performed through a competency test or portfolio assessment. For portfolio assessment, it can be conducted off-line or on-line.

Considering the geographical condition of Indonesia as an archipelagic country and along with technological advances, to carry out the recognition effectively, efficiently, and economically, the system and mechanism can utilize information technology or the recognition process can be performed online. To conduct the on-line recognition process optimally, it must be supported by a reliable and high-quality software application. [1] states that high-quality interactive software can be reviewed from soundness, usability, motivating, visually stimulating, flexibility, reliability, and useful, as listed in Table 1.

Table 1. The dimension of High-Quality Interactive software

Soundness	Accuracy, validity, and completeness of the content
Usable	The time required by the user to run the program without errors.
Motivating	The ability of the program to motivate and involve user participation

Visually Stimulating	The ability of the program to capture visual stimulation
Flexible	Flexible interactive software
Reliable	Consistent and free from "bugs"
Useful	The program is full of benefits for the user

According to McCall, the factors that affect software quality can be observed from three aspects, namely product transition, product operation, and product revision. Product operations include correctness, reliability, reusability, integrity, and efficiency. Product transitions include portability, reusability, and interoperability. Product revisions include maintainability, flexibility, and testability [2].

In addition to the quality aspects that need to be considered in the design of interactive software, testing of system reliability also needs to be performed. Some forms of testing that can be used are testing: unit, system, volume, integration, and acceptability [3].

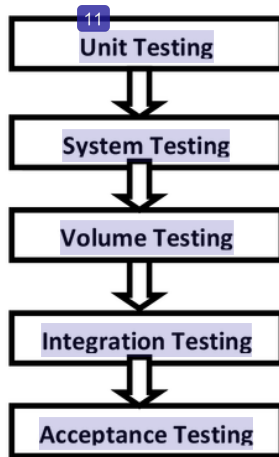


Figure 1. Types of information system testing

[4] divides acceptance testing into two types namely alpha testing and beta testing. Alpha testing is conducted on the developer's side by a user. The software is used in natural settings with developers "who look" through the user side and record all errors and usage problems. Beta testing is carried out on one or more customers by end-users in the actual environment, program developers are usually not in this test. The user records all problems (real or imaginary) encountered during testing and reports to the developer at specified time intervals. Linkages between systems are presented in Figure 2.

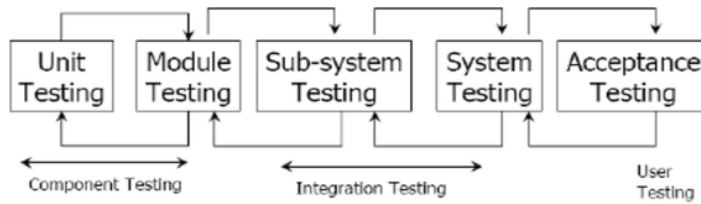


Figure 2 Linkages between system testing

1.1 Black-Box Testing

Black Box testing is sometimes called behavioral testing or partition test that focuses on the functional specifications of the software. This means that the main purpose of Black Box testing is to the functional aspects of a software system [2]. This test allows system analysis to obtain a set of input conditions that will do all the functional needs of the program. The purpose of this method is to find: 1) Function that is wrong or missing; 2) Error in the interface; 3) Errors in data structures or database access; 4) Performance error; 5) Error initialization and final destination. Furthermore, questions that can be answered through Black Box testing are: 1) How are the functions tested so that they can be declared valid ?; 2) What kind of input can be used as a good test case materials ?; 3) Is the system sensitive to certain inputs ?; 4) How can a set of data be isolated ?; 5) How much data is the average and how much data can the system handle ?; 6) What effect can a combination of data have on a specific system operation?

Based on several studies of software testing systems as stated by [1], [2], and [3], not all aspects of the determinants of software quality criteria are used in this study. These aspects are adapted to the needs and complexity of software programs developed in the online ReWELO system. The aspects that will be examined as the object of testing in this study consisted of soundness, motivating, correctness, reliability, reusability, integrity, reusability, security, maintainability, flexibility, quality design stability, and effectiveness.

Functionality testing of the software system is tested with Black Box testing viewed from the user's aspect called beta testing [4].

2. Method

The on-line ReWELO system development was carried out through design activities with the following stages: (a) Pre-development of the system; (b) System analysis and simulation; (c) System design; and (d) System testing, expert testing, and user testing [2]. Furthermore, the implemented steps from the above stages were [5]: (a) Literature study, (b) Data collection, (c) System design, (d) System development, and (e) System testing and analysis.

2.1 Validity and Reliability of the On-Line ReWELO Questionnaire

The questionnaire used to determine the performance of the online ReWELO system was validated through expert judgment while the reliability was tested using the Cronbach Alpha testing. The validity testing results of the questionnaire for Information Technology (IT) experts are as follows:

Table 2. Validity Testing of the Instrument for IT Experts

Validator	Instrument Validation Results
Expert Judgment 1 (RUS)	Feasible to be used with minor revisions
Expert Judgment2 (ACN)	Feasible to be used
Expert Judgment 3 (MKH)	Feasible to be used with minor revisions

The reliability testing results of the on-Line ReWELO system instrument for IT Experts are presented in Table 3.

Table 3 Reliability testing of the instrument for IT experts

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Case Processing Summary

		N	%
Cases	Valid	3	100.0
	Excluded	0	.0
	Total	3	100.0

Reliability Statistics

Cronbach's Alpha	N of Items
.936	30

- 2
Alpha < 0.7 : Inadequate
Alpha ≥ 0.7: Good
Alpha ≥ 0.8: Excellent

Based on calculations using the Cronbach Alpha formula as seen in Table 3, the reliability coefficient was 0.936. This indicated that the instrument was considered as excellent and reliable as an instrument. The results of questionnaire validity testing for users (assessors and candidates) are as follows

Table 4. The validity of the ReWELO website instrument for users (assessors and candidates)

Validator	Instrument Validation Results
Assessor 1 (JKL)	Feasible to be used
Assessor 2 (HSP)	Feasible to be used with minor revisions
Assessor 3 (HTO)	Feasible to be used with minor revisions
Assessor 4 (NHY)	Feasible to be used

The reliability test results of the On-Line ReWELO system instrument for users (assessors and candidates) are as follows:

3
Table 5. The reliability of the Rewelo website instrument for IT experts
Case Processing Summary

		N	%	Reliability Statistics	
Cases	Valid	4	100.0	Cronbach's Alpha	N of Items
	Excluded ^a	0	.0	.863	22
	Total	4	100.0		

- 2
Alpha < 0.7 : Inadequate
Alpha ≥ 0.7: Good
Alpha ≥ 0.8: Excellent

Based on calculations using the Cronbach Alpha formula as shown in Table 5, the reliability coefficient was 0.863. This means that the instrument or the ReWELo website questionnaire has excellent reliability.

3. Results and Discussion

3.1 Display of the ReWELo On-Line Website

The appearance of the on-line ReWELo website can be seen by visiting the site of www.rewelo.info. The first display that can be visited is the Main Page as seen in Figure 3. The component of the Main Page or often called Home, consists of 3 parts, namely the head of the website or header, the middle or contents and the foot of the website or footer.

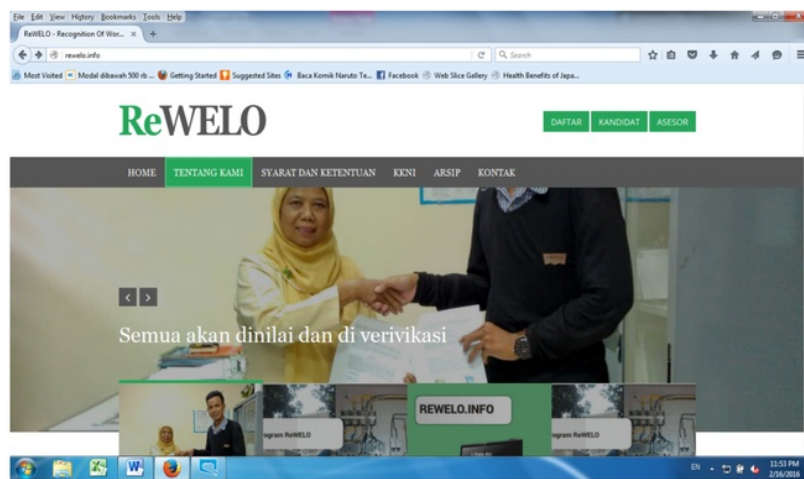


Figure 3 Display of the Main Page of the on-line ReWELo website

In the Main Page image, there is some information and navigation buttons. The information displayed includes visitors being able to access recognition methods that can be done off-line or online, a list of the newest members, and news related to ReWELo as shown in Figure 4.

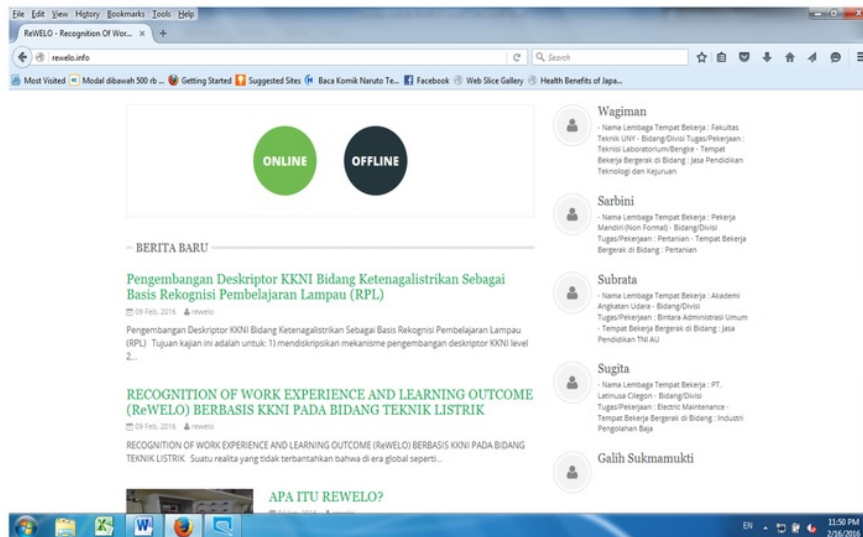


Figure 4. Content of the Main page

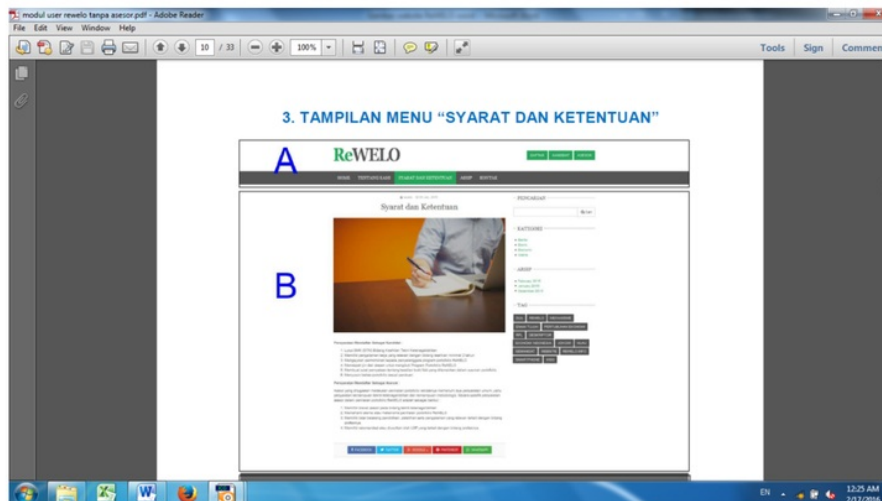


Figure 5. Display of the "Terms and Conditions" sub-menu of the ReWELo website

The "Terms and Conditions" page as shown in Figure 5 contains information about the requirements for assessors and candidates to be accepted as members of the ReWELo website. The image also displays several navigation buttons such as "Category, Archive, and Tag".

The login form for the assessor can be seen in Figure 6 below. To access the ReWELo website according to the rights granted, firstly the assessor must log in. In the login form, the assessor needs to enter the same email or username and password when registering as the assessor.

If the username and password entered in the login form are correct, the assessor can access the page or further information, for example, the list of candidates, candidate portfolios, candidate details, and so on as explained in Figure 6.

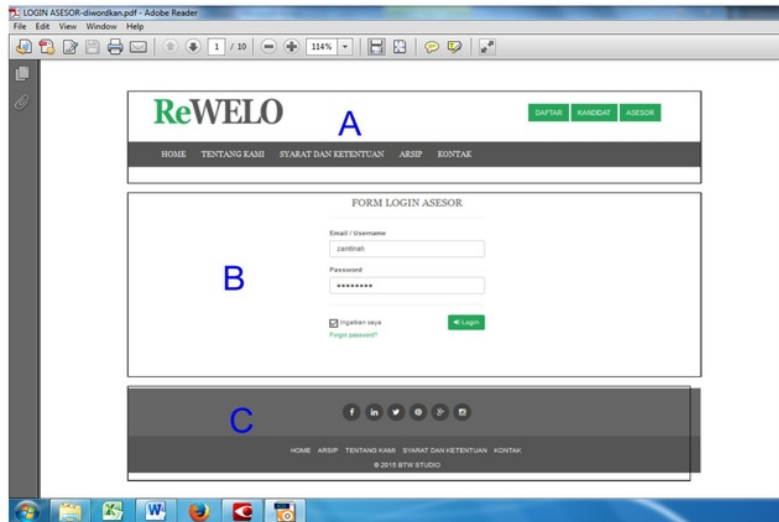


Figure 6. Form login for assessors

The login form for the candidate can be seen in Figure 7. To access the ReWELo website according to the rights granted, the candidate must log in first. In the login form, candidates need to enter the same email or username and password used for the registration.

If the username and password entered in the login form are correct, then the candidate can access the page or further information, for example, the candidate's data, candidate portfolio, candidate details, candidate portfolio updates.

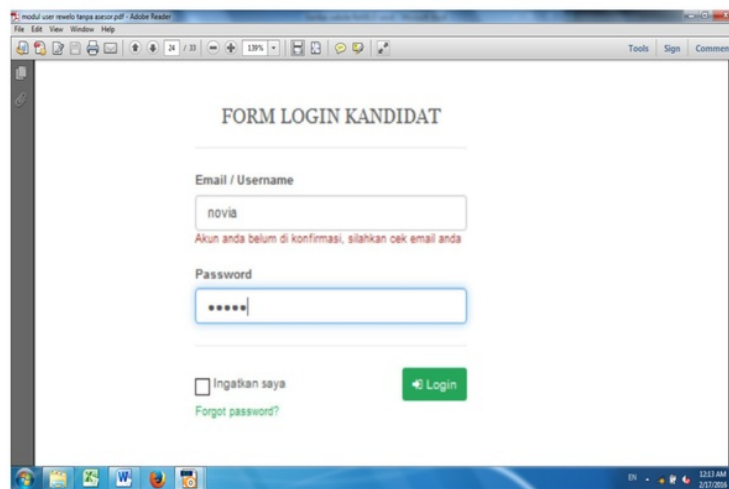


Figure 7. Form login for candidates

3.2 The Feasibility of the ReWELo Website

The feasibility of the ReWELo Website was tested by IT experts, practitioners, users of assessors, and users of candidates. The tested aspects of the feasibility of the ReWELo Website

consisted of soundness, usable, motivating, visually stimulating, flexible, reliable, and useful. Figure 8 shows the respondents' assessment of the feasibility aspects of the ReWELO Website.

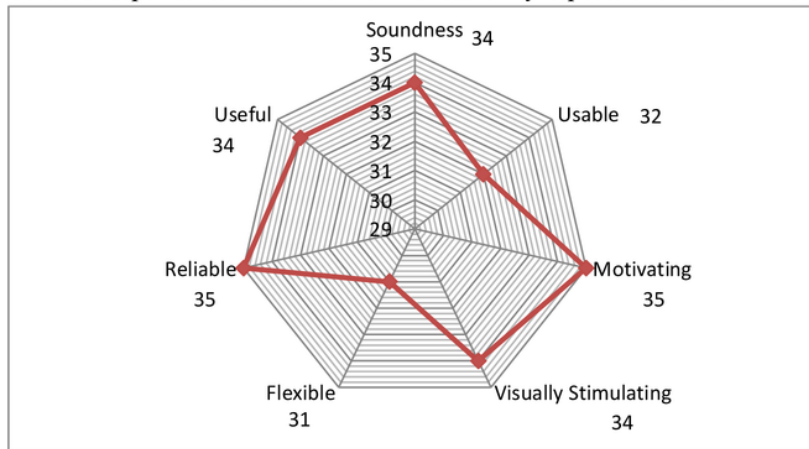


Figure 8. Respondents assessment of the aspects of the ReWELO Website

Furthermore, the respondents' assessment of the overall feasibility of the ReWELO Website can be seen in Figure 9.

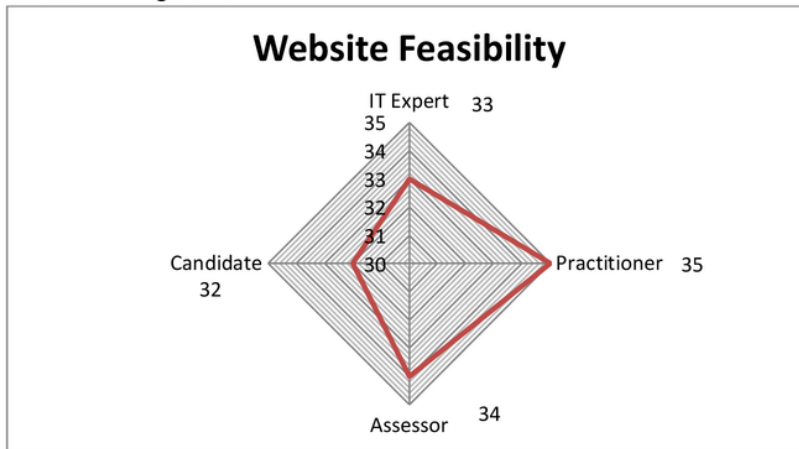


Figure 9. The Feasibility of the ReWELO Website

5

3.3 Black Box Testing Testing

Black Box testing was carried out to test whether the system worked by the planned functions. This test included testing the navigation buttons, functions that can be accessed by users, both admin, assessors, and candidates. In other words, users of this system can run the system following the access rights they have.

Black Box testing conducted by the admin included trial forms for Login, Main Page, Article Content Settings, Page / Page Settings, Image Settings, Slide Show Settings, Display Settings, Assessors Settings, and Contact Settings. Black Box testing for assessors included testing the Login Form and the

Main Page. Next, the test forms for candidates are the Registration, Login, and Main Pages. Figure 10 shows the results of the black box testing for all three users (admin, assessors, and candidates).

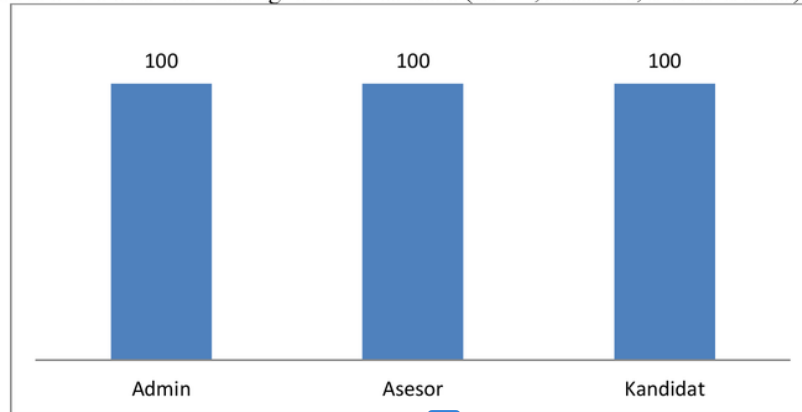


Figure 10. Functional Test of the ReWELO System

Based on Figure 10, the results of the black box testing of the system functions from the online ReWELO website met the desired plan. This was indicated by the percentages of 100% by the admin, assessors, and candidates. This means that all forms tested in the online ReWELO system can function according to the designed scenario, namely Login, Main Page, Article Content Settings, Page / Page Settings, Image Settings, Slide Show Settings, Display Settings, Assessors Settings, and Contact Settings. Black Box testing for assessors included testing the Login Form and the Main Page.

4. Conclusions

The performance evaluation of the ReWELO website consisted of page display performance, black-box testing, and performance assessment by IT experts, assessors, and candidates. The display of the ReWELO on-line website can be seen by visiting the site of www.rewelo.info. The first display that can be visited is the Main Page or often called Home, consisting of 3 parts, namely the head of the website or header, the middle or contents and the foot of the site or footer. Overall the results of the display design assessment achieved the desired plan.

Black Box testing was carried out to test whether the system worked in accordance with the planned functions. This test included testing the navigation buttons, functions that can be accessed by users, both admin, assessors, and candidates. In other words, users of this system can run the system by the access rights they have. The Black Box testing results of the system functions of the online ReWELO website achieved the predetermined plan.

5. References

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