

Online test application development using framework CodeIgniter

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Abstract. The purpose of this study is developing application *an online test* for vocational students and to know the *user acceptance testing* on the application. The method used in this research is the *Research and Development* (R & D) only up to the pilot phase of the product. The stage of the procedure of the research namely: (1) Analyze the exam using paper compared to using web-based application *test* online. (2) Design the media in accordance with the design of the author. (3) To test the product by including a questionnaire instrument against the application that has been done. Researchers carried out tests on class X on the computer and network engineering Vocational High School (SMK) Darul Ma'wa Plumpang. It can be concluded that: (1) application *online test* was created gets the value of the validator with the percentage of lowest value and the highest value for the validation of products: 25% and 100%. With a total number of 14 questions, after validation of the products obtained from the three aspects of the assessment scale from 81.25 to 100 obtained from 2 different validators with the meaning of an application that has been developed and very suitable for use in school. (2) Based on *User Acceptance Testing* (UAT), applications can be very well received by the students and recommend to replay the final semester and others. With the successful acquisition of a category which means it's ready and qualified.

1. Introduction

The growth of information systems is currently very fast and rapid, so it offers a convenience and comfort for the user. It can be seen from various activities that are organized by an information system. Therefore, we try to create an information system and an application to explore the challenges and sophistication of existing application programs. This study begins with the relevant research conducted by [5] entitled "Application Exam Online at International School Stubs (RSBI) Public High School (SMAN) 2 Mojokerto" and [7] entitled "Application Design Simulation TOEFL (Test of English as Foreign Language).



With the problems and the relevant research mentioned above, the researcher attempts to implement Development of Test Online by Using CodeIgniter Framework in SMK Darul Ma'wa Plumpang on the subject of Basic Network for class X. The purposes of this research are: (1) Determining the validity of the online test application development using CodeIgniter framework in SMK Darul Ma'wa Plumpang on the subjects of Basic Network for class X (2) Knowing user acceptance testing on online test applications.

According to [4], *CodeIgniter* is a *web framework* for the PHP programming language, created by Rick Ellis in 2006, inventor and founder of Ellis Lab (www.ellislab.com) [4]. EllisLab is a work team which was established in 2002 and engaged in the manufacture of *software* and *tools* for web developers. Since 2004 until now, EllisLab has awarded ownership rights of *CodeIgniter* to the British *Colombia Institute of Technology (BCIT)* to further the development process. Currently, the official website of CodeIgniter has changed from www.ellislab.com to www.codeigniter.com.

Online test application or online exam application is an application used to perform the test without using the paper process or can be called as *Computer Based Test (CBT)* or *Computer Assisted Test (CAT)*. All test process is done through computers, ranging from constructing questions, classroom settings, user settings which can take the exam, setting teachers teaching, until the examination process, by utilizing web engineering technology. The type of questions that can be included in the online exam application is a multiple choice questions type [10].

2. Method

Type of research used in this study is a research and development (*R & D*) stated that methods of research and development are a research method that is used to produce a specific product and test the effectiveness of the product [8].

Sugiyono divided the various stages of research and development into 10 stages: (1) the potential and problems, (2) data collection, (3) the design of the product, (4) design validation, (5) design revisions, (6) test products, (7) product revision, (8) utility testing, (9) the revision of the product and (10) the mass production [8].

2.1 Stage Potential and Problems

The first stages are to analyze the potential and problems. Potential is anything that if it is utilized, it will have an additional value. In this case, it is an online based test. SMK Darul Ma'wa Plumpang has been supported by laboratory capable enough to implement a computer-based test, but it still uses the conventional exam. Therefore, this potential needs to be raised.

2.2 Data collection phase

Once the problem can be demonstrated factually, the next step is to gather information that can be used as product planning. The steps are made by the author:

1. Perform initial observation. It has been conducted by the researchers by doing the interview. Conducted studies on various ways of making online-based exams from various books on web programming, especially the book on the CodeIgniter framework.
2. Information obtained from the Professional Teacher Program (PPP) and the study will be used to create media-based test online.

2.3 Stage Product Design

After seeing the potential or problems and gathering information, the next step is to create a product design that will be developed i.e. computer-based exam through *online* exam using multiple choice questions. With the allocation of the following values:

- Values Multiple Choice

$$pg = \frac{\sum \text{jawaban benar}}{\sum \text{soal pg}} \times 60 \quad (1)$$

2.4 Data Collection Techniques

The study used two data collection techniques that is by way of validation to the experts as a validator and evaluation of learning outcomes that perform tests.

2.4.1 Validation. Validation is the process of collecting data on the feasibility of teaching materials and applications obtained previously reviewed with SMK teachers and expert lecturers based on the assessment of the validator. With reference to the validity of the content and application test *online* developed.

2.4.2 Test. The test is a series of questions or exercises and other tools used to measure skills, intelligence knowledge, talents possessed by individuals or groups [13]. Students' answers obtained from the test will be corrected in two ways: manual (teacher-corrected) and automatic ways (corrected by the online system). The correction result will be converted to a value ranging from 0-100. Furthermore, the value of manual and automatic correction result compared with using t-test to know the significance of the difference of both. Thus, it can be written

1. Variable 1 = Automatic correction Result
2. Variable 2 = Manual correction Result

That has been given treatment from the control class and experimental class.

2.5 Data Analysis Techniques

Data analysis conducted by researchers are as follows:

2.5.1 Expert Analysis Applications. From validation, sheet will be obtained by the researcher validity of online exam application done by experts by providing valid response criteria. For validation data analysis applications used the same calculation, i.e. using descriptive statistical rating as follows:

- a. Determination of the size of the study along with the weight value. The determination is as follows:

Table 1 Scale Rating [8]

Category	Percentage (%)	Weight
Invalid	0-25	1
Less Valid	26-50	2
Valid Enough	50-75	3
Valid	75-100,	4

- b. Specifies the maximum score validator

The determination is conducted by multiplying the number of validator/respondent with the highest value weighted on the qualitative assessment. The formula used as table 3:

Table 2 Scale formula [10]

Valid	Nx4
Enough Valid	Nx3
Less Valid	Nx2
Invalid	Nx1
Score Validation

2.5.2 Validation of Grain Problem. The research instrument is filled by a material that teachers of subject basic network class X to obtain opinions and feedback on the initial media used during the test or quiz taking place, so we get a decent medium to be applied. Validation of the application used the same

calculation, i.e. using descriptive statistical rating for determining the size of the study along with the weight value.

2.5.3 Analysis of the application acceptance students (User Acceptance testing). User acceptance test (UAT) is a process of testing by users who are intended to produce documents used as proof that software which has been developed to be accepted by the user if the results of the testing can be considered to meet the needs of the user [13].

2.5.4 Algorithm Problem Scrambling. The algorithm used in the scrambling problem is the *order by rand* which is *syntax* contained in the *SQL* that is used to display the results of *record* randomly. The algorithm is placed in the *syntax quiz_model*, so as to make the matter in accordance with the desired randomization. Standard used in the manufacture of these online test is such a national test in the sense that students can work on the problems with randomization matter though selecting the same number.

Explanation of randomization question stems from the decision process *database* later in the *query* tables that *savesoft_category* and choose a matter on a question bank with a table named *savesoft_qbank* and choose the level of questions that are available (level 1, 2, 3). Level 1, 2, and 3, namely the level of easy, medium and hard. Then the results of *random* questions in the table stored *savesoft_result* in *fields* or columns *r_qids*. The contents of the column *r_qids* are all about exams.

Online exam can be used on each PC installed with *browser* exam. Students are unable to see or access another application unless the application online exam only.

3. Results and Discussion

3.1 Results Research

This aims to create an application to support the implementation of exams on the subjects of the basic network in Network and Computer Engineering Department and determine the feasibility of application *Test Online* created as a means to test. The results also present a description of the results of validation in the form of media validation and validation problems.

3.1.1 Online test. Application *online test* is an application used to perform the test without using the paper process.

- The first page (homepage). It is the initial page when entering sites *test online* that allow users to be able to do the exam through *logging in*.
- The main page. It is the initial page of the application after the user has logged in, beginning at page contains quiz that has been created by admin and has already done by the user.
- Account page. This page contains the biographical data that has been registered account. These users can change the bio-data and fill as desired.
- Page quiz. Page quiz is a page for users to work on the problems or exams that have been made by the admin. This page is not much different from the main page. Students can directly work on the exam that has been set.
- The results page contains student experiments or users who have completed the exam. In this menu, there is a facility to view all test results that have been completed.
- A page out contains a *log out* so the user can be out of the application or exam. Then, the user will be on the first page.
- Main page admin is a page that contains users who are already registered.
- Admin Page Sub Additional User Menu. This page to add new users.
- Home Admin Menu Sub Users List is useful for the admin page to add a list of users.
- Page Admin Menu Question Bank Sub Add New
- Page Admin Menu Question Bank Sub Questionnaire

- Page Admin Menu Quiz Sub Add New. This page serves to create a new quiz
- Home Admin menu sub-register quiz serves to change quiz that was ready to be done.
- Results page Admin Menu contains test results of students.
- Exit page serves to get out of the admin page.

3.2 Discussion

Making online test application through several stages in research methods, validation research instrument used has a scale of 1-4 values, then the data obtained. Calculation analysis application quality according to product experts. Data have been obtained will be analyzed with the following provisions.

Table 3 Quality Criteria based on tables researchers

Answer Scale	Criteria	Assessment Scale	Scale Ratings (%)
Strongly Good	1	14 to 24.5	25 to 43.75
Less Good	2	24.5 to 35	from 43.75 to 62.5
Good Enough	3	35-4.5	62.5 to 81.25
Very Good	4	45.5 to 56	from 81.25 to 100

3.3 User Acceptance Testing (UAT)

From the table below, it shows that the application can be used in schools and applied to the test. The results of the assessment indicate success validator passed *user acceptance testing*. Assessment is done in accordance with the steps and procedures that have been arranged by the author.

Table 4 ratings based UAT, modified source [13]

No.	Use Case Process	Success / Fail
1.	Test Name: Log Description Testing: Verify the access rights can only be accessed by registered users Test Case - Username - Password Expected results: - If successful will display the main page of the application. - If it fails displays an error message	<i>Successfully</i>
2.	Name Test: Working Quiz Description Testing: The execution of a matter can be done by the user/admin Test Cases: - Working Quiz Expected results: - Users can complete the provided quiz	<i>Successfully</i>
3.	Name Test: Results List Description of the test: See results of workmanship exam. Test Case: Seeing Results Expected results: - Users can view the exam that has been done.	<i>Successfully</i>
4.	Test Name: Edit and delete Test Description: Can modify and delete users who have registered. Test Case: - Edit and delete Expected Results: - Admin can change and delete users who have registered	<i>Successfully</i>
5.	Test Name: Add New User Testing Description: Registration of new users. Test Case: - Entering personal data users	<i>Successfully</i>

	Expected Results: - If successful, the user will be registered as a member / new user.	
6.	Test Name: Add New Questions Test Description: Add Questions Test Case: - Can create a new question. Expected Result: - If successful, there are new issues	<i>Successful</i>
7.	Test Name: Questions Bank Testing Description: The matters: Test Case - Admin can delete the questions and change matter. Expected Result: If successful, item will change and will be deleted	<i>Successfully</i>
8.	Test Name: Add new quiz Test Description: Creates a new quiz Test Case: - Admins can create new quizzes Expected Results: If successful, quiz will appear on the page a list of quizzes.	<i>Successfully</i>
9.	Name Test: Quiz Description Testing: Experiment quiz Test Case: - Trial work on the problems Expected results: If the question, successfully done it can be seen in the results pages	<i>successfully</i>
10.	Name Test: Results Report Description Testing: Seeing Results Reports Test Cases: - View results - Delete users have been working on the exam expected Results: If successful, the user will be deleted	<i>successfully</i>

4. Conclusions

The research conducted in developing online test application using CodeIgniter framework in SMK Darul Ma'wa Plumpang on the subjects of the basic network of class X results in a conclusion as follows: Research produces products in the form of online test applications that can be used in SMK Darul Ma'wa Plumpang. From the validator, it can be obtained from the media expert value of 81.25% which means the application is very valid and can be used. From the validation expert about the aspect of Validation, Content get a *valid* value which means can be used, while the aspect of Language and Writing Problem gets a *very understandable* value which means can be used in testing. According to research by *User Acceptance Testing* (UAT), applications can be received very well by the students and can be used to do the final semester or midterm's exams. With the acquisition of the category, the application is successfully ready and qualified to be tested.

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