Development of Vocational Online Examination: A Case Study of Computer Systems

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Abstract: This study aims to help teachers and students in the administration of examinations which in general in the implementation of examinations still use conventional methods that require considerable time and effort. The study conducted in this study made an online question bank based test. In addition, teachers can upload the questions they have to do online tests for their students. In this system will present value or score that can be seen immediately after students complete the exam. The type of research used is development based on the 4-D model, namely the stage of defining, designing, developing and disseminating. With a limit of 3 stages, namely the stage of defining (designing), the design stage (design), and the stage of development (develop). Finally, according to the validation experts, the bank-based online exam about this matter has been very good. Then for item validation, the questions get very good qualifications. The results of the trial questionnaire conducted obtained good qualifications. By obtaining these percentages it shows that the application can be used as an alternative online test question-bank based easily.

1 INTRODUCTION

The online question-based online exam is an evaluation during the education process. On the other hand, evaluation plays an important role in the world of education. With the evaluation, learners can be known for their development. According to Gronlund (1976: 8) evaluation in education has a purpose: (a) to provide clarification about the nature of learning outcomes that have been carried out, (b) provide information about the achievement of short-term goals that have been implemented, (c) provide input for the progress of learning, (d) provide information about difficulties in learning and to choose future learning experiences. In the school level, the process of evaluating learning outcomes is carried out through direct observation by the teacher which is seen in the teaching process towards students and is assessed through tests or examinations.

2 METHOD

This study uses development based on the 4D model which has 4 stages, namely the stages of defining, designing, developing and disseminating. In this study, it is limited to using only 3 stages, namely the stage of defining (design), the design stage (Design), and the stage of development (develop). Based on the description above, the scheme model of the process of developing a question bank based online exam can be seen in the following figure 1:

Stage 1: Defining Phase (Define)
Defining learning needs by analyzing the goals and boundaries of the material. This stage consists of four main steps, namely: initial analysis (front-end analysis), student analysis (learner analysis), concept analysis (concept analysis) and specification of objectives (specifying instructional objectives).
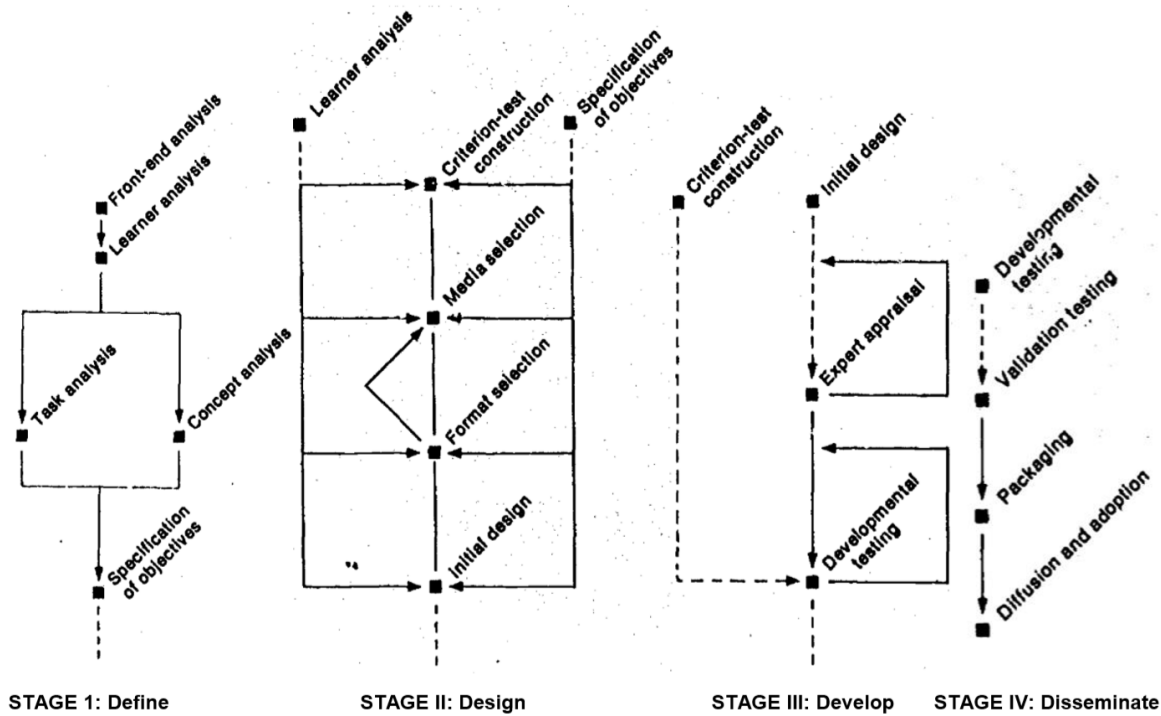
STAGE 1: Define   **STAGE II: Design**   **STAGE III: Develop**   **STAGE IV: Disseminate**

Figure 1. Research using 4D Thiagarajan Model

Stage 2: Design Stage

The design phase aims to design the initial design of a question bank based online exam. The design process begins after the objectives of the learning activities are determined. The following steps at the design stage:
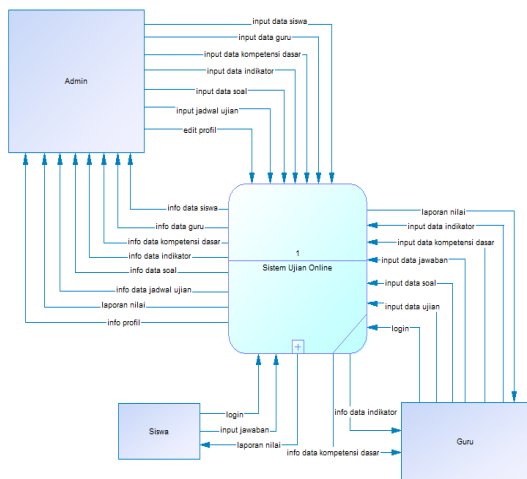
• Designing DFD (Data Flow Diagram)

Figure 2. DFD Level 0

Level 0 DFD or can also be called context is the initial description of the question bank based online exam system. there are three entities involved in the question bank-based online examination system, namely: admin, teacher, and students. Each entity is directly involved with a system that gets output from the online examination system or inputs into the online examination system

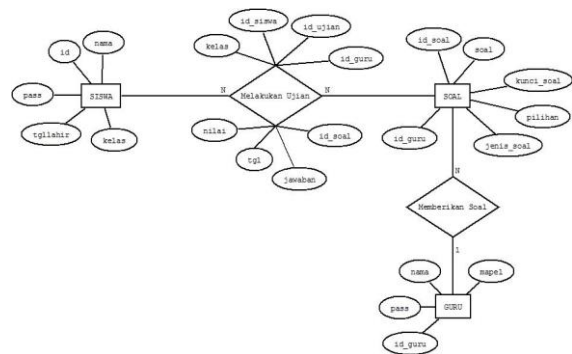• ERD Planning (Entity Relationship Diagram)

Figure 3. ERD Online Test System

From a context diagram that describes the system in general, then to understand the relationship between entities can be explained through ERD (Entity Relationship Diagram). ERD explains the relationship between data in a database system based

on a perception that "real world" consists of basic objects that have a relationship between these objects. In the ERD above consists of three entities, each of which has attributes that complement it

Flowcharts for student pages that are useful for displaying questions, answering questions, saving questions that have been answered and displaying the final value of the questions that have been answered, as figure 4.
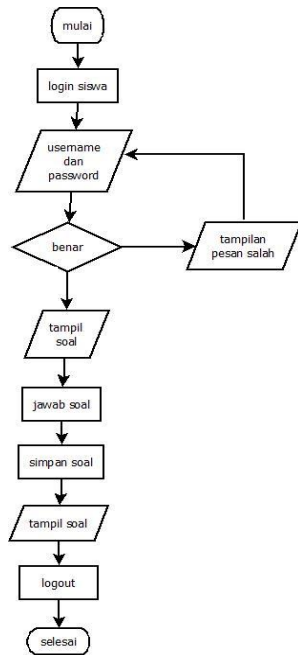

Figure 4. Student flowchart

Stage 3: Development Stage (Develop)
The purpose of the development stage is to produce a product in the form of an online question-based bank exam that has been revised based on expert input and data obtained from the results of the trial. The following is a description of the steps:
• *Expert validation*
Appraisal of experts is a technique for obtaining inputs for improving the quality of the question bank based online exam. Revision
•*Trials*
The trial aims to measure the useful aspects of the website that have been developed. The trial was applied to students in class X Basic Network 1 as many as 36 students.
• *Analysis and Reporting*
This stage is the final stage in conducting research. After all the stages have been completed, the next step is to analyze the reporting data on the results of the research conducted by the researcher.

After calculating the percentage of the results of the validation of the research tool, then it will be seen the feasibility of using the criteria found in Table 1.

Table 1. Interpretation of the score validation

Category	Weighting Value	Percentage Rating (%)
Very Valid	4	82-100
Valid	3	63-81
Valid Enough	2	44-62
Invalid	1	25-43

3   RESULTS AND DISCUSSION

Referring to the design of DFD (Data Flow Diagram), ERD (Entity Relationship Diagram), Flowchart and design that has been made, along with the results of its implementation.

Admin Main Page displays the homepage, teacher data, student data, basic competencies, indicators, tests, grades, my profile and exits. Here the admin is given full rights to manage online examinations. The page below as figure 5 shows the test value by clicking on the value button on the main page,
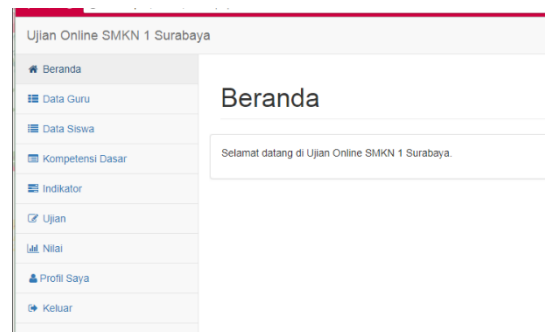

Figure 5. The test value page

The first validation process is media validation which has four aspects of assessment, namely the appearance aspect of the website gets 81.6%, can be categorized very well, in the dynamic aspect the percentage of feasibility reaches 95.8% is categorized very well, while the interaction aspect gets 85.4% and the variation aspect gets a percentage of 100%, this is categorized very well based on the validator rating

scale. From all percentage aspects assessed, it can be categorized as very good based on the research instrument rating scale table.

The format of the item validation has two aspects of assessment, namely content validation, language and question writing. From the two assessments the items that have been published in the online exam get a very good rating category with a percentage of the average score of 90.01% for aspects of content validation and 92.5% for aspects of language and question writing.

From the results of student questionnaire response validation by experts obtained 87.96%, which means that the feasibility of the response questionnaire to be given to students included in the excellent category.

The results of student responses based on questionnaires that have been given to students after evaluating using online examinations got a percentage of 83.3% which falls into the very good category. By obtaining the percentage, it shows that students can use the online question-bank based exam easily.

4 CONCLUSIONS

Based on the results of the analysis and discussion of this study, it can be concluded that the results of the question-bank based online exam media validation were 81.6% for the display aspect, 95.8% for the dynamical aspect, 85.4% for the interaction aspect and 100% on the aspect variation. In general, according to the validation experts, the bank-based online exam about this matter has been very good. Then for the validation of the items got an average percentage of 90.01% for aspects of content validation and the average percentage of 92.5% for aspects of language and writing questions that can be categorized very well. For the results of student responses obtained a percentage of 83.3% which can be categorized as good. By obtaining the percentage, it shows that students can use the online question bank based exam easily.

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