



Developing of Online-Based Mathematical Evaluation Instruments

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Abstract

The purpose of this research is to create a mathematical evaluation tool that has been scientifically tested so that it is declared feasible and practical for use in the evaluation process. This research is a research development (Research and Development) and the research model used is the Plomp model which consists of four stages, namely: initial investigation; design stage; realization; tests, evaluations, and revisions. The software used to develop the evaluation tool is *Ispring Suite*. In terms of data collection, the research instruments used were material validation sheets, media validation sheets, and student assessment response questionnaires. The validation results of the material validator get the final percentage of 84% with the criteria feasible. The validation results from the media validator get a final percentage of 80% with the feasible category. In the assessment of students, the final percentage was 83% with very attractive criteria. It is concluded that the evaluation tool in the form of an online test developed is very suitable for use as an evaluation tool in mathematics learning.

Keywords: *learning, evaluation, computer-based evaluation*

A. Introduction

Education is very important and needed for every individual. Because of the importance of education, 12 (twelve) years of compulsory schooling are implemented in Indonesia. The educational process itself is deliberate guidance to each individual so that the individual can

achieve a higher level of life than before. With education, a person will have knowledge, skills, values, attitudes that will later be useful for oneself and others. Education is usually marked by a learning process so that students can develop their potential to face changes in the development of science and technology.

Currently, the development of science and technology has made very rapid progress. The development of technology certainly has an impact on various changes in all aspects of life. One aspect that has an impact on technological development is the world of education. The development of technology in the world of education today certainly has its own role in the process of teaching and learning activities, wherein the teaching and learning process the development of technology is expected to be able to provide change and a better impact on learning. Generally, the use of technological developments that are often used in the world of education is the use of computer technology in making learning media that can facilitate educators in delivering material, for example in the form of presentation media in the form of Microsoft PowerPoints.

Technological developments should be utilized more optimally to improve the quality of learning, especially in computer technology and the internet. The use of computer technology is not only used as a learning medium but can also be used in the evaluation process in learning. However, the use of computer technology itself is still not optimal for educators. For example, MTS Negeri 2 Kolaka still uses a manual or conventional evaluation system, namely paper-based evaluation. Even though there have been many academics, both from teachers, lecturers, and researchers, who have developed a computer-based evaluation system.

To make computer-based questions, you don't have to have mastery of the program language skills. Currently, there is a lot of software that can be used to create computer-based and even android-based questions without having to have program language skills. The software, among others, Wondershare quiz creator, Ispring suite, Kahoot, google classroom, and others.

Several previous researchers who developed computer-based evaluation questions using Wondershare quiz creator include (Candra Rolisca & Achadiyah, 2014) (Purnamasari & Rochmawati, 2015) (Pratiwi, 2016) (Dafitri, 2017) (Iqbal et al., 2018) dan (Nasrum, 2020). The use of this software is very easy and can produce evaluation applications both offline and online. Offline applications can only be opened using a computer or laptop, cannot be opened using a smartphone/gadget because the output is a flash file. If you want to make evaluation questions that can be opened with Android, the right software is Kahoot (Dewi et al., 2018). Besides that, another application that is no less interesting is Ispring Suite. This application can not only be used to make evaluation tools but also can be used to create learning media. Several previous researchers used the Ispring Suite in the implementation of the online evaluation process such as (Cahyanti et al., 2019), dan (Rovita et al., 2020).

Some of the advantages of computer-based evaluation are that it allows giving questions to each student differently because it has the facility to randomize questions. Facilities like this are very useful in minimizing the occurrence of fraud. This is difficult to do when using conventional evaluation. It is not impossible but not as easy as if the implementation is computer-based. In addition, another weakness of conventional evaluation is that the planned time allocation does not match what happened at the time of the evaluation. Assessment errors can also occur during the process of correcting students' answers because educators are less focused when correcting answers. These weaknesses can be overcome by developing computer-based evaluations.

From these problems, we will develop a conventional evaluation process to an evaluation that can be done online. This online evaluation can certainly make it easier for teachers in the assessment process. The exam process takes place according to the set time and the teacher does not need to take the time to check the questions because once the questions have been answered, the student's scores are immediately visible and will automatically be sent to the teacher's email. The software used in developing online-based questions is Ispring Suite version 9.0

The Ispring Suite was chosen because of its ease of operation. Has a familiar interface feature. Provides various types of questions, ranging from True/False, Multiple Choice, Multiple Response, Type-In, Matching, Sequence, Numeric, Fill in the Blank, and Multiple Choice Text.

Version 9 has advantages over the previous version. For the previous version, the equation feature cannot be used while in version 9 it is functioning properly. Of the many software we have tried, only Ispring version 9 is capable of producing math typing such as typing in Microsoft word or in PowerPoint.

From the above study, the researcher is interested in conducting research by developing an evaluation tool that uses the Ispring Suite as a tool in the evaluation process at MTS Negeri 2 Kolaka.

B. Methodology

This research is a research development (Research and Development / R & D). In this study, the research model used is the research model proposed by Tjeerd Plomp or known as the Plomp model. This model consists of four phases, namely 1) initial investigation, 2) design, 3) realization, 4) testing, evaluation, and revision (Rochmad, 2012). The subjects in this study were students of class VIII MTs Negeri 2 Kolaka.

In the initial investigation stage, we observed the evaluation system used in schools, supporting facilities and infrastructure, and the level of student readiness. In the second stage, the evaluation tool began to be designed in accordance with the information obtained from the initial stage. This design stage includes material selection, application interface display, question display settings, timing, and so on, including selecting the appropriate software. The third stage is the stage of making an application in accordance with the design that has been made. After the application is finished, the feasibility of the application is tested by the media validator and the material validator through the research instrument. There are three instruments in this study, namely the material validation sheet, the media validation sheet, and the student response questionnaire. The results of this instrument were analyzed and used as the basis for revision/improvement.

After being declared feasible, the evaluation tool was tested on students. If there are still mistakes in writing the questions, or other things that are considered wrong by students, then improvements will still be made. In the final step, a response questionnaire was given to students to find out their responses to the evaluation tools used.

C. Findings and Discussion

1. Initial Investigation Phase

This phase is the initial stage before designing a learning evaluation tool, based on the observations that have been made at this stage the researchers found that the evaluation system running in the school still uses manual techniques or paper-based evaluations, while the school is equipped with computerized tools that can be used. to develop an evaluation process. From these problems, the researcher then plans a solution in the form of developing a manual evaluation tool to evaluate using a question maker software using the Ispring Suite. Before stepping into the evaluation tool design phase, the researcher first analyzes the students who will be the subjects in the research to assist in the process of making evaluation tools. Student analysis is an analysis of the characteristics of students in accordance with the design of the evaluation tool development. The results of the analysis of students at MTs Negeri 2 Kolaka are:

- (1) Class VIII students of MTsN 2 Kolaka already know and study the material that will be used in the evaluation tool.
- (2) Class VIII students of MTs Negeri 2 Kolaka basically have the ability to do online questions, but there is still rarely an evaluation tool that is deliberately designed to train these students' abilities. So an evaluation tool is needed that can train students' abilities to work on questions that are designed using an online question maker application.

2. Design Phase

Based on the results of the analysis from the initial investigation phase, the evaluation tool quiz display design will then be developed. The following are some of the steps that are carried out in this phase.

Questions Design

The results of the initial design at this stage include the design of the questions that will be used and entered in the Ispring Suite application. The design of the questions can be seen in the following pictures.



Figure 1. The online test design for multiple-choice and true/false types of questions

To obtain data about the process and results of developing appropriate learning evaluation tools, it is important to prepare research instruments. The research instrument designed in this phase is the validation sheet for the validator in the form of a validation sheet for the questions to be used in the study and a validation sheet for evaluation tools and a student response questionnaire to the developed evaluation tools. Validation is used to test whether or not the evaluation tool is in the form of an online test conducted by a team of assessors (validators). This time the validation was carried out using a checklist in the form of a questionnaire.

3. Realization Phase

In this phase, a learning evaluation tool has been produced based on the design that was made in the previous phase. In this phase, the evaluation tool that has been produced has not been validated by the validator. Here are some views of the results of making evaluation tools with Ispring Suite.

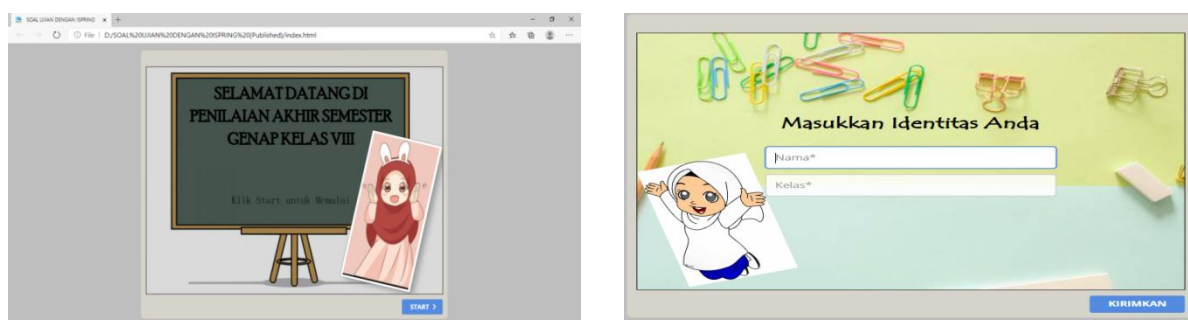


Figure 2. Initial Display of Ispring Suite Problem Design and When Entering Identity



Figure 4. One of the Display Questions and Results after completing the Problem

Some of the pictures above are the result of making a mathematical evaluation tool using the Ispring Suite software. In this phase, apart from producing an evaluation tool, an instrument is also produced in the form of a validation sheet for evaluation tools and a student response questionnaire to the evaluation tool that will be used in the next phase.

4. Fase Tes, Evaluasi dan Revisi

In this phase, validation is carried out by evaluation experts. The results of the validation are in the form of expert considerations regarding the evaluation tools that were made in the previous phase. The validation technique is carried out by asking experts to fill out a questionnaire that has been made, tick marks on the appropriate aspects, and complete notes on points that need to be corrected along with suggestions and suggestions. The results of the validation of the mathematics learning evaluation tool can be seen in table 1.

Based on the results of data processing from the distribution of questionnaires validated by material experts, the average score is 84%, this score includes the interval interpretation criteria of $80\% < x \leq 100\%$ categorized as "Very Feasible".

The results obtained from the processing of the media expert questionnaire obtained an average score of 80% with interpretation criteria with an interval of $60\% < x \leq 80\%$ with the "feasible" category.

Table 1. Validation Results by Material Validators

Assessment Aspects	Criteria	V1	V2	Vtot	Percentage	Information
Curriculum	1	4	4	8	80%	Good
	2	5	4	9	90%	Very Good
	3	4	4	8	80%	Good
	4	4	5	9	90%	Very Good
	5	3	4	7	70%	Good
	Average				82%	Very Good
Substance	1	4	4	8	80%	Good
	2	4	5	9	90%	Very Good
	3	4	5	9	90%	Very Good
	4	4	4	8	80%	Good
	Average				85%	Very Good
Evaluation	1	4	4	8	80%	Good
	2	4	5	9	90%	Very Good
	Average				85%	Very Good
Final Average				84%		Very Good

Data Sources: Processed from the Results of Material Expert Validation Questionnaires for an Online Test Evaluation Tool Using the Ispring Suite Application

Table 2. Results of the Validation of Evaluation Tools by Media Validators

Indicator	Criteria	V1	V2	Vtot	Percentage	Information
General Aspects	1	4	4	8	80%	Good
	2	3	4	7	70%	Good
	3	4	3	7	70%	Good
	4	4	5	9	90%	Very Good
	Average				78%	Good
Presentation	1	3	3	6	60%	Cukup
	2	5	5	10	100%	Very Good
	3	3	4	7	70%	Good
	4	4	5	9	90%	Very Good
	Average				80%	Good
Display Design	1	4	4	8	80%	Good
	2	3	4	7	70%	Good
	3	3	4	7	70%	Good
	4	4	4	8	80%	Good
	Average				75%	Good
Accessibility	1	5	4	9	90%	Very Good
	2	5	5	10	100%	Very Good
	3	4	5	9	90%	Very Good
	4	4	4	8	80%	Good
	Average				90%	Very Good
Use of Language	1	4	4	8	80%	Good
	2	4	4	8	80%	Good
	3	4	3	7	70%	Good
	Average				77%	Good
Final Average					80%	Good

Data Sources: Processed from the Results of a Media Expert Validation Questionnaire for an Online Test Evaluation Tool Using the Ispring Suite Application

After the evaluation tool is validated by the media and material validator, it is followed by the trial phase. The aim is to see the use by students as well as to find out the student's response to the tool. This trial phase was held in November-December 2020, with 18 students. After students take the online test using the Ispring Suite application, each student is given a response questionnaire to the evaluation tool to see the attractiveness of the evaluation tool that has been made. The assessment technique is done by asking students to fill out a questionnaire that has been provided. The results of student assessments of the Ispring Suite evaluation tool can be seen in table 3.

No	Indicator	Percentage	Criteria
1	I am interested in working on problems with a computer/laptop and android	86%	Very Good
2	I am happy to be introduced to the software to carry out the learning evaluation process	85%	Very Good
3	I enjoy using an evaluation tool that uses the Ispring Suite application	81%	Very Good
4	I enjoy working on problems using the Ispring Suite evaluation tool	80%	Good
5	I am interested in working on problems with a computer/laptop and android	78%	Good
6	I am happy to be introduced to the software to carry out the learning evaluation process	76%	Good
7	I enjoy using an evaluation tool that uses the Ispring Suite	81%	Very

	application		Good
8	I enjoy working on problems using the Ispring Suite evaluation tool	84%	Very Good
9	I am interested in working on problems with a computer/laptop and android	81%	Very Good
10	I am happy to be introduced to the software to carry out the learning evaluation process	75%	Good
11	I enjoy using an evaluation tool that uses the Ispring Suite application	94%	Very Good
12	I enjoy working on problems using the Ispring Suite evaluation tool	91%	Very Good
Average		83%	Very Good

D. Discussion

After going through a fairly long process, finally obtained an evaluation tool that can be used as a mathematics evaluation tool at MTs Negeri 2 Kolaka, especially on mathematics material in grade VIII. This evaluation tool has been tested and validated by two validators, namely the material validator and the media validator. The results of the validation of the material in the application are stated to be very good, while from the media side it is stated that it is good. These two results indicate that the evaluation tool developed is declared fit for use as a mathematical evaluation tool.

In addition, the use of evaluation tools developed using the Ispring suite received a very good response from students. For example, the indicator "I like to work on problems using the Ispring Suite evaluation tool" gets a score of 80%. This means that of all students in the class only 20% disagree with this. Maybe because there are still obstacles encountered when accessing the questions or are there other factors that the researcher cannot explain. However, in general, the value category for student responses falls into a very interesting category.

The capabilities and advantages of Ispring Suite in creating and managing questions and in-display design make the results always meet expectations. As has been done by (Cahyanti et al., 2019), the mathematical evaluation tool made is feasible to use. Regardless of the material side, the development of questions using the Ispring suite always received very interesting assessments both from the design aspect and from student responses. The same can be seen from research conducted by (Rovita et al., 2020). Student responses to the use of evaluation tools developed using the Ispring suite get a very interesting category.

E. Conclusion

Based on the literature review, it can be concluded that the mathematical evaluation tool developed with the Ispring Suite has a very feasible and practical category to use. In achieving this feasibility and practicality, a development model is needed, a feasibility test for the material validators and media validators, and then trials on students to find out the students' responses to the evaluation tools developed.

Suggestion

Suggestions that can be conveyed from the results of research on the development of evaluation tools using the Ispring Suite application in improving the evaluation process are as follows:

Learning mathematics with the Ispring Suite evaluation tool can be used by teachers in evaluating the level of understanding of students towards the material that has been presented.

For teachers or further research, they can develop an evaluation tool in the form of an Online / Offline Test using the Ispring Suite with a wider range of criteria and using the latest version of the application.

The evaluation tool using the Ispring Suite application is very good for students in addition to adding to the learning experience as well as making students not bored in taking

mathematics lessons. The Ispring Suite application is a practical evaluation tool that teachers can use because the test results can be saved and downloaded.

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