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Digital Test Application for Mathematics Subject Based on *Superitem* Using the *Wondershare* Platform

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***Abstract*—The purpose of this research was to show a *Superitem*-based digital format test application using the *Wondershare* platform for Mathematics subjects used as a tool for measuring students' cognitive abilities ranging from low to high-level abilities. This application was created using the *Wondershare Quiz Creator* platform. There were several valid test questions used in this application, ranging from the lowest to the highest difficulty level. The application development stage refers to the *Borg* and *Gall* model which focuses on product development. The initial trial of the product involved six experts, including three educational evaluation experts and three informatics experts. The tool used in the initial trial of the product was questionnaires. The data from the trial results were analyzed using a quantitative descriptive technique by comparing the percentage of the product trial results with the product effectiveness standard which refers to an eleven's scale. The results of this research showed the effectiveness of the test application was included in the good classification. The impact of research results on the progress of the field of educational evaluation is that it makes it easier for teachers to measure students' cognitive abilities.**

***Keywords*—Digital Test Application, Mathematics Subject, Superitem, Wondershare.**

I. INTRODUCTION

Student achievement is determined by the results of their cognitive scores. Students' cognitive scores can be determined through cognitive tests. Cognitive tests can be in the form of multiple-choice tests or essay tests. The reality that occurs in the field is that teachers (especially mathematics teachers) still have difficulty in making cognitive test questions that can realistically measure students' abilities. Therefore, it is necessary to make a digital test application containing cognitive test questions arranged in stages ranging from low-level to high-level. One of the breakthroughs that can be a solution to this need is a digital test application for mathematics subjects based on the *Superitem* concept created using the *Wondershare* platform.

The *Wondershare* platform provides several facilities to create digital test questions. It is multiple choice, matching, true or false, essays, and others. The *Superitem* concept can be used as a basis. This basis is for arranging questions ranging from easy to difficult level.

Based on the needs or problems that occur in the field and breakthroughs that become the solution, the questions and objectives of this research can be formulated. The question of this research was "How is the display of the digital format test application based on the *Superitem* using the *Wondershare* platform for Mathematics subjects?". The purpose of this study was to show the appearance of a digital test application for mathematics subjects based on the *Superitem* concept created using the *Wondershare* platform.

The emergence of breakthroughs as solutions to problems in the field is also based on several limitations found in the results of previous research. Research by Ikawati et al. [1] shows the use of the *Superitem* concept as learning to support student achievement. Research limitations Ikawati et al. is that it has not shown examples of *Superitem*-based cognitive questions that are used to measure student achievement. Research by Lian and Yew [2] demonstrated the use of *Superitem*-based tests for assessment. The limitation of Lian and Yew's research is that it has not shown in detail the form of test questions used in the assessment.

Nasser and Lian's research [3] showed a measurement skill instrument that utilizes the *Superitem* concept. It has not shown the complete form of the instrument items is the limitation of Nasser and Lian's research. Ridzuan et al.s' research[4] showed the validity and reliability test results of the *Superitem*-based test instrument. Even though it was valid and reliable but it not shown a *Superitem*-based test instrument that can be accessed anytime and anywhere. It is the limitations of Ridzuan et al.s' research. Research by Aprilia et al. [5] showed the utilization of the *Superitem* concept in the test instrument. Research limitations Aprilia et al. is that the test instrument in digital format has not been shown to the test instrument cannot be accessed anytime and anywhere.

II. METHOD

This research approach is the development that refers to the Borg and Gall model, which consists of 10 stages of development [6-11]. This development only focused on design development; initial trial; and initial trial revision. This research was conducted at several public elementary schools in the *Blahbatuh* area, *Gianyar*.

The initial trial involved six research subjects. There were three educational evaluation experts and three informatics experts. The initial testing tool used a questionnaire. Data from the initial trial were analyzed using quantitative descriptive analysis techniques. The trick is to compare the design quality standard which refers to a scale of eleven with the percentage of the initial test results from the digital test application.

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The calculation formula of the initial trial results percentage is as follows [12-16].

$$P = (f \times N^{-1}) \times 100\% \quad (1)$$

Notes:
P=Descriptive percentage; f = total of the acquisition value; and N = total of maximum value.
The percentage of initial trial results obtained from that formula is converted to a eleven-scale categorization table [17].

TABLE I. QUALITY STANDARDS REFERS TO ELEVEN'S SCALE

Classification	Range of Quality Percentage (%)	Follow-up
Excellent	95-100	No Need for Revision
Very Good	85-94	No Need for Revision
Good	75-84	No Need for Revision
More than Enough	65-74	No Need for Revision
Enough	55-64	Revision
Almost Enough	45-54	Revision
Minus	35-44	Revision
Very Minus	25-34	Revision
Poor	15-24	Revision
Very Poor	5-14	Revision
Highly Poor	0-4	Revision

III. RESULTS AND DISCUSSION

A. Results

1. Display of *Superitem*-Based Digital Format Test Application Using *Wondershare* Platform for Mathematics Subject

The display of the *Superitem*-based digital format test application using the *Wondershare* platform for Mathematics subjects, especially for the elementary level, can be seen in Figure 1.

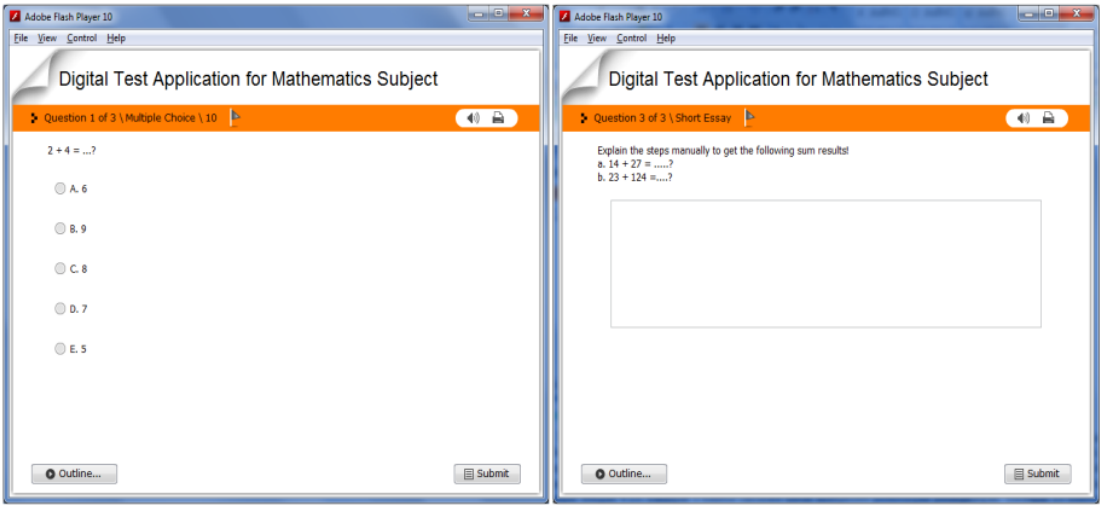

Fig. 1. Display of *Superitem*-based Digital Format Test Application Using *Wondershare* Platform for Elementary Level Mathematics Subject

Figure 1 shows the display of a digital format test application created using the *Wondershare* platform with a multilevel question arrangement based on the *Superitem* concept, starting from the lowest to the highest difficulty level. The application shows two types of test questions (multiple choice and essay) which are used to measure the cognitive abilities of elementary school students in learning Mathematics.

2. Initial Trial of *Superitem*-Based Digital Format Test Application Using the *Wondershare* Platform for Mathematics Subjects

The results of the initial trials conducted by six experts on the *Superitem*-based digital format test application using the *Wondershare* platform for Mathematics can be seen in Table II.

TABLE II. INITIAL TRIAL RESULTS OF A *SUPERITEM*-BASED DIGITAL TEST APPLICATION USING *WONDERSHARE* PLATFORM FOR MATHEMATICS

No	Respondents	Items-										Σ	Percentage of Quality (%)
		1	2	3	4	5	6	7	8	9	10		
1	Informatics Expert-1	5	4	5	4	5	4	4	4	4	4	43	86.00
2	Informatics Expert-2	4	4	4	4	4	4	4	5	5	4	42	84.00
3	Informatics Expert-3	5	4	4	4	5	4	4	4	4	4	42	84.00
4	Education Evaluation Expert-1	4	4	4	4	4	4	4	4	4	4	40	80.00
5	Education Evaluation Expert-2	4	4	5	5	4	4	5	4	4	4	43	86.00
6	Education Evaluation Expert-3	4	5	4	4	4	4	4	4	4	4	41	82.00
												Average	**83.67**

Notes:
Item-1 : Number of multiple choice questions according to the need
Item-2 : Number of essay questions according to the need
Item-3 : The content of multiple choice questions is by the material topic
Item-4 : The content of the essay questions is by the topic of the material
Item-5 : The *Superitem* concept has been applied to the preparation of test questions
Item-6 : There is a feature in the *Wondershare* application that makes it easy to make multiple-choice test questions
Item-7 : There is a feature in the *Wondershare* application that makes it easy to make essay test questions
Item-8 : There are features in the *Wondershare* application that make it easy to edit, update, and delete test questions
Item-9 : There is a feature in the *Wondershare* application that makes it easy to manage the time for working on test questions
Item-10 : There is a feature in the *Wondershare* application that makes it easy to publish test questions so that they can be accessed anytime and anywhere by students

There are some suggestions given by the experts to improve the application. Although in general, the results of the initial trial show that the quality of the digital test application is good. The suggestions can be seen in Table III.

TABLE III. *EXPERT'S SUGGESTIONS ON DIGITALLY FORMATTED TEST APPLICATIONS BASED ON SUPERITEM USING WONDERSHARE PLATFORM FOR MATHEMATICS*

No	Experts	Suggestions
1	Informatics Expert-1	Add a feature to be able to see the resume of test results
2	Informatics Expert-2	Facilities need to be displayed to be able to see a resume of test results
3	Informatics Expert-3	It is need to add a variety of images that have a test feel at the beginning
4	Education Evaluation Expert-1	It is need to add the page to show the introduction
5	Education Evaluation Expert-2	Add test result resume notification
6	Education Evaluation Expert-3	Need to add an introduction page before entering the test questions section

3. Revision of Initial Trial Results for *Superitem*-Based Digital Format Test Applications using the *Wondershare* platform for Mathematics subjects

Based on the suggestions shown in Table III, it is important to revise the *Superitem*-based digital format test application using the *Wondershare* platform for Mathematics. The display of the *Superitem*-based digital format test application using the *Wondershare* platform for Mathematics subjects after revision can be seen in Figure 2.

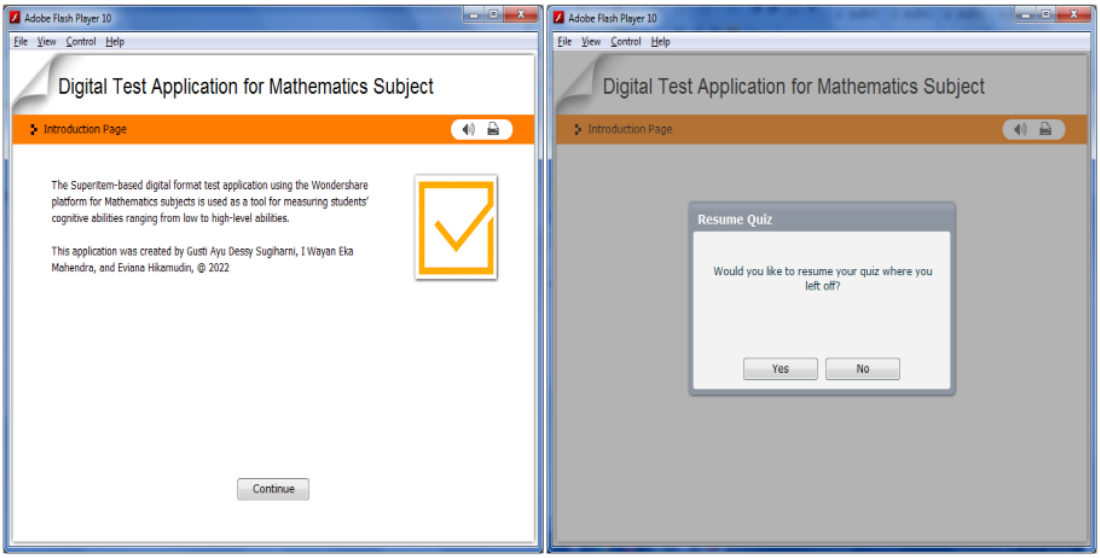

Fig. 2. Display of *Superitem*-Based Digital Format Test Application Using *Wondershare* Platform for Mathematics Subject after Revision

Figure 2 shows the display of the *Superitem*-based digital format test application using the *Wondershare* platform for the revised Mathematics subject. Suggestions from Informatics Expert-1, Informatics Expert-2, and Education Evaluation Expert-2 have been answered by providing a resume notification of test results. Suggestions from Informatics Expert-3,

Education Evaluation Expert-1, and Education Evaluation Expert-3 have been answered by providing an introduction page before entering the test questions section.

B. Discussion

Based on the data in Table I and the average quality percentage in Table II, it can be categorized that the *Superitem*-based digital format test application using the *Wondershare* platform is classified as good. This is shown from the average percentage of quality tests in a digital format based on the *Superitem* using the *Wondershare* platform of 83.67%, which is in the percentage range of 75%-84% when viewed from the eleven scale categorization.

The results of this study had shown a solution to the limitations of the research by Ikawati et al. [1], Lian and Yew [2], Nasser and Lian [3], Ridzuan et al. [4], and Aprilia et al. [5]. It was by showing the existence of a *Superitem*-based digital format test application using the *Wondershare* platform for Mathematics subjects. The results of this study were strengthened from several previous studies, including research by Ariawan and Divayana [18], Mahendra et al. [19], Ariawan et al. [20-22], Siti and Paulus [23], Noer et al. [24], and Sarah et al. [25]. They also showed the use of the *Superitem* concept and the *Wondershare* platform in the preparation of cognitive test questions in stages starting from the lowest level of difficulty to the highest.

The novelty of this research is the emergence of a digital test application created using the *Wondershare* platform. It is integrated with the *Superitem* concept. So it produced quality and neatly arranged Mathematics test questions from the lowest to the highest difficulty level.

The limitation of this research is that the process of randomization of test questions has not been shown in the *Wondershare* application. So the pattern of questions will be easily known by students if the application is used repeatedly.

IV. Conclusions

In general, the results of this study indicate the quality of the *Superitem*-based digital test application using the *Wondershare* platform was quite good. Therefore, there is no need for a major revision of the digital test application. Future work that can be done as a solution to solving this research problem is to show the process of randomizing test questions more optimally on the *Wondershare* platform. The impact of the results of this study on the education sector is to increase knowledge for Mathematics teachers in preparing quality test questions using the right platform and concept.

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