Validity of Website-Based Statistical Learning Tools with an Islamic Context to Improve Student Mathematical Communication

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Abstract. The development of increasingly sophisticated technology makes students very skilled in using technology. These skills in using technology need to be accompanied by the development of Islamic character. In addition, in learning, students are also required to be able to communicate their ideas to others both orally and in writing. Therefore, learning innovations with an Islamic context are needed, one of which is using websites to improve students' mathematical communication. The learning tools developed are e-modules containing live worksheets, videos, and assessments. This study is research and development by following the stages of Plomp, especially in the prototyping and assessment stages. The data sources were the results of validation from three experts. The data analysis technique carried out is to calculate the average validity score of the three experts. The results of the validity test show that the website-based statistical learning tools with an Islamic context meet the valid criteria. This study implies that the learning tools developed need to be continued at the practicality and effectiveness stages.

Keywords: Topic, Website, Islamic Context, Mathematical.

1 Introduction

The development of technology in the 21st century is increasingly sophisticated and rapid, so that any information can be accessed easily, including to access learning. The sophistication of technology makes it easier for students to learn independently [1], but it is undeniable that behind the benefits of sophisticated technology also has a negative impact, some of which are fostering individualism, anti-social attitudes, gambling, and other slander. Therefore, the skill of using technology needs to be accompanied by the development of Islamic character.

The Islamic character of students can be built by teachers, namely by linking learning with Islamic values, instilling religious values in learning activities by optimizing the use of technology and integrating the values contained in Islam into mathematics learning materials and communicating them to students [2]. One of the

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mathematical materials that can be integrated with Islamic values is statistical material, with an Islamic context.

Berelson and Steiner [3] argue that communication is the process of conveying information, ideas, emotions and skills using symbols such as words, pictures, numbers, etc. Communication is an important part of the learning process in the classroom and the quality of communication influences the quality of teaching and learning mathematics [4]. Students are expected to have good communication skills so they can convey mathematical ideas or thoughts orally or in writing [5]

In fact, based on several previous studies, it shows that students' mathematical communication is still relatively low [6] [7] [8]. Where in this digital era, communication carried out by students is often through social media by utilizing devices and the internet [9] resulting in students being more likely to communicate something through internet technology rather than writing on paper. So innovation is needed in learning to improve students' mathematical communication, namely by using technology in learning [10], for example by using website-based learning media [11], but unfortunately the learning device supplies that use technology is still limited. Therefore, it is necessary to develop valid learning tools to improve students' mathematical communication. Based on the explanation mentioned earlier, the formulation of the problem in this study is "How is the validity of statistical learning tools with a website-based Islamic context to improve students' mathematical communication".

2 Method

This study uses the Research & Development (R&D) method, using the Plomp 2013 model. There are three stages of the Plomp 2013 model, a preliminary research, the prototyping stage, and the assessment stage [12], but this research only uses two stages, namely the prototyping stage and the assessment stage. At the prototyping stage, the development or creation of a prototype was carried out in the form of e-module and validation. At the assessment stage, the assessment or evaluation of the e-modules developed was carried out by field testing. This study only discusses the results of validation.

The validity of website-based statistical learning tools with an Islamic context was tested out by three competent experts. The three experts include lecturers and teachers as learning experts, media, and also development experts.

The data collection instrument in this study was a validation sheet. The data analysis technique used was to calculate the average validity score of the three experts and revise learning tools according to experts' comments. The validity criteria for the learning tools (e-module containing live worksheets, videos, and assessments) developed are as presented at Table 1 [13]. KV is Average validation results from experts on learning tools.

Table 1. Validity criteria for the learning tools

Criteria	Average
Very valid	$4 \leq KV^a < 5$
Valid	$3 \leq KV < 4$
Less valid	$2 \leq KV < 3$
Invalid	$1 \leq KV < 2$

Based on Table 1, learning tools include very valid criteria if the average validation result from the experts is more than or equal to 4 and less than 5, valid if more than or equal to 3 and less than 4, less valid if more than or equal to 2 and less than 3, Invalid if greater than or equal to 1 and less than 2. If the validation results show that the data obtained are valid or very valid, then the learning tools are suitable for field testing.

3 Results and Discussion

The design of website-based statistical learning tools with an Islamic context aims to improve students' mathematical communication. The learning tools developed in this study are e-modules containing live worksheets, videos, and assessments. After designing website-based statistical learning tools with an Islamic context, the learning tools were validated by experts on the e-module containing videos, and live worksheets. The results of the validation of the learning tools are presented in Table 2.

Table 2. Results of validation of learning tools by experts

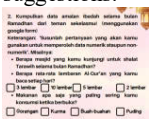
Assessment Aspects	Average	Criteria
1. Presentation of e-module components		
a. Suitability of the materials in the e-modules with learning outcomes.	5	Very valid
b. Clarity of learning objectives on each Student Worksheet which is presented using a Live worksheet.	4	Very valid
c. The video illustrations in the e-modules make students hooked, interested, and challenged to learn and reason.	3	Valid
d. The activities in the live worksheets require students to reason.	4	Very valid
e. Suitability of image illustrations in the live worksheets with student characteristics.	3	Valid
2. Suitability of the materials	4.7	Very valid
3. Video content and display	3.8	Valid
4. Presentation of the Live worksheets	4.5	Very valid
5. Language	3	Valid

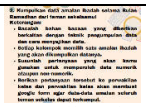
Table 2 shows that the criteria for suitability of the materials, activities in the live worksheets, and presentation of the live worksheets are very valid. Meanwhile, the criteria for illustrations and video content, suitability of image illustrations in the live worksheets, and language aspects are valid. Thus, designed learning tools can be used.

Based on the validation results by the three experts, there are several suggestions for improving website-based statistical learning tools with an Islamic context. The experts suggested that the video display should not be monotonous—it can be improved by displaying illustrations that are close to students' lives, the writing of the objectives on the live worksheets should be in sentences that are easy for students to understand, neutral background colors should be used, and choice of words should be in accordance with the KBBI. The experts believe that collecting data on students' religious practices

during the month of Ramadhan should not only be those that have been carried out, but also the practices that are planned for the next month of Ramadhan, with the aim of making students better prepare for the best practices that will be carried out during the next month of Ramadhan. Several examples of revised aspects of learning tools are presented in Table 3.

Table 3. Revision of aspects of learning tools

Aspects E-Module	Before Revision	Experts Improvement Suggestions and Comments	After Revision and Conclusion
Live worksheets: content	 Collect data on worship practices during Ramadan from your classmates!	The instructions for students to collect data are too long, resulting in students having difficulty providing answers. There should be several examples that are easy for students to understand, so students can provide answers/other solutions that are as expected.	Worth testing with revisions according to suggestions. 
Live worksheets: purpose	Objectives of activities on E-Modules (Worksheets): Through discussion, it is hoped that students will be able to discover data collection techniques and be able to present the data in diagram forms.	Objectives of activities on E-Modules (Worksheets) should use words that are directly aimed at students and easy to understand, namely 'students' become 'you'. So students will understand that those activities are for them.	Objectives of activities on E-Modules (Worksheets):Through discussion, it is hoped that you will be able to find data collection techniques and be able to present the data in diagram forms.
Live worksheets: purpose		Objectives of activities on E-Modules (Worksheets) 2 are too long, it would be better if the sentence after 'a group' is deleted and objectives of activities readjusted.	
Live worksheets: content	The data collected are data on students' religious practices during the month of Ramadan.	The data collected should not only be data on religious practices during the month of Ramadan that have been carried out by students, but also data on religious practices planned for the next month of Ramadan.	The data collected are data on students' religious practices during the month of Ramadan and data on religious practices planned

Aspects E-Module	Before Revision	Experts Improvement Suggestions and Comments	After Revision and Conclusion
Live worksheets: content	 Collect data on worship practices during Ramadan from your classmates!	The instructions for students to collect data are too long, resulting in students having difficulty providing answers. There should be several examples that are easy for students to understand, so students can provide answers/other solutions that are as expected.	Worth testing with revisions according to suggestions. 
Live worksheets: purpose	Objectives of activities on E-Modules (Worksheets): Through discussion, it is hoped that students will be able to discover data collection techniques and be able to present the data in diagram forms.	Objectives of activities on E-Modules (Worksheets) should use words that are directly aimed at students and easy to understand, namely 'students' become 'you'. So students will understand that those activities are for them.	Objectives of activities on E-Modules (Worksheets):Thr ough discussion, it is hoped that you will be able to find data collection techniques and be able to present the data in diagram forms. for the next month of Ramadan.
Video: views	Illustrations and video displays are monotonous. 	It is best to use video illustrations that are appropriate to students' daily lives, and the video display should not be monotonous with only narration from the narrator, but rather display illustrations that match the narrative being spoken.	Illustrations are appropriate to students' daily lives and the video display has changed or is not monotonous. 

Based on the validation results, the learning tools developed are valid. However, several things need to be revised so learning tools can better improve students' mathematical communication. Among them are video design and also instructions for working on live worksheets. Where video design using interesting animation makes learning tools interesting, so that it can improve students' mathematical communication

[14]. Likewise, systematic live worksheet instructions can make it easier for students to do activities on live worksheets in accordance with student mathematical communication indicators [15]. Therefore, learning tools can be used with slight revisions as suggested by experts.

4 Conclusion

Based on the results and discussion, validation of website-based statistical learning tools with an Islamic context developed to improve students' mathematical communication is declared valid and suitable for use, however these learning tools need to be further tested for their practicality and effectiveness.

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