Development of evaluation of mathematical communication capabilities based on information technology for junior high school students

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Abstract. Evaluation is a measure of learning outcomes, so evaluation is a description of the success of learning that has been done by educators. Because of this, the aim of this study was to produce an evaluation tool for IT-based learning using the Wondershare Quiz Creator software with the title of developing an IT-based mathematical communication skills evaluation tool for junior high school students who obtained feasibility and validity as an evaluation tool for mathematics learning, especially in triangular material. rectangular. This research is R & D (Research and Development) research. This evaluation tool was developed with a 4-D learning device development model that was modified to 3-D (Define, Design, Develop). The research instruments used were interview guidelines and questionnaires. Data collection techniques of research conducted were interviews, validation sheets, and response questionnaire sheets. Based on the results of the validation conducted by 3 experts, it was found that the learning evaluation tool that had been made was very valid with an average percentage of 88.89%. While the results of the user response questionnaire that the percentage of the results of the overall student response questionnaire amounted to 88.33% and the percentage of the results of the overall teacher response questionnaire amounted to 91.67%, thus both results of the questionnaire responses have very good criteria. So, the IT-based mathematical communication skills evaluation tool for junior high school students is a practical evaluation tool.

Keywords: Learning Evaluation Tools, Mathematical Communication, Wondershare Quizcreator, Triangle and Quadrilateral.

1. Introduction
Mathematics is as one of the subjects in school which are considered very important because it can increase students' knowledge in thinking logically, rationally, critically, meticulously, effectively, and efficiently. Consequently, the students are expected to have the ability to obtain, analyze, conclude and utilize information to survive in a state that is always changing and developing rapidly and competitive.

According to BSNP in 2006 (Amalia, 2013) stated that the purpose of mathematics subjects is for students to obtain mathematical abilities, namely the ability to understand, reasoning ability, problem-solving ability, mathematical communication skills. These abilities must be owned and developed by students in learning mathematics in order to achieve maximum learning goals. According to Lestari and Yudhanegara (2015), mathematical communication skills are abilities that convey mathematical ideas carefully, analytically, critically, and evaluative to sharpen the understanding.
Mathematical abilities that are still low are also faced by students in the learning evaluation process which the students still tend to have difficulty in translating questions using conventional evaluation tools, so the results obtained cannot meet learning objectives in general. Mathematical communication skills can be done by applying an interactive learning evaluation model by applying information technology in the process of evaluating learning in schools.

A teacher who has good knowledge and appropriate way of teaching will help students to easily build their understanding of the material which is presented (N Aminah & I Wahyuni, 2019). In the process of learning, we need an evaluation, and the development of education quality can be accounted for by this evaluation and the teacher or educator knows and measures the learning outcomes of students (Hamzah, 2014). Besides, that evaluation must also be practical because flexibility is a requirement of a standard evaluation test (Arifin, 2014). Learning devices are said to be practical if they are arranged by considering the ease for students and teachers - which can be interpreted to get a positive response from students and teachers (Rajabi, et al. in Aminah, 2016).

The development of information and communication technology (ICT) which is growing rapidly is enabled people to be smarter in understanding all aspects of life. It's possible that in the field of education can also be carried away by the globalization to be implemented in the education system based on information and communication technology. One of the interesting innovations to accompany the changes in the learning evaluation process is that originally only relied on the evaluation model of learning outcomes manually, then along with the development of information technology, it is found many innovative learning evaluation models based on information technology. This is confirmed that currently, the curriculum in Indonesia is the 2013 curriculum which requires teachers to be skilled in packing the lesson with either one of them using a scientific approach, must be skilled in the use of science and technology, skilled in evaluating both cognitive, effective, and psychomotor, and many other related demands with the applicable curriculum (Aminah, N. & Wahyuni, I., 2018).

Today, the development of information and communication technology (ICT) stimulates the presence of a variety of software that can be used in the world of education; one of them is Wondershare Quiz Creator. The software is software for making questions, quizzes or tests online. The use of this software is quite familiar, so it is easy to use and does not use programming languages that are difficult to operate. Based on the results of observations and interviews with several teachers and students about learning and the mathematics evaluation process at Haungeulis 1 Junior High School, they use conventional evaluation tool: the students rewrite some questions from the teacher then answer in sheet-form which is provided by the teacher (usually the questions are written by students or are read by the teacher orally). And for the results of interviews with students, students complained about the difficulty of understanding geometric material. They not only find it's difficult to describe or imagine geometrical problem but also, it's difficult to understand the mathematical language contained in the material or problem. This may happen because according to Aminah (2017), adequate teaching knowledge and understanding the depth of the material taught is not enough to build students' understanding.

Here the author will try to develop the evaluation tool in another form and interactive. This is supported by previous studies that have been developed, namely by Purnamasari (2015) with his research entitled "Development of Information and Communication Technology-Based Learning Evaluation Tools with Wondershare Quizcreator Inventory Assessment System Material" in 3rd Accounting Students in SMK Negeri 2 Nganjuk. The overall results of expert validation and limited trials averaged a score of 81% so that it can be concluded that the developed evaluation tool was declared very feasible as an evaluation tool in learning activities. therefore, IT-based evaluation tools can be very suitable for use in learning activities.

It has been explained previously, there are similarities of research reasons that will be carried out by the author. The researcher intends to create an IT software-based evaluation tool, which in previous studies the use of software in evaluating learning was received a positive response because it was very feasible to use and could foster student interest in mathematics. In accordance with the problems stated
above, the writer interested in conducting research entitled "Development of IT-Based Communication Ability Evaluation Tools for Junior High School Students".

2. Research Methods
This research is development research that is the development of evaluation tools on flat-build material. This development aims to optimize the valid evaluation tools. The Thiagarajan development model is known as the 4D model was chosen that consists of four stages of development, namely Define, Design, Develop, and Disseminate. The development was carried out by conducting practical tests, that practicality of an evaluation tool or teaching material was prepared to take into account the ease (Trianto: 2013 in Aminah, 2016).

The instrument of this study was an interview guide sheet, that was used to conduct interviews that contain guidelines in the outline or principal of the contents of the interview. In addition, the validity sheet was used to assess the validity of evaluation tools. Then use the questionnaire response to the teacher and students was to find out if the evaluation tool has reached practicality.

3. Research Results in Discussion

3.1 Development
The first step taken was the define stage. The researcher conducted five steps: front end analysis, student analysis, concept analysis, task analysis and formulation of indicators. The second step (design stage) was the researcher compiled the reference test, media selection, format, and design selection early. The third step (develop stage) was the validation of the learning evaluation tool by the validator and revised the evaluation tool. This validation was to assess the feasibility of product Draft I. Learning evaluation tools which were the author made were validated by 3 the experts. The given suggestions were used to improve the design of evaluation tools that had been compiled by the author. Although the learning evaluation tool that the author made was valid, but the author received some input from the validator and revised the learning evaluation tool before being tested by the students. After being validated and revised, Draft II was tested by the teacher to 20 students of class VIII of SMP Negeri 1 Haurgeulis. From the results of the experts' validation data and the response of students and teachers from limited trials. Those data analysis was used as preparation for the discussion of the development of IT-based mathematical communication skills evaluation tools for junior high school students.

3.2 Validation
From the results of the validation, it was showed that the aspect of content evaluation tools gets a percentage of 89.33%. It means that they were very valid criteria. This is because the online quiz evaluation tool that has been created by the author can measure learning outcomes clearly and can be interpreted properly, and it contains questions that are in accordance with the learning indicators to be achieved. The aspect of mathematical communication skills was the percentage of 93.33% (criteria are very valid). This is because the questions in the online quiz evaluation tool have been adjusted to the indicators of mathematical communication skills and predetermined learning. According to Purwanto (2012), evaluation tools must be able to measure the learning outcomes that have been set clearly. So that the online quiz evaluation tool content was in accordance with student learning objectives.

Aspects of online quiz evaluation tool design based on expert validation results get a percentage of 86.67% which is included in the very valid criteria. This is due to the technical quality of the online quiz functioning properly and accordingly, as well as its colorful appearance.

The results of the validation of IT-based mathematical communication skills evaluation tools by expert validators were obtained an average percentage of 88.89% which means that criteria were very valid. Learning evaluation expert validators obtained an average percentage of 82.22% which means that criteria are very valid. And the validator of school mathematics materials experts obtained an average percentage of 95.56% which also means that criteria are very valid. Thus, the validation
assessment of an IT-based mathematical communication ability evaluation tool for junior high school students from the three expert validators was found that learning evaluation tools that had been made were highly valid with an average percentage of 88.89%. This is supported by Riduwan (2011) which states that learning evaluation tools can be said to be valid if the mean percentage of expert validation questionnaires is above 61%.

### 3.3 Practicality

Based on the results of the student response questionnaire data, the aspect of ease was obtained 86.67% which showed very good criteria. This was because the online quiz evaluation tool can be used for any computer connected to the internet, so it did not need a computer with certain specifications.

On the aspect of the online quiz, the content was obtained 90% which means that the criteria were very good. This happened because the presentation of the questions had been adjusted to the students' abilities, and they had been studied before. In addition, the questions are accompanied by a clear picture; therefore, the questions were easy to understand. According to Rangkuti (2014), presenting questions into various forms (visual representation) can help students understand problems. Based on the explanation above, it was concluded that the online quiz evaluation tool made was practical.

The satisfaction aspect was obtained 88.57% which means has very good criteria. Most students assumed that this tool can help save time to get test results quickly.

Whereas for the results of the teacher response questionnaire data, the ease of teacher aspects was obtained an average of 90.47% and the aspect of assistance was obtained an average of 93.33%. So, both aspects were included in the very well criteria. This was because the evaluation process was easy to do. It was because of having adequate computer laboratories in the school. Then, the use of this evaluation tool was very helpful for the teacher in collecting data from the student learning evaluation by email.

Based on the explanation above, the result of the overall student response was 88.33% and the result of the teacher response was 91.67%, thus both results of the questionnaire responses have very well. So, the IT-based mathematical communication skills evaluation tool for junior high school students was a practical evaluation tool. This is supported by Rajabi, et al. in Aminah (2016) states that the learning device is said to be practical if it is designed by considering the ease for students and teachers, which can mean getting a good response from students and teachers.

### 4. Conclusions and Suggestions

#### 4.1 Conclusion

Based on the results of the research data analysis and discussion, it can be concluded as follows.

1. An evaluation tool for IT-based mathematical communication skills for junior high school students that have been developed based on the validation of IT experts, evaluation experts, and school mathematics material experts shows very valid criteria with an average of 88.89%. So, these evaluation tools are appropriately used as a learning evaluation tool in junior high school.

2. The evaluation tool for IT-based mathematical communication skills for junior high school students that have been developed based on the responses of students and teachers shows very good criteria with an average of 88.33% and 91.67%. So, this evaluation tool is a practical evaluation tool.

#### 4.2 Suggestion

Based on the conclusions above, some of the suggestions that researchers can reveal are as follows.

1. Because of the limited time, the author used only up to the third stage (develop stage from the 4-D development stage. It is expected to continue to the next stage, namely, disseminate.
2. This research is only on mathematical communication skills and triangular and quadrilateral material, it is hoped that further research can develop evaluation tools on other abilities and materials.

3. This evaluation tool that has been developed can be used to measure the effectiveness of learning in schools so that it can be used as a learning tool for further research.

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