IT-based Tools for Development of Teaching Materials

Abdul Rahman[1], Ansari Saleh Ahmar[2]

[1]Department of Mathematics,
Makassar State University,
Makassar, South Sulawesi, Indonesia

[2]Department of Statistics,
Makassar State University,
Makassar, South Sulawesi, Indonesia

ABSTRACT: The purpose of this study was to develop a teaching materials based IT which have a quality (valid, practical, and effective) as an effort to improve the quality of student learning outcomes. The process of developing this material will use Plomp Development Model (1997) consists of the prelimenary investigation phase; the design phase; realization/construction phase; test, evaluation and revision phase; and implementation phase. And to assess the quality of the learning device then tested the validity of the validator of experts in order to obtain teaching material is valid, practical, and effective.

KEYWORDS: valid; practical; effective; teaching material; IT-based Tools.

1 INTRODUCTION

At the time of today's sophisticated, a lot of modern tools are an invaluable tool in the completion of a problems of mankind. The period is called the era of science and technology. Each of the ins and outs of human life certainly could not be separated from science and technology. One of the foundation supporting the development of science and technology as it is today is the math. As noted Sudrajat [1] said that the rapid development of science and technology is through to the support of mathematics. The cornerstone of the support due to the strength of the structure and mathematical reasoning. The development of mathematics is often pioneering new application possibilities in various other fields.

Sahid [2], said that the presence and progress of ICT in the era of today's global communications has provided opportunities and expansion of interaction both between professors/teachers/experts and learners, among learners, between learners and learning resources can happen anytime and anywhere without being limited by space and time. With the help of ICT, the process of delivering and presenting learning materials and ideas can be more interesting and fun. The presence of ICT as new technologies provide a challenge to the faculty and teachers to be able to master it so that it can choose and utilize ICT effectively and efficiently in the learning process management.

Sahid [3] explained that the ICT covers all technologies that can be used to store, process, display, and communicate information in the communication process. Furthermore, he revealed that included this technology are: (a) computer technology, (b) multimedia technology, (c) telecommunications technology, and (d) computer network technology. Furthermore, Krisnadi (2009) in [3] explains that in addition to the proper functioning as a tool of human problem solving, ICT can also be used to support the learning process that is believed to be: (1) improve the quality of learning, (2) expand access to education and learning, (3) reduce the cost of education (4) the answer must participate in ICT, and (5) developing the ICT skills (ICT skills) that students are required when working and in later life.

2 METHOD

This type of research is the development of research or known as the Research and Development (R & D). The development of learning tools in this study was developed by adapting the model development of Plomp (1997) [4]. The aim of this study was to develop a teaching material Based IT that quality (valid, practical, and effective) to improve the quality of learning mathematics. Teaching materials that will be developed are a web-based. This web-based teaching materials created using HTML, PHP, Javascript and CSS. The model development of Plomp (1997) [4]:

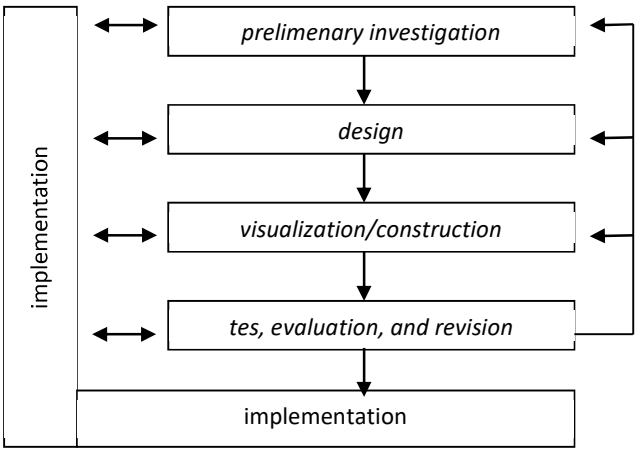

Fig. 1. General Model of Problem Solving of Education

Note :

Development activity
Flow of development phase
Reciprocal activity between development and implementation phase
Ongoing learning model
Cycle of development activity

The development of these materials follows the phases of development. The phases are developed by Plomp. Details of the activities for each phase of the development is described as follows .

a) P*relimenary investigation phase*

In this phase will be the identification and study of theories regarding IT-based learning as a reference in developing teaching materials and establishment of basic competencies that must be achieved.

b) Design phase

After a phase of preliminary investigations carried out, the next phase is the design phase. In this design phase, the princi pal thing that will do is design the instrument teaching materials developed in this phase is intended to determine the validity and effectiveness of teaching materials.

c) *Realization/construction* Phase

In this phase, will be compiled prototype I of the teaching materials. The prototype I of this phase will be the process of testing, evaluation, and revision at the next development stage.

d) *Test, evaluation and revision* phase

In this phase, the focus of activities on just two things: the validation and testing of teaching materials. This phase aims to determine: (1) whether the prototype I of teaching materials that have been prepared valid or not based on the consideration of the experts; (2) whether a valid teaching materials that can achieve results in accordance with its intended purpose. This teaching material will be validated by two experts of teaching material and one expert of media.

Table 1 Category of Validity (Nurdin, 2007)

Criteria	Category
3,5 ≤ M ≤ 4,0	Very Valid
3,5 ≤ M ≤ 4,0	Valid
3,5 ≤ M ≤ 4,0	Pair Valid
M < 1,5	Not Valid

Note : M = Score of validity

3 RESULTS AND DISCUSSION

Validity

This research has resulted in a material in the form of IT-based materials (web-based). Feasibility of teaching materials is obtained based on the assessment of media experts and subject matter experts. Data expert assessment of the teaching materials, based on, among others: indickator, construction, language, content, and / or illustrations contained in the instrument validation sheet teaching materials. The results of the expert assessment of the material, can be summarized as shown in Table 1 below.

Table 2. Description of the results of expert assessment of the teaching materials

Indicator	Score
1. Contruction	3,54
2. Content	3,80
3. Language	3,65
Average	3,66

Based on Table 2 above when converted into the categorization of validity, it was found that the teaching materials, in terms of the indicators are in the category of **very valid** because every aspect for each type of device achieved an average value of more than 3.5. In addition, all validator concludes that the materials have been developed and can be used with minor revisions. In particular, there are still aspects that according to the advice of experts and practitioners need to be repaired or added.

Responses of Students

Instrument used to obtain data on students' responses are student questionnaire responses. This questionnaire given to students after participating in learning activities to be filled according to feeling and what they thought of teaching materials and learning activities. The results of data analysis students' response to the implementation of learning are briefly shown in Table 3 below.

Table 3. Description of the results of students' response to the implementation of the Teaching and Learning Activities

No	Aspect of responses	Responses	
		Comfortable	Uncomfortable
1.	What do you think about these materials?	87%	13%
		Like	Dislike
2.	What do you think about the learning process using IT-based teaching materials	100%	0%
3	How do you feel about :	Like	Dislike
	a. The learning atmosphere in the classroom	81%	19%
	b. the appearance of lecturer	98%	2%
	c. How lecturer teaching	100%	0%
	Percentage of Mean	93%	7%
5	What do you think about :	New	Not New
	a. The learning atmosphere in the classroom	85%	15%
	b. the appearance of lecturer	82%	18%
	c. How lecturer teaching	94%	6%
	Percentage of Mean	87%	13%
		Not Difficult	Difficult
6	Do you have difficulty in learning to use IT-based teaching materials?	100%	0%
	Percentage of Mean	100%	0%
		Like	Dislike
7	Do you feel there is improvement after learning with IT-based teaching materials?	98%	2%
	Percentage of Mean	98%	2%

Table 3 shows that the results of the data analysis of students' response to the implementation of learning by using IT-based teaching materials show that on average 87% of students said they was happy to teaching materials. In addition, 100% of students expressed don't have trouble learning to use IT-based teaching materials, 98% of they feel there are improvement after learning by using IT-based teaching materials.

4 CONCLUSION

The results of this study indicate that the product development of teaching materials to be developed. This is indicated by the results of expert assessment from the aspect of contruction, content and language have valid criteria with a mean of 3.66. Results of student questionnaire responses on a limited test obtained that on average 87% of students said they was happy to teaching materials. In addition, 100% of students expressed don't have trouble learning to use IT-based teaching materials, 98% of they feel there are improvement after learning by using IT-based teaching materials. Thus, it can be concluded that the teaching materials eligible for use in the learning process.

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