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Electronic Students Worksheet on Linear Equations and Inequalities

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ABSTRACT

The Purpose of this research is to develop an electronic student worksheet based on android in linear equation and inequalities. Method of this research using ADDIE model, there are five steps, namely Analysis, Design, Dedvelopment, Implementation and Evaluation. This research use experts of content and media while the subject are students in Mts N 1 Tanggamus. Meanwhile the research instrument are interview and questionnaire. Based on calculation, the electronic students worksheet reached 3.90 in good criteria for content expert and 4.28 in very good criteria for media expert. It shows that the electronic student worksheet is valid and its also practical based on small class trial which reach 4.93 in very good criteria and also for large class trial reach 4.75 in very good criteria.
Keywords : Electronic students worksheet, linear equation, inequalities, android

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PENDAHULUAN

Education is an important to improve human resources in order to get a decent andquality education. Djemari (in Widoyoko, 2017) who said that efforts to improve the quality of education can be achieved through improving the quality of learning which will result in good quality learning. According to Government Regulation No.47 of 2008, compulsory education has the aim of advancing the nation's generation, seeking quality learning opportunities for every Indonesian citizen. Growth of learning process to attempts the quality of learning process is identic with the growth of information and technology. According to Rosenberg (2001:8), with the development of the use of information and communication technology there are several shifts in the learning process, namely: from the classroom to where and at any time, from class to online or through channels, from physical facilities to network facilities. Learning conditions at Mts N 1 Tanggamus during the covid-19 pandemic required online learning which is used e-learning. From online learning condition the teacher distributed the material using pdf form and learning media using videos form then uploaded on Youtube and sent the link via WhatsApp Groups. This condition liked by mostly students in Mts N 1 Tanggamus and easier to see the materials.

Based on interviews conducted with Mrs. Meri Yuheni S.Pd. The mathematics teacherat MtsN 1 Tanggamus said that teaching materials at school were only in the form piece of paper for the Student Worksheets and also using government books. The textbooks still using 2013 curriculum published by Erlangga. Moreover during the mathematics learning process the non-existence of Electronic Student Worksheets (E- LKPD) affected the student activities. According to Puspita (2021) When learning process using electronic student worksheet has an impact for the enjoyable students activities. which can be downloaded and studied using mobile phones.

The researches also conducted interviews with some of the students and the results of theinterviews showed that students said mathematics was a difficult lesson and sometimesconfused in applying formulas to problems. Students also said that students worksheet or government books were difficult to understand because the teaching materials usedwere less of attractive and also examples of questions were less varied, and the material was sometimes unclear.

From the condition of lack electronic Student Worksheet, the researcher come with idea to develop an electronic student worksheet but also inserting story questions relatedto everyday life so that students solve the problem by thinking critically. For example, a farmer has a rectangular plot of land, the width of the land is 6m shorter than the length. If the perimeter is 60 m, find the area of the farmer's land. From these examples, it can be solvedby using pictures and and using learning videos so that students can easily

understand them. Sothe researchers conducted a study entitled "Electronic Development of Android-based StudentWorksheets (E-LKPD) on Linear Equations and Inequality Materials".

METODE

The used type of this research is research and development. According to Sugiyono (2010:407), research and development methods are research methods used to produce these products. The developing model for electronic students worksheet ini linear equation and inequalities is ADDIE model. According to A. Pribadi (2009: 128-132), there is one generic learning design model, namely the ADDIE (Analysis Design-Develop-Implement-Evaluate) model. One of the functions of ADDIE is to be a guide in building effective, creative and dynamic tools that support learning performance and load learning videos that will be used. This mode uses 5 stages of development, namely analysis, design/planning, development, implementation/execution and evaluation. Feedback and suggestion which obtained from material experts, media experts and students can be used to fix the electronic students worksheet into valid and practical. Electronic students worksheet called valid and practical based on :

1. Analysis of Validity

   According to Yamasari (2010), electronic-based teaching materials are said to be valid if the results of the validation evaluation state that the electronic-based learning media can be used with little or no revision.

Table 1. conversion from data Quantitative to Qualitative

Score Range	Criteria
$\bar{x} > Mi + 1{,}8\ SBi$	Very Good
$Mi + 0{,}6\ SBi < \bar{x} \leq Mi + 1{,}8\ SBi$	Good
$Mi - 0{,}6\ SBi < \bar{x} \leq Mi + 0{,}6\ SBi$	Quite good
$Mi - 1{,}8\ SBi < \bar{x} \leq Mi - 0{,}6\ SBi$	Less good
$\bar{x} \leq Mi - 1{,}8\ SBi$	worst

(Sumber Widoyoko, 2017:238)

Information:

$\bar{x} = average$

$M_i = \frac{1}{2}(total\ ideal\ maximum\ score + ideal\ minimum\ total\ score)$

$SB_i = \frac{1}{6}(maximum\ total\ scrore - ideal\ minimum\ total\ score)$

$M_i = ideal\ average$

$SB_i = Ideal\ standard\ deviation$

Total ideal maximum score = highest score (5) × total of item number

Ideal minimum score =lowest score (1)× number of items

2. Analysis of Practicality

   The instrument that used to calculate practicality of electronic students worksheet from the student response questionnaire.

Table 2. conversion from data Quantitative to Qualitative

Score Range	Criteria
$\bar{x} > Mi + 1{,}8\ SBi$	Very Good
$Mi + 0{,}6\ SBi < \bar{x} \leq Mi + 1{,}8\ SBi$	Good
$Mi - 0{,}6\ SBi < \bar{x} \leq Mi + 0{,}6\ SBi$	Quite good
$Mi - 1{,}8\ SBi < \bar{x} \leq Mi - 0{,}6\ SBi$	Less good
$\bar{x} \leq Mi - 1{,}8\ SBi$	worst

Form table 1 and 2 electronic students worksheet called valid and practical when score from material experts and media experts gets minium good criteria. While called practical when score from student response questionnaire minimum gets good criteria.

HASIL DAN PEMBAHASAN

In the result of this study, electronic student worksheets can be obtained and used by downloading it on link provided. Once downloaded, the electronic student worksheet can be read offline. The stages of developing an Android-based electronic student worksheet on the material of linear equations and inequalities are as follows.

Data Processing

Data analysis After evaluating the product which is the final stage of the ADDIE research method, the next step is to analyze the data. Data analysis obtained from qualitative data is thenconverted into quantitative data. The data tested included assessments from media experts, materials and student response questionnaires. The results of the data obtained from the study of Electronic Student Worksheets (E-LKPD) based on android on the material of equations andinequalities are as follows.

Electronic student worksheet viewed in terms of material

The validity of the electronic student worksheet which was developed based on assessment from two material expert. There are one lecturers from Mathematics Education and other is Mathematics Teacher at MTsN 1 Tanggamus. The following are the results of calculations from material experts:

Table 3. average validity viewed from aspects on materials questionaire

No	Aspects	Average	Criteria
1	Eligibity of contents	4,21	Very Good
2	Feasibikity of presentation	3,88	Good
3	Eligibility of Language	3,64	Good
4	Assesment of contextual	3,83	Good

Table 4. Average of validity from materials experts

No	Material Expert	Average	Criteria
1	Lecturer of Mathematics Education	3,86	Good
2	Teacher Of mathematics education from Mts N Tanggamus	3,95	Good
	Total Average	3,90	Good

Based on table 4. can be seen the assessments from two materials experts gets an average score of 3.90 with good criteria. These results show that the electronic student worksheets meet the valid qualifications can be seen from the achievement of the criteria Good.

Electronic Students worksheet viewed in terms of media

The validity of the electronic student worksheet which was developed based on assessment from two media expert. There are one lecturers from Mathematics Education and other is Mathematics Teacher at MTsN 1 Tanggamus. The following are the results of calculations from media experts.

Table 5. average validity viewed from aspects on media questionaire

No	Aspects	Average	Criteria
1	Assesment of display	4,29	Very Good
2	Assesment of progamming	4,25	Very good

Table 6. Average of validity from materials experts

No	Media Expert	Average	Criteria
1	Lecturer of Mathematics Education	4,7	Very Good
2	Teacher Of mathematics education from Mts N Tanggamus	3,85	Good
	Total Average	4,28	Very Good

Based on table 6, can be seen the assessments from two media experts gets an average score of 4,28 with very good criteria. These results show that the electronic student worksheets meet the valid qualifications can be seen from the achievement of the criteria Very Good.

Electronic students worksheet viewed from students repsonses

Student responses to the developed electronic students worksheet seen from the results of student response through a questionnaire given in the form of a google form and filled out by 30 students of MTsN 1 Tanggamus at the time the trial was conducted. The following are the results of the student response questionnaires:

Table 7. Average of students respons seen from their aspects

No	Aspec	Small Class Trial		Large Class Trial	
		Average	Criteria	Rata-Rata	Criteria
1	Assesment of display	3,85	Very Good	4,76	Very Good
2	Assesment of progamming	4,92	Very Good	4,78	Very Good
3	Benefit	4,28	Very Good	4,69	Very Good

Table 8. Average of studenst repsonses on each trial

No	Students Response	Average	Criteria
1	Small Class Trial	4,93	Very Good
2	Larger Class Trial	4,75	Very Good
	Total Average	4,84	Very Good

Based on table 8, can be seen that the calculation of student responses in small class trials obtained an average score of 4.93. These results indicate that the developed electronic student worksheets resulted in very good criteria and met practical qualifications.While the results of the calculation of student responses in large classes obtained an average score of 4.75. These results indicate that the developed electronic student worksheets have achieved the very good criteria and meet the practical qualifications. So the conclusion electronic students worksheet meets the practical qualifications because it reaches the very good criteria.

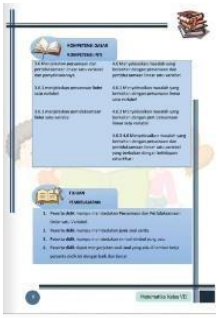
The last product of the electronics students worksheet can be explained with the following.

1. Cover, Identity of electronic students worksheet
   Cover in electronics students should designed in interesting mode. Cover in electronis students worksheet consist of title, university and study program logo and the writers. Therefore the identity of electronic students worksheet used for figure out the elements of worksheet itself. We can see cover and identities of electronic students worksheet on picture below.

Picture 1. Cover and identity of electronic students worksheet

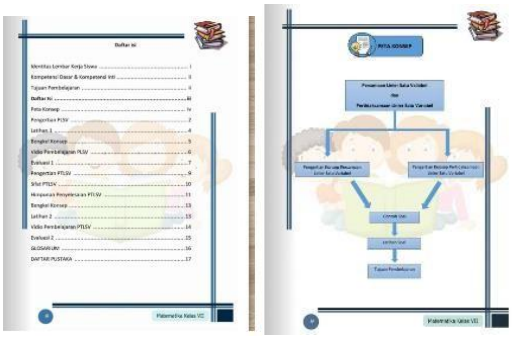
2. Basic Competencies and learning Purposes

This part is to inform the reader the purposes must be reached in electronic students worksheet.



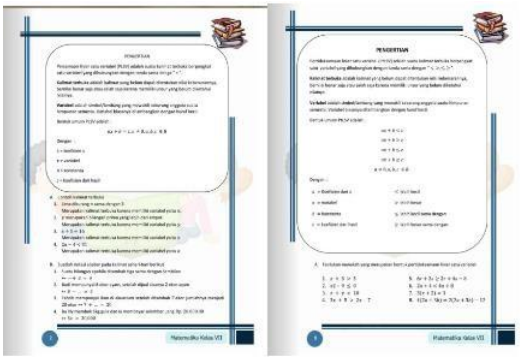
Picture 2. Basic competencies and learning purposes

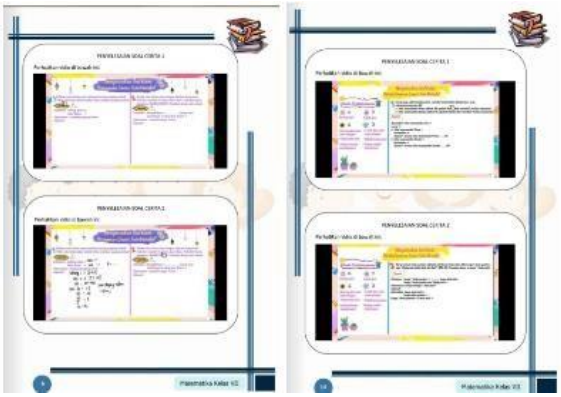
3. Table of Contents and mapping of concepts
   This part is to inform the reader what is the content of the electronic students worksheet and also make the reader easier to known the information of the topics in electronis students worksheet



Picture 3. Table of contents and mind map

4. The material and its video
   Materials in electronic students worksheet consists of two topics there are linear equation and its inequalities. Materials in this worksheet separated is to make the students easy to understand.



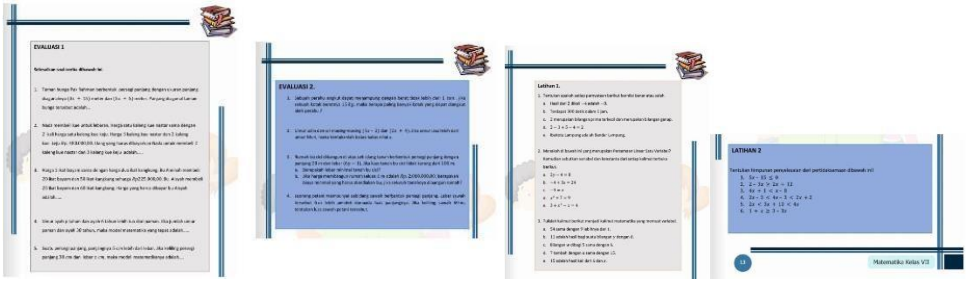


Picture 4. Materials and its video

In this worksheet there are 4 videos lessons that divided into 2 kinds. Two first videos is about linear equations topics and two seconds is about linear inequalities.

5. Exercise of problem and evaluation

In electronic students worksheet we put 2 kinds of exercise there are exercise for linear equation and linear inequalities. Exercise is useful for train students ability in understand the popics.



Picture 5. Evaluation and exercise of problem

Evaluation used to know the ability of students in discussed topis in worksheet. And also to know the understanding of conseptd in the related topics.

Based on this research, it can be concluded that the mathematical component of linear equations and inequalities in mathematics is an abstract knowledge, but it is very useful in everyday life. Mathematics is interconnected in activities carried out by humans, so that mathematics lessonsfunction as a guide in life. Mathematics is also often feared and avoided by students because according to students mathematics is a difficult subject. Mathematics is considered difficult because it has the abstraction of existing concepts and there are story questions that sometimesconfuse students, so they will have difficulty and think mathematics is difficult. Therefore, it is necessary to develop varied teaching materials developed by educators. The development of teaching materials is useful as a means of educators so that students are more active, creative and effective in the learning that will be taught to students.

KESIMPULAN

The result of the research on the development of an Android-based electronic studentworksheet with linear equations and inequalities material obtained the following conclusions. Development of android-based electronic student worksheets (E-LKPD) with linear equations and inequalities using data analysis where the researcher conducted interviewswith Mathematics teachers and students at MTsN 1 Tanggamus regarding learning difficulties,learning methods and problems during learning and using android during the teaching and learning process. It was found that when learning the teacher only used government textbooks and media in the form of word-shaped papers distributed in class groups, and the lack of use an android in the learning process. Because of that, students sometimes do not understand the learning that is given. Then proceed of developing the worksheet is with the design. The design begins with designing the electronic student worksheet based on the existing problems, the electronic student worksheet design

consists of a cover, identity, basic competencies, learning objectives, table of contents, concept map, materials, practice questions, evaluation, glossary and bibliography. Followed by the validation of the E-LKPD which was developed by researchers through a validation process carried out with material experts, media experts andteachers after receiving input and suggestions from material experts, media experts and mathematics teachers which were then improved so that the E-LKPD developed was valid and practical. And also be used to conduct mathematical research to provide assessments, input and suggestions.

Daftar Pustaka (10 PT)

A. Pribadi, Benny. (2009). Model Desain Sistem Pembelajaran. Jakarta: PT. Dian Rakyat.

Puspita, V., & Dewi, I. P. (2021). Efektifitas E-LKPD berbasis Pendekatan Investigasi terhadap Kemampuan Berfikir Kritis Siswa Sekolah Dasar. *Jurnal Cendekia: Jurnal Pendidikan Matematika*, *5*(1), 86-96.

Rosenberg, Marc J. (2001). E-Learning Strategies for Delivering Knowledege in the Digital. New York: Mc Graw Hill.

Sugiyono. (2010). Metode Penelitian Pendidikan (Pendekatan Kualitatif, Kuantitatif, dan R&D) Cetakan ke-10. Bandung: Alfabeta.

Widoyoko, E. P.S. (207). Evaluasi Program Pembelajaran. Yogyakarta: Pustaka Pembelajaran.

Yamasari, Y. (2010). Pengembangan Media Pembelajaran Matematika Berbasis ICT yang Berkualitas. Surabaya: Jurusan Matematika, FMIPA UNESA.