

# THE DEVELOPMENT OF QUIZZIZ ASSISTED THINK-TALK-WRITE APPROACH TEACHING MATERIALS TO IMPROVE STUDENTS PROBLEM SOLVING SKILLS ON SOCIAL ARITHMETIC

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## ABSTRACT

The development of this research was driven by the low academic achievement of high school students in the field of social arithmetic. This study aims to develop teaching materials through a test-assisted think-speak-write approach to improve problem-solving skills. The type of research used is development research with the 4D development model (Define, Design, Develop, Dissemination). Research using this model is limited to stage 3 (define, design, develop) due to limited research time. The object of this study was students of class VII at Al-Fatih KBB integrated college with data analysis techniques using descriptive qualitative techniques. Data was collected and then analyzed using Microsoft Excel. Results shows that the feasibility of teaching materials can be seen from the results of the evaluator's assessment, small-scale tests and large-scale tests. At 91% and 95% in the "Very Decent" category. Thus the student response to teaching materials has developed with a percentage of 82% and 84% are in the "Very Realistic" category. The limitations encountered in the development of educational materials are supported by the quizziz application. Study time is limited and school facilities are very inadequate to carry out learning in the classroom. Learning by using teaching materials media assisted by the quizziz application can be used and can be developed by the teacher on ongoing basis with different materials and themes.

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## INTRODUCTION

Students' mathematical problem-solving abilities must be improved in learning activities, because in the process of learning and solving a problem, students can gain experience using the knowledge and skills they already have to apply in solving mathematical problems. Given the importance of mathematics, mathematics cannot be separated from its role in all aspects of life. As stated by Cornelius that mathematics is a means to solve the problems of everyday

life. However, in reality students often experience difficulties in associating material with real life problems. Student understanding is still abstract and has not touched practical needs and their application in real life.

Problem solving is one of the goals in the learning process in terms of curriculum aspects. The importance of problem solving in learning was also conveyed by the National Council of Mathematics Teachers (NCTM). According to NCTM (2000) the process of thinking mathematics in learning mathematics includes five main competency standards, namely problem solving abilities, reasoning abilities, connection skills, communication skills and representational abilities. This low ability will result in low quality of human resources as indicated by low problem solving abilities. This is because so far learning has not provided opportunities for students to develop their ability to solve problems.

One form of teaching materials that can be developed by researchers is teaching materials assisted by the Quizizz application. The development of teaching materials is expected to improve the processes and results of students' mathematical problem solving abilities. Students can freely collect information related to mathematical problem solving abilities, both from media images provided by the teacher and by gathering information from various sources. Quizizz is a game-based educational application, which brings multiplayer into the classroom, is online and fun, real time, and learning outcomes can be downloaded immediately. Quizizz can be used as an alternative learning evaluation for students, and can also be monitored for item analysis. Quizizz can be accessed through electronic devices owned by students. Quizizz also allows students to compete with each other, provides motivation in learning, sees live leaderboards, helps stimulate interest, has a very attractive appearance, and has a time setting that can guide student concentration. The use of Quizizz assists teachers in carrying out learning outcomes assessment activities without being limited by place.

Education is one important aspect that will determine the quality of life of a person or a nation. In formal education, one of the subjects in schools that can be used to build students' way of thinking is mathematics. Therefore, mathematics lessons at school do not only emphasize giving formulas but also prohibit students from being able to solve various math problems related to everyday life (Samin, 2018). Mathematics is a field of science that is very important for human life. Formally mathematics is taught from elementary school to university, this is because mathematics is indeed a subject that students must master because it has great benefits in life, especially in improving the human mindset. Learning in schools refers to the applicable curriculum with predetermined learning goals and is expected to be achieved by all students, including in learning mathematics (Sani, 2017). Manuscripts submitted to this journal must be subject to the following titles, except for review articles: Title; Writer's name; Writers' Association; Abstract; Keywords; Introduce; method ; Results and Discussion; detect; Thank You ; and References.

Teaching materials are one of the most important elements in curriculum implementation. With teaching materials, the time needed during the learning process will be more efficient. Majid stated. Teaching materials are all types of materials used to assist teachers or instructors in carrying out teaching and learning activities. (Reza, 2020). Subandiyah (Khuzamah & Umami, 2019), explains that teaching materials are anything that is used by teachers or students to facilitate language learning, increase knowledge and language experience. Another definition states that teaching materials are a collection of materials that are arranged systematically so as to create an environment or atmosphere that allows students to learn.

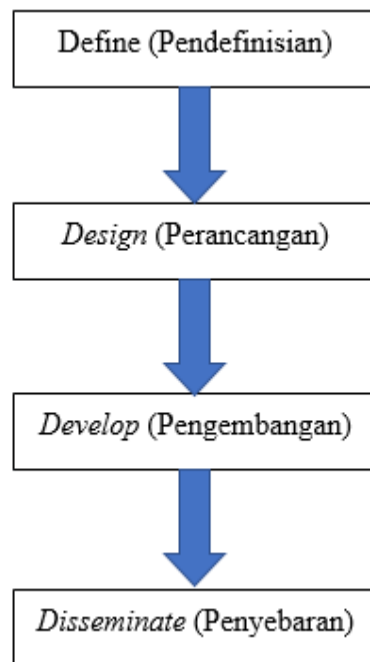
The Think Talk Write (TTW) learning model was first introduced by Huinker and Laughlin in 1996. The Think Talk Write (TTW) learning model is based on constructivism learning which is applied through thinking, speaking and writing activities. Huinker and Laughlin (Hamdayana, 2020, p. 217) state that the Think Talk Write (TTW) learning model process can build understanding through thinking, speaking, and sharing ideas (sharing) with friends before writing. This is in line with Suyanto's opinion (Chandra, et al. 2018, p. 36) that this learning begins with thinking through reading material (listening, criticizing, and alternative solutions). Reading results are communicated through presentations, discussions, then reports on the results of the presentation. The essence of the Think Talk Write (TTW) learning model is a constructivist learning design through self-communication activities, between students and teachers which encourage students to think, speak, express opinions, and write down the results.

According to Isrok'atun, et al. (2018) in learning mathematics, the Think Talk Write (TTW) learning model is applied through three mathematical abilities, namely thinking mathematically, speaking mathematically, and writing mathematically. Mathematical thinking is applied by understanding an event or mathematical problem. This math problem is packaged in life problems. This speaking ability is applied when students verbally express various mathematical ideas based on their knowledge. Students express mathematical ideas using their own language. Furthermore, writing skills are applied by directing students to express the mathematical ideas they have acquired, in written form using the language of mathematics, namely symbols or concepts and mathematical rules.

Quizizz according to Rizal Dzul Fadly, (2020, p. 72) is a web tool that can be used for learning in the classroom and outside the classroom in the form of homework (PR), which can also be used as an interactive quiz game. Quizizz is a game-based educational application, which brings multiplayer into the classroom, is online and fun, real time, and learning outcomes can be downloaded immediately. Quizizz can be used as an alternative learning evaluation for students, and can also be monitored for item analysis. Quizizz can be accessed through electronic devices owned by students. Quizizz also allows students to compete with each other, provides motivation in learning, sees the leaderboard directly, helps stimulate interest, has a very attractive appearance, and has a time setting that can guide student concentration. The use of quizizz assists teachers in carrying out learning outcomes assessment activities without being limited by place.

## **METHOD**

This research was conducted at AL-Fatih Integrated Junior High School which is located in Cikallong Wetan District (West Bandung Regency). The subjects used in this study were class VII students, totaling 30 students. The time of the research was carried out for 3 days, starting on March 28-30 2023. The type of research used was development research (R&D) with a 4D development model (Define, Design, Develop, Disseminate).



**Figure 1.** 4D Development Model Source: (Thiagarajan 1974)

Research conducted using this model is limited to step 3 (Define, Design, Develop) due to limited research time. The interview process was carried out before conducting research on teaching materials. This aims to obtain data regarding the material that must be taught, the learning objectives to be achieved, and the media that students have used so far. This research also requires information whether school facilities support the learning process. The source of information for this interview was a mathematics teacher, a curriculum representative for the AL-Fatih Integrated Junior High School. Expert validation, validation of learning outcomes test questions, and manual results for expert use. The validator is a lecturer in Mathematics Education Study Program, FPMS IKIP SILIWANGI and a mathematics teacher at AL-Fatih Integrated Junior High School

The questionnaire method is a measuring tool for measuring student responses after learning with the quiz application. The questionnaire instrument for this method consists of the ease of understanding the material, the level of enjoyment and saturation of students using learning media, then repeating learning and the level of student motivation after using learning media. Data processing procedures for all research data were collected using Microsoft Excel in the form of: 1) Descriptive statistics to describe the stages of the development process and constraints during development, 2) Inferential statistics to see the feasibility of product effectiveness. Perform data processing analysis which will later be used to formulate research results. The results of this analysis are the answers to existing problems. This in-depth data processing analysis is the result of expert validation of the learning media assessment evaluation instrument. Analyzing the data from the validation results of the expert team using a Likert scale. The percentage of validation results is calculated using the following equation:

$$P = \frac{\sum x}{\sum x1} \times 100\%$$

Information:

P : Desired percentage

$\sum x$  : Total score of respondents' answers as a whole

$\sum x1$  : Maximum total score overall

100% : Constant

Benchmarks are used to present validation scores

**Table 1.** Product Validation Criteria

Presentase	Criteria	Inteprestasi
81%-100%	Very Worth it	The product can be used immediately without repair
61% - 80%	Worthy	The product can be used with minor repairs
41% - 60%	Decent Enough	Products can be used with many improvements
21% - 40%	Not Yet Eligible	Products can be used with many improvements
0% - 20%	So inadequate	Product cannot be used

## RESULTS AND DISCUSSION

### *Results*

The results of this study aim to develop teaching materials for social arithmetic learning made with the help of the quiziz application. In addition to producing interactive quiz applications, researchers also want to see the feasibility of teaching materials used in the learning process. The results of research and development with the 4D model limited to step 3 (Define, Design, Develop) are explained as follows namely.

### **Define**

The analysis carried out in the seventh grade junior high school mathematics curriculum is about social arithmetic which will be designed using the quiziz application. After careful analysis, the material that can be developed is social arithmetic material, because social arithmetic material must be explained with reasoning and understanding. To determine the overall value, determine the profit and loss on the sale. Interesting teaching materials need to be developed so that students can understand concepts because students will not be able to use visual aids enough because most students find it difficult to understand the steps that must be taken with the teaching materials that will be developed will make students better understand social arithmetic material. This material requires an in-depth explanation of students' mathematical problem solving abilities.

Student character analysis was carried out by interviewing class VII accompanying teachers. By conducting interviews with the class VII teacher at Al-Fatih Integrated Middle School, West Bandung, namely Mr. Tubagus Suwanda, S.Pd and interviews with several class VII students, two of whom were named Salwa and Mutia, the results of the interviews explained that teaching materials needed to be used to support the delivery of material to students in class. The method used by the teacher in learning mathematics is discussion, question and answer, group work, and teaching aids to help the teacher explain the material to students. But today's students are excited by technology.

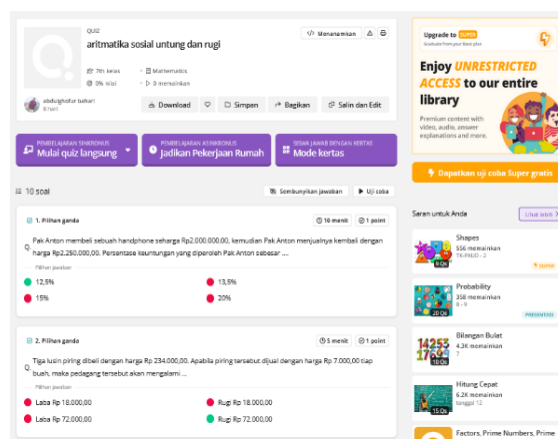
Because students like technology such as computers and cellphones, students themselves have a very high curiosity. With the quiziz application-based learning material, students will be interested in learning and will not feel bored with the learning material that will be delivered. The teacher's opinion about teaching materials assisted by the quiziz learning application is quite good, because it can help teachers in the teaching and learning process to be easier and able to build student learning motivation, it's just that there are several obstacles faced,

namely limited time in the very little learning process, school facilities which are inadequate are very inadequate in implementing learning in class and there are some students who do not have mobile phones so that learning is a little hampered.

An analysis of students' needs was carried out to get the result that teaching materials are truly effective in learning mathematics. The results obtained from students are that students are students with all different characters and abilities. The learning objectives to be achieved by the teacher should pay attention to the needs of students according to their character. The teacher is not solely the dominant party in controlling learning in the classroom because each student has sensitivity in learning, curiosity, the ability to express opinions and learning needs that attract his attention so that students' interest in learning grows. The abilities possessed by these students and sensitivity to learning demand learning teaching materials. Observations made on learning at the Al-Fatih Integrated Junior High School show that during the lesson the teacher does not use teaching materials.

## Design

The design at this stage is carried out by designing teaching materials while the steps for designing teaching materials are as follows: 1) Front Page of Teaching Materials. The front page of this teaching material contains a login page for teaching materials in general and there are several links that can be used to verify Quiziz account logins, so that students who have accounts can access these teaching materials. 2) Advanced login page for the use of teaching materials. In this section the processing of teaching materials contains guide steps to help students access teaching materials that will be used during the learning process. 3) Materials and activities. On this part of the material page is intended as students' basic knowledge in understanding social arithmetic material, for the learning media used, namely teaching materials assisted by the quiziz application in which there are experiments on the think talk write approach, not only that the material and activities are arranged with the characteristics of the think-talk approach. talk-write. After that, students will be given problem-solving activities related to the material to be studied.



**Figure 2.** Learning Media Design

After finishing developing the teaching materials using the Quiziz application and before the teaching materials were carried out on a small scale trial, an assessment or validation of the eligibility was carried out from media experts, material experts, and mathematics teachers at Al-Fatih Integrated Junior High School, the teaching materials became a reference for making improvements. This process is very useful before the product is shown to students at the field test stage. The assessment was carried out with media experts to determine the feasibility of

think-talk-write teaching materials assisted by the quiziz application. Aspects assessed include appearance, content and benefits.

### Develop

The development of the 4D model which is limited to step 3 (Define, Design, Develop) contains activities to realize product design, in this case think-talk-write teaching materials assisted by the quiziz application. The manufacturing step in this research is to create and modify teaching materials. At the design stage, a flowchart has been made and realized in the form of teaching material development products that are ready to be implemented in accordance with the objectives of developing teaching materials. To find out the feasibility of the teaching materials developed by this researcher, the researcher asked for assessments from material experts, medical personnel and one of the field practitioners in this study, namely the Gulrul Observer at the school. In addition, the most important thing in the validation process by experts is to re-ensure that the teaching material products assisted by the Quiziz application can indeed solve problems effectively and efficiently. Assessment findings are compiled and presented in tabular form. Validation of RPP, LKPD, TEACHING MATERIALS and TEACHER. The validation results of lesson plans, worksheets, teaching materials and teachers were carried out by validators I and validators II, namely Wahyu Setiawan, M.Pd and Tubagus Suwanda, S.Pd.

**Table. 2** RPP validation results

No	aspect	Total score	Percentage	Information
1	Identity	10		
2	Formulation of Learning Objectives and Indicators	14		
3	Content Material	14		Average = 4,71
4	Learning approaches	9	94 %	Expected score = 105
5	Learning Activity Planning	19		
6	Learning Resources	10		
7	Evaluation	8		
8	Language	15		
Total		99	94 %	Very Valid

The results of lesson plan validation by material experts and media experts show that of the 21 statements given there are 99, the average validator's overall rating is 4.71, the percentage of the validator's score is 94% and is included in the very valid category with an interval score of 80% - 100%. The results of the LKPD assessment are presented in Table 3, namely:

**Table 3.** LKPD Validity Results

No	aspect	Total score	Percentage	Information
1	material	17	85%	very valid
2	LKPD view	31	88%	very valid
3	Linguistic Aspect	19	95%	very valid
Total		67	89 %	very valid

LKPD validation results by material experts and media experts found that out of 15 statements given a total of 67, the average validator's overall rating was 4.46, the validator's percentage score was 89%, and included in the very valid category with an interval score of 80% - 100%. The results of the assessment of teaching materials are presented in Table 4, namely:

**Table 4 .** Results of Teaching Materials Validity

No	aspect	Total score	Percentage	Information
1	material	17	85%	very valid
2	appearance	31	88%	very valid
3	Linguistic Aspect	19	89%	very valid
<b>Total</b>		<b>67</b>	<b>89%</b>	<b>very valid</b>

The results of media validation by media experts showed that out of 15 statements given a total of 67, the average validator's overall rating was 4.46, the validator's percentage score was 89%, and included in the very valid category with a score interval of 80% -100%.

After validating material experts and media experts, it can be seen that the feasibility of the teaching materials developed is think-talk-write teaching materials with the help of the quizz application, along with their recapitulation in table 5.

**Table 6.** Results of the Validity of Mathematics Teachers

No	aspect	Total Score	Percentage	Information
1	Learning objectives	16	80%	very valid
2	Material Assessment	17	85%	very valid
3	Benefit	19	95%	very valid
4	Completeness	18	90%	very valid
<b>Total</b>		<b>70</b>	<b>87,5%</b>	<b>very valid</b>

Based on Table 6 it can be seen that the total score obtained was 70 with a percentage of 87.5% included in the very valid category of the developed teaching materials.

After being validated by experts and teaching staff (practitioners), then a small-scale trial was carried out. This small-scale trial was used to find out and obtain results on the quality, practicality and usability of the teaching materials developed by researchers. The small-scale trial was carried out by 10 class VII students of Al Fatih Terpatu Middle School who had finished attending the Social Arithmetic material. The selection of students is arranged randomly, accompanied by the results of a student questionnaire regarding the assessment of teaching materials assisted by the Quizizz application.

**Table 7.** Student Response Results in Small-Scale Trials

No	Aspect	Total score	Percentage	Information
1	Appearance	234	82 %	Very practical
2	Material presentation	233	82 %	Very practical
3	Benefit	314	82 %	Very practical
<b>Total</b>		<b>781</b>	<b>82 %</b>	<b>Very practical</b>

Based on the results of the questionnaire on responses, it shows that with reference to practicality criteria in small-scale trials, active student responses to the development of teaching materials presented with the help of the quizz application with a percentage result of 82% can be declared "very practical". Apart from this limited trial, not many revisions were found, some students were very interested in using this teaching material. As for the improvements made, such as changing the layout and replacing images on teaching materials that are still blurry. Furthermore, after the small-scale trial the researcher made minor improvements to the content of the teaching materials, the next step the researcher took was to



conduct a trial on a larger scale. This large-scale trial was conducted on 30 grade VII students of SMP Al Fatih Terpadu, and the results of this extensive trial are as follows:

**Table 8.** Student Response Results in Large-Scale Trials

No	aspect	Total score	Percentage	Information
1	appearance	801	84 %	Very practical
2	Material presentation	789	83 %	Very practical
3	Benefit	799	84 %	Very practical
Total		2.389	84 %	Very practical

Based on the results of the questionnaire on responses, it was shown that with reference to the practicality criteria in the limited trial the active student responses to the development of teaching materials were presented with the help of the Quizizz application with a percentage result of 84% and can be said to be "very practical" and in this broad trial not many revisions were found. The following is a recapitulation in table 8.

**Table 9.** Summary of the results of small and large scale trials

No	Trial code	score	max	sign %
1.	small	781	950	82 %
2.	big	2389	2850	84 %
Average				83 %

Based on the results of the recapitulation, it shows that with reference to practicality criteria in small and large trials the active student responses to the development of teaching materials are presented with the help of the quizizz application with a percentage result of 83% and can be stated as "very practical".

### **Discussions**

Education is an important aspect that will determine the quality of life of a person or a country. In formal education, one of the school subjects that can be used to build students' way of thinking is mathematics. Therefore, school mathematics lessons do not only emphasize formulation, but also teach students to be able to solve various mathematical problems related to everyday life. (Samin, 2018). Researchers make the curriculum as a basic reference and main reference so that it can adapt to the contents of teaching materials. Not only that, there are important points that become a reference requirement for researchers when developing teaching materials.

Researchers pay attention to these things, the same as what was stated by Emanuel (2021) who explains that the development of learning tools must pay attention to the requirements of important points so that after the finished product can be directly used as a tool. to support learning. Proceed to the stage of preparing teaching materials, learning devices and test instruments. This stage is a fairly time-consuming and time-consuming activity. The steps taken to make teaching materials started from preparing materials according to Core Competencies (I), Basic Competencies (KD), designing content schemes for teaching materials with the characteristics of a social arithmetic think-talk-write approach and practice questions to strengthen the depth of the material. With advances in application-based technology, Quizizz has become a design tool especially for making teaching materials. This makes the packaging on the display of teaching materials. The teaching materials presented

have very interesting quality pictures and illustrations, so that they become one of the factors to increase interest and enthusiasm for learning in the students themselves.

All teaching material products developed before they are widely used and can be used during learning in schools, these products must immediately be checked for their feasibility by being validated by experts. So that the validity of the teaching materials that we have developed will be seen. This validation was carried out by IKIP Siliwangi lecturers and math practitioners or teachers at schools according to field criteria and abilities. These stages and implementation are in accordance with the opinion according to Nurdien (2019). In the process of developing teaching materials, the validation step by experts is an important sequence for research results. The validator is a reference for whether or not this teaching material is appropriate, for this reason this validation is carried out with the same validator and indicators. This is done to find out how far the development of material products on social arithmetic material. In the results of expert validation I and II, the "very feasible" category was extended with a few revisions. With the acquisition of these results researchers can conclude that student responses to the development of teaching materials get the "very practical" category used in learning mathematics.

According to Imtiyas (2018) suggests that in order to determine the feasibility of the teaching materials being developed, it is necessary to carry out direct trials in the field to find out the results of student responses to the teaching materials that have been developed. After knowing that the teaching materials that have been developed by researchers are feasible to use and can be implemented during learning, researchers conduct product trials on students, so researchers can see when using teaching materials whether they can be effective or not during learning. Implementation of learning that had previously been consulted with the validator and math teacher at the school. During the learning process, students are able to follow and carry out instructions for working on teaching materials which include the TTW approach. The initial step of the researcher is to observe the problems presented in teaching materials using the Quizizz application, then try practical adjustments, then end by concluding.

According to Sandinan, et al. (2020), argued that the steps of the TTW approach can produce students who can have the ability to actively seek, process, construct and use knowledge. Siwi & Puspaningtyas (2020) said that after developing teaching materials that had been validated and made improvements, the result was that students were able to understand the material well, and were able to explain the material back to other students. After learning is carried out according to the TTW approach method and the tools that have been prepared carefully, the final meeting of the lesson is a question test to see the effectiveness of learning using teaching materials assisted by the Quizizz application on student learning outcomes. ability to solve math problems. This step was taken because the questions given to students were arranged according to indicators of mathematical problem solving abilities. In line with that, the effectiveness test aims to find out how much influence teaching materials have on student learning outcomes (Ernawati, 2020).

## **CONCLUSION**

Based on the results of the research that has been done, as well as looking at the existing problem formulation, the following conclusions can be drawn: The process of developing think-talk-write teaching materials with the help of the quiziz application to improve problem-solving abilities of class VII students is already in the "very feasible" criteria and "very effective" student responses to teaching materials are already in the criteria of "very practical" based on student learning outcomes obtained meaning that the teaching materials developed

are effective for class VII students of junior high schools, the obstacles encountered during the process of developing teaching materials developed include: Time which is limited to learning and school facilities that are very inadequate in the implementation of learning in the classroom. Suggestions that researchers can put forward are as follows: 1) Learning by using teaching materials media assisted by the quizizz application can be used and can be developed by the teacher on an ongoing basis with different materials and themes. 2) In making teaching materials there are several obstacles or difficulties that might be an improvement for other researchers to develop teaching materials with different methods. 3) For future researchers, this research can be a reference for researchers to be able to develop other products, especially those that are useful in the field of education.

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