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# Development of Tangram Media in Mathematics Learning Flat Built Materials to Improve Self Efficacy in Class 2 of Kendalrejo Negeri Srengat Primary School

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**Abstract**

The research aims to develop tangram media in flat building material which plays a role in increasing the self-efficacy of Class 2 of Kendalrejo Srengat District Elementary School. Blitar. Rises uses research and development (R&D) methods. The development stages used are ADDIE, namely Analysis, Planning, Development, Implementation and Evaluation. The data used is primary data from the research location, the subjects are 11 grade 2 students. The data collection technique is through a questionnaire and interview process, but during the pre-practice stage, observations are made, material and media experts, as well as a questionnaire for N-gam exam students. According to the results obtained by material experts (93%) and media experts (100%) it was declared very valid, media feasibility (100%) was declared very feasible, and the gain in increasing self-efficacy using the N-gain formulation obtained a value of 0.7788 which was declared high. This shows that tangram learning media can increase students' self-efficacy.

**Keywords**:*Tangram, flat shape, self efficacy*

**Abstract**

*The research aims to develop tangram media in flat building material which plays a role in increasing the self-efficacy of Class 2 of Kendalrejo Srengat District Elementary School. Blitar. Research uses research and development (R&D) methods. The development stages used are ADDIE, namely Analysis, Planning, Development, Implementation and Evaluation. The data used is primary data from the research location, the subjects are 11 grade 2 students. The data collection technique is through a questionnaire and interview process, but during the pre-practice stage, observations are made, material and media experts, as well as a questionnaire for N-gam exam students. According to the results obtained by material experts (93%) and media experts (100%) it was declared very valid, media feasibility (100%) was declared very feasible, and the gain in increasing self-efficacy using the N-gain formulation obtained a value of 0.7788 which was declared high. This shows that tangram learning media can increase students' self-efficacy..*

***Keywords**:*Tangram, flat shape, self efficacy

**Introduction**

Education is a step in changing the attitudes and actions of each individual through training and teaching. Education is a limitless space for developing oneself (Alfi, 2020).

Mathematics is a compulsory subject at all levels of education, generally with each level up this subject the difficulty increases. Mathematics taught in schools today prioritizes theory which is sometimes difficult for students to accept in real life. The average student thinks that mathematics is difficult, many students often avoid this subject, even though mathematics is the most important thing in their daily activities.

In the teaching and learning process, teachers usually use tools or media for learning which aims to make it easier for the teacher when delivering the material and can stimulate students' thinking, attention and abilities. This activity cannot be separated from the learning media which participates in having an impact on the realization of good learning objectives (Fatih & Alfi, 2022).

According to (Fatih & Alfi, 2021) learning media is a facility for conveying positive messages in the form of information and knowledge to students. Media makes it easier for students to understand a lesson. Generally, students feel that learning subjects, especially mathematics, make them feel bored and are not used in their daily activities. However, mathematical knowledge is needed for success in the field of SAINTEK (Science and Technology) (Jehlička & Rejsek, 2018).

According to the results of the question and answer session with Mrs. Suprapti S.Pd, namely the homeroom teacher for class 2 at SDN Kendalrejo on Monday, Wednesday 11 January 2023, the researcher found several problems that were found in the learning, the teacher had not provided learning through real media which was used as a facility in learning mathematics chapter Two-dimentional figure. This makes it difficult for students to learn mathematics such as calculating, drawing, determining the size and shape of other things. Namely, teachers only use textbooks and the surrounding environment as source material in the teaching and learning process. Accompanied by explaining and giving examples via a whiteboard without any real media. while students just listen and take notes. Giving examples on the whiteboard is felt to be very ineffective.

Based on the problems obtained, the solution found was to develop tangram media which could be used as a means of understanding geometric concepts (Fitria Dam Suyadi, 2021). Learning media is very important for students (Fatih & Alfi, 2021)

The media developed by researchers is tangram media. Tangram media is a puzzle game that can be used as an effective learning tool in developing self-efficacy and exploring various flat shape concepts. According to (Nada et al, 2020) Tangram is

a technique that can be used in geometric materials. (Fatih, 2020) said that Tangram media helps students understand learning and increases students' self-efficacy. The benefit of this tangram media is that students become highly curious in their learning process, apart from that it provides motivation to study well in groups and individually (Suryani et al., 2018). So it can be said that tangram media can foster self-efficacy in each individual. This can help improve student learning outcomes (Fatih, 2018). Self-Efficacy is an individual's belief in carrying out activities to achieve their goals. According to (Fadali, 2024) Self-efficacy determines the amount of confidence in a person's abilities to carry out their learning steps.

Flat shapes are important material related to daily activities (septihani, melisari et al, 2020). Therefore, tangram media is needed to study various flat shapes. Each structure is related to the ability to mobilize motivation, resources, cognition and activities needed to achieve task completion (Liu & Koirala, 2019).

This research also quotes relevant previous research from several researchers using various media to increase lower class self-efficacy. This research was carried out by Puput Ary Desi Wiranti, 2021, namely: Development of HOTS-Based Flat Building Material Tangram Media to Improve Learning for Class 2 Students at SDN Srengat 2 Blitar where the research used tangram media which obtained a mean percentage of 86.75% and was said to be very interesting. Another research was conducted by Rati Nugrahani where in her research increasing self-efficacy in the mathematics learning process obtained a very high percentage, namely 69.7% in terms of the learning implementation process.

Based on the problems described, the reviewer has an interest in expanding the tangram media entitled Development of Tangram Media in Mathematics Learning with Flat Building Materials to Increase Self Efficacy in Class 2 of Kendarejo Srengat State Elementary School, Blitar Regency.

**Method**

Research uses development techniques (Research and Development) with the ADDIE model, namely Analysis, Design, Development, Implementation, Evaluation.

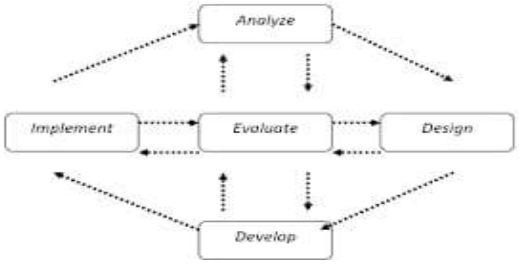



Fig.1 ADDIE model

Data collection techniques through observation, interviews, questionnaires, and documentation. In this research, instrument testing/data processing uses validity and reliability testing. The analysis technique uses media truth testing and N-gain to measure the high and low levels of self-efficacy when using the tangram method to increase self-efficacy. The media validity test was obtained by the results of an instrument filled in by media and material

experts. Next, the following percentage results are taken into account:

$$\% = \frac{sekor\ jawaban\ responden}{sekor\ total} X100\ \%$$

Next, the calculation using the N-gain formula is done by entering the value of increasing Self-efficacybefore and after the questionnairegiven using tangram media using the following formula:

$$N - gain = \frac{spost - spre}{side - spre}$$

N-gain earnings are classified into:

**Table 1**N-gain interpretation

| No | Gains | Group |
|---|---|---|
| **1.** | <40 | low |
| **2.** | 40-55 | Enough |
| **3.** | 59-75 | Good |
| **4.** | 76 | Very good |

The N-gain test is used to test how influential learning media is that is expanded through media. Students are said to be able to increase their self-efficacy if they get a score ≥ 0.7 according to the table of criteria for increasing self-efficacy.

**Results and Discussion**

The product of this research development is the tangram method in the process of learning mathematics about flat shapes in order to increase the self-efficacy of class 2 of SD Negeri Kendalrejo Srengat, Blitar Regency. Analysis, design, development, implementation, evaluation are the 5 stages used in the research.

The first step in research is analysis (Analyziz)At this stage the teacher has not implemented the use of media when teaching, the teacher only relies on books and the school environment.

The purpose of analysis is to create media that can make it easier to understand learning material. One of them is by applying tangram media to increase students' self-efficacy.

At the observation stage, researchers found several student characters at Kendalrejo Srengat State Elementary School. During the learning process, the students were busy themselves, chatting and not paying attention to the teacher who was explaining the material and students were less enthusiastic about being active in asking questions during the learning process. With

If there are problems that occur, there is a need for learning media that can realize maximum learning goals.

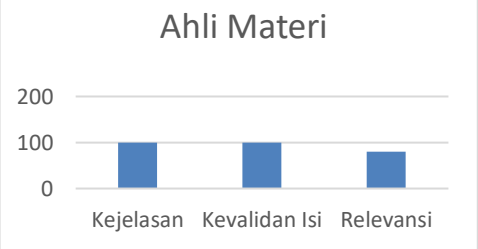
Planning stage (Design)The next step is to carry out an initial design which is carried out according to the students' needs, in the form of tangram learning media which is made using pieces of flat shapes in the form of puzzles measuring 12 cm x 12 cm, made from wood which is shaped into several flat shapes and colored, accompanied by several pieces of building material. Flat edited using the Canva application using buffalo paper size 14 x 4, front cover using hard cover. The design on the tangram material uses the More Sugar type font size 14 with an initial design before being validated by the validator.

The development stage was carried out at SD Negeri Kendalrejo Srengat, Blitar

Regency. Includes product development, test instruments, validation tests, and creation of questionnaires based on student needs to increase self-efficacy. In the Validity instrument test, it was stated that it gave very valid results. Below are the results from each expert. Validation of media expert instruments, which was confirmed by Mrs. Cindya Alfi, M.Pd. namely UNU Blitar Lecturers who get a score of 100% are declared Very Valid, here are the results.


Graph 1 Summary of Material Expert Instruments

Next, validate the material expert instrument and questionnaire to increase self-efficacy. The material expert validation test validated by Mohamad Fatih, M.Pd, namely a lecturer at UNU Blitar, obtained a result of 93% which was declared Very Valid, here are the results.




Based on the results of expert assessments as validators for the development of tangram media which was carried out at SD Negeri Kendalrejo Srengat, Blitar Regency to achieve targets developed pre-practice on Tuesday 19 December 2023, researchers tested the media with the research class. Data was obtained from the results of the evaluation of the questionnaire instrument to determine whether there was an increase in the use of tangram media to increase students' self-efficacy.

Product validation is carried out to evaluate the product according to expert input on the results of the media being developed so that it is more valid in use. So that we can get tangram media in the process of learning mathematics about flat shapes to increase the self-efficacy of grade 2 students at Kendalrejo Srengat State Elementary School. Next, calculate the validity and reliability of the Self-efficacy questionnaire. The aim of testing the questionnaire to increase self-efficacy is to test the validity of the questionnaire before testing it on class I2 students first. If the questionnaire given is appropriate, it can be used in research classes. According to the results obtained r-hit>r-tab, so 10 questions are said to be valid/valid. Meanwhile, in measuring the reliability test of the instrument, the Cronbact Alpha formula is used.

Here are the results:

**Table 2**. *Correlation Results*

| Item no | Person Correlation R count |
|---|---|
| **1** | 752 |
| **2** | 813 |
| **3** | 755 |
| **4** | 603 |

| | |
|---|---|
| **5** | 752 |
| **6** | 967 |
| **7** | 752 |
| **8** | 967 |
| **9** | 755 |
| **10** | 603 |

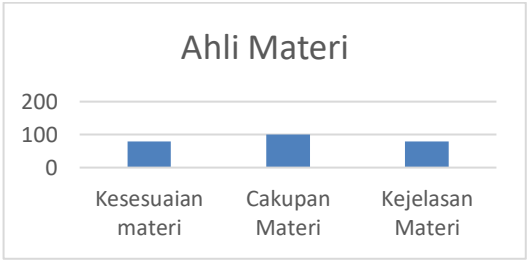
According to table 2, a conclusion can be drawn if r-hit<r-tab so that 10 questions are said to have validity/legitimacy, that is, the instrument can be used to measure student self-efficacy. Next, measuring the reliability of the questions is used through the formulation of Alpha Crombach in SPSS software. Generally using the internal consistency testing method of the test, namely Cranbach's Alpha/coef. Alpha. The results are:

Table 2 Cronbach't Alpha results

| ***Cronbach's Alpha*** | **N of items** |
|---|---|
| 0.927 | 10 |

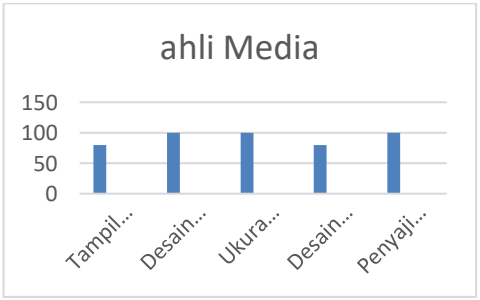
According to the results obtained using Ms Exel 2021, it shows a score of 0.7788, so the questionnaire statement is said to be "very high" so the instrument is suitable for use.

Next, validate the product with validation by experts. According to (Uji (Dwi&agil, 2020). Validation is an activity in providing an assessment for the design of a product that has been created by measuring whether it is suitable or not if used. Testing in material expertise was confirmed by Mrs. Latifatul Jannah, M.Pd,. by obtaining a result of 86% in the Valid category " with a recapitulation as follows.




Graph 3 recapitulation of material expert validation

Furthermore, the media expert validation was confirmed by Mrs. Jammilna Darojat, M.Pd by obtaining 90% in the "Very valid" category with the following recapitulation.



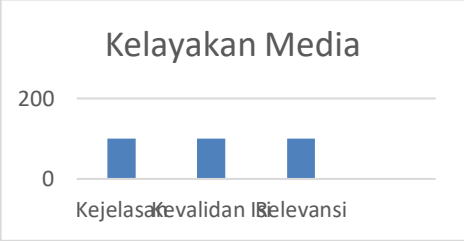

Graph 4 recapitulation of media expert validation

The implementation stage is a product trial stage carried out at SD Negeri Kendalrejo, Srengat District, Blitar Regency. There are 2 (two) stages of this implementation, namely pre-questionnaire and post-questionnaire. By testing it on 13 students/respondents in class 2 of elementary school. Then the data obtained is analyzed using the N-gain formula, if the student gets a score ≤ 0.3

then the student is said to be able to increase self-efficacy and if he gets a result ≥ 0.3 then he is said to be unable to increase self-efficacy. Meanwhile, based on the N-gain calculation, it was found to be 0.77, which is high. The conclusion is that self-efficacy increases after using tangram learning media.

Evaluation Stage (Evaluation), Evaluation is the provision of grades in the field of education related to activities (Magdalena, Haidana et al, 2020). In this stage, researchers make improvements to the media in accordance with the direction of experts. The results of research in developing tangram media to increase self-efficacy are used to work on problem formulation in research with research objectives.

**Feasibility of Tangram Media to Increase Self Efficacy of Flat Building Materials**




Graph 5

A feasibility test is a test used to show how far the tool is in measuring the object. So it can be said that a validity test is an instrument used to measure data that has been obtained and then the data will be said to be valid or correct.

Validation by media experts with overall validity obtained a score percentage of 90% classified as Very Decent. Obtaining results from this tangram media through 3 aspects, namely (1) Appearance (80%), namely Appropriate. (2) Design (100%) which is very feasible. (3) Size (100%) which is very Decent. (4) Design (80%) is feasible. (5) Presentation (100%) is very decent. Based on the score percentage of all the assessments, the learning media was declared "very suitable". This means that the media can be used without any revision according to the direction of media experts.

**Conclusion**

Based on the problem formulation in the development of tangram media in the flat-rise chapter to increase the self-efficacy of grade 2 students at Kendalrejo Srengat State Elementary School, Blitar Regency, it can be concluded that the feasibility of tangram media to increase self-efficacy is given to material and media experts. Media assessments from material experts (86%) are classified as valid. The assessment from media experts (90%) is classified as very valid. According to the results, it is shown that this media is very valid to use for learning.

The feasibility of Tangram media to increase self-efficacy results from the assessment of the media's attractiveness as assessed by class 2 teachers at Kendalrjejo State Elementary School, Srengat, obtained a score percentage of 100%, which is classified as very feasible, which makes the media usable for class 2 elementary schools. Increasing self-efficacy in the tangram media with flat building material at SD Negeri Kendalrejo Srengat, Blitar Regency, obtained from pre-questionnaire and post-

questionnaire test results according to the N-Gain Score value is 0.778846 which is above 0.7, so the category obtained is "high ". So tangram media has an effect on increasing students' self-efficacy.

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## Curiculum Vitae

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