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DEVELOPMENT OF LEARNING MEDIA ASSISTED BY GEOGEBRA TO IMPROVE STUDENT'S SPATIAL ABILITY ON TWO-DIMENSIONAL SHAPED TOPIC

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ABSTRACT

The purpose of this study is to describe a valid, practical, and effective GeoGebra-assisted learning media to improve students' spatial mathematical abilities on flat-shaped materials and describe the process of students' answers on spatial abilities. This type of research is research and development using the Hannafin and Peck model (analysis, design, development, and implementation stages). The research was conducted at one of the junior high schools in Labuhan Deli, namely SMP Negeri 1 Labuhan Deli which is located at Jalan Veteran Pasar IV Helvetia, Labuhan Deli, Deli Serdang in the odd semester of the 2021/2022 academic year. The sample of this research is the students of class VIII-1 SMP Negeri 1 Labuhan Deli, totaling 16 students. The sampling technique using purposive sampling. The result of this research is a valid, practical, and effective learning media assisted by GeoGebra software. The learning media was declared valid based on the assessment of three media and materials experts with a percentage of validity of 87.61% and 85.06%, respectively, in the very feasible category. The media is declared practical based on the student response questionnaire with a percentage of 89.45% which has a very practical category. The effectiveness of learning media is based on the n-gain value of 0.453 with the interpretation that there is an increase in the medium category. Based on these results, the developed media is feasible to use to improve students' mathematical spatial abilities. In this study, it was found that the answer process of students who received learning using media assisted by the GeoGebra software was better and received a positive response from students.

Keywords: *Spatial Ability, Answer Process, GeoGebra Software*

INTRODUCTION

The rapid development of technology brings new challenges to the world of education. New technologies have the ability to transform education. In order to receive more education, many people are already using and exploring new technologies that exist. The use of technology in education requires educators to be more creative and innovative in using technology to improve the quality of education in order to achieve learning objectives. Almost all components of education involve technology. According to Oktaviyanthi (2015), the use of technology in education can greatly enhance the learning effect and is superior to traditional learning methods. Technology should be used to increase the efficiency and effectiveness of education. NCTM (Octaviyanthi, 2015) technology is very important for teaching mathematics. This affects the mathematics taught and improves student learning abilities. In the use of technology to teach mathematics, the attitude of the teacher plays an important role. Porter advocates the use of technology for mathematics teachers. As recently as 2017, they described true teachers and their views on the availability of teaching technology, while Hatlevik, Throndsen, Loi, and Gudmundsdottir explained students' beliefs and actual achievements in the ICT experience (Nisiyatussani, 2018).

The role of learning media in the teaching and learning process is an inseparable part of the world of education. Learning media is anything that can be used to convey information from the sender to the recipient. This can stimulate students' thoughts, feelings, attention and interest in

learning (Tafonao, 2018). According to Arsyad (Artasari, 2017), learning media is an intermediary or introduction to the source of the message recipient. Learning media plays an important role in the learning process and can improve the quality of education. In addition, the use of teaching media in learning mathematics independently can stimulate students' motivation and interest in learning.

The problem that we often encounter in the world of education, especially mathematics, is a negative reaction to mathematics. Students still believe that mathematics is a scary subject compared to other subjects. Indirectly students become lazy to understand the concepts contained in mathematics. As stated by Irwanto (Azriati, 2018), in his research, class VIII students had difficulty learning mathematics, especially material related to pluralism or geometry, because students could only pass through unattractive schools. material interests.

The fact shows that teachers have not implemented the use of information and communication technology properly. Researchers at SMP Negeri 1 Labuhan Deli proved this through observations made through interviews with a school teacher. He said the school's facilities and infrastructure were adequate, such as projectors, laptops, and computer laboratories. School computer laboratories are rarely used in the teaching process. School laboratories are only used in ICT subjects and have never been integrated into other subjects, especially mathematics. Learning in schools only uses reading text books, but also mediocre and traditional media. Teachers rarely use teaching media based on the development of computer technology. Especially with the current situation being hit by the COVID-19 pandemic which is changing all human activities and habits, especially in the field of education. Learning that used to be face-to-face is now distance learning (online).

The use of media in the form of software can help improve the efficiency of the learning process and convey information in the early stages of learning. Visually, students will be more active in the learning process, because students can directly develop material on the media through software in the form of the material being taught. Learning media can also be used in making virtual classes. One of the learning media resulting from the development of technology, information and communication is GeoGebra. GeoGebra is a free non-commercial software for mathematics educators (teachers and lecturers) in Indonesia.

The use of learning media in learning mathematics will certainly help improve students' mathematical abilities, one of which is students' spatial abilities. Spatial thinking is a collection of cognitive skills, which consists of three elements, namely spatial concepts, representational tools, and reasoning processes (NCTM, 2006).

The teacher said that he experienced several difficulties in the learning process, including (1) Students often perceive mathematics as a difficult and boring subject for students. (2) Students have difficulty in recognizing and understanding geometric objects including two-dimensional objects and their elements. (3) Some students do not understand the queue attribute relationship, so it is difficult to define the quadrilateral concept. (4) There are still many students who do not meet the minimum standards of integrity that have been determined.

The next major problem is that students have poor spatial ability. In this aspect, students still have difficulty in visualizing images and cannot correctly understand the images in their minds. The fact shows that students' mathematical spatial ability in maintaining the relationship of object positions is still very low.

Therefore we need an appropriate learning activity to be able to improve students' mathematical spatial abilities, including by utilizing appropriate learning

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media to be able to describe geometric shapes in real contexts.

RESEARCH METHODS

This research is a Research and Development using Hannafin and Peck's development model which has been simplified by Tegeh, et al (2014). The Hannafin and Peck development model is a simple yet elegant development model consisting of three main processes. The three phases are connected with the evaluation and revision phases. Hannafin and Peck's development model can be seen in Figure 1 below.

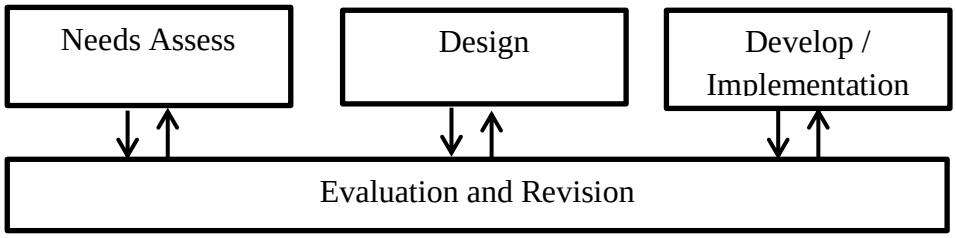

Figure 1. Hannafin and Peck's development stages

The research was conducted at one of the junior high schools in Labuhan Deli, namely SMP Negeri 1 Labuhan Deli which is located at Ps. 4, Jalan Veteran, Helvetia, Kec. Labuhan Deli, Deli Serdang Regency, North Sumatra postal code 20373. The research time was carried out in the even semester of the 2020/2021 school year.

The population in this study were all students of SMP Negeri 1 Labuhan Deli who were studying the two-dimensional. The sample in this study is class VII-1 SMP Negeri 1 Labuhan Deli. The sampling technique using purposive sampling. Purposive sampling is a non-random sampling technique that does not require basic theory or the number of its population (Etikan, et al., 2016).

A research instrument is a tool used to obtain information and data from respondents which are then processed and interpreted by the researcher so that a conclusion can be drawn. In the preparation of this research instrument, there are two main variables, namely the development of *GeoGebra* learning media and students' mathematical spatial abilities.

To develop learning media, it was tested using a questionnaire method in the form of a questionnaire. The questionnaire instrument involved several data sources, namely media experts, material experts, teachers, and students. This is to determine the level of quality of the use and development of instructional media. Meanwhile, the students' spatial ability can be determined by using the test method. The researcher gave the test questions to the students according to the competency achievement indicators for the two-dimensional shape material consisting of pre-test and post-test questions.

In the development of *GeoGebra-assisted* learning media in two-dimensional shape subjects, it is intended to test the feasibility or validity of the media developed based on the content standards and media design developed. Also, students' responses to this media are needed to determine the practicality of the media when it is used. The scores obtained based on the questionnaire were analyzed using a Likert scale. Data analysis was obtained based on a questionnaire of responses from media and material experts to determine the feasibility and validity of the developed media in the form of a score carried out using a percentage (Arikunto in Sari, 2017).

$$P = \frac{\sum x}{\sum xi} \; x \; 100\%$$

Information
P = Score sought
∑x = The total number of respondents' answers
∑xi = The total number of ideal scores
100% = Constant number

Table 1. Level of achievement and quality of eligibility

No	Achievement Level	Qualification	Information
1.	76% - 100%	Very Good	Very feasible, no need to revise
2.	51% - 75%	Good	Feasible, no need to revise
3.	26% - 50%	Not Good	Not feasible, needs to be revised
4.	< 26%	Not Very Good	Not very feasible, needs to be revised

The learning media developed in this study are said to be practical if the average score obtained from the questionnaire responses of students who get learning using media that has been developed reaches a minimum percentage of 51% or in the practical category. So that the resulting learning media can be used in the learning process of two-dimensional shapes in class VII SMP.

Table 2. Criteria of Practicality

Criteria	Category
75% - 100%	Very Practical
51% - 74,99%	Practical
26% - 50,99%	Less Practical
0% - 25,99%	Not Practical

The effectiveness of the product developed in the form of learning media assisted by GeoGebra can be seen from the results of the analysis of the mathematical spatial ability test, namely pre-test and post-test.

The effectiveness of learning tools related to spatial abilities is determined based on the classical achievement of student learning completeness. Determination of scores for student work is done by providing an appropriate assessment in the scoring rubric. In this study, the reference for the achievement of completeness is the maximum completeness criteria that the school has determined 75. Students are said to have completed their learning if they have a value of 75. The following are the steps to analyze student learning completeness in classical:

1. Determine the results of the student's spatial ability test based on the assessment guidelines. To determine the results of the student's spatial ability test, a formula can be used (Trianto, 2009)

   $$KB = \frac{T}{T_t} \; x \; 100$$

   Information
   KB = mastery learning
   T = the number of scores obtained by students
   T_t = total score total
2. Determine the number of students who completed or KB ≥ 75
3. Determine the percentage of completeness per class or the percentage of classical completeness using the formula:

$$PKK = \frac{The\ number\ of\ students\ who\ have\ completed\ their\ studies}{the\ totsl\ number\ of\ students} \; x \; 100\%$$

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A class is said to have completed learning if in the class there are ≥ 85% of students who have reached ≥ 75 (Depdikbud in Trianto, 2009).

The analysis used to see the increase in students' mathematical spatial abilities is the normalized gain analysis. N-gain (normalized gain) is used to measure the increase in mathematical spatial ability that occurs between before and after learning

$$g = \frac{Posttest - Pretest}{Total\ Maximum - Pretest\ Score}$$

The results of the Gain calculation are then interpreted using Hake's classification in Meltzer, namely:

Table 3. N-Gain Classification

Normalized n-gain Value	Category
$0.70 \leq g \leq 100$	High
$0.30 \leq g < 0.70$	Medium
$0.00 < g < 0{,}30$	Low

The process of answering students' mathematical spatial abilities was discussed descriptively. Assessment of the answer process can be seen from the errors made by students, the difficulties faced, the strengths they have, the fulfillment of the indicators of the students' mathematical spatial abilities, and the steps for solving problems. Furthermore, from the analysis of the student's answer process, the level of students' mathematical spatial ability will be described based on 4 indicators of spatial ability.

RESEARCH RESULT

The results of the study were carried out based on development procedures that adapted the Hannafin and Peek models. The stages that have been implemented include (1) needs assessment, (2) design, (3) development and implementation. The following are the results of the three stages.

Needs Assessment

Needs assessment is carried out before research activities are carried out. Researchers conducted several school observations as well as discussions with teachers about the media needed by students in teaching and learning activities at SMP Negeri 1 Labuhan Deli, especially for class VII on the two-dimensional shape material.

At this stage, three stages of analysis are carried out, namely problem analysis, curriculum analysis, and analysis of learning objectives. The following are the results of observations and discussions with the teacher.

Design

After the essential concepts are obtained, the next step is to design the GeoGebra-assisted learning media. This design stage was carried out to obtain a draft of learning media that would be developed in the form of GeoGebra media to improve students' mathematical spatial abilities on two-dimensional shaped materials at SMP Negeri 1 Labuhan Deli. At this stage, the media design and learning device design are carried out.

Development and Implementation

Result Making Learning Media Assisted by GeoGebra

After obtaining the draft of the learning media, the next step is to make and develop the learning media. Learning media is made using the *GeoGebra* application.

Figure 2. Display on GeoGebra

Figure 3. Materi Bangun Datar

Figure 4. Two-dimensional Properties

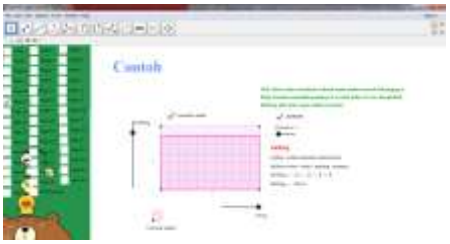

Figure 5. Example of two-dimensional shaped topic

Validation Learning Media Assisted by GeoGebra

The product validation of GeoGebra-assisted learning media development was assessed by 3 experts consisting of 3 media and material experts. The validation instrument used is a validation instrument compiled about the *Learning Objective Review Instrument* (LORI) and uses a four Likert scale. Find the percentage value of the validity of the *GeoGebra-assisted* learning media through the formula

$P = \frac{\sum x}{\sum xi} \times 100\%$, as follows:

Table 4. Percentage of Media Validation Test Result

No	Aspect	Expert 1	Expert 2	Expert 3	Average Percentage	Category
1	Content Quality	93.75%	87.5%	87.5%	89.58%	Very worth it
2	Motivation	100%	100%	75%	91.67%	Very worth it
3	Presentation Design	75%	100%	100%	91.67%	Very worth it
4	Interaction Usability	83.33%	83.33%	91.67%	86.11%	Very worth it
5	Accessibility	75%	100%	75%	83.33%	Very worth it
6	Reusability	100%	100%	75%	83.33%	Very worth it
Average proportion of media validity (%)		87.61%				Very worth it

The results of the validation test by material experts are in the form of responses and assessments which then from the results of the data obtained are analyzed and product revisions are made by suggestions from the validator. The following are the results of the media validation analysis data contained in Table 4.4 below.

Table 5. Percentage of Material Validation Test Results

No	Aspect	Expert 1	Expert 2	Expert 3	Average percentage	Category
1	Content Quality	t	100%	87.5%	91.67%	Very worth it
2	Learning Goal Aligment	87.5%	81.25%	87.5%	85.41%	Very worth it
3	Feedback and Adaptation	100%	75%	75%	83.33%	Very worth it
4	Motivation	100%	75%	75%	83.33%	Very worth it
5	Presentation Design	75%	75%	75%	75%	Very worth it

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6	Reusability	75%	100%	100%	91.67%	Very worth it
Average percentage validity of media (%)		85.06%				Very worth it

Description of Learning Media Assisted by GeoGebra

The next step is to conduct a trial to class VIII-1 students to find out the practicality and effectiveness of GeoGebra-assisted learning media. The application of the use of GeoGebra-assisted learning media was carried out for 3 meetings. Implementation of media applications is carried out for 30 minutes each meeting. The first meeting for two-dimensional shapes of triangles, squares, and rectangles and the second meeting for parallelograms, rhombuses, kites, and trapezoids. Researchers applied the media to class VIII-1 students of SMP Negeri 1 Labuhan Deli by using the Zoom meeting application.

Then, at the end of the GeoGebra software, practice questions are presented to determine students' spatial understanding and abilities. Furthermore, the researcher gave 15 minutes to the students to answer the questions presented in the software. The following are the results of students' answers to the questions presented in GeoGebra-assisted learning media.

Practicality of Learning Media Assisted By GeoGebra

The practicality test was carried out by giving response questionnaires to students who were the research samples. The learning media developed is said to be practical if it gets a positive response from students with minimum practicality criteria or has an interval value of 51% - 74.99% (Arikunto, 2008). The following is a description of the results of small group and limited group trials.

Description of Small Group Trial Results

The media that has been validated by a team of material and media experts is then carried out an initial field trial (small group trial) by 3 students. The responses from this small group trial will be used as revision material for the improvement of learning media products to make them better and suitable for use as learning media for two-dimensional building materials in class VIII-1. The results of student assessments in this small group trial were in the form of scores obtained through a questionnaire. The results can be seen in Table 4.7 below.

Table 6. Small Group Test Assessment Result (3 students)

No	Aspect	Average Percentage	Category
1.	Display Design	88.33%	Very practical
2.	Material Presentation	88.89%	Very practical
3.	Motivation	83.33%	Very practical
4.	Benefits of Media	94.44%	Very practical
Total average		88.74%	Very practical

Description of Limited Group Trial Results

This limited group trial consisted of 16 students. This trial aims to find out again the assessment and interest of students in learning media products assisted by GeoGebra and identify the shortcomings of learning media that have been developed. The results can be seen in Table 4.8 as follows.

Table 7. Limited Group Test Assesment Results (16 Students)

No	Aspect	Average Percentage	Category
1.	Display Design	92.18%	Very practical
2.	Material Presentation	88.54%	Very practical
3.	Motivation	85,93%	Very practical
4.	Benefits of Media	91.14%	Very practical
Total average		89.45%	Very practical

The Effevtiveness of GeoGebra Assisted Learning Media to Improve Students' Matematical Spatial Ability

The results of this study include a description of the initial knowledge test (pre-test) and final knowledge test (post-test) about students' spatial abilities using one group pre-test post-test in a limited group. The initial test and the final test used 5 questions in the form of an essay. Then, the initial test scores and the final test scores of the students' mathematical spatial abilities were tested to see if there was an increase in the students' mathematical spatial abilities.

1) Paired sample t-test

Before performing the paired t-test, a normality test was first performed to determine that the data used were normally distributed. Table 4.9 shows the results of the calculation of the data normality test.

Table 8. Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
PRE TEST	,188	16	,135	,923	16	,191
POST TEST	,198	16	,092	,921	16	,172

Based on the output table, it can be seen in the shapiro-wilk test that sig. for the pre-test value of 0.191 and the post-test value of 0.172. because the value is greater than 0.05, it can be concluded that the pre-test and post-test data values are normally distributed.

The results of the paired sample t-test analysis of students' mathematical spatial abilities were limited by using IBM SPSS Statistic 22 software at a significance level of = 0.05. The tested hypotheses are Ho:μ1=μ2 and H_a:μ1>μ2. The basis for decision making is based on the probability value or significance value, namely: 1) if the value of sig. (2-tailed) < 0.05, then Ho is rejected and Ha is accepted; 2) if the value of sig. (2-tailed) > 0.05, then Ho is accepted and Ha is rejected.

From the results of the calculation of the acquisition of the value of sig. (2-tailed) of 0.000 <0.05, then Ho is rejected and Ha is accepted. This shows that there is a difference between the results of the pre-test and the results of the post-test. So it can be concluded that there is an average difference between the pre-test and post-test learning outcomes.

1. N-gain Score

After using this learning media, students were again given a spatial ability test. Then the initial test scores and final test scores of students' spatial abilities were carried out to see if there was an increase in spatial abilities. The test is carried out using the n-gain formula and then interpreted according to the category. Initial test scores, final tests, n-gain, and improvement categories of each student can be seen in Table 4. 10

Table 9. Student Spatial Ability Data

Statistics	Pre-test	Post-test
Mean	60.5469	77.7344
Std. Deviation	12.44127	9.67405
Minimum	43.75	62.50

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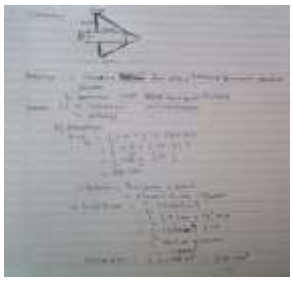
Maximum	87.50	93.75
n-gain score	0.453 (medium)	

Description of The Answer Process on the Spatial Ability Test

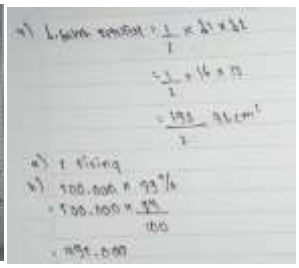
a. Description of the Answer Process on Indicator 1




The picture above shows the students' ability to imagine the shape of a two-dimensional shape based on the picture presented. Students seem to be able to imagine the shape of a triangular and quadrilateral two-dimensional shape from the given problem. However, there are still students who cannot imagine the two-dimensional shape of the image presented in the problem.

The students' scores for the spatial mathematical ability of students for item 1, students who got a score of 4 were 5 people or 31.25%, students who got a score of 3 were 9 or 56.25%, and students who got a score of 2 were 2 people or 12.5%.

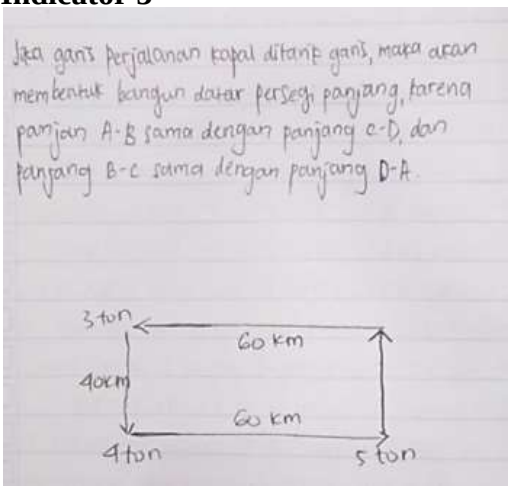
b. Description of the Answer Process on Indicator 2

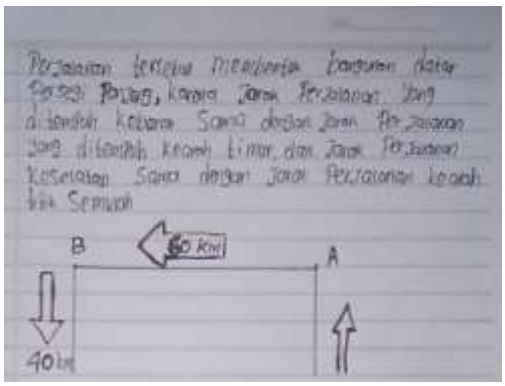



The picture above shows the ability of students to relate data or information by looking at the available questions. Students seem to be able to relate data or information in solving the problems given correctly. However, there are still some students who cannot conceptualize or relate the data correctly.

The students' scores for the spatial mathematical ability for item 4 are 4 students who get a score of 4 or 25%, students who get a score of 3 are 9 people or 56.25%, and students who get a score of 2 are 3 people or 18.75%.

c. Indicator 3





The picture above shows the remaining ability in determining the pattern of the questions that have been presented. The students appear to have been able to find patterns and the reasons for the patterns being formed. However, there are still students who are not able to find the right pattern.

The students' scores for spatial ability are for item 3, students who get a score of 4 are 7 people or 43.75%, students who get a

score of 3 are 6 people or 37.5%, and students who get a score of 2 are 3 people or 18.75%.

DISCUSSION

This GeoGebra learning media can be used as a learning medium because students are currently included in Generation Z, which of course is very literate with technological developments. Therefore, the learning process must juxtapose the use of technology in it. In addition, in 2021 education staff must change the learning process to be digital-based. This is due to the global COVID-19 pandemic that is hitting the whole world, especially Indonesia.

Based on the introduction of students through questionnaire responses students are more enthusiastic and active in learning. When teachers use GeoGebra-assisted learning media, the material becomes easier to see through existing images or animations. The media also makes students more focused on following the lesson because it focuses on the media displayed by the teacher.

This media helps students in understanding triangle and quadrilateral material. In addition, it can improve students' understanding and visual abilities on two-dimensional material.

The product validity assessment is carried out by material experts and media experts. The results of the expert assessment are categorized based on the percentage level of validity of the learning media, if X < 25% then the learning media is very inappropriate in the sense that it is not feasible to be tested (total revision), if 25%-50% then the learning media is not feasible (partial revision and reassessment).). material), if 50%-75% then the learning media is feasible (can be tested with several revisions), if X>75% then the learning media is very feasible and can be tested (not revised). The quality of the GeoGebra-assisted learning media developed is based on aspects of content quality, alignment of learning objectives, feedback and adaptation, motivational aspects, aspects of media display design, interaction usability, accessibility, and reusability. Based on the assessment aspect, the GeoGebra learning media is declared valid with a very feasible category. With an assessment percentage of 87.61% by media experts and 85.06% by material days. The results of the validation that the researchers got were inseparable from the suggestions and inputs given by media experts and material experts. In addition to providing a validation score, the validator also provides suggestions and comments for improving the media to make it even better for use in the learning process.

Student responses to the GeoGebra learning media also received a good response. The results of the student response questionnaire as a representation of the practicality of the GeoGebra learning media. Learning media was tested in small groups and limited groups. The media was not tested in the development class due to the limitations of the researcher on location, time, and facilities. GeoGebra was tested online via the Zoom meeting app. Based on the results of the small group trial, the percentage of the assessment is 88.33% which has a very practical category. While in the limited group trial, the percentage of assessment was 89.45% which has a very practical category. Thus, it can be concluded that the developed GeoGebra-assisted learning media is included in the very practical category. So it deserves to be used as a source of teaching materials.

According to Arsyad (2017), about 90% of a person's learning outcomes are obtained through the sense of sight, about 5% from the sense of hearing, and only 5% from the other senses. Based on the experience gained during the research, this theory proves that the effect of learning outcomes is strongly influenced by vision. Students find it easier to see what they see, observe and learn. Through learning, the media that has been developed by the teacher can improve students' mathematical spatial abilities.

After testing the GeoGebra-assisted learning media, this learning media is

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effective for improving students' spatial abilities and is suitable for use as learning media. This media also helps students to know, understand and analyze animation. The effectiveness of the developed learning media is difficult to measure from the learning process because there are many things that need to be observed. The most likely way is to measure the extent to which the increase in spatial ability is achieved from the beginning before the treatment (pre-test) until the mastery target is given the treatment (post-test). The target to be achieved is of course 100% of the material is mastered by students. To see how effective the GeoGebra learning media is, the n-gain is calculated from the limited group given the treatment. The results obtained are 0.453 which means the n-Gain score is in the medium category.

Based on the student's answer process for the spatial ability test from items 1 to 4 students still find difficulties. This is presumably due to differences in the ability of each student to absorb information in each lesson. However, the error that occurs in students in each lesson is a lack of accuracy in understanding questions and calculations. Even some students still solve problems by directly solving problems and skipping the previous stage. Some students answered correctly, but did not write down the information obtained, did not develop a settlement plan, and also did not re-check the results.

For indicator 1, only 31.25% got a score of 4, students who got a score of 3 were 56.25%, and students who got a score of 2 were 12.5%. In indicator 2 only 25% of students who get a value of 4, students who get a value of 3 are 56.25% and students who get a value of 2 are 18.75%. In indicator 3, only 31.25% scored 4, students who scored 3 were 50%, and students who scored 2 were 18.75%. In indicator 4, only 43.75% of students scored 4, students who scored 3 were 37.5%, and students who scored 2 were 18.75%.

CONCLUSION

Based on the results and discussion of the research on the development of learning media previously stated, the following conclusions are drawn.(1) The results of the development of GeoGebra-assisted learning media to improve the mathematical spatial ability of the rest of the flat shape material are declared valid based on the assessment of material experts and media experts. The assessments of these experts consistently categorize GeoGebra-assisted learning media in the valid category with a presentation of 87.61% by media experts and 85.06% by material experts. In general, this media assessment is very good and can be used. The results of the development of learning media are also stated to be practically based on student response questionnaires. The percentage of assessment is 89.45% which has a very practical category. Therefore, it can be concluded that the GeoGebra-assisted learning media that was developed is included in the very practical category. So it is feasible to be used as a source of teaching materials. The effect of GeoGebra-assisted learning media in improving students' mathematical spatial abilities on flat-shaped material is the n-Gain value of 0.453 which is in the range $0.30 \leq (g) \geq 0.70$ with medium category. So that this learning media is able and effective to improve students' mastery of concepts in the flat wake material. (2) The process of student answers in solving spatial ability test questions can be said to be good. This can be seen from the results of student work in online learning with the help of GeoGebra software. And the students' response to the GeoGebra-assisted learning media is positive, so that students can process the answers well.

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