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Assessment: Attitude and Spatial Ability in Learning Flat-Sided Rational Buildings in Junior High School

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Abstract

This study aims to determine the results of attitude assessment and spatial abilities of students on the material of flat-sided space building class VIII in one of Yogyakarta State Junior High Schools. This research uses descriptive research through qualitative and quantitative approaches. The sampling technique in this study used a random sampling technique. The subjects of this study were 32 students of class VII with the duration of the study for 5 meetings. This research instrument is an observation guideline for attitude assessment containing 7 aspects of assessment at each meeting and a test for spatial ability divided into 2, namely 2 questions for assignments done at school and 2 questions as take-home assignments. In addition, at the last meeting, 4 questions were given as a daily test. This research data was processed with the help of SPSS and Microsoft Excel. Based on the results obtained through several aspects of attitude assessment, aspects that have increased between the beginning of the meeting and at the end, namely the attitude of expressing opinions, the attitude of answering, and the attitude of imagining. However, the attitude assessment on the aspect of listening to the teacher's explanation is the aspect that has decreased. In addition, it was found that students' spatial abilities were seen from four ability indicators. The concept understanding indicator increased until the last meeting, while the pattern recognition and imagination indicators tended to increase and decrease at the last meeting. In the problem-solving indicator, students had experienced an increase and decrease but experienced a significant increase during the last meeting.

Introduction

Mathematics is an important part of the development of the current era. This is based on the fact that mathematics is considered to be directly related to human daily life (Fendrik, 2019). The importance of mathematics makes it one of the compulsory subjects in schools, from elementary to higher levels (Hermawati et al., 2018; Khasanah et al., 2021; Mulyati & Evendi, 2020). Learning mathematics becomes a process of understanding and mastering the science of mathematics, which can shape the mindset of students to become even more advanced (Julaeha & Fathani, 2020). However, based on the assessment included in the latest PISA, Indonesia received a score that was far from the average score for all countries, namely 379 in the field of mathematics. This raises the idea that the a need for improvements to the curriculum in Indonesia to catch up with other countries. This lag cannot be denied anymore, several areas of mathematics tested including geometry still experience percentages below the average (Novalia & Noer, 2019).

According to Birds (2002), Geometry is one of the important elements of mathematics related to geometric shapes, plane shapes, and the elements that exist in each of these plane shapes and geometric shapes. The smallest elements discussed in geometry are points, then lines, angles, and planes, to form a geometric arrangement. These geometric materials appear in almost every aspect of human life and geometry is considered important for human learning (Bintoro & Sumaji, 2021; Zuliana et al., 2020). However, it was found that learning geometry at school is still an obstacle for some students, one of which is in the material of flat-sided shapes (Muslimin & Sunardi, 2019). According to the results obtained by Munawaroh's research, et al (2018), geometric errors found in students' work included errors in understanding the questions given and misinterpretations in formulating and entering data. Other errors were also found in understanding the concept of the geometry being studied, understanding problem patterns, and errors in making calculations (Utami, 2019).

Student errors in geometry material can be caused by the low ability to solve problems and spatial reasoning including in flat-sided geometric material (NCTM, 2000; Serin, 2018). Measurable spatial reasoning ability from geometry because geometry examines abstract matters so students must be able to solve problems by paying attention to several aspects, namely: a) imagination by observing objects and connecting them; b) conceptualization by understanding the things that exist in geometry material well; c) solving problems by thinking about possible solutions that can be done to get a solution to the problem; d) searching for patterns by observing the problems and then compiling the patterns formed in the geometric problems. This description at the same time shows that spatial abilities require training and become a special focus when learning geometry material (Haas, 2003).

The importance of spatial abilities has been studied by several researchers. Deep Mohler (Silalahi et al., 2021)revealed that spatial ability also influences mastery in various fields and can predict someone's success in that field. Spatial abilities are very useful for understanding geometric relations, and geometric properties, and solving mathematical problems (Soraya et al., 2021). Nemeth meth (Leni et al., 2021) also stated that spatial abilities play a role in engineering sciences and mathematics, especially in geometry. In addition to several studies regarding the urgency of spatial ability, several studies discuss learning tools to improve spatial abilities (Hariastuti et al., 2018; Jelatu & Ardana, 2018; Lubis et al., 2020), error analysis on spatial ability (Mahfuddin & Caswita, 2021; Soraya et al., 2021), a suitable learning model to see an increase in spatial abilities (Arifin et al., 2020; Hendriana, 2019; Meirida et al., 2021), to ethnomathematics-based spatial abilities (Abdullah & Wardono, 2019; Fauzi & Setiawan, 2020). However, of all the studies regarding spatial abilities, there has been no research that is aware of the importance of evaluation and assessment of computational-based learning. Therefore, it is necessary to develop an adequate assessment instrument to measure students' spatial abilities in geometry material including flat-sided geometric material.

Even the best learning strategy that has been given by the teacher does not guarantee the creation of good learning achievements for students, including the mastery of spatial abilities. This fact can be caused by several factors, one of which is the characteristics of students (Rahima et al.,

2020; Safitri et al., 2022). Different characteristics of students make interests, motivations, learning styles, and many other things different among students. In addition to student characteristic factors, teaching quality is also one of the things that affect student achievement and learning outcomes (Hariroh & Soleha, 2022; Onih et al., 2022; Purnawati, 2022). Teachers will have a higher quality of teaching when they get a conducive class and at the start of learning compared to when they get to class during the hour before going home from school. Based on this elaboration, the teacher is not allowed to generalize students' understanding of the material that has been taught by the teacher. Therefore an assessment and evaluation are considered important to see the achievement of learning in the classroom (Airasian, 2001; Chappuis & Stiggins, 2002; Gronlund, 1998).

Assessment of spatial abilities in this geometry material can be carried out starting from the application of spatial ability-based learning, observing student activities during learning, student self-assessment regarding spatial ability-based material, exercises based on spatial abilities, to final questions to measure overall understanding of ability-based material spatial (Nuralan, 2022; Widiyanto et al., 2022). With some of the elaborations above, it is necessary to develop adequate assessment instruments to measure spatial abilities in geometry subjects, one of which is the material for flat side shapes. The results obtained from this study are expected to create good assessment instruments and to raise teacher awareness of the importance of adequate assessment instruments to measure students' spatial abilities in flat-sided geometric material.

Methods

The type of research used in this research is descriptive research with qualitative and quantitative approaches. Descriptive research is research that focuses on collecting and explaining the facts in as detail as possible (Kenedi, 2019). This type of research can be supported by a qualitative approach that is used to understand and find out things related to research. In addition to the qualitative approach, a quantitative approach was also used in this study to find out the quality of the instruments and the categories of students' spatial abilities based on existing indicators. This research was conducted in the even semester of the 2022/2023 school year at a school in Yogyakarta. The area of Yogyakarta which is too wide does not allow researchers to conduct thorough research. Therefore, the researcher chose the research sample using a random sampling technique. One class with 18 male students and 13 female students was selected as the research sample which was conducted for several months.

The instruments used in the qualitative approach are observation guidelines which are carried out regularly with teachers and students and written interviews given to students. The instrument in the quantitative approach is a spatial ability test instrument with 3 categories on the flat-sided spatial material. The first category is used as a daily assignment that is used at each meeting and is collected after 40 minutes consisting of 2 questions. The second category is used as homework given at each meeting and collected at the next meeting which consists of 2 questions. Spatial ability indicators are divided equally at each meeting through category one and two tests. The third category is the final test as a measure of spatial ability after a thorough discussion of the material and collected after 80 minutes consisting of 4 questions representing each indicator of spatial ability. To get maximum results, researchers do not allow students to work on the third category of instruments with any assistance and check class conditions so that all students can work on the test instruments with focus and comfort (Moustakas, 1994).

The assessment phase was carried out starting with the development of an assessment tool in the form of an observation guide, an arrangement of questions for a written interview, 3 categories of test instruments, and a self-assessment questionnaire at the end of the meeting. This begins with setting assessment objectives and preparing a blueprint that will be used as a guideline for preparing test items. Before carrying out periodic tests and observations, the validity of the research instruments to be used was tested by 5 validators. After validation, the test instrument was tested for an index of difficulty and reliability on the test instrument with the results attached in Table 1.

Table 1. Test results of validity, reliability, discriminatory power, and level of difficulty of each meeting

Meeting	Indicator	Reliability	validity	Discriminating Power	Difficulty Level
1	Concept Understanding	0.768 (High)	0.810 (High)	0.616 (Good)	0.426 (Medium)
	Solution to problem		0.745 (Enough)	0.523 (Good)	0.484 (Medium)
	Pattern recognition		0.737 (Enough)	0.587 (Good)	0.354 (Medium)
	Imagination		0.795 (Enough)	0.588 (Good)	0.388 (Medium)
2	Concept Understanding	0.708 (High)	0.578 (Enough)	0.360 (Enough)	0.49 (Medium)
	Solution to problem		0.863 (High)	0.628 (Good)	0.258 (Difficult)
	Pattern recognition		0.834 (High)	0.637 (Good)	0.27 (Difficult)
	Imagination		0.631 (Enough)	0.468 (Good)	0.354 (Hard)
3	Concept Understanding	0.752 (High)	0.818 (High)	0.563 (Good)	0.658 (Medium)
	Solution to problem		0.838 (High)	0.728 (Very Good)	0.412 (Medium)
	Pattern recognition		0.886 (High)	0.767 (Very Good)	0.574 (Medium)
	Imagination		0.504 (Enough)	0.254 (Enough)	0.71 (Easy)
4	Concept Understanding	0.778 (High)	0.624 (High)	0.484 (Good)	0.58 (Medium)
	Solution to problem		0.732 (High)	0.634 (Good)	0.464 (Medium)
	Pattern recognition		0.929 (Very High)	0.859 (Very Good)	0.394 (Medium)
	Imagination		0.928 (Very High)	0.748 (Very Good)	0.458 (Medium)
5	Concept Understanding	0.841 (Very High)	0.873 (Very High)	0.777 (Good)	0.332 (Medium)
	Solution to problem		0.820 (Very High)	0.643 (Good)	0.729 (Easy)
	Pattern recognition		0.855 (Very High)	0.756 (Good)	0.606 (Medium)
	Imagination		0.781 (High)	0.580 (Good)	0.271 (Difficult)

Assessments are carried out periodically until the required data is obtained. After the class assessment is completed, the next stage is data analysis to see the development of students' abilities on each indicator as well as the development of behavior and assessment of the learning process shown by students and teachers at each meeting on the flat-sided room build.

Result and Discussion

1.1 Learning Process Assessment

Based on the results of observations that have been made, the teacher has carried out various series of learning. Some of these series include an introduction that involves students'

daily lives. Assessment of the learning process includes several components, namely planning, implementation, and reports carried out by observation and documentation. At the planning stage, several things need attention. Widiyanto (2020) said that in the preparation stage, there are five indicators in the form of preparing lesson plans, learning indicators, allocating the time required for each meeting, learning materials, methods to be used, and learning media that attract students. Based on the results of observations, the teacher has prepared a lesson plan that is by the basic competencies and focuses on increasing spatial abilities in the material for flat-sided spaces. The teacher makes the right indicators and allocates time according to the material needs at each meeting. Sadly, Mathematics at the school has 3 hours of lessons cut by a 15-minute break. Break time that is placed in the middle of learning makes students less concentrated when approaching break time. In addition, the teacher's lack of assertiveness means that class hours will be postponed for a few minutes until all students are ready to continue learning. Regarding the learning method, the teacher uses a very interactive learning method so that students can contribute optimally to the learning process. This good method is supported by good learning media that has been prepared by the teacher. The media used by the teacher can adapt to the times, such as GeoGebra, so that students are more interested in learning. Based on the details of the observations made, it can be said that the teacher has carried out the planning stage properly. A good planning process indicates that one of the learning process assessment criteria has been fulfilled (Brooker, 2006).

In addition to the preparation stage, the assessment is also carried out at the implementation stage. The implementation stage has five core indicators, namely the implementation of the teacher's plan, the interaction in class, the implementation of the plan for students, the students' passiveness, and the assessment of learning outcomes. Based on the observation guidelines that have been made and validated by experts, the teacher has several things that are missed during the learning process. At the beginning of learning, the teacher did not convey the assessment criteria and achievement indicators before entering learning. In addition to this, the teacher properly motivates learning so that students have an increase in learning enthusiasm. The learning process runs very interactively between teachers and students as well as students and students. The teacher can facilitate learning very well by focusing on improving spatial abilities on flat-sided geometric material so that students look more active in class. At each meeting, the teacher invites students to imagine geometric shapes in everyday life, present material with examples, practice analyzing problem patterns, and identify elements in geometric shapes. This is considered to be able to improve the spatial abilities of students which are very useful in the geometric material. Unfortunately, the teacher does not assess students during the learning process. This makes students not afraid to do things that are contrary to discipline and neatness during learning. Based on the results of observations during several meetings.

The report used as an aspect of the assessment is an assessment document made by the teacher for students. Based on observations, interviews, and documentation conducted, the teacher provides several exercises and assessments on aspects of knowledge and skills in detail. The teacher analyzes student learning outcomes and reports these results in the form of grades. However, the aspect of attitude is less the focus of the teacher on the learning that is carried out. Existing reports are intended as a means of communication between teachers, students, and parents of students to find out the progress of these students and as motivation and improvement in further learning (Payne, 2003). The results of the assessment of the learning process that has been carried out show that the teacher is quite good at the planning, implementation, and reporting stages.

1.2 Attitude of Students

Attitude is a person's response to a stimulus or object given to him (Sirajuddin et al, 2019). Hawes (Sirajuddin et al, 2019) also explains that attitude is a general tendency possessed by each individual about various beliefs, identities, or with other individuals. Based on some of the opinions above, it can be concluded that attitude is a response or reaction

given by each individual to an object. So, students' reactions when learning mathematics can be interpreted as students' reactions to this learning both inside and outside the classroom.

Based on the observations that have been made, data is obtained regarding students' attitudes during mathematics learning in class. The data was obtained by observing the behavior of each student during the learning process. Consider the following student attitude assessment Figure 1.

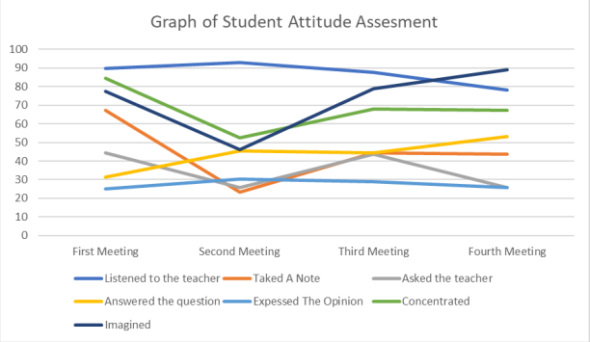

Figure 1. Student Attitude Assessment Results

The attitude of students in learning greatly influences how students can receive and understand the material that has been explained by the teacher. In line with the opinion (of Ningsih et al, 2019) the attitude shown by students during learning greatly influences their learning outcomes. The attitude shown by students is certainly different. When the teacher explains there are still students chatting, disturbing their friends, not paying attention to the teacher, and many more. Based on the data that has been processed and presented above, it was found that the average score at the first meeting of students who listened to the teacher's explanation was 89.843, then at the second meeting the graph of students who listened to the teacher's explanation had an average score that rose to 92.968, at the third meeting of the chart began to show a decrease in the average score to 87.5, and in the last meeting, students who listened to the teacher had an average score of 78.125. So, it was concluded that the attitude of students in listening to the teacher's explanation initially increased, but at the last meeting also experienced a graphical decrease. The attitude of the next student is to ask the teacher. Based on the graph above, it was found that at the first meeting, the students who asked the teacher had an average score of 44.531, then at the second meeting it decreased and had an average score of 25.781, at the third meeting the students asked experienced an increase having an average score of 43.75, but at the last meeting, the graph experienced a decrease having an average score of 25.781. It was concluded that the attitude of students who asked this teacher experienced ups and downs. At the first and third meetings, the attitude of students asking questions increased, but at the second and fourth meetings, this attitude decreased. Then there is the attitude of expressing opinions. From the graph, it was found that at the first meeting, the attitude of expressing students' opinions had an average score of 25, then at the second meeting it increased to 30.468, at the third meeting it decreased slightly to 28.906, and at the last meeting, it became 25.781. So, it can be concluded that the attitude of expressing students' opinions at the beginning of the meeting has increased, but at the end of the meeting has decreased slightly. The attitude of the next student is imagining. From the chart above, It was found that the attitude of imagining students at the first meeting had an average score of 77.343, then at the second meeting it decreased to 46.093, at the third meeting this attitude of imagining increased to 78.906, and in the last meeting, it became 89.0635. It can be concluded that the student's attitude, i.e. imagining geometric shapes, experienced a significant increase at the end of the meeting. The next student's attitude is note-taking. From the graph it was also obtained data that the attitude of students' notes at the first meeting had an average score of 67.187, then at the second meeting it became 23.437, at the third meeting it increased to 44.531, and at the last meeting, it decreased slightly to 43.75. It was concluded that the students' note-taking attitude increased at the third meeting, but also decreased at the second and fourth meetings. The next attitude is to answer

questions. Note that the first meeting chart has an average score that shows the number 31.25, then at the second meeting it increases to 45.312, at the third meeting it drops slightly to 44.531, and at the final meeting, it increases again to 53.125. The conclusion obtained was that students who answered the teacher's questions experienced an increase in the second meeting and the last meeting, but also experienced a slight decrease in the third meeting. The last attitude is concentration. At the first meeting, students' concentration attitudes had an average score that was quite high, namely 84.375. then at the second meeting, it decreased to 52.343, at the third meeting it rose to 67.968, and at the last meeting, the decline that occurred was not too visible so the graph was at 67.187. It can be concluded that the attitude of students' concentration at the first meeting was already at a fairly high level and had decreased at the second meeting, but eventually rose again and stabilized until the fourth meeting.

The data is processed according to the results of observations that have been made during the four meetings. The attitude given by each student during learning will certainly be different. From the data processing above, it was found that the attitudes of students who experienced an increase in the average score were expressing opinions with a difference of 0.781 at the beginning of the meeting and the end of the meeting, then there was an attitude of answering questions which also experienced an increase in the average score with a difference of 21.875 from the initial meeting with the final meeting, and finally there is an imaginative attitude which increases the average score by a difference of 11.719. changes in student attitudes can be influenced by the surrounding environment, learning motivation, or other things outside the object of research. this is in line with several studies that say that changes in student attitudes can be influenced by learning motivation and the student learning environment (Emda, 2018; Hasibuan, 2018).

1.3 Spatial Ability

After assessing the learning process and student attitudes, the researcher also conducts periodic assessments of students' spatial abilities. Assessment takes place at each meeting with the average student score on each spatial ability indicator attached in Figure 2.

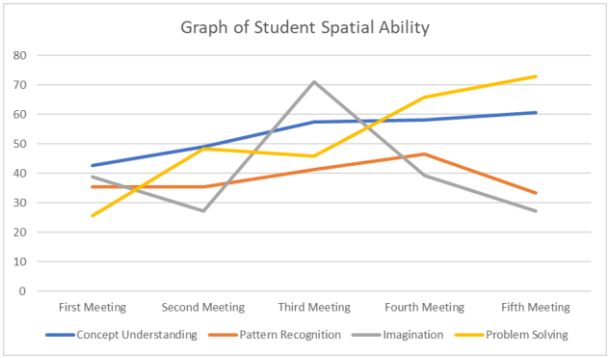

Figure 2. Results of Assessment of Students' Spatial Ability

1.3.1 Concept Understanding

Understanding concepts is a fundamental ability in mathematics. According to Kesumawati (Yanti et al., 2019), This ability is an important basis that students must have to solve a problem in everyday life. Concept understanding according to (Yulianah et al., 2020) namely the ability possessed by students to explain a concept and apply the concept to solve mathematical problems. Kholidah and Sujadi (Suendarti & Liberna, 2021) explain that a student can be said to have a good conceptual understanding if they can re-explain the concepts they have learned and can apply these concepts in everyday life. Based on the descriptions of several researchers above, it can be concluded that understanding the concept is a person's way of gaining in-depth knowledge of information about an object.

A good understanding of concepts in students can help them understand and solve a problem. However, if students do not understand the concept, students will have difficulty applying the concept in their daily lives (Suendarti et al, 2021). Therefore, this study will show how students understand the concept. The data above shows that students' conceptual understanding indicators at the first meeting had an average score of 42.580, then the second meeting was 49.032, the third meeting was 57.419, the fourth meeting was 58.064, and the last meeting was 60.645. From these results, it can be concluded that the indicators of students' conceptual understanding have increased from the first meeting to the last meeting. This is by the results of interviews with students that they can identify a geometric shape simply by describing its elements, which include ribs, sides, vertices, plane diagonals, space diagonals, and diagonal planes. Students are also able to explain the properties of geometric shapes such as cubes, beams, prisms, and pyramids in general. However, from the results of the self-assessment, it was found that some students still had difficulty in determining the spatial diagonal of a flat-sided geometric shape. However, on the whole, students have been able to identify the elements and properties of flat side shapes. beams, prisms, and pyramids in general. However, from the results of the self-assessment, it was found that some students still had difficulty in determining the spatial diagonal of a flat-sided geometric shape. However, on the whole, students have been able to identify the elements and properties of flat side shapes. beams, prisms, and pyramids in general. However, from the results of the self-assessment, it was found that some students still had difficulty in determining the spatial diagonal of a flat-sided geometric shape. However, on the whole, students have been able to identify the elements and properties of flat side shapes.

1.3.2 Pattern recognition

Pattern recognition is the ability that students have to recognize similarities and differences which will then be used to make predictions about a problem (Maksum et al., 2022). According to (Mubarokah et al., 2023) pattern recognition is an ability to identify, develop, and recognize patterns or similarities which are then used to understand data and can help strengthen ideas in abstract form. Whereas (Hidayatuloh et al., 2023) explained that pattern recognition is a part of digital science that is used as a description or grouping of an object based on the characteristics or properties of the object itself. From the explanations according to some of these experts, it can be concluded that pattern recognition is a way of identifying an object which is then grouped into certain categories based on the characteristics and properties possessed by the object.

Pattern recognition can help students understand data and create strategies to solve a problem. Conversely, if students are unable to recognize patterns, students will have difficulty determining strategies for solving mathematical problems. Therefore, this study will show whether students can recognize the pattern of an object in flat-sided geometric material. It can be seen in the picture above that the student pattern recognition indicator at the first meeting has an average value of 35.483, then the second meeting is 35.483, the third meeting is 41.290, the fourth meeting is 46.451, and the fifth meeting is 33.225. The data shows that the pattern recognition indicator for students has increased and decreased. In line with the results of the interview, students have not been able to read patterns to solve a flat-sided geometrical problem properly. This can be seen from the results of drawing a flat side shape by rotating it a few degrees, many students still cannot describe it. In addition, students have difficulty seeing patterns from flat-sided shapes and solving existing problems. From the results of the student's self-assessment, it was found that it was still difficult to see the image patterns of the flat side shapes, so when describing the flat side shape patterns they often missed the target. However, students have been able to accurately determine the pattern of nets of different plane side shapes. there are still many students who cannot describe it. In addition, students have difficulty seeing patterns

from flat-sided shapes and solving existing problems. From the results of the student's self-assessment, it was found that it was still difficult to see the image patterns of the flat side shapes, so when describing the flat side shape patterns they often missed the target. However, students have been able to accurately determine the pattern of nets of different plane side shapes. there are still many students who cannot describe it. In addition, students have difficulty seeing patterns from flat-sided shapes and solving existing problems. From the results of the student's self-assessment, it was found that it was still difficult to see the image patterns of the flat side shapes, so when describing the flat side shape patterns they often missed the target. However, students have been able to accurately determine the pattern of nets of different plane side shapes.

1.3.3 Imagination

Imagination comes from the word "imagine" which according to KBBI means "something that is imagined in the mind". In the context of learning mathematics, imagination can be used by students in understanding and solving problems such as shifts, translations, and rotations. Students who have good imaginations feel better when learning by seeing rather than listening. They are also more interested in creating a visual picture when they want to present information, such as when they are making a presentation.

Therefore, this study will show whether students can do imagination on the material on flat sides. From the data above it is known that the indicator of student imagination at the first meeting has an average value of 38.709, then the second meeting is 27.096, the third meeting is 70.967, the fourth meeting is 39.354, and the last meeting is 27.096. It can be concluded that the indicators of student imagination have increased and decreased. These results are in line with the results of interviews with students that they find it difficult when imagining geometric shapes, especially prisms, and pyramids. Students have not been able to imagine a flat side shape well, because students are often confused when imagining a given flat side shape. Besides that, students also have difficulty imagining the shapes of the flat side shapes composed of the provided nets. So the ability of students to imagine a flat-sided geometric shape is still lacking.

1.3.4 Problem Solving

Problem-solving is a skill that students must have in learning mathematical material (Reski et al., 2019). This happens because one of the successes of learning mathematics can be seen in how students can solve problems (Setiawan et al., 2021). Solving the problem itself becomes an effort by students to use the skills and knowledge they have to get a solution (Davita & Pujiastuti, 2020). Problem-solving becomes a complex skill. This statement is in line with what was said in the article by Swanson, et al (2020), where solving mathematical problems requires complex processes beyond computational skills, such as how students can use linguistic information or how to identify correct information (Lee Swanson et al., 2021).

Through problem-solving, students are encouraged to solve mathematical problems using their concepts and strategies (Rahmmatiya & Miatun, 2020). Based on this, it can be said that problem-solving is one of the skills that can improve students' cognitive abilities. Problem-solving also affects students' spatial abilities. There are characteristics of students who have good problem-solving when it comes to spatial abilities. These characteristics include their thoughts that spread and use solutions that are different from other students. In addition, they have various strategies to solve problems by considering these problems. Through the considerations and processes to solve these problems, it becomes more interesting than the answers with solutions in general.

Therefore, this study will show whether students can do problem-solving on the material of flat-sided spaces. From the data above, it was found that the indicators of student problem-solving at the first meeting had an average value of 25.806, then the second meeting was 48.387, the third meeting was 45.806, the fourth meeting was

65.806, and the last meeting was 72.903. This shows that the indicators of student problem-solving have increased and decreased, but at the end of the indicator, there has been a significant increase. The data is supported by the results of interviews with students that they can solve problems in the questions. In addition, students can solve various complex problems related to surface area and volume on flat side shapes. These changes at each meeting can be caused by differences in learning methods and student conditions as external factors of this study.

Conclusion

Based on the results obtained through several aspects of the assessment, both from the teacher and students, it can be concluded that in the assessment of the learning process, the teacher has carried out learning activities quite well, from planning to reporting. However, the teacher is lacking in providing an assessment of students during the learning process, resulting in the attitude of students that is contrary to discipline and neatness during learning. The results of the data regarding the assessment of student attitudes are seen from several aspects of attitude assessment during the learning process, it tends to experience ups and downs, such as the aspects of taking notes, answering questions, and concentrating. Some aspects have increased between the beginning of the meeting and the end, namely the attitude of expressing opinions with an average score difference of 0.781, the attitude of answering with an average increase in score difference of 21.875, and the attitude of imagining with an average score difference of 11.719. However, the attitude assessment on the aspect of listening to the teacher's explanation is the aspect that has decreased.

Students' mathematical spatial abilities during learning about flat side shapes are divided into four indicators. Based on the results of research on ability, indicators of conceptual understanding have increased until the final meeting, with the acquisition of the first meeting having an average value was at 42.580, then the second meeting was 49.032, the third meeting was 57.419, the fourth meeting was 58.064 and the last meeting was 60.645. The pattern recognition indicator tends to experience conditions of increase and decrease during the final evaluation, with gains in the first meeting at an average value was at 35.83, then the second meeting at 35,483, the third meeting at 41.290, the fourth meeting at 46.451, and the fifth meeting 33.225. Likewise with imagining indicators, where the results of the assessment have increased and decreased, with the acquisition at the first meeting having an average value was at 38.709, then the second meeting 27.096, the third meeting 70.967, the fourth meeting 39.354, and the last meeting was 27.096. The problem-solving indicator also experienced conditions of increase and decrease but experienced a significant increase at the final meeting with the results of the first meeting at 25.806, then the second meeting at 48.387, the third meeting at 45.806, the fourth meeting at 65.806, and the last meeting at 72.903.

Based on this, it can be assumed that several things affect students' spatial abilities. Therefore, this research is expected to be the basis for further research regarding the factors that influence students' spatial abilities.

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