

Analysis Mathematical Concept Understanding Ability in Grade V Student in Geometry Material

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Abstract

This study was motivated by the low understanding of mathematical concepts in students. This study aims to analyze the ability to understand mathematical concepts of geometry material in grade V students. This type of research is descriptive quantitative research. The instruments used were tests, semi-structured interviews, and classroom observations. The results showed that the ability to understand concepts in class V students was low, which was shown based on the test results with the results of 3 students in the high category, 6 students in the medium category, and 2 students in the low category. Factors influencing this low understanding include less varied teaching methods, lack of visual aids, learning resource support, and lack of student motivation. This study contributes to educators in improving geometry teaching methods with more variety and involving relevant visual aids, as well as motivating students, to improve better concept understanding in elementary school students.

Keywords: Concept understanding capacity, rudimentary school, geometry.



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Introduction

Education is an effort to help the soul of students both physically and mentally from their nature towards a better civilization (Khaidir & Suud, 2020). Education is a conscious and planned effort to create a pleasant learning and learning atmosphere so that students actively develop their potential to have religious spiritual strength, self-control, personality, intelligence, noble character, and skills needed by themselves and society (Pristiwanti et al., 2022). Education has an important role in the process of improving the quality of human resources (Madani, 2019). Therefore, education deserves deep attention to the basic values to improve the quality of human resources by improving the quality of learning in schools (Taufiqurokhman et al., 2023).

Learning and learning are two things that are closely related and cannot be separated in educational activities (Malone & Lepper, 2021). Learning and learning can be said to be a form of education that makes interaction between educators and students (Munna & Kalam, 2021). Learning is a two-way process, in which the teacher as an educator is tasked with teaching while students receive learning (Zaifullah et al., 2021). So it can be said that learning exists if there is a process of interaction between educators and students (Furlong, 2020). From the two definitions above, it can be concluded that learning is a two-way process, namely the interaction between educators and students in the communication process to have a learning experience (Adhiska et al., 2020).

Understanding numerical concepts to students in basic school cannot be isolated from the part of teachers. Therefore, educators must be able to communicate scientific concepts in a great and curious way. Educators must also be able to build understanding of concepts to students, so that students can build, reflect, articulate students' knowledge and have a sense of ownership of knowledge (Radiusman, 2020). Concept understanding is an important element in learning mathematics (Komariyah et al., 2018). Mastery of many concepts allows a person to solve problems better because solving problems requires rules, and these rules are based on the concepts they have (Fajar et al., 2019). Concepts are abstract ideas that allow a person to be able to categorize objects or events and explain whether the object or event is an example or not an example of the idea (Mulyani, 2020).

Primary School (SD) is essentially a social institutional unit to which the community is assigned the task of systematically organizing basic education (Hanselman et al., 2016). Mathematics is one of the many subjects that have an important role in education (Kilpatrick, 2020). Mathematics is a subject that supports the development of science and technology (Nurhikmayati, 2019). Besides, science plays a really a vital part of lifestyle. Therefore, teaching mathematics in elementary school is very important to train students' thinking skills (Nuraini, 2022). However, in reality, there are still many students who consider math as a difficult, unpleasant, and scary subject (Susanti, 2020). This is because there are still many students who are lacking in solving math problems (Usman et al., 2022). Mathematics learning in elementary schools not only improves students' numeracy skills, but also improves students' problem-solving skills, both in mathematical problems and other problems whose solutions use mathematics depending on the situation (Kenedi et al., 2019).

Mathematics education plays a fundamental role in shaping students' cognitive abilities, particularly in developing their logical reasoning, problem-solving, and conceptual understanding skills (Al-Mutawah et al., 2019). Among various mathematical topics, geometry is crucial as it introduces students to spatial reasoning, shapes, measurements, and relationships between figures (Lowrie et al., 2019). Understanding geometry concepts in early education lays the foundation for higher-level mathematics (Maričić & Stamatović, 2018). This paper analyzes the numerical concept understanding capacity of fifth-grade students in the setting of geometry, centering on how well they get a handle on foundational geometric concepts and how their capacities can be evaluated and made strides.

In the world of education, elementary school students must understand the concept of geometry well (D. R. Sari et al., 2021). One of the most important branches of mathematics, geometry teaches learners to recognize the shape, size, and spatial relationships of objects (Windasari & Dheasari, 2023). This forms the basis for critical and logical thinking. However, several studies and observations show that many learners face difficulties in understanding basic geometry concepts, such as identifying flat and spatial shapes, and their properties. One of the main causes of this lack of understanding is a learning approach that tends to be abstract and focuses on memorizing formulas rather than understanding concepts in depth. In addition, there is a lack of visual aids and manipulative media in schools (Amelia, 2023). So it is difficult for learners to see and internalize geometry concepts concretely.

It is very important to learn concept understanding skills in geometry because a strong understanding of geometry will affect learners' ability in higher-level mathematics as well as the ability to think logically and analytically which is needed in various aspects of life (Kurnia & Hidayati, 2022). By improving learners' understanding of geometry concepts since elementary school, learners can be better prepared for more complex and applicable math materials in the future (Fauziyah & Wahyuni, 2024). In addition, understanding geometry concepts is also beneficial in developing problem-solving skills and spatial abilities, both of which are important for various fields of science and professions. Addressing these issues will improve the overall quality of mathematics education, creating a generation that is better prepared to face intellectual and practical challenges (Kurniawan & Parnawi, 2023).

Based on the findings of past analysts appears that Ayu Mitha Khoiriyah's investigation entitled "Application of PMR Approach (Reasonable Arithmetic Instruction) to Move Forward Concept Understanding for Course V Understudies of SDN 3 Purwodadi Trimurjo Lampung Tengah Lesson Year 2016/2017". The has about appeared that the application of the PMR (Reasonable Arithmetic Instruction) approach can progress the concept understanding capacity of fifth-grade understudies of SDN 3 Purwodadi Trimurjo Central Lampung. The normal esteem of the primary cycle was 60.8 with a learning completeness of 42.3% and the normal esteem of the moment cycle was 77.7 with a learning completeness of 88.5%. Besides, Sugiarti's investigation entitled "The Impact of Educator Abilities in Clarifying on Understanding the Concept of Arithmetic Learning for Understudies of SDN 04 Metro Pusat" in 2018. Cahya Dina Sartika's investigation entitled "Investigation of the Capacity to Get it Scientific Concepts of Review V given Learning Fashion and Sex" in 2019. This investigation employments the Blend Strategy with the Concurrent Inserted approach (unequal blend) which is done by collecting quantitative information and subjective information. Of the 30 understudies who have a visual learning fashion as numerous as 14 understudies, the understanding capacity of male understudies is superior to that of females, and 4 other understudies utilize an auditorium learning fashion. Male learners too have way better scores than young ladies and kinesthetic learning styles 12 learners, young ladies have superior scores than male learners.

Previous research is often less than optimal in providing solutions to the low understanding of geometry concepts in students because it tends to focus on teaching methods that involve less interactive media or approaches that motivate students to think critically. Overly theoretical and memorization-based approaches

make it difficult for students to build deep understanding, while the use of visual media that supports learning is also rarely implemented consistently. Future research will focus on analyzing students' understanding of mathematical concepts as well as the main factors that influence concept understanding, which can later contribute to teachers improving better concept understanding in elementary school students.

Based on the comes about of perceptions and introductory interviews, it appears that a few students consider math subjects to be troublesome subjects so a few understudies can fathom issues and a few students are less able to unravel issues. Since concept understanding is imperative in understanding math issues, it must be investigated in advance. In this manner, analysts are fascinated by inquiring about the capacity to get concepts in understudies in rudimentary schools. In the meantime, the inquiry about to be carried out is around analyzing the capacity to get scientific concepts in review V students in geometry fabric. Hence, the novelty of this inquiry lies within the subject, factors, and sort of investigation, where the investigation over is an interrelated variable. This think about centered on analyzing the understanding of numerical concepts in fifth- review students in geometry fabric. Through this thought, this inquiry is anticipated to be valuable for teachers in cultivating the capacity to get concepts within the learning handle, as well as being data for assist inquire about and as a reference fabric for the improvement of science.

Method

This ponder utilized a subjective expressive approach to analyze the understanding of scientific concepts in geometry fabric. This approach was chosen to get an in-depth portrayal of students' understanding of numerical concepts understanding. The subjects of this consideration were fifth-grade students at one of the open basic schools within the Blitar area, with an additional 11 students chosen by purposive examination based on their scholastic execution in science. The instruments used included written tests to measure the understanding of geometry concepts, semi-structured interviews to explore learners' understanding and difficulties, and classroom observations to see the application of geometry concepts in learning. Data collection techniques were carried out in several stages, among others: a). Written test, where students are given a test containing questions totalling 5 items of geometry that aim to measure their concept understanding; b). Interview, this interview was conducted on some students who were selected to be interviewed further to explore the understanding and difficulties that students face; c). Observation, observation is done during the learning process to see directly how students understand and apply the concept of geometry.

Pointers of numerical concept understanding utilized in this ponder are markers of concept understanding that have been adjusted concurring to Kilpatrick, specifically: a). Rehash concepts that have been given; b). Classifying objects based on scientific concepts; c). Applying concepts algorithmically; d). Connecting different numerical concepts inside or remotely; e). Show concepts in different numerical representations.

Information investigation procedures are carried out through three stages, to be specific information collection, information decrease, information introduction, and conclusion drawing. Information lessening is done to summarize the information obtained and center on students' understanding of scientific concepts. Data presentation, which is collecting information that can be used to map and reason about students' mathematical understanding. Finally, conclusions reveal the meaning of each student's mathematical understanding data in one of the Blitar Regency Public Elementary Schools that has been collected or obtained during the research process.

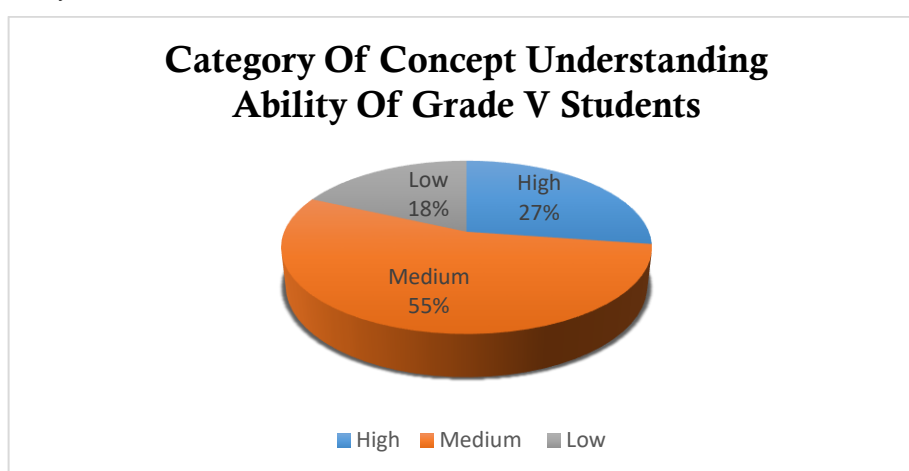
Results and Discussion

Conceptual understanding in mathematics refers to the comprehension of mathematical ideas, operations, and relations (Malatjie & Machaba, 2019). It goes beyond mere memorization of procedures and formulas and involves an in-depth grasp of the why and how behind mathematical principles (Barumbun & Kharisma, 2022). In geometry, conceptual understanding involves recognizing the properties of shapes, the relationships between different figures, and the ability to apply geometric principles in solving real-world problems (İbili et al., 2020). For fifth-grade students, key geometry concepts include understanding basic shapes (such as triangles, rectangles, and circles), properties of these shapes (angles, sides, perimeters, and areas), and spatial relationships (such as symmetry, congruence, and transformations) (Seah & Horne, 2019). At this stage, students should also begin to connect geometric ideas to their everyday experiences, such as identifying shapes in their surroundings or understanding the concept of area in terms of covering surfaces (Dogruer & Akyuz, 2020).

This investigation was conducted on understudies who have considered geometry fabric in review V. The populace of this think about were fifth-grade students within the scholarly year 2023/2024 indeed semester.

In this think about, analysts need to analyze the capacity to get the concept of students in geometry fabric. Understanding the concept is the foremost important portion of learning arithmetic, an increase in the understanding of mathematical concepts must be sought after for the success of students within the learning handle. Concept understanding is one of the numerical abilities or capabilities that are anticipated to be accomplished in learning science. An understanding of mathematical concepts will be meaningful if mathematics learning is directed at developing the ability of mathematical connections between various ideas, understanding how mathematical ideas are interrelated with each other so that a comprehensive understanding is built, and using mathematics in contexts outside of mathematics (Aledya, 2019).

This inquiry was conducted by testing students through graphic questions as numerous as 5 questions with geometry fabric concept understanding pointers, to be specific: a). Rehash the concepts that have been given; b). Classify objects based on scientific concepts; c). Apply concepts algorithmically; d). Connecting different scientific concepts inside or remotely; e). Display concepts in different numerical representations. Analysts analyze concept understanding capacity based on high, medium, and low bunches. The following is a diagram of the categorization results of students in working on the mathematical concept understanding ability test geometry material.

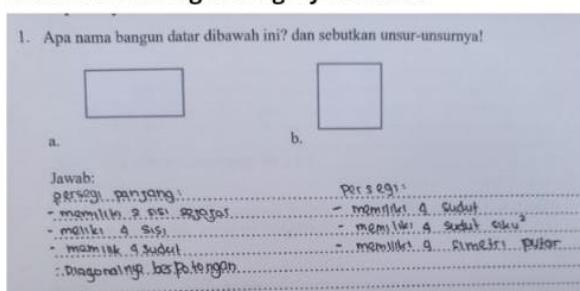


Picture 1. Concept understanding ability category diagram

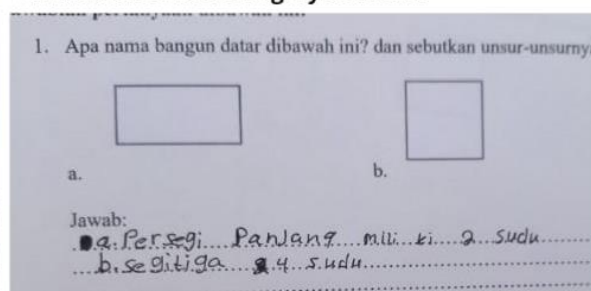
The diagram above illustrates the level of students' ability to understand, analyze, and apply mathematical concepts. This diagram categorizes learners into several categories, such as high, medium, and low based on certain evaluation results. Each category reflects the level of mastery of mathematical concepts, which can be used as a reference for designing learning strategies that suit the needs of learners.

Based on the test comes about, appears that there are as numerous as 3 students within the tall gather category, 6 students within the medium category, and 2 students within the low category. The following is a clarification of the inquiry about comes about for each pointer. The primary pointer, specifically the pointer of understanding the concept of repeating the concept that has been given, appears that the question appears how the capacity to get the concept of understudies on the pointer of repeating the concept that has been given is thing number 1 with a simple trouble level. The taking after presents student answers to question number 1.

a. Answers of high-category students



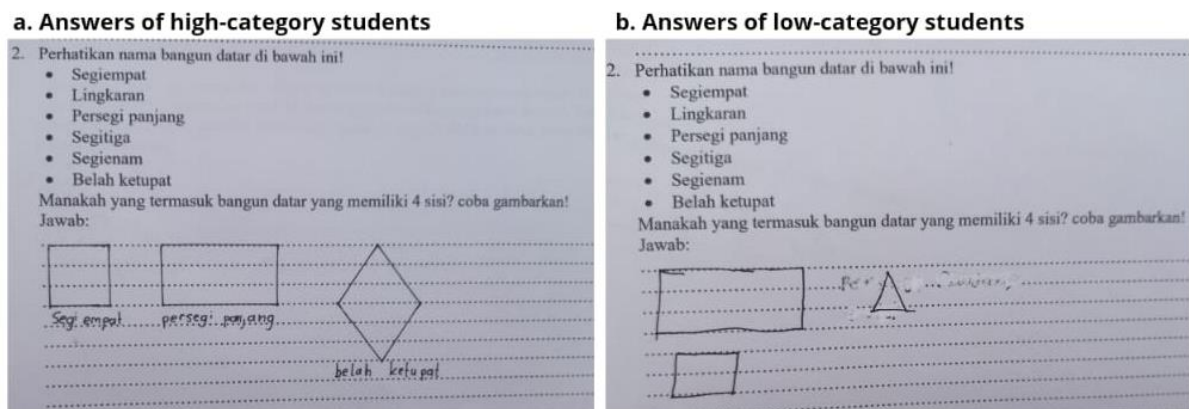
b. Answers of low-category students



Picture 2. Student answers to question number 1

Picture 1 shows the answers of tall and low-category students. Within the answers of high-category students, students now know the characteristics of rectangular and square-level shapes. This indicates that students can work on problems in the first indicator, namely knowing the form of questions to analyze flat shapes well. The picture of the answers of low- category learners shows that students are still unable to mention the characteristics of square buildings.

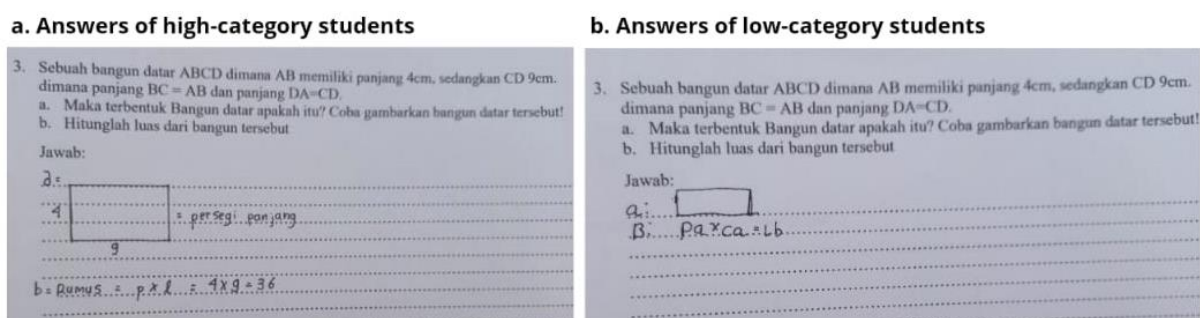
The second pointer, specifically classifying objects based on scientific concepts, appears as the question that shows the students' concept understanding capacity on the marker of classifying objects based on numerical concepts that have been given is question number 2 with a straightforward trouble level. The taking after presents student answers to question number 2.



Picture 3. Student answers to question number 2

The Picture 2 above shows that the answers of high-category learners can know the types and describe flat shapes that have 4 sides correctly. Whereas in the picture the answers of low- category students show that students still do not know the types and have not been able to describe flat shapes that have 4 sides.

The third pointer, namely applying concepts algorithmically, shows that the question that shows how the students' concept understanding ability on the pointers of applying concepts algorithmically that has been given is question number 3 with an easy difficulty level. The following is presented student answers to question number 3.

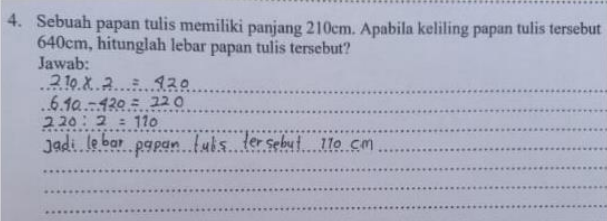


Picture 4. Student answers to question number 3

Picture 3 shows the answers of high-category students who can reply to the questions well and accurately agreeing to the information asked. In any case, the picture of the answers of low-category students shows that understudies are still not able to reply to the questions well, and students still have trouble deciding the equation to be utilized.

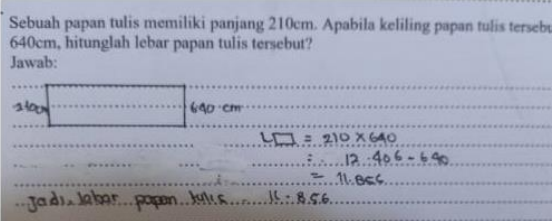
The fourth pointer, to be specific connecting different numerical concepts inside or remotely, appears that the question that appears how students' concept understanding capacity on the pointer of connecting different numerical concepts inside or remotely that has been given is question number 4 with a troublesome trouble level. The taking after presents student answers to question number 4.

a. Answers of high-category students



4. Sebuah papan tulis memiliki panjang 210cm. Apabila keliling papan tulis tersebut 640cm, hitunglah lebar papan tulis tersebut?
Jawab:
 $2p \times l = 640$
 $2 \times 210 \times l = 640$
 $420 \times l = 640$
 $l = \frac{640}{420}$
 $l = 1,5238$
Jadi, lebar papan tulis tersebut 110 cm.

b. Answers of low-category students



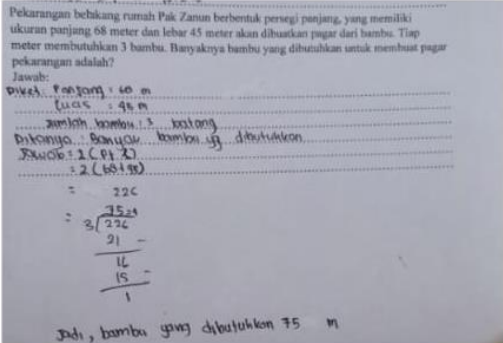
Sebuah papan tulis memiliki panjang 210cm. Apabila keliling papan tulis tersebut 640cm, hitunglah lebar papan tulis tersebut?
Jawab:
 $Lp = 210 \times 640$
 $l = \frac{13.440}{1556}$
 $l = 8,56$
Jadi, lebar papan tulis 8,56.

Picture 5. Student answers to question number 4

Picture 4 of the answers of high-category students shows that students can reply accurately and can get the issue well, but students still miss composing the equation utilized. Less. The picture of the answers of low-category students shows that low-category students have not been able to get the issue well so the answers created are less exact.

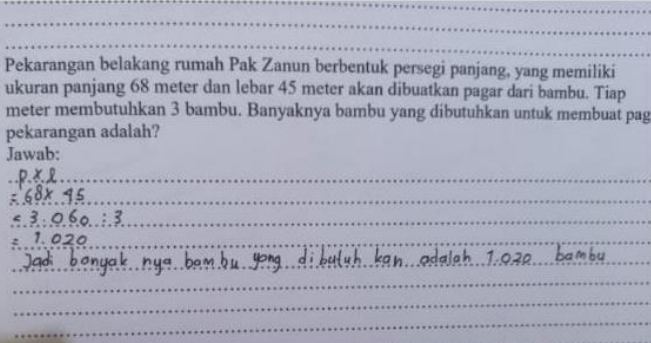
The fifth pointer, specifically showing concepts in different numerical representations, appears the question appears how the students' concept understanding capacity. The pointer of showing concepts in different scientific representations that have been given is question thing number 5 with a troublesome trouble level. The taking after presents student answers to question number 5.

a. Answers of high-category students



Pekarangan belakang rumah Pak Zanun berbentuk persegi panjang, yang memiliki ukuran panjang 68 meter dan lebar 45 meter akan dibuatkan pagar dari bambu. Tiap meter membutuhkan 3 bambu. Banyaknya bambu yang dibutuhkan untuk membuat pagar pekarangan adalah?
Jawab:
Dikah: Panjang: 68 m
Lebar: 45 m
Bentuk: Persegi Panjang
Banyaknya bambu: 3 per meter
Ditanya: Banyak bambu yg dibutuhkan
Jawab: $2(p + l)$
 $= 2(68 + 45)$
 $= 226$
 $= \frac{226}{3}$
 $= 75,33$
Jadi, bambu yang dibutuhkan 75 m

b. Answers of low-category students



Pekarangan belakang rumah Pak Zanun berbentuk persegi panjang, yang memiliki ukuran panjang 68 meter dan lebar 45 meter akan dibuatkan pagar dari bambu. Tiap meter membutuhkan 3 bambu. Banyaknya bambu yang dibutuhkan untuk membuat pagar pekarangan adalah?
Jawab:
 $p \times l$
 $= 68 \times 45$
 $= 3.060 : 3$
 $= 1.020$
Jadi banyak nya bambu yang dibutuhkan adalah 1.020 bambu

Picture 6. Student answers to question number 5

Within the picture of the answers of high-category students, it appears that students can reply to the questions well and utilize the equation accurately but they still require heading to get the issue. The picture of the answers of low-category students appears that students have not been able to get the issue well indeed in spite of the fact that it has been clarified that low-category students are still having trouble.

From the comes about of the consideration, it was found that the capacity to get it numerical concepts in students was classified within the low category. This conclusion is distinctive from other ponders, which appears that the capacity to understand mathematical concepts is within the high category. The high category is research conducted by(Regi & Yanto, 2020; J. Sari & Hayati, 2019). Based on the comes about of inquiry conducted on course V students, understudies who have the most elevated score on pointer 3 , namely Applying concepts algorithmically, and the lowest score indicators on indicators 1 and 5, namely restating concepts that have been given and preparing concepts in various representations. Another thing that was found was that students still had difficulty distinguishing the characteristics of rectangular and square flat shapes and a lack of understanding of the problem-solving questions given so they were less precise in answering the questions.

The following are the findings of investigating discoveries related to the understanding of numerical concepts of review V understudies in geometry fabric seen from the following pointers: a). pointers of rehashing concepts that have been given, in this ponder the capacity to restate the concepts of students in general is still relatively low, this is due to students still having difficulty distinguishing the characteristics of square and rectangular shapes and students rarely repeating the material that has been taught before. Furthermore, for high category students, can mention the characteristics of square and rectangular flat shapes

correctly and they can distinguish between rectangular and square. In the medium category, students can only mention the characteristics of rectangular shapes correctly, for square shapes they are still not correct in mentioning their characteristics. While in the low category, students have not been able to mention the characteristics of rectangular and square shapes and some are wrong in writing the names of flat shapes; b) Pointer classifies objects based on the concept of number, in this pointer the average student is able to classify the shape of the level correctly so it is classified as high. Learners in the high category show that learners can describe flat shapes that have 4 sides correctly. In the medium category, learners can describe flat shapes that have 4 sides but are not perfect. While in the low category, students show that students have not been able to describe a flat shape that has 4 sides. c). Pointers of applying concepts algorithmically, in this thought about the capacity of students to apply concepts was very great, but learners skip key steps. Usually, since understudies need to hone in on fathoming issues.

In addition, in this study, students belonging to the high and medium categories were able to understand the issue themselves and were able to work according to the instructions, but there were several steps that they missed when working on the problem and in determining the right formula to solve the problem. Whereas within the medium category of understudies after being clarified related to the existing problems they still need to be guided in working. d). pointers of linking several mathematical concepts internally or externally; in this indicator, students are generally able to relate to everyday objects but are still wrong in writing the formula used. In the high category, students can understand the problem themselves and can do the problem correctly. In the medium category, students still need elaboration related to the questions given before they can work on them. While in the low category, understudies are still confounded approximately the questions given. e). pointers of preparing concepts in various mathematical representations; in this indicator in general students are still lacking in understanding and some still seem confused. Based on the results of initial interviews which show that students do not really understand story problems well, in the process of working students still do not understand story problems and need to be reviewed first. In the high category, students still need to be explained the problems in the problem, then they can do it correctly. Though within the medium category of understudies after being clarified related to the existing problems they still need to be guided in working.

Concept understanding in learners of geometry material is influenced by several main factors. The following are some of these factors, the first is the cognitive ability of learners, the ability to think of learners greatly affects how learners understand new concepts, including mathematics. Learners who have good cognitive abilities tend to more easily connect new concepts with prior knowledge. Conversely, learners with underdeveloped cognitive abilities may struggle to understand abstract concepts such as the relationship between geometry or spatial figures. As a result, to help learners gain a deeper understanding of geometry concepts, a stronger visual approach is often required. The second is the learning method, the method used by the teacher greatly affects the ability of learners to understand concepts. If the methods used focus too much on memorizing formulas and less on providing context or visualization, learners will have difficulty understanding the concepts deeply. Interactive learning that involves props, simulations, or technology that can demonstrate geometry concepts in real-time tends to have a greater effect.

The next factor is the interest and motivation of learners, in this factor learning math is very important for understanding concepts. Learners who dislike math or find geometry difficult are often less engaged in learning. In contrast, learners who are motivated and want to learn will be more active in exploring concepts and asking questions when experiencing difficulties. This causes learners to rely more often on memorization without understanding the concept thoroughly. And finally, learning resources support, learners' concept understanding is strongly influenced by the availability of resources such as books, teaching aids, and learning technology. Schools with limited resources only rely on textbooks or teachers' oral explanations, which are sometimes not enough to understand abstract geometry concepts.

Based on the comes about of tests and interviews conducted with understudies utilizing pointers of concept understanding, understudies still have trouble communicating concepts that have been learned, and a few understudies are not adjust in specifying the characteristics of square and rectangular shapes. In expansion, understudies have trouble finding the proper equation to fathom the given issue. The difficulty of understanding mathematics experienced by grade V students in understanding mathematical concepts is that students do not fully understand geometry material (Sulistiowati et al., 2019). It can be seen from the answers of understudies when given questions and when members are met, they don't meet the criteria for the markers set. This is the same as in previous studies, namely, students have difficulty in solving a given problem and they are lacking in understanding the material that has been given (Setiawan et al., 2023). The inability of students to understand mathematical concepts when answering questions is one of the causes of students not being able to learn mathematical concepts completely and accurately (Kamarullah, 2017).

Factors that influence the low understanding of mathematical concepts students are the use of less varied learning methods and the lack of support for effective visual aids, as well as students who do not understand mathematical concepts as a whole so that they have difficulty in developing ideas, information and other mathematical skills, even if their abilities are very limited, they are unable to solve problems related to mathematical problems with real life (Permatasari, 2021). The reason students have difficulty understanding mathematical concepts correctly is that students do not understand mathematical concepts as a whole when given problems or when the teacher explains the material (Umam & Zulkarnaen, 2022). This is in line with research which explains that students will have difficulty in understanding mathematical concepts if they do not understand mathematical concepts as a whole during the learning process (Maryanti & Zulfarazi, 2022). Another cause of students' difficulty in understanding mathematical concepts is self-confidence (Permatasari, 2021). This has been proven in previous research, where self-confidence is one of the major influences on students' behaviour. For example, when they solve math problems or ask the teacher directly if there is material that is not understood (Dwi & Audina, 2021).

From the clarification of the investigation of the understanding of numerical concepts in lesson V understudies, the understanding of scientific concepts in understudies is still within the low category. This is caused by various things, among others, less varied learning methods, lack of support for effective visual aids, students' lack of confidence, and lack of understanding related to the material being studied (N. Nuraini & Abidin, 2020). Overcoming this problem requires the efforts of all parties involved, be it teachers, parents, and students (Triwardhani et al., 2020). The problems related to the concept of mathematics that have been described above, the researcher aims to provide suggestions to all parties to improve concept understanding in students. One of them is motivating students to be more enthusiastic and confident in learning mathematics (Pangestu & Sutirna, 2021). Thus the application of mathematical concepts can be used properly in solving a problem. If the higher the enthusiasm of students in understanding mathematical concepts, then when students are faced with a problem related to mathematical concepts the results obtained will be more optimal (Herzanzam, 2021). So that students become more confident and confident that they can understand math concepts better (Andayani & Amir, 2019).

The analysis revealed several factors contributing to students' difficulties in understanding geometric concepts. One key factor is the abstract nature of geometry. Unlike arithmetic, where students can often rely on memorized procedures, geometry requires a deeper level of spatial reasoning and the ability to visualize shapes and their properties (Rich & Brendefur, 2018). This suggests that students need more opportunities to engage with geometry in a hands-on, visual way, using manipulatives and technology to explore shapes and their transformations (Walkington et al., 2021). Another factor is the students' lack of experience with certain geometric tools, such as protractors and rulers (Disbudak & Akyuz, 2019). Proper instruction on how to use these tools is essential for developing students' procedural fluency in geometry (Foster, 2018). Incorporating more activities that involve measurement and construction of shapes could help students become more comfortable with these tools. Additionally, misconceptions about geometric properties, such as the idea that larger shapes always have larger areas or that all triangles have the same shape, need to be addressed explicitly in the classroom (Ngirishi & Bansilal, 2019). Teachers should focus on correcting these misconceptions through targeted discussions and problem-solving exercises.

Conclusion

Based on the results of the analysis, it can be concluded that the ability to understand mathematical concepts of grade V students in geometry material is in the low category. The main difficulty faced by students lies in understanding and applying the basic concepts of geometry, especially in calculating the area and perimeter of flat shapes. Factors that influence the low understanding are caused by the use of less varied learning methods, lack of support for effective teaching aids, support for learning resources, and lack of confidence in students.

To overcome this problem, teachers should use more interactive visual media during the learning process. Learners can gain a better understanding of geometry concepts by using props such as 3D models, interactive geometry apps, or animated videos. To encourage learners to think critically and understand how geometry is used in the real world, a problem-based learning approach can help. It is expected that learners' understanding of geometry will improve significantly by using a more innovative learning approach that actively engages learners. This will make learners better prepared to face challenges in the next grade.

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References

- Adhiska, D. P., Fathurrohman, M., & Khaerunnisa, E. (2020). Analisis Pemahaman Konsep Matematis Peserta Didik Pada Materi Aljabar. *WILANGAN: Jurnal Inovasi Dan Riset Pendidikan Matematika*, 1(1), 64–75.
- Aledya, V. (2019). Kemampuan Pemahaman Konsep Matematika Pada Siswa. *May*, 0–7.
- Al-Mutawah, M. A., Thomas, R., Eid, A., Mahmoud, E. Y., & Fateel, M. J. (2019). Conceptual Understanding, Procedural Knowledge And Problem-Solving Skills In Mathematics: High School Graduates Work Analysis And Standpoints. *International Journal Of Education And Practice*, 7(3), 258–273.
- Amelia, U. (2023). Tantangan Pembelajaran Era Society 5.0 Dalam Perspektif Manajemen Pendidikan. *Al-Marsus: Jurnal Manajemen Pendidikan Islam*, 1(1), 68–82.
- Andayani, M., & Amir, Z. (2019). Membangun *Self-Confidence* Siswa Melalui Pembelajaran Matematika. *Desimal: Jurnal Matematika*, 2(2), 147–153.
- Barumbun, M., & Kharisma, D. (2022). Procedural Knowledge Or Conceptual Knowledge? Developing The So-Called Proceptual Knowledge In Mathematics Learning. *Beta: Jurnal Tadris Matematika*, 15(2), 167–180.
- Disbudak, O., & Akyuz, D. (2019). The Comparative Effects Of Concrete Manipulatives And Dynamic Software On The Geometry Achievement Of Fifth-Grade Students. *International Journal For Technology In Mathematics Education*, 26(1), 3–20.
- Dogruer, S. S., & Akyuz, D. (2020). Mathematical Practices Of Eighth Graders About 3D Shapes In An Argumentation, Technology, And Design-Based Classroom Environment. *International Journal Of Science And Mathematics Education*, 18(8), 1485–1505.
- Dwi, D. F., & Audina, R. (2021). Analisis Faktor Penyebab Kesulitan Belajar Matematika Kelas IV Sekolah Dasar Negeri. *Cybernetics: Journal Educational Research And Social Studies*, 94–106.
- Fajar, A. P., Kodirun, K., Suhar, S., & Arapu, L. (2019). Analisis Kemampuan Pemahaman Konsep Matematis Siswa Kelas VIII SMP Negeri 17 Kendari. *Jurnal Pendidikan Matematika*, 9(2), 229–239.
- Fauziyah, S., & Wahyuni, F. T. (2024). Etnomatematika: Konsep Matematika Pada Proses Pembuatan Keripik Tempe Khas Desa Kalirejo. *Numeracy*, 11(2), 184–198.
- Foster, C. (2018). Developing Mathematical Fluency: Comparing Exercises And Rich Tasks. *Educational Studies In Mathematics*, 97, 121–141.
- Furlong, V. J. (2020). Interaction Sets In The Classroom: Towards A Study Of Pupil Knowledge. In *Life In School* (Pp. 145–159). Routledge.
- Hanselman, P., Grigg, J., K. Bruch, S., & Gamoran, A. (2016). The Consequences Of Principal And Teacher Turnover For School Social Resources. In *Family Environments, School Resources, And Educational Outcomes* (Pp. 49–89). Emerald Group Publishing Limited.
- Herzanzam, D. A. (2021). Peningkatkan Motivasi Dan Self Efficacy Belajar Matematika Melalui Model Pembelajaran Berbasis Masalah Pada Siswa Sekolah Dasar. *Jurnal Basicedu*, 5(4), 2133–2144.
- İbili, E., Çat, M., Resnyansky, D., Şahin, S., & Billingham, M. (2020). An Assessment Of Geometry Teaching Supported With Augmented Reality Teaching Materials To Enhance Students' 3D Geometry Thinking Skills. *International Journal Of Mathematical Education In Science And Technology*, 51(2), 224–246.

-
- Kamarullah, K. (2017). Pendidikan Matematika Di Sekolah Kita. *Al Khawarizmi: Jurnal Pendidikan Dan Pembelajaran Matematika*, 1(1), 21–32.
- Kenedi, A. K., Helsa, Y., Ariani, Y., Zainil, M., & Hendri, S. (2019). Mathematical Connection Of Elementary School Students To Solve Mathematical Problems. *Journal On Mathematics Education*, 10(1), 69–80.
- Khaidir, E., & Suud, F. M. (2020). Islamic Education In Forming Students' Characters At As-Shofa Islamic High School, Pekanbaru Riau. *International Journal Of Islamic Educational Psychology*, 1(1), 50–63.
- Kilpatrick, J. (2020). History Of Research In Mathematics Education. *Encyclopedia Of Mathematics Education*, 349–354.
- Komariyah, S., Afifah, D. S. N., & Resbiantoro, G. (2018). Analisis Pemahaman Konsep Dalam Memecahkan Masalah Matematika Ditinjau Dari Minat Belajar Siswa. *SOSIOHUMANIORA: Jurnal Ilmiah Ilmu Sosial Dan Humaniora*, 4(1).
- Kurnia, A. N., & Hidayati, N. (2022). Analisis Kemampuan Berpikir Geometri Berdasarkan Tahap Berpikir Van Hiele Pada Pembelajaran Matematika Siswa SMP. *Edumatsains: Jurnal Pendidikan, Matematika Dan Sains*, 6(2), 419–430.
- Kurniawan, R., & Parnawi, A. (2023). Manfaat Literasi Untuk Meningkatkan Mutu Pendidikan. *Jurnal Pendidikan, Bahasa Dan Budaya*, 2(1), 184–195.
- Lowrie, T., Logan, T., & Hegarty, M. (2019). The Influence Of Spatial Visualization Training On Students' Spatial Reasoning And Mathematics Performance. *Journal Of Cognition And Development*, 20(5), 729–751.
- Madani, R. A. (2019). Analysis Of Educational Quality, A Goal Of Education For All Policy. *Higher Education Studies*, 9(1), 100–109.
- Malatjic, F., & Machaba, F. (2019). Exploring Mathematics Learners' Conceptual Understanding Of Coordinates And Transformation Geometry Through Concept Mapping. *Eurasia Journal Of Mathematics, Science And Technology Education*, 15(12), Em1818.
- Malone, T. W., & Lepper, M. R. (2021). Making Learning Fun: A Taxonomy Of Intrinsic Motivations For Learning. In *Aptitude, Learning, And Instruction* (Pp. 223–254). Routledge.
- Maričić, S., & Stamatović, J. (2018). *The Effect Of Preschool Mathematics Education In Development Of Geometry Concepts In Children*.
- Maryanti, M., & Zulfarazi, Z. (2022). Peningkatan Kemampuan Pemahaman Dan Pemecahan Masalah Matematis Siswa Sekolah Menengah Atas Dengan Model Pembelajaran Kooperatif Tipe Team Assisted Individualization. *Jurnal Real Riset*, 4(2), 147–155.
- Mulyani, T. (2020). Strategi Pembelajaran Jarak Jauh Siswa Berkebutuhan Khusus Di Sd Inklusi Era Pandemi Covid-19. *ELEMENTARY: Islamic Teacher Journal*, 8(2), 247–276.
- Munna, A. S., & Kalam, M. A. (2021). Teaching And Learning Process To Enhance Teaching Effectiveness: A Literature Review. *International Journal Of Humanities And Innovation (IJHI)*, 4(1), 1–4.
- Ngirishi, H., & Bansilal, S. (2019). An Exploration Of High School Learners' Understanding Of Geometric Concepts. *Problems Of Education In The 21st Century*, 77(1), 82.
- Nuraini, L. (2022). Integrasi Nilai Kearifan Lokal Dalam Pembelajaran Matematika Sd/Mi Kurikulum 2013. *Jurnal Pendidikan Matematika (Kudus)*, 1(2).
- Nuraini, N., & Abidin, Z. (2020). Kesulitan Guru Dalam Mengimplementasikan Pembelajaran Tematik Terintegratif Di Sekolah Dasar. *Premiere Educandum*, 10(1), 49–62.
- Nurhikmayati, I. (2019). Implementasi STEAM Dalam Pembelajaran Matematika. *Jurnal Didactical Mathematics*, 1(2), 41–50.
- Pangestu, R. A., & Sutirna, S. (2021). Analisis Kepercayaan Diri Siswa Terhadap Pembelajaran Matematika. *Maju*, 8(1), 505035.
- Permatasari, K. G. (2021). Problematika Pembelajaran Matematika Di Sekolah Dasar/Madrasah Ibtidaiyah. *Jurnal Pedagogy*, 14(2), 68–84.
-

-
- Pristiwanti, D., Badariah, B., Hidayat, S., & Dewi, R. S. (2022). Pengertian Pendidikan. *Jurnal Pendidikan Dan Konseling (JPDK)*, 4(6), 7911–7915.
- Radiusman, R. (2020). Studi Literasi: Pemahaman Konsep Anak Pada Pembelajaran Matematika. *FIBONACCI: Jurnal Pendidikan Matematika Dan Matematika*, 6(1), 1–8.
- Regi, I. S., & Yanto, Y. (2020). Analisis Kemampuan Pemahaman Konsep Segiempat Siswa Kelas Viii Smp Negeri 1 Lubuklinggau Tahun Pelajaran 2017/2018. *Jurnal Derivat: Jurnal Matematika Dan Pendidikan Matematika*, 7(1), 39–45.
- Rich, K., & Brendefur, J. L. (2018). The Importance Of Spatial Reasoning In Early Childhood Mathematics. *Early Childhood Education*, 1–19.
- Sari, D. R., Lukman, E. N., & Muharram, M. R. W. (2021). Analisis Kemampuan Siswa Dalam Menyelesaikan Soal Geometri Pada Asesmen Kompetensi Minimum-Numerasi Sekolah Dasar. *Fondatia*, 5(2), 153–162.
- Sari, J., & Hayati, F. (2019). Analisis Kemampuan Pemahaman Konsep Matematis Siswa Smp Pada Materi Kubus Dan Balok. *Pi: Mathematics Education Journal*, 2(1), 14–25.
- Seah, R., & Horne, M. (2019). A Learning Progression For Geometric Reasoning. In *Researching And Using Progressions (Trajectories) In Mathematics Education* (Pp. 157–180). Brill.
- Setiawan, S., Julrissani, J., & Savira, L. (2023). Analisis Kemampuan Pemahaman Konsep Matematis Siswa Pada Materi Bangun Ruang Sisi Datar. *AKSIOMA: Jurnal Program Studi Pendidikan Matematika*, 12(1), 80–91.
- Sulistiowati, D. L., Herman, T., & Jupri, A. (2019). Student Difficulties In Solving Geometry Problem Based On Van Hiele Thinking Level. *Journal Of Physics: Conference Series*, 1157(4), 042118.
- Susanti, Y. (2020). Pembelajaran Matematika Dengan Menggunakan Media Berhitung Di Sekolah Dasar Dalam Meningkatkan Pemahaman Siswa. *Edisi*, 2(3), 435–448.
- Taufiqurokhman, T., Satispi, E., Izzatusholekha, I., Andriansyah, A., & Samudera, A. A. (2023). Kebijakan Pemerintah Memajukan Kualitas Sumber Daya Manusia Unggul. *SWATANTRA*, 21(2), 189–205.
- Triwardhani, I. J., Trigartanti, W., Rachmawati, I., & Putra, R. P. (2020). Strategi Guru Dalam Membangun Komunikasi Dengan Orang Tua Siswa Di Sekolah. *Jurnal Kajian Komunikasi*, 8(1), 99–113.
- Umam, M. A., & Zulkarnaen, R. (2022). Analisis Kemampuan Pemahaman Konsep Matematis Siswa Dalam Materi Sistem Persamaan Linear Dua Variabel. *Jurnal Educatio FKIP UNMA*, 8(1), 303–312.
- Usman, P. M., Tintis, I., & Nihayah, E. F. K. (2022). Analisis Kemampuan Pemecahan Masalah Matematika Siswa Dalam Menyelesaikan Sistem Persamaan Linear Tiga Variabel. *Jurnal Basicedu*, 6(1), 664–674.
- Walkington, C., Gravell, J., & Huang, W. (2021). Using Virtual Reality During Remote Learning To Change The Way Teachers Think About Geometry, Collaboration, And Technology. *Contemporary Issues In Technology And Teacher Education*, 21(4), 713–743.
- Windasari, I. W., & Dheasari, A. E. (2023). Studi Literatur Pembelajaran Media Geometri Dalam Meningkatkan Kemampuan Kognitif Anak Usia Dini Di Taman Kanak-Kanak. *Al-ATHFAL: Jurnal Pendidikan Anak*, 4(1), 85–93.
- Zaifullah, Z., Cikka, H., & Kahar, M. I. (2021). Strategi Guru Dalam Meningkatkan Interaksi Dan Minat Belajar Terhadap Keberhasilan Peserta Didik Dalam Menghadapi Pembelajaran Tatap Muka Di Masa Pandemi Covid 19. *Guru Tua: Jurnal Pendidikan Dan Pembelajaran*, 4(2), 9–18.
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