IMPROVING THE ABILITY TO CALCULATE BLANKET AREA VOLUME OF THE TUBE AND CONES WITH A SOLID FIGURE NET METHOD FOR DEAF STUDENT

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Abstract

Improve the ability to calculate blanket area, tube volume, and cone with the solid figure net method for junior secondary deaf students. This study uses the Classroom Action Research method. The research subjects were seventh-grade middle school deaf students in special schools in Bandung Regency. This study uses two cycles, the first cycle uses tube material and the second cycle of cones. One cycle of one meeting with an allocation of 2 x 40 minutes. The results of the study showed that calculating the area of blankets, volume of tubes and cones for deaf students should be given examples and giving as many questions as possible. Giving examples and questions must be various types so students can understand

Keywords:

Deaf, Volume, Blanket Area, Cone, Tube

Introduction

The material calculates the area of blankets, the volume of tubes and cones to be material that must be given to class VII deaf students. Tube and cone material is a standard of competence in geometry and measurement. This material is easily given if students understand the spatial relations, such as the top down, far close, short height, front back as according to Kahfi [1]. According to Pradan conveying the material with a contextual approach is better the results [2], therefore the matter of building space is more understood if it is associated with things that are directly felt by students, so students better interpret solid figure material. The material will be effectively delivered if based on the abilities possessed by students, or using constructivism assessment as delivered by Syahbana in his research [3]. The constructivism approach will trigger students to explore their abilities so that in accepting children's material they are better prepared.

Solid figure feeding is more understood if children are given usefulness in daily life or according to Saefudin the principle of realistic mathematics is a mathematical concept that allows students to experience themselves [4]. The broad material of blankets and volumes for students is generally quite easy because the formula is clear. But for deaf students this material is classified as difficult because it is abstract, therefore it needs a realistic and real explanation so that it is easy to understand.

Material of volume and area of blankets is very useful in daily life, especially volume measurement which is often used, for example knowing the volume of bottled water, knowing the amount of water needed to fill water tanks, gasoline needed to fill gas, although not using the formula, children know direct understanding of volume. Explaining the material that builds up the teacher's room can utilize the surrounding objects to improve students' understanding, this is explained in the research conducted by Yeni [5].

Understanding solid figure students must have understood the plane figure area, therefore in studying solid figures it is important to know that solid figures are a combination of plane figures, according to Suharjana solid figure material can be given by splitting solid figures so that solid figures are made up of plane figure [6]. This study uses solid figure nets to improve the ability of deaf students to calculate blanket area and volume of tubes and cones.

Research Method

The research method used is the class action method, with 2 cycles. Classroom action research is useful for the professional development of more creative and innovative educators who can influence learning, as stated by Subadi in his research [10]. The most important class action research is the benefit of the results of its actions, this is in line with Latief's opinion which states the significance of research is the usefulness of the results or research products [11]. The following is the flow of classroom action research [12].

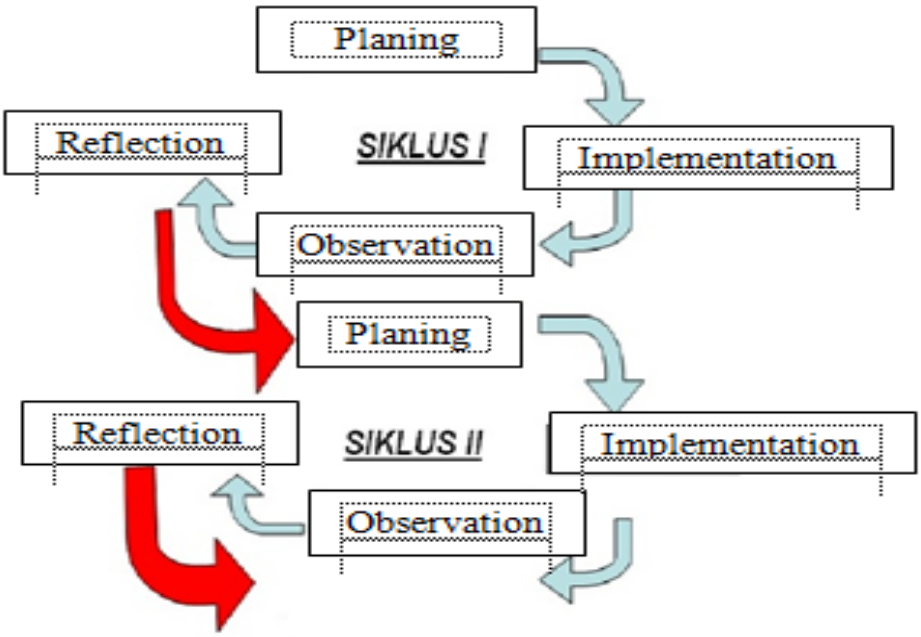


Figure 1. Flow of classroom action research

The first lesson is to carry out pre-tests, the purpose of the pre-test to find out the students' initial ability to build space, the questions given 5 questions, more questions about remembering the formula for the area and volume of tubes and cones. After the pre-test was given an explanation of the formula area and volume of the tube then post-test. The initial results are evaluated. Preliminary results as a basis for determining strategies or techniques teach the area and volume of tubes and cones so that students understand more in tube and cone material. The evaluation results are formulated to plan learning in the cycle 1. Planning the first cycle with activities as follows:

a. Preparation of learning plans.
b. Preparation of student worksheets in accordance with the learning indicators to be achieved
c. Making test questions that will be held to find out the results of student learning

The implementation of cycle 1 is to give an explanation to students about the surface area and volume of tubes using space-built nets, the time allocation in cycle 1 is a meeting with a time of 2 x 40 minutes. After the question is given about the material provided. Observations were made throughout the learning process by finally looking at the test results. The results of the reflections were then concluded to be corrected in the second cycle.

Cycle 2 is the result of cycle 1 reflection, planning cycle 2 is the same as cycle 1 but in sub-material is different, in cycle 1 uses tube material and 2 cone cycles. The material is explained using solid figure webs. The subject of this study was the seventh grade of the class at the SLB Negeri Cinta Asih, with the number of students three deaf people with the initials S, R and H, two women and one male. The researcher collected student demographic data, namely listening ability using

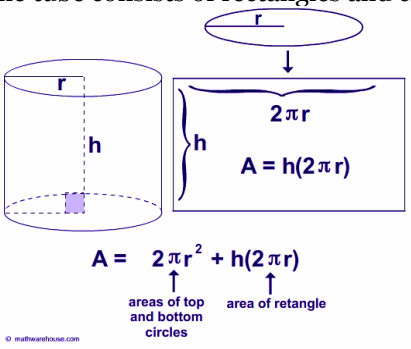
decibell units, mental maturity level, academic ability and language ability.

The ability to hear is seen from the fallow test results, then categorized into several parts, this part is based on Moore's opinion, namely deafness (40 dB), moderate (41-70 dB), weight (71-90 dB) and very heavy (90 dB) [13]. Mental maturity level is categorized based on Jannah's research, ie IQ is classified as follows: (1) 30130 very superior category, (2) 120 - 130 superior categories, (3) 110 - 119 bright normal categories, (4) 90 - 109 normal categories . Academic ability is taken from the grades of report cards for semester 1 of the school year 2018-2019. Academic abilities taken are Indonesian subjects, mathematics, natural sciences, social sciences, and special programs.

Language ability is not categorized because deaf people have had language problems, this is a sign that Hernawati's opinion is that deaf children are children who have a hearing loss that is classified into deaf (deaf) and hearing impairment (hard of hearing), aromas affect their language development and speech [14]. Language skills will be presented in the description of each child. Language ability can influence the conveying of messages or material during learning, this is a sign conveyed by Sunardi [15].

Literature Review

Syahbana said that the solid figure volume can be seen by looking at the shape of the base. In essence a solid figure originates from the base area arrangement that forms the solid figure height [3]. solid figure is composed of several plane figures, the surface area of a solid figure depends on the plane of the figure that composes it. The tube consists of three surfaces, namely a blanket in the form of a rectangle, a circular base and lid. This is in accordance with the research conducted by Syarifudin whose research results show that students' external knowledge of solid figures on plane figures prove that the tube consists of rectangles and circles [7].



Source www.google.com

Figure 2. Formula for tube surface area

The tube volume can be determined using the formula π.r2.t with π = **22/7**, it is found in the Asyhar paper [8].

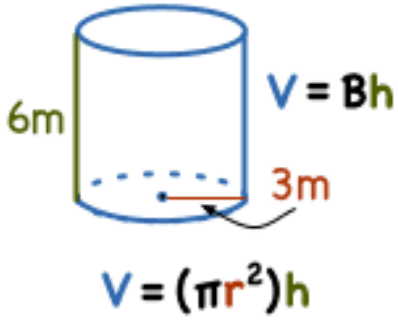


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Figure 3. Tube volume formula

According to Syriac, the cone consists of two plane figures, namely triangles and circles [9], whereas according to Syahbana cone is an oblique tube on the top to the bottom [3]. Still according to Syahbana the volume of the cone is a reduction in tube volume. Reduction occurs at 2/3 of the tube volume (tube volume = 3. cone volume)[3]

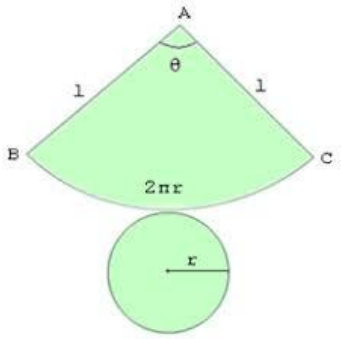


Figure 4. Formula for cone surface area

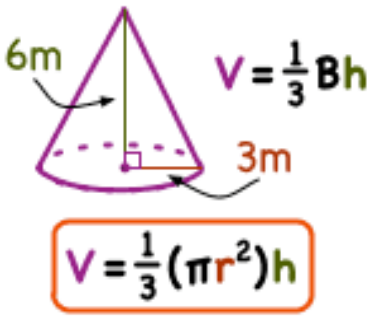


Figure 5. Volume cone formula

Results and Discussion

1. Demographic Data of Deaf Students

Student demographic data is very important to know because to know the ability of students to absorb the subject matter given. the ability of sound intensity affects one's communication skills, this is similar to that conveyed by Filina [16]. Figure 6 presents data on right and left intensity abilities, IQ and decryption of receptive and expressive language skills.

Student S has the ability to intensity the left ear sound 100 dB and the right ear is 100 dB, IQ 106 is normal. Student's language skills are very good compared to other deaf students, receptive language students can receive messages quickly, except new vocabulary that is not often seen. Students can receive messages in the form of signal messages and voice messages. The expressive language of students is very good so that it can respond to the message given with the response given in accordance with what was delivered, the response given is in the form of verbal and verbal signals, the verbal message conveyed is quite clear so that people hear the translation of the message given.

Student H has the ability to intensity the left ear sound 100 dB and the right ear 90 dB, IQ 100 or normal. Students' receptive language skills are quite good, students quickly receive messages that are conveyed with gestures and slow even the message is not understood by the child if delivered verbally. The expressive language of students is lacking, the signal messages conveyed are less understandable, especially verbal messages. It often happens eg communication, therefore messages are often translated by friends to help students understand.

Student R has the ability to have 100 dB left sound intensity and 100 dB right ear, IQ 102 or normal. Students' receptive language skills are very good as well as expressive language skills, student R language skills make it easier for messages to be received and responded to. Students can receive messages in the form of signals and verbals quickly. Expressive language both verbal and verbal can be understood by people who hear.

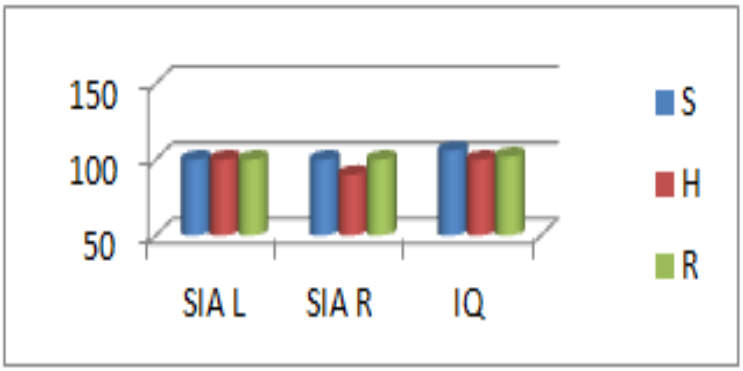


Figure 6. Student Demographic Data

Language skills and deaf communication affect the absorption of subject matter this is similar to what was conveyed by Masrukhin whose contents are language skills needed to understand science [17]. Figure 7 shows data on student academic results.

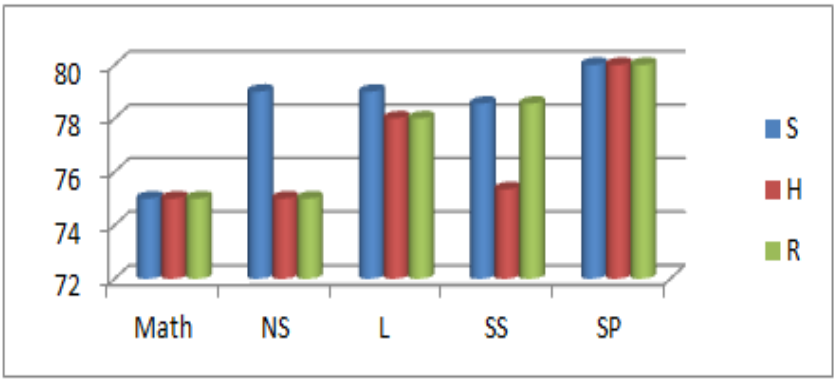


Figure 7. Student Academic Results

The academic results shown show that student S has a higher value than the other two students, a higher value indicates that with good language and communication skills, the material is more easily accepted and understood. Student H has the lowest score compared to his classmates, H students have less receptive and expressive language skills.

2. Teaching the Surface Area and Volume of Tubes and Cones

The first meeting was to provide a pre-test, the pre-test questions related to the tubes and cones, the questions amounted to 6, the pre-tests were given aimed at knowing the initial knowledge about the tubes and cones. The pre-test was completed and then continued by giving an explanation of the tubes and cones, the material was given by giving an explanation on the board with drawings accompanied by the formula of area and volume. The material recorded by students is continued by giving examples of questions, students are also given questions that are similar to examples to work on. Learning outcomes are evaluated by giving post-tests with the same questions. Below is presented a table 1 of the results of the pre-test and post-test. The correct answer is presented with number 1 and the answer is wrong with the number 0.

Table 1. Pre-test and Post-test results

No	Soal	Hasil					
		S		H		R	
		Pr	Po	Pr	Po	Pr	Po
1	Write the tube volume formula!	0	0	0	0	0	1
2	Write the volume cone formula!	0	0	0	0	0	1
3	Write the formula for the cone blanket!	0	0	0	1	0	0
4	Write the formula for the tube blanket!	0	1	0	1	0	0
5	Calculate the volume of the tube below! 	0	1	0	0	0	0
6	Calculate the volume of the cone below! 	0	0	0	0	0	0

Pr=pre-test, Po=post-tes

Table 1 shows the pre-test results of all children not yet knowledgeable about the volume and area of tubes and cones. The post-test results show that new students memorize the formula, but all children cannot solve the volume calculation problem. Student's post-test results in question number 1 answer π ^ 2 xt students do not write radius (r), after being asked the student forgets, the problem number 2 is equal to number 1 does not write fingers, the child writes 〖v = 1 / 3 π〗 ^ 2 x t. Student S is exchanged between answer number 1 and 2. Student S can answer correctly question number 5. The method of explaining and giving examples at the initial meeting does not have a significant impact on students' understanding of tube and cone material. The results of the initial meeting are used for material consideration of planning Cycle 1 learning.

3. Cycle 1

The material for cycle 1 is the surface area and volume of the tube. The researcher explained the webs built up space, building space consists of a flat wake. The tube consists of three flat shapes, namely two circles and a rectangle. After completion students are asked to make a tube from the webs, with a radius of 7 cm and a rectangular width or a tube height of 10 cm.

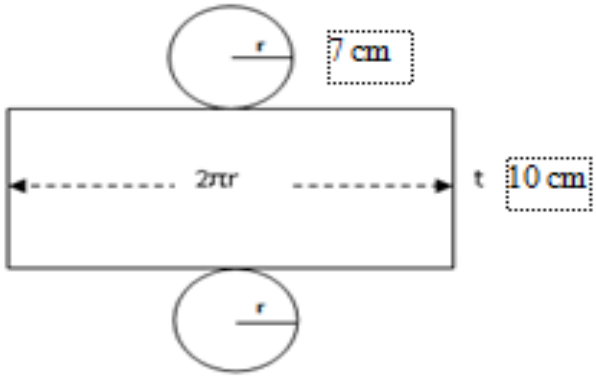


Figure. 8. Exercise

Students have difficulty in the tube material is to distinguish the broad formula and circumference of the circle, the formula is often confused so that it is wrong to answer questions, students always ask questions and be remembered when working on practice questions. In addition to the formula that is confused with students having difficulty determining π used, students always ask whether to use 3.14 or 22/7. The researcher explained the use of π, multiples of 7 using 22/7 and beyond that using 3.14.

Final evaluation of cycle 1, students are given 5 questions about surface area and volume of tubes. The results show students S can answer 4 questions correctly, one question is filled but wrong in counting. student H can answer 3 questions correctly and two questions are filled but wrong in the calculation but the formula is correct. Student R answers 3 questions correctly and two questions are wrong in the calculation. Reflection on cycle 1, students have been able to distinguish formulas of area, volume and differentiate usage π. Students are still careless in multiplication calculations, especially in multiplication using commas.

4. Cycle 2

Cycle 2 cone material using nets to build space, learning is the same as in cycle 1. Understanding that has been obtained in cycle 1 makes it easier for students to understand the use of the formula for cones. The problem in cycle 2 is that students forget 1/3 on the cone volume formula, so the results are not divided by 3, these problems occur in all students when working on the exercise about the surface area and volume of cones. Another problem in cone material is that students have difficulty calculating the area of a blanket if the length of the sloping side is unknown. Students must be reminded of the formula of Pythagoras.

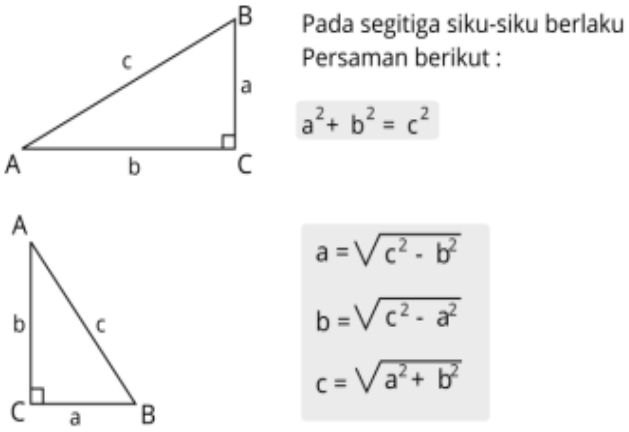
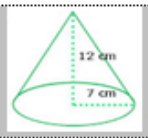
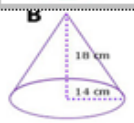
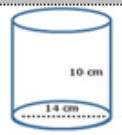


Figure. 9. Pythagoras formula

The problem is solved by giving practice and examples of phytagoras, students become accustomed when one size on the cone does not exist, students can finish easily because they have understood the use of the phytagoras formula. Deaf students who have an average or high IQ are

basically the same as students in general, the difference in learning in deaf students is the technique of delivering material, deaf students need to get a more detailed and concrete explanation to be understood. Evaluate cycle 2 by giving a tube and cone question, the number of questions 10, below is presented in table 2 the results of students working on the problem.

Table 2. Student Evaluation Results

No	Question	S	H	R
1	The volume cone formula is ...	1	1	1
2	The cone surface area formula is	1	1	1
3	 V=...	1	1	1
4	8  V= ...	1	1	0
5	The diameter of a cone is 14 cm. If it is 12 cm high, then the entire area of the cone is ..... cm^2	1	0	1
6	The tube volume formula is ...	1	1	1
7	The total formula for the entire surface of the tube is ...	1	1	1
8	A can is tubular with a radius of 5 cm and a height of 10 cm. The volume of the can is ..... cm^3	0	0	0
9	A tube has a radius of 10 cm and a height of 15 cm. The volume of the tube is ... cm^3.	0	0	0
10	 V=...	1	0	1

Based on the table above, it can be said that students have memorized the volume, tube and cone surface formulas. Students are still having difficulty in working on the problem with a value of $\pi = 3.14$, the cause of students not answering correctly is multiplication using commas. Errors in the workmanship are not the fault of the workmanship concept but the calculation is still wrong. Deaf students must continue to be given practice questions in counting, subtraction, multiplication and division operations with small to large numbers, decimal numbers to fractions.

Conclusion

Deaf students are basically the same as students in general in working on mathematics, students must often practice to get used to working on the questions in various forms. The difference between deaf students and students in general is the explaining technique, deaf students must be given a concrete explanation so that deaf students can understand.

Tube and cone material can be understood by using space-built nets, by asking students to make tubes and cones from the nets. Students can understand that building space comes from waking up flat. Students can remember the formula for surface area because remembering the origin of the building from the calculated space, students break the shape and calculate each. The volume of the tube and cone can be done by students after knowing that the base is flat. Students have applied the broad formula to build flat so that it is easy to work on the volume of tubes and cones. The first problem that occurs is that students often forget that the cone formula uses 1/3, so the final result is not divided by 3. The second problem of students is the difficulty of using π, using 3.14 or 22/7. The last problem is the difficulty in multiplying using commas so the answers are often wrong because of calculations.

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