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Profile Of Students' Mathematical Literacy Skills Private High Schools In Yogyakarta In Differentiated Learning Reviewed In Terms Of Process Differentiation

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This study aims to describe the implementation of differentiated learning in terms of differentiation of processes held in class XII MIPA in a high school in Yogyakarta. Differentiated learning is a systematic approach to designing curriculum and learning instruction for students who have a variety of abilities, interests, and learning needs. The research will also describe students' mathematical literacy skills in solving numeracy literacy problems in the fields of geometry and measurement, algebra, and data and uncertainty. This type of research is qualitative descriptive with quantitative assistance. The subjects of this study are 40 students in grade XII MIPA. Research data includes observation sheets and student worksheets. Observation data was processed by calculating the implementation of differentiated learning, while student worksheets were described, and categorized based on the same type of work into the level of PISA standard mathematical literacy ability. The first result of the study is that differentiated learning has been 82% well carried out and the second is the result based on the results of student work, there are 87.5% of students have level 2 mathematical literacy skills and 5% of students at level 3 in answering geometry and measurement problems. There were 2.5% of students with level 1 mathematical literacy skills and 97.5% of students with level 2 mathematical literacy skills in solving geometry and second type measurement problems. On the topic of algebra, there are 5% of students who have level 1 mathematical literacy skills, 80% of students at level 2, and 5% of students at level 3. On the topic of data and uncertainty, there are 87.5% of students who have level 3 mathematical literacy skills.

1. Introduction

Education is one of the important aspects in improving the quality of human resources (HR). Improving the quality of human resources is a priority because the world is experiencing very rapid changes in all walks of life. According to a Mc Kinsey study, 60 percent of job titles in the world will be replaced by automation. In Indonesia itself, it is estimated that 51.8 percent of the potential jobs will be lost. The transition from school to work is a very important moment for young people, but many of them are left behind (Schmillen and Umkehrer, 2017). The preparation of the young generation or human resources is carried out at every level of education starting from elementary school (SD) to high school (SMA). Students at the end of high school are students who are ready to enter the work industry or higher education, so it is very important to have the skills needed by the industry.

By World Economic Forum, future job or the jobs of the future demand that humans have the abilities anaategies, complex problem-solving, critical thinking and analysis, creativity, originality, and initiative, leadership and social influence, technology use, monitoring, and control, technology design and programming, resilience, stress tolerance, and flexibility, reasoning, problem solving, and ideation. One of the skills that must be possessed to support the skills needed in the industry is mathematical literacy skills.

Mathematical literacy ability is the ability of individuals to formulate, use, and interpret mathematics in various contexts, including the ability to reason mathematically and use concepts, procedures, facts, as tools to describe, explain, and predict a phenomenon or event (OECD, 2003). Mathematical literacy is very important for everyone related to their work and activities in daily life. Mathematical literacy is needed not only limited to understanding arithmetic, but also requires mathematical reasoning and problem solving, as well as mastery of logical reasoning to solve various problems in daily life. Seeing the importance of mathematical literacy skills, mathematical literacy skills should be possessed by students in order to be able to think logically, analytically, and be able to adapt and innovate in the world of work, further students in solving problems faced in daily life.

However, based on several world research projects that Indonesia has participated in, one of which is PISA (Program for International Student Assessment) still shows unsatisfactory results. PISA is an international-level study organized by the Organization for Economic Cooperation and Development (OECD). Indonesia's mathematical literacy ability in PISA in 2000, 2003, 2006, and 2009 consecutively occupied the bottom seven positions (IAARD, 2011). Meanwhile, in PISA in 2012, Indonesia was ranked 64th out of 65 countries with an average score of 375, while the average international score was 494 (The Guardian, 2013).

The score of students' mathematical literacy skills in PISA in 2015 was 386 which was level 6 from the bottom and in 2018 and 379 which was ranked 7 from the bottom (Tohir: 2019). The results of PISA in 2022 have not been released to date.

One of the mathematics learning methods that can have a positive impact on students' critical thinking skills is the differentiated learning method (Hadi:2022). In addition, based on research conducted by Rosinta Saburian, et al. (2019), differentiated learning can improve mathematical problem-solving skills. As an educator, I am well aware that students who attend school do not come from the same background. They come with a unique diversity in the classroom during the learning process. Students who are almost the same age do not necessarily have the same abilities in various subjects. We certainly cannot avoid this condition, with the condition of student diversity, teachers are required to be able to create learning that is on the side of students, namely learning that accommodates the learning needs of students. With the creation of learning that is on the side of students, it is believed that meaningful learning will be realized, and in the end the learning goals will be achieved well. To realize meaningful learning, learning differentiation is one of the solutions to be planned and implemented in the classroom and school.

Differentiated learning has been known in Indonesia since the first teacher education program was held in 2020. According to Tomlinson (2001:1), differentiated learning is an effort to combine differences to obtain information, create ideas, and express or convey the results that students have learned. There are 3 important aspects as the learning needs of students in differentiated learning (Tomlinson, 2001), including: 1) learning readiness, that is, students are ready with new materials to face the next learning process; 2) Learning interest, namely students have personal motivation in encouraging the desire to learn. Differentiated learning uses multiple approaches in content, processes, and products (Andini, 2016). Differentiated learning strategies include: 1) content differentiation: content is what we teach students, content can be differentiated in response to students' readiness, interests, and learning profiles or a combination of the three; 2) Process differentiation: process refers to how students will understand or interpret what they are learning by using tiered activities and providing guide questions or challenges that need to be solved according to the student's interests, creating an individualized agenda for students (to-do lists, varying the length of time students can take to complete tasks, developing varied activities; 3) product differentiation: Learning products are a performance that exists and must provide challenges and give students choices on how students can express the desired learning.

Differentiated learning does not mean that teachers provide different materials to

students with different abilities, but teachers need to think about reasonable actions that will later be taken to create a learning environment that invites students to learn, a curriculum that has clearly defined learning objectives, there is continuous assessment, and teachers respond or respond to students' learning needs. and effective classroom management. Differentiated learning whose implementation is in accordance with students' abilities and needs is expected to improve students' mathematical literacy skills because mathematical literacy skills are not only students able to solve mathematical problems, but also logical and logically mathematically according to contextual situations where differentiated learning is also carried out based on students' previous abilities and knowledge. Contextual problems given to students are adjusted to students' learning interests.

SMA Stella Duce 2 Yogyakarta is one of the high schools that has implemented differentiated learning and based on the results of the ANBK (ANBK Report 2021) SMA Stella Duce 2 has numerical ability in the indicator "reaching the minimum criteria" with a score of 2.09 and the national average score is 1.81, but the numerical ability score is still lower when compared to the score in the city of Yogyakarta which reached 2.15. Therefore, the profile of students' mathematical literacy skills before and after getting differentiated learning will be seen. The application of differentiated learning is expected to facilitate students in formulating, using, and interpreting mathematics in various contexts, including the ability to reason mathematically and use concepts, procedures, facts, as a tool to describe, explain, and predict a phenomenon or event according to students' learning interests so that the application of differentiated learning can develop the components that students have and can support the mathematical literacy ability of the students themselves.

2. Method

This type of research is descriptive research with a qualitative approach assisted by quantitative. Descriptive research with a quantitative approach itself is a research that aims to describe and describe phenomena as they are, where these phenomena are described based on the results of calculations in the form of a number, size or frequency (Nana Sukmadinata, 2012).

The research was conducted at a private high school in Yogyakarta with a population of 61 students from grades XII MIPA 1 and XII MIPA 2 with a composition of 21 boys and 40 girls. Class XII MIPA was chosen as the research subject because they had received differentiated learning in specialized mathematics learning. This school was chosen as the research site because its students come from various regions in Indonesia who have different school backgrounds.

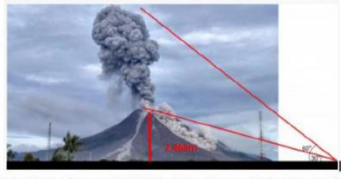
The data collection technique used was a test technique held on October 20, 2022 and learning observation. The observations in this study focus on the implementation of differentiated learning and use Kappa interatereliability calculations. The test technique is carried out to determine the mathematical literacy ability of students. Observations were carried out by three observers, observations included introductions including providing motivation to students before learning began, information on learning objectives, division of groups to do assignments, presentation of the use of numerical literacy contexts, interactivity during learning, closing and summarizing learning materials. The test given consisted of 3 questions taken from the 2020 AKM questions. The test in the form of a description was chosen because with the test in the form of a description, the process of working on the questions and the students' abilities in numerical literacy can be known. The test questions consist of Geometry and Measurement, Algebra, and Data and Uncertainty, The following is one of the instruments for geometry and measurement, algebra, and data and uncertainty test questions that students work on:

Try Out Kemampuan Literasi Matematis

Petunjuk: Kerjakan soal-soal di bawah ini dengan cara yang rinci yang kalian ketahui.

A. Geometri dan Pengukuran

1. Perhatikan gambar berikut:



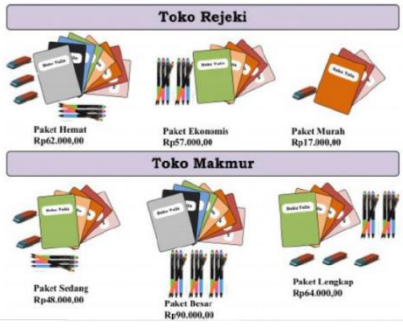
Badan Geologi, Kementerian ESDM dan Mitigasi Bencana Geologi Sumatra Utara sedang mengamati ketinggian letusan awan panas gunung Sinabung pada hari tersebut. Puncak gunung terlihat pada sudut elevasi 30° sedangkan puncak letusan awan panas terlihat pada sudut elevasi 60°.

Diketahui tinggi gunung Sinabung adalah 2.460 meter dan terjadi kesalahan dalam mengukur sudut elevasi. Besar sudut elevasi untuk melihat tinggi erupsi seharusnya adalah 50o. Akibat kesalahan ini, maka tinggi erupsi gunung sebenarnya lebih tinggi atau rendahkah bila dibandingkan dengan tinggi erupsi yang didapatkan dari sudut elevasi semula? Beri alasannya!

B. Aljabar

4. Perhatikan gambar berikut:

Bu Siti mendapat tugas dari sekolah untuk menyiapkan paket hadiah untuk siswanya yang berprestasi di sekolahnya. Bu Siti ingin membeli alat-alat tulis sebagai hadiahnya. Alat-alat tulis yang ingin dibeli berupa buku tulis, bolpoin, dan penghapus. Pada setiap pembelian alat tulis, pembeli dikenakan pajak sebesar 10%. Berkaitan dengan tugas tersebut, bu Siti melihat beberapa paket alat tulis yang dijual di toko Rejeki dan toko Makmur seperti pada gambar berikut.



Bu Siti ingin membuat 5 paket hadiah dengan tiap paket hadiah berisi paling sedikit dua macam alat tulis. Kelima paket yang akan dibuat, isinya tidak harus sama. Jika bu Siti memiliki dana sebesar Rp125.000,00 dan menginginkan setiap paket hadiah harus ada penghapus dan bolpoin, maka paket yang dapat dibeli adalah ....

C. Data dan Ketidakpastian

7. Perhatikan kasus berikut:

EMAS = INVESTASI YANG MENGUNTUNGKAN?

Investasi adalah penanaman modal untuk satu atau lebih aktiva yang dimiliki dan biasanya berjangka waktu lama dengan harapan mendapatkan return di masa yang akan datang. Keputusan penanaman modal tersebut dapat dilakukan oleh individu atau suatu entitas yang mempunyai kelebihan dana. Investasi selalu memiliki dua sisi, yaitu return dan risiko.

Berikut ini disajikan grafik harga emas ANTAM pada bulan Mei 2019 :

Summary Description of the Six Levels of Mathematical Proficiency in PISA 2015

The level of ability in the PISA question consists of 6 levels. In this case, the level indicates the level of complexity of the question. The higher the level of ability in PISA, the more complicated the problem will be. The highest ability level is level 6 and the lowest level is level 1. The following is a description of each level of the question (OECD, 2013a; OECD, 2013b).

Summary Description of the Six Levels of Mathematical Proficiency in PISA 2015

Level	Description
1	Students at this level can answer questions that are common and familiar in context and all relevant information is available with clear questions. Students can identify information and complete routine procedures according to explicit instructions. Students can take action according to the stimulus given.
2	Students in this level are able to interpret and recognize situations in contexts that require direct reference. Students can sort out relevant information from a single source and use a single means of representation.
3	At level 3, students are able to carry out procedures well, including procedures that require decisions in order. They can choose and implement simple problem-solving strategies
4	At this level, students can work effectively with models in concrete but complex situations. They can select and integrate different representations, and relate them to real situations.
5	At level 5, students can work with models for complex situations, know the obstacles they face, and make guesses. They can select, compare, and evaluate strategies to solve complex problems related to models.
6	At this level, students can conceptualize and generalize by using information based on modeling and studying in a complex situation. Students can flexibly connect different sources of information and translate them.

3. Result and Discussion

Implementation of Differentiated Learning

This study aims to describe the implementation of differentiated learning in terms of differentiation of processes held in grade XII of MIPA in a high school in Yogyakarta and also describe the mathematical literacy ability of students in solving numeracy literacy problems in the fields of geometry and measurement, algebra, and data and uncertainty. Based on the results of the observations of 3 observers who made observations on teachers in the classroom, the following results were obtained:

	Observer 1	**Observer 2**	**Observer 3**
Value	**46**	**38**	**39**
Maximum Score	**50**	**50**	**50**
Percentage	**92 %**	**80%**	**84%**

Based on the detailed data on the implementation of mathematics learning with differentiated learning presented in the table, it is obtained:

$$\text{Overall Execution} = \frac{\text{Percentage of Implementation } (1 + 2 + 3)}{3}$$

$$= \frac{(92\% + 76\% + 78\%)}{3}$$

$$= 82\ \%$$

As a result of 82% of observations from 3 observers, teachers have carried out a differentiated learning process. The results of observations from 3 observers in classroom learning are known that teachers have carried out several activities that show deferential learning, including the learning process carried out by teachers who have introduced numerical literacy methods for mathematics learning. This can be seen when the teacher presents a problem that can activate numerical literacy in the student activity sheet and gets an enthusiastic response from students by doing the assignment well. Learning has also accommodated differences in student character and differences in students' abilities in learning mathematics, this can be seen when teachers conduct assessments with standards that are adjusted to the methods used by students in

completing projects and teachers provide with different standards. With the differentiated process carried out by teachers, it is hoped that learning will provide more opportunities for students to be able to solve problems according to their numerical literacy skills, it is also hoped that students will be more accustomed to doing mathematical problems that are relevant to daily life. However, there are still several things that teachers need to pay attention to in the learning process, namely teachers still have to create a fun learning atmosphere. It should also be noted that teachers conduct a mapping of student interests which is the basis for providing differentiated learning, this mapping can be done by interviewing and or filling out questionnaires. By mapping student interests, teachers will be more precise in choosing teaching methods so that the learning process can run well.

To ensure the observation of the implementation of dereferential learning, an interatereliability calculation was carried out which obtained a result of 0.90, meaning that there was an agreement of 3 assessors or observers who were very good. This is based on the interpretation of Kapa's grades according to Altman 1991.

Symmetric Measures

Rater3			Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
.00	Measure of Agreement	Kappa	.000[c]	.000	.	
	N of Valid Cases		3			
1.00	Measure of Agreement	Kappa	.111	.120	.717	.473
	N of Valid Cases		6			
2.00	Measure of Agreement	Kappa	-.059	.044	-.343	.732
	N of Valid Cases		18			
Total	Measure of Agreement	Kappa	.090	.144	.786	.432
	N of Valid Cases		27			

Kappa calculation result 0.90

The value of Cohen's Kappa coefficient can be interpreted (Altman, 1991):

Nilai *K*	Keeratan Kesepakatan (Strength of agreement)
< 0.20	Rendah (Poor)
0.21 - 0.40	Lumayan (Fair)
0.41 - 0.60	Cukup (Moderate)
0.61 - 0.80	Kuat (Good)
0.81 - 1.00	Sangat Kuat (Very good)

Students' Mathematical Literacy Ability

A test has been held to determine the mathematical literacy ability of 40 grade XII students of MIPA. The test consists of 3 questions quoted from the AKM question set and consists of geometry and measurement questions, algebra, and data and uncertainty. Student answer data was grouped based on similar methods of work and the results were obtained that students were categorized in several levels, namely level 1 to level 4.

Result

Try Out Kemampuan Literasi Matematis

Petunjuk: Kerjakan soal-soal di bawah ini dengan cara yang rinci yang kalian ketahui.

A. Geometri dan Pengukuran

1. Perhatikan gambar berikut:

Badan Geologi, Kementerian ESDM dan Mitigasi Bencana Geologi Sumatra Utara sedang mengamati ketinggian letusan awan panas gunung Sinabung pada hari tersebut. Puncak gunung terlihat pada sudut elevasi 30° sedangkan puncak letusan awan panas terlihat pada sudut elevasi 60°.

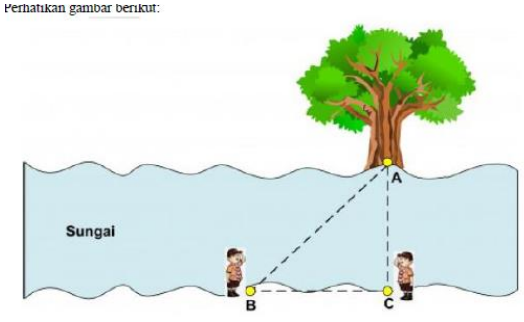
Diketahui tinggi gunung Sinabung adalah 2.460 meter dan terjadi kesalahan dalam mengukur sudut elevasi. Besar sudut elevasi untuk melihat tinggi erupsi seharusnya adalah 50o. Akibat kesalahan ini, maka tinggi erupsi gunung sebenarnya lebih tinggi atau rendahkah bila dibandingkan dengan tinggi erupsi yang didapatkan dari sudut elevasi semula? Beri alasannya!

"The Geological Agency, Ministry of Energy and Mineral Resources and Geological Disaster Mitigation of North Sumatra are observing the height of the eruption of Mount Sinabung hot clouds on that day. The peak of the mountain is seen at an elevation angle of 300 while the peak of a hot cloud eruption is seen at an elevation angle of 600. It is known that the height of Mount

Sinabung is 2,460 meters and there is an error in measuring the elevation angle. The large elevation angle to see the height of the eruption should be 500. As a result of this error, is the height of the eruption of the mountain actually higher or lower when compared to the height of the eruption of the mountain obtained from the angle of original elevation? Give me a reason!"

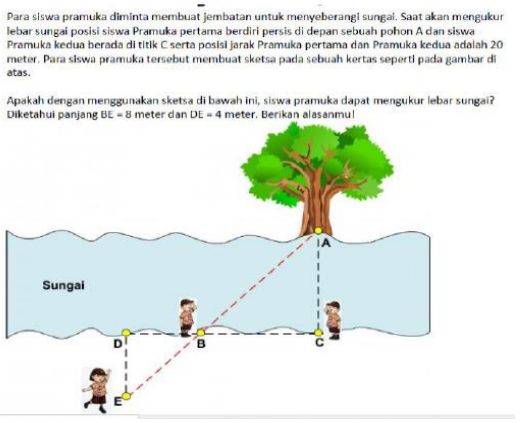
This problem is a level 2 problem because to solve it, students are required to extract relevant quantitative information, and be able to interpret simple quantitative models (such as proportional relationships) and apply them using basic arithmetic calculations. Students must understand the chronology of this problem. This problem can be solved using observation or by calculating trigonometric comparisons. In its operation, a calculator can be used to calculate the trigonometric ratio of the desired angle.

The second question is about geometry and measurement.



The scout students were asked to make a bridge to cross the river. When measuring the width of the river, the position of the first scout student standing right in front of a tree A and the second scout student is at point C and the position of the first and second distance is 20 meters. The scout students made a sketch on a piece of paper as shown in the picture above.

Is it possible to measure the width of the river by using the sketch below? It is known that the length of BE=8 meters and DE=4 meters. Give your reason!



The third question is about Algebra.

"Mrs. Siti received an assignment from the school to prepare a gift package for her students who excelled at her school. Mrs. Siti wanted to buy stationery as a gift. The stationery you want to buy is in the form of notebooks, ballpoint pens, and erasers. On every purchase of stationery, the buyer is subject to a tax of 10%. In relation to this task, Mrs. Siti saw several packages of stationery sold at the Rejeki store and the Makmur store as shown in the following picture.

Mrs. Siti made 5 gift packages with each gift package containing at least a variety of stationery. The five packages to be made, the contents do not have to be the same. If Mrs. Siti has funds of Rp 125,000.00 and wants each gift package to have an eraser and a ballpoint pen, then the package that can be purchased is...."

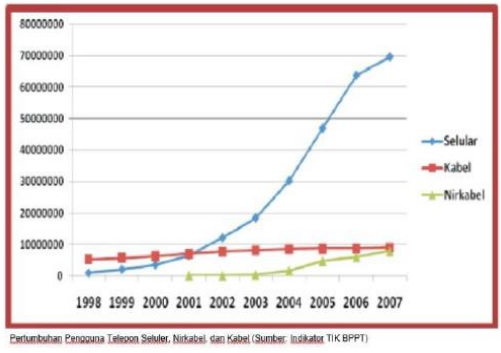
This question is a level 2 question, because in solving it students are required to analyze the questions and do simple calculations according to the logic used to solve the problem.

The fourth question is about data and uncertainty.

Analyze the case below:

The communication system in Indonesia is divided into fixed networks (wired and wireless) and mobile networks (cellular). In its development, there has been a shift in the telecommunications sector in Indonesia. Initially, the people of Indonesia used a cable-based telecommunication network. However, high mobility and the need for fast and accurate access to information have shifted the choice of telecommunication modes used by the people of Indonesia.

From 2007, many mobile phone users f(x) (in millions) can be modeled by the equation f(x)=1.3x2+1.6x+3.7 with x=0 representing the year 2000. The following graph shows the growth of mobile, wireless and cable phone users in Indonesia (in the nearest tens of millions rounded).



Pertumbuhan Pengguna Telepon Seluler, Nirkabel, dan Kabel (Sumber: Indikator TIK BPPT)

Many mobile phone users in Indonesia will reach 78.6 million by 2022...."The following are some of the answers of students who are included in levels 1 to 4.

1. Mathematical Literacy Skills in Geometry and Measurement Level 2 Problems

There were 87.5% of students at level 2 who answered geometry and measurement questions. At level 2, students are expected to be able to interpret, recognize situations, and use formulas in solving problems.

The following is a sample of students' answers at level 2

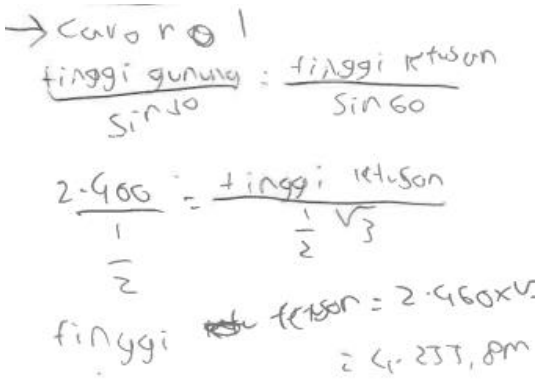


Figure 3.1 Sample of student work of level 2 geometry and measurement

Based on the sample answer above, it can be seen that students can answer questions, but the answers are wrong. This is because students compare the height of the mountain with an angular sine value of 300 and equate it with the comparison of the height of the eruption with an angular sine value of 600. This indicates that the student does not understand the question that there was an error in measuring the angle from 600 to 500. In addition, students also involved a comparison of sinus trigonometry even though the inclined side from the calculation position to the tip of the eruption and to the top of the mountain is unknown. From this, it can be concluded that students do not understand the use of sinuses, so students.

Figure 3.2 Sample of student work level 2 geometry and measurement

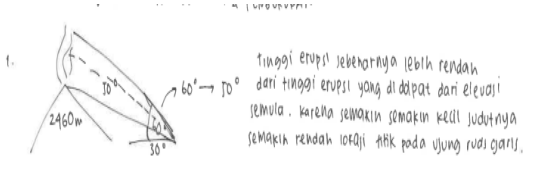


Figure 3.3 Sample of student work of level 2 geometry and measurement

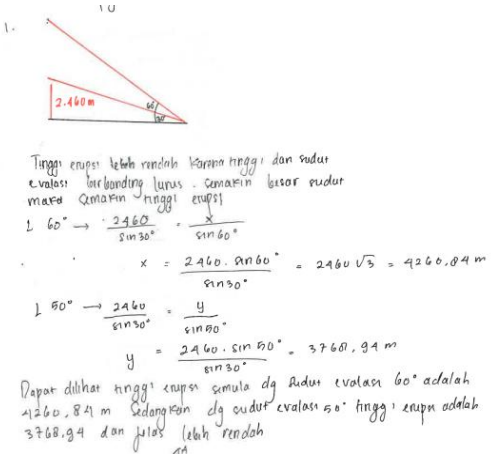


Figure 3.4 Sample of student work of level 2 geometry and measurement

Based on the sample answers in figures 3.2 and 3.3, it can be seen that students can answer the questions correctly by analyzing from the big angles. The student saw that the position was looking at the peak of the eruption with an elevation angle of 600. will be higher if the observer makes a high observation of the eruption with an angle of 500. This means that students understand that the angle of 500 is more sloping when compared to the angle of 600. When compared to indicators of mathematical literacy ability, students can extract relevant quantitative information, and can interpret simple quantitative models (such as proportional relationships).

In sample 3.4, it can be seen that students can conclude that the height of the eruption is lower when the observation uses an elevation angle of 500, but in the analysis the students are still wrong because they compare the height of the mountain and the height of the eruption with the sine of the observation angle. Even so, the calculation of the mathematical operations carried out is correct. The thing that distinguishes answer 3.4 from answer 3.2 is that student 3.2 did not analyze the calculation of the height of the new eruption, so it can be said that the level of analysis of student 3.2 is not as deep as student 3.4.

2. Mathematical Literacy Skills in Geometry and Measurement Problems Level 3

There are 5% of students who are at level 3 in doing geometry and measurement. The following is a sample of student answers at level 3

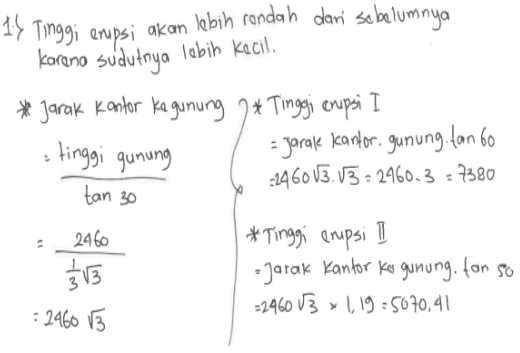
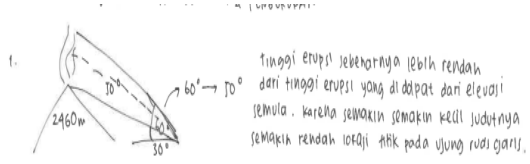


Figure 3.6 Sample of geometry and measurement level 3 student work



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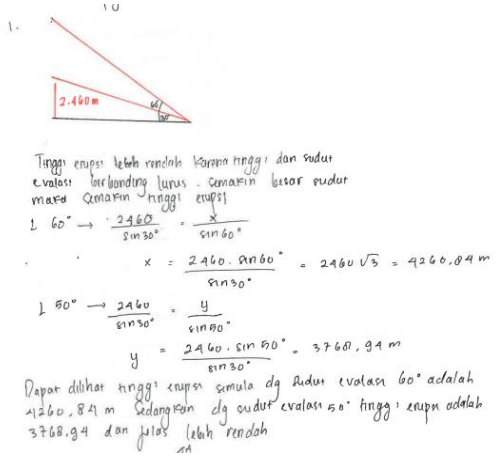

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Based on the sample answers in figures 3.2 and 3.3, it can be seen that students can answer the questions correctly by analyzing from the big angles. The student saw that the position was looking at the peak of the eruption with an elevation angle of 600. will be higher if the observer makes a high observation of the eruption with an angle of 500. This means that students understand that the angle of 500 is more sloping when compared to the angle of 600. When compared to indicators of mathematical literacy ability, students can extract relevant quantitative information, and can interpret simple quantitative models (such as proportional relationships).

In sample 3.4, it can be seen that students can conclude that the height of the eruption is lower when the observation uses an elevation angle of 500, but in the analysis the students are still wrong because they compare the height of the mountain and the height of the eruption with the sine of the observation angle. Even so, the calculation of the mathematical operations carried out is correct. The thing that distinguishes answer 3.4 from answer 3.2 is that student 3.2 did not analyze the calculation of the height of the new eruption, so it can be said that the level of analysis of student 3.2 is not as deep as student 3.4.

2. Mathematical Literacy Skills in Geometry and Measurement Problems Level 3

There are 5% of students who are at level 3 in doing geometry and measurement. The following is a sample of student answers at level 3.

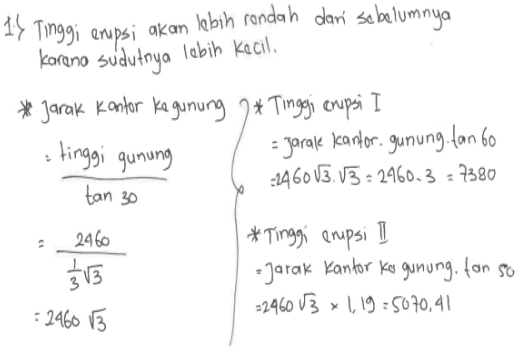


Figure 3.6 Sample of geometry and measurement level 3 student work

In the student's answer 3.5 above, it can be seen that the student compares the angular tangent of 500 with the angular tangent of 600 and gets that the value of tan 500 is less than the value of tan 500. So it can be seen here that students calculate the tangent value and connect the results of the calculation so that students can conclude that if the value of tan 500 is less than the value of tan 500, then the height of the eruption after the recalculation is lower than the calculation of the height of the previous eruption. The student has appropriately used the tangentian comparison. This is because what will be seen is the height of the eruption compared to the distance of the observer from the base of the summit point (drawn straight). Students can perform accurate and more complex calculations, meaning that even though students can answer that the height of the eruption is lower than the initial measurement, students still try to analyze it with more complex calculations so that students can be categorized as having level 3 mathematical literacy skills.

3. Mathematical Literacy Skills in Geometry and Measurement Problems of the Second Type Level 1

There are 2.5% of students who have mathematical literacy skills at level 1. Here is a sample.

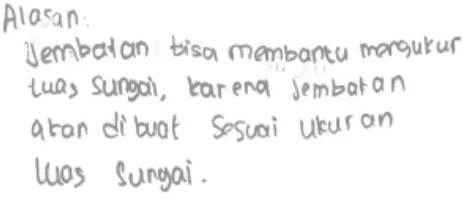


Figure 3.7 Sample of student work level 1 geometry and measurement

In the answer above, students answered the question that bridges can help determine the width of the river while what was asked was whether the sketch could be used to calculate the width of the river. This indicates that the student does not understand the problem well and the student also does not do calculations to sharpen the analysis of problem solving.

4. Mathematical Literacy Skills in Geometry and Measurement Problems of the Second Type Level 2

There are 97.5% of students who have level 2 mathematical literacy skills in geometry and type 2 measurement problems. The following is a sample of student answers from the second question:

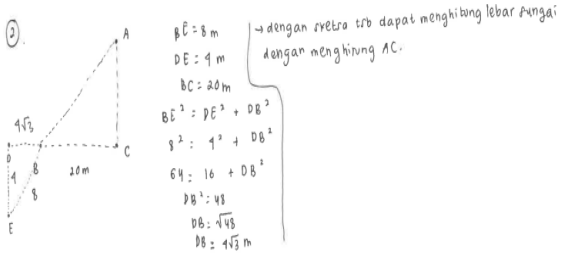


Figure 3.9 Sample of student work of level 2 geometry and measurement

In the work of the students above, students first find the length of BD using the Pythagorean theorem. Furthermore, students immediately concluded that this way can be used to calculate the width of the river. From the student's work, it can be said that the student has not been able to

answer the question because there is no further explanation of what the length of the BD should be used to calculate the width of the river.

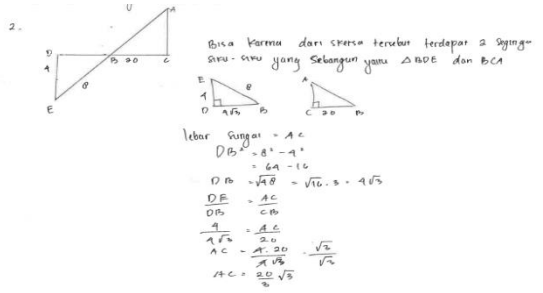


Figure 3.10 Sample of level 2 student work geometry and measurement

In the student's work above, it can be seen that the student answered that the sketch can be used to measure the width of the river. Just like student 3.9, students find the length of BD using the Pythagorean theorem, then students find the length of AC using comparison. Students write that DE is comparable to AC and BD is comparable to BC, but this is still not right because DE is not necessarily proportional to AC, it can be DE is comparable to BC, not necessarily BD is comparable to BC, it can be BD is comparable to AC. So it can be said that students have not solved this problem accurately and students are categorized as having level 2 mathematical literacy skills.

5. Mathematical Literacy Skills in Algebra Level 1 Problems

There are 5% of students who have level 1 mathematical literacy skills. The following are some sample student answers.

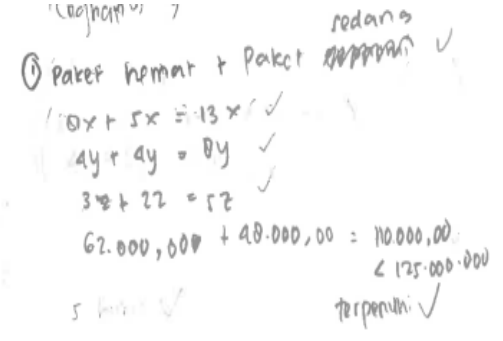


Figure 3.11 Sample of algebra level 1 student work

In the student worksheet above, it can be seen that students solve problems using 3-variable linear equations, but only to model. Here it is not known what the x and y variables represent. It

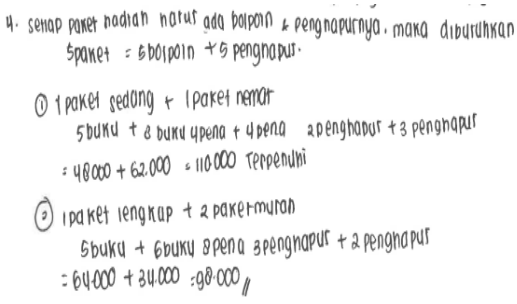
can be concluded that students do not understand the problem.

Figure 3.12 Sample of algebra level 1 student work

On the student sheet above, it can be seen that students register the contents of each package and add up the overall price. Students do not understand the problem and cannot formulate a solution.

6. Mathematical Literacy Skills in Algebra Level 2 Problems

There are 80% of students who have level 2 mathematical literacy skills in working on algebra problems. In question number 2, students are required to observe the contents of stationery in each package and take into account the price of the package so that it is in accordance with the money owned by Mrs. Siti. The following is a sample of students' work in solving algebra problems.


4. Setiap paket hadiah harus ada bolpoin & penghapusnya, maka dibutuhkan
5paket = 5bolpoin + 5 penghapus.

① 1 paket sedang + 1 paket hemat
5buku + 8 buku 4pena + 4pena 2penghapus + 3 penghapus
= 48.000 + 62.000 = 110.000 terpenuhi

② 1 paket lengkap + 2 paket murah
5buku + 6buku 8pena 3penghapus + 2 penghapus
= 64.000 + 34.000 = 98.000 //

In the student worksheet above, it can be seen that the students have understood the problem, but in solving there is a student's inaccuracy that in the problem, the number of erasers and ballpoint pens does not have to be the same. In the work, students write 5 packages = 5 ballpoint pens and erasers. There is a contradiction in the information contained in the questions and answers of the students. Even so, students can write down the possibilities of the package

requested even though not all of them are written. Therefore, students are categorized as having mathematical literacy skills at level 2 because students understand the context of the question and answer correctly even though the student's answers are not accurate.

7. Mathematical Literacy Skills in Algebra Level 3 Problems

There are 5% of students who have mathematical literacy skills at level 3. The sample of the student's work is as follows.

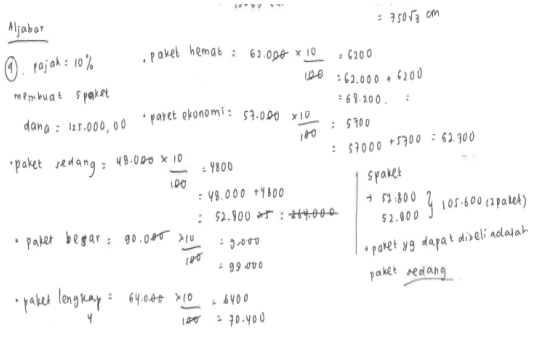


Figure 3.14 Sample work of algebra level 2 students

8. Mathematical Literacy Skills in Data Problems and Uncertainty Level 2

There are 87.5% of students who have level 3 mathematical literacy skills in working on data and uncertainty problems. The following is a sample of student answers.

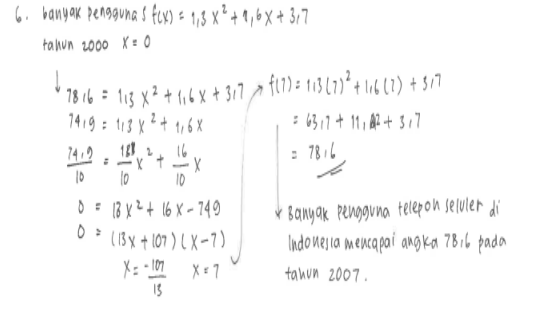


Figure 3.15 Sample of level 2 student work data and uncertainty

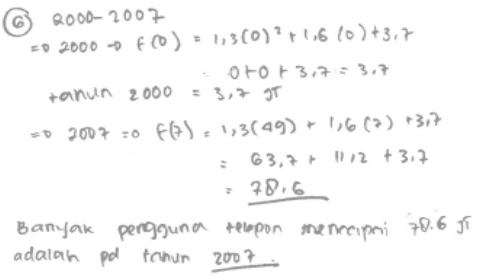


Figure 3.16 Sample of level 2 student work data and uncertainty

4. Conclusion

Based on the student's ability profile, it was found that the implementation of differentiated learning was 82 percent and the most prominent thing is that the teacher has raised an example of a problem that can trigger students' numeracy literacy and has been presented in the student activity sheet. Differentiated learning is done well so that students become interested in participating in mathematics learning which has been considered a difficult and uninteresting subject. By giving questions related to daily life and work that gives freedom to students, students are enthusiastic and dare to develop numerical leterization skills without being limited by methods and ways of working that have been considered the only way to solve problems. With federated learning, students are increasingly developing in mathematical reasoning and becoming more daring to express their opinions according to their abilities.

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