Jpm Artikel

Ayu Faradillah

Quick Submit

Quick Submit

Universitas Muhammadiyah Prof. Dr. Hamka

Document Details

Submission ID
trn:oid:::1:2983083536

Submission Date
Aug 14, 2024, 9:20 AM GMT+7

Download Date
Aug 14, 2024, 9:22 AM GMT+7

File Name
Finale_JPM_Article.docx

File Size
2.6 MB

14 Pages

4,038 Words

21,866 Characters

11% Overall Similarity

The combined total of all matches, including overlapping sources, for each database.

Match Groups

31 Not Cited or Quoted 7%
Matches with neither in-text citation nor quotation marks

10 Missing Quotations 4%
Matches that are still very similar to source material

0 Missing Citation 0%
Matches that have quotation marks, but no in-text citation

0 Cited and Quoted 0%
Matches with in-text citation present, but no quotation marks

Top Sources

6% Internet sources
8% Publications
1% Submitted works (Student Papers)

Integrity Flags

0 Integrity Flags for Review

No suspicious text manipulations found.

Our system's algorithms look deeply at a document for any inconsistencies that would set it apart from a normal submission. If we notice something strange, we flag it for you to review.

A Flag is not necessarily an indicator of a problem. However, we'd recommend you focus your attention there for further review.

Match Groups

31 Not Cited or Quoted 7%
Matches with neither in-text citation nor quotation marks

10 Missing Quotations 4%
Matches that are still very similar to source material

0 Missing Citation 0%
Matches that have quotation marks, but no in-text citation

0 Cited and Quoted 0%
Matches with in-text citation present, but no quotation marks

Top Sources

6% Internet sources
8% Publications
1% Submitted works (Student Papers)

Top Sources

The sources with the highest number of matches within the submission. Overlapping sources will not be displayed.

1 Internet
jpm.ejournal.unsri.ac.id 2%

2 Publication
Axl Ferrari Fatahillah, Ayu Faradillah. "Project-based learning assisted augmente... 2%

3 Internet
e-journal.hamzanwadi.ac.id 2%

4 Publication
Kamid Kamid, M. Rusdi, Olva Fitaloka, Fibrika Rahmat Basuki, Khairul Anwar. "Ma... 2%

5 Student papers
Universitas Siswa Bangsa Internasional 1%

6 Internet
ijirset.com 0%

7 Publication
Zakia Yolanda, Murni Ramli, Dewi Puspita Sari. "Card game “RECAME” to improve ... 0%

8 Internet
journal.unnes.ac.id 0%

Jurnal Pendidikan Matematika
https://doi.org/10.22342/jpm.v18i3.pp313-328

Mathematical Understanding Concepts Ability in QR Code-Assisted Problem Solving by Gender

Ayu Faradillah, Putri Awalia Rizkia

Department of Mathematics Education, Prof. Dr. Hamka Muhammadiyah University, Jakarta, Indonesia
Email: ayufaradillah@uhamka.ac.id

Abstract

Students must be able to develop an accurate understanding of mathematical concepts since it is essential for them to understand the concepts related to their studies. The purpose of this study is to analyze the ability of students' conceptual understanding assisted by QR codes in solving mathematical problems based on gender. This study is a qualitative research project with a descriptive approach. The data collection techniques used in this study include tests, interviews, and documentation The subjects of this research were one male and one female students in one of the public high schools in Jakarta. The research findings indicate that both male and female students perform equally well in the indicators of restating concepts and providing examples and non-examples of the material taught. Subsequently, the male student is great in presenting concepts related to the learned material through mathematical representations. On the other hand, the female student is great in applying concepts logically. However, both male and female students still exhibit deficiencies in their ability to classify objects based on the concepts that have been taught.

Keywords: Gender, Mathematical Understanding Concepts, Problem Solving, QR codes

How to Cite: Faradillah, A., & Rizkia, P. A. (2024). Mathematical Understanding Concepts Ability in QR Code-Assisted Problem Solving by Gender. *Jurnal Pendidikan Matematika*, *18*(3), 313-328. https://doi.org/10.22342/jpm.v18i3.pp313-328

INTRODUCTION

Mathematical understanding involves the knowledge, comprehension, and graps of both the meaning and connotations of mathematical concepts. This ability to understand mathematics is vital and povital in the learning process of the subject (Hartati et al., 2017). Gaining mathematical understanding is essential and fundamental to the process of learning mathematics (Yang et al., 2021). In addition, mathematical understanding encompasses critical knowledge and content that enables students to effectively address mathematical problems encountered during learning (Hernández et al., 2020).

Students' difficulties in understanding concepts and lack of sound reasoning when tackling given problems indicate underlying factors that impede their ability to solve mathematical problems (Pongsakdi et al., 2020; Tsany et al., 2020). This demonstrates that their comprehension of mathematical concepts remains inadequste (Ismail, 2020). The subject of mathematics is perceived as unenjoyable by some individuals due to its inherent difficulty and lack of engaging conditions. Although teachers try to make students understand the concept of mathematics, their efforts fail easily (Papadakis & Kalogiannakis, 2017).

Based on the previously stated explanation, the use of interesting and interactive learning media can foster students' interest and motivation in studying and understanding mathematical concepts (Pongsakdi et al., 2020). One way to increase students' enthusiasm and motivation in understanding mathematical concepts is smartphones. Smartphones are an effective tool to encourage student

Received May 17, 2023; Revised September 24, 2023; Accepted April 26, 2024

motivation to understand concepts through collaborative learning (Iqbal & Bhatti, 2020). It is difficult to write long characters in a site address because typing errors might exist. The subject can be immediately accessed by using Quick Response codes or usually called QR codes. Students can save time by avoiding typing with QR codes, and they will get it straight the very first time (Widyasari et al., 2019). By using a QR code you can directly connect to a website without entering a web address (Park et al., 2019). This is done by scanning a QR code, which is a kind of two-dimensional barcode on smartphones.

There are three gender gaps in mathematics learning, namely ability, attitude and socialization activities. The development of students' self-concept may be closely related to their parents. Therefore, it is very important that parents influence their children's values, beliefs and behavior, self-concept and interest in mathematics (Mejía-Rodríguez et al., 2021; Rodríguez et al., 2020; Wang, 2020). Gender is also an important factor in mathematics learning. In fact, differences between females and male genders exist through any field. According to previous research, gender differences in math learning depend on the type of task, the student's level of understanding and preparation, as well as the situation the task is being carried out now (Gross, 2014).

Gender stereotypes prevalent in society, such as the belief that men have higher mathematical abilities than women, can pose a significant challenge to female students. However, according to Leder and Forgasz's findings, the potential for both genders to excel in various mathematical elements is contingent upon the specific domain of mathematics content being evaluated, as well as the assessment tool employed (Leder & Forgasz, 2018). The study indicated that gender differences did not have any influence on the attitudes towards mathematics. The 2022 PISA survey found that girls performed much better than boys in the ability to understand mathematical concepts (OECD, 2023).

Several studies have been conducted regarding mathematical understanding concepts, QR code and gender. First, Kamid et.al (2020) have conducted research on differences in mathematical communication based on cognitive style and gender, the results showed that there were significant differences in cognitive style but not very significant gender differences in mathematical communication abilities. Male students were able to explain problem solving strategies quite clearly but were less structured. Meanwhile, women explained strategies and steps to solve problems in detail and in a structured manner. Second, another study discussed the theme of mathematical concept with GeoGebra among initial teacher education, the use of technology provides special experiences in learning mathematics in three approaches, namely dynamic, numerical and algebra. Technology in the form of GeoGebra makes it easier for subjects to understand and solve mathematical problems (Hernández et al., 2020). Third, another research project (Widyasari et al., 2019) utilized QR code technology in the learning process has been found to be beneficial for educators as it facilitates access to math games, thereby enhancing children's motivation to learn mathematics. The utilization of the math game as an educational tool is advantageous for students as it provides them with the flexibility to access it at any time and from any location, thereby potentially enhancing their academic

performance.

Meanwhile, previous research used QR code technology to motivate students to learn mathematics. Apart from that, other research also analyzed students' mathematical understanding abilities by looking at gender differences without using QR technology. This research shows the importance of analyzing the ability to understand technology-based mathematical concepts based on gender differences. Thus, this research aims to analyze the comparison of students' mathematical understanding abilities based on QR codes in terms of students' gender.

METHODS

The method used in this research is the descriptive qualitative approach. Qualitative research methods are conducted in real-world settings, thus classifying this approach as a naturalistic research method (Aspers & Corte, 2019).

This research was conducted in 10th grade students of one of public senior high schools in Jakarta. The subjects were chosen through purposive sampling, where subjects determination is based on recommendations from teachers that have equivalent communication and mathematics skills. Hence, the chosen subjects consisted of one male student and one female student. The research instrument was in the form of a description test with a total of five questions which contained indicators of the ability to understand conceptual mathematics. Descriptions related to indicators of mathematics understanding concept's ability are tabulated in Table 1.

Table 1. The Description of indicators' mathematics understanding concepts

No	Indicator	Description
1	Restating a concept in writing	Ability to describes the concept according to the object
2	Classifying Objects According to Certain Properties Based on the Concept	Ability to analyze objects based on categories, properties, and concepts
3	Applying the concept logically	Ability to identify mathematical operations according to concepts
4	Providing examples and non-examples of a concept they have learned	Ability to present other examples according to the concepts that have been studied
5	Presenting concepts in the form of mathematical representation	Ability to present solutions using other concepts

The research instrument employed was in the form of a description test with a total of five questions containing the indicators of the ability to understand conceptual mathematics and was supported by interview results. The test in this study used mathematical understanding conceptual assisted by QR code, where the validity and reliability of the previously mentioned has been tested through validation. The validation of the test was conducted through content validity by expert

specialists in education, including a lecturer and a mathematics teacher. The result of this validation was changing the words used in the questions to make them easier to understand for the upper high school students.

In the content validation process, there were four classes of 10th grade students with a total of 140 students. Validity and reliability test was done using the Winstep software version 3.73. It is seen based on the MNSQ, ZTSD, and PT-MEASURE CORR values which are displayed in Figure 1.

ENTRY NUMBER	TOTAL SCORE	TOTAL COUNT	MEASURE	MODEL S.E.	INFIT MNSQ	INFIT ZSTD	OUTFIT MNSQ	OUTFIT ZSTD	PT-MEASURE CORR.	PT-MEASURE EXP.	EXACT MATCH OBS%	EXACT MATCH EXP%	Item
1	246	86	-.07	.15	.78	-1.5	.82	-1.1	.76	.71	51.9	51.2	a1
2	297	86	-1.38	.18	1.03	.2	.85	-.4	.59	.61	64.2	64.9	a2
3	244	86	-.03	.15	.90	-.7	.84	-1.0	.76	.71	51.9	51.0	a3
4	206	86	.78	.14	1.34	2.1	1.27	1.7	.68	.74	34.6	48.4	a4
5	210	86	.70	.14	.99	.0	1.06	.5	.72	.74	48.1	46.9	a5
MEAN	240.6	86.0	.00	.15	1.01	.0	.97	-.1			50.1	52.5	
S.D.	32.7	.0	.77	.01	.19	1.2	.18	1.0			9.5	6.4	

Figure 1. Validity of the question test

Figure 1 above shows that all items are declared valid because they have fulfilled the 2 suggested criteria, which is Outfit Mean Square (MNSQ) is about 0.5 < MNSQ < 1.5; Outfit Z-Standard (ZSTD) -2.0 < ZSTD < +2.0; Point Measure Correlation (Pt Measure Corr) 0.4 < Pt Measure Corr < 0.85 (Sakakibara et al., 2018). The test of mathematical understanding conceptual consists of five indicators including (1) restating the concepts in writing; (2) classifying objects according to certain properties based on the concept; (3) applying the concepts logically; (4) providing examples and non-examples of the concepts they have learned; and (5) able to present concept in the form of mathematical representation (Rohaeti et al., 2023). In this case, the test was assisted with QR codes. The Cronbach alpha coefficient for the final scale derived from the test is 0.76, as illustrated in Figure 2.

	TOTAL SCORE	COUNT	MEASURE	MODEL ERROR	INFIT MNSQ	INFIT ZSTD	OUTFIT MNSQ	OUTFIT ZSTD
MEAN	14.0	5.0	1.62	.69				
S.D.	3.7	.0	1.46	.29				
MAX.	20.0	5.0	4.88	1.80				
MIN.	5.0	5.0	-1.73	.57	.07	-2.5	.08	-2.4
REAL RMSE	.79	TRUE SD	1.23	SEPARATION	1.55	Person RELIABILITY	.71	
MODEL RMSE	.75	TRUE SD	1.25	SEPARATION	1.66	Person RELIABILITY	.73	
S.E. OF Person MEAN = .16								

Person RAW SCORE-TO-MEASURE CORRELATION = .98
CRONBACH ALPHA (KR-20) Person RAW SCORE "TEST" RELIABILITY = .76

Figure 2. Reliability of the question test

Based on Figure 2, KR-20 value obtained is 0.76 and categorized as high, in which when the Cronbach's Alpha value is above 0.50, the instrument is considered reliable (Faradillah & Febriani, 2021). The selected participants went through a test to evaluate their ability to understand mathematical concepts. The instrument used for the study included a set of five trigonometric questions that went through expert validation and was determined suitable for use. After taking the understanding concept ability test, the researcher interviewed the students. The purpose of the interview is to determine the students understanding concept ability, which consists of 5 indicators. Researchers did not ask identical questions for each subject; rather, the questions depend on the quantity of information required. Two students from a public high school were purposely selected according to their last results of students' test scores in X grade on mathematics and were interviewed by the researchers. The results of student work were analyzed based on gender, reflected by female students (FS) and male students (MS).

RESULTS AND DISCUSSION

The researchers then analyzed the students' understanding of conceptual ability assisted with QR codes. The QR codes require a smartphone camera to scan a barcode which will show the image on the screen of the students' smartphone. Question numbers three and five are the example of the application of QR code technology (See Figure 3). The results are written based on each indicator.

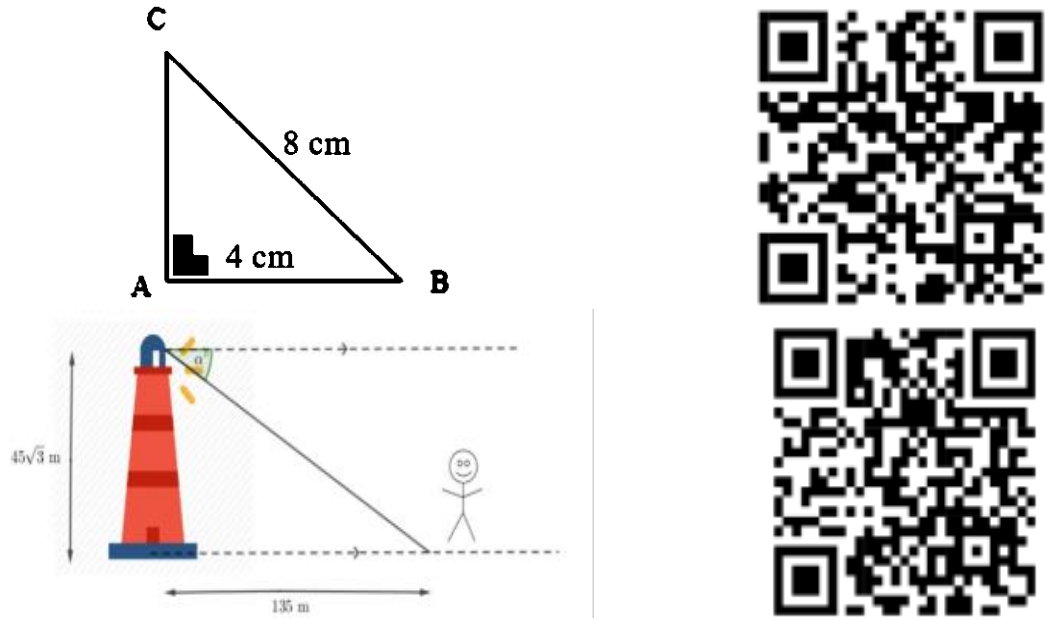


Figure 3. Questions given to students with QR codes

1st Indicator: Restate a Concept in Writing

Students were supposed to show their understanding of the topic at issue by restating a significant concept. FS claimed to be familiar with the format of the test questions and able to paraphrase the concepts in her own words.

Jurnal Pendidikan Matematika, Volume 18, No. 3, September 2024, pp. 313-328

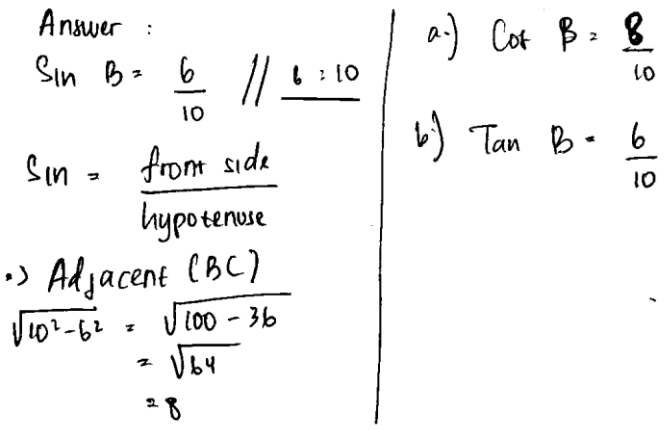


Figure 4. Results of FS's answer writing the concept of Trigonometry

Interviewer : *Please explain your understanding for question number 1*
FS : *So, for question number 1 is a right triangle with sides AB = 6, BC = 10, and AC = unknown. Then, the question concerns the idea of comparing trigonometric functions. Here, we shall search for Sin B, which is* $\frac{6}{10} = 6:10$. *A frontal or oblique Sin B. Therefore, the answer is 8 when the Phytagorean theorem is applied to the other side using the root formula* $\sqrt{(10^2 - 6^2) = 64} = 8$. *Simply substitute the* $\frac{8}{10}$ *Cos B value with the* $\frac{6}{10}$ *tan B value. I made a typo in B. It should read Tan not Cos.*

Based on the findings of the FS answer sheets and supported by the outcomes of the interviews (See Figure 4), it can be posited that FS has not satisfactorily fulfilled the criteria for restating concept in their own language, as they have failed to explicate the concept of the Pythagorean triangle that was assessed in the questions, instead solely concentrating on rote memorization of formulas. Then, similar answers were also given by the MS who also excel in expressing concepts. MS claimed to have a complete understanding of the problem's structure and was able to articulate the central idea in his own words.

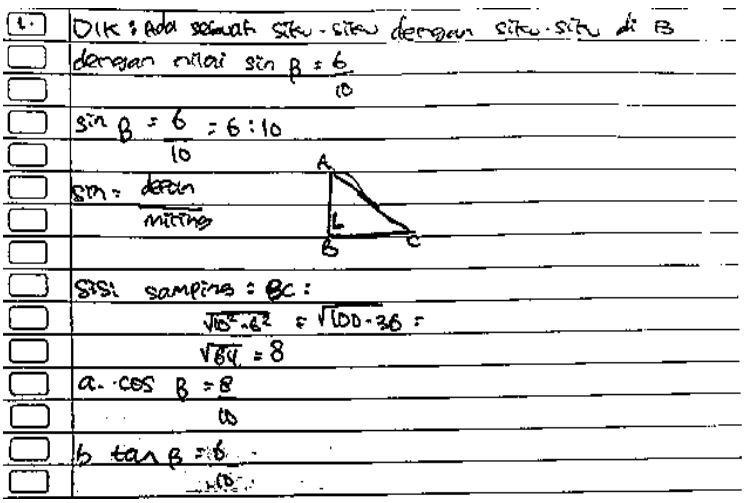


Figure 5. Results of MS's answer writing the concept of Trigonometry

Interviewer : *How can you solve problem number 1? Explain it.*
MS : *To avoid getting lost when determining the trigonometry location, I first write down what I already know. Specifically, the Sin B value is 6/10. Then, I may apply the standard Sin formula (forward/slanted). I can calculate Cos from the BC length, but I did not remember to look up Tan.*

According to the findings based on answers and interviews (See Figure 5), MS exhibit greater abilities in restating a concept and providing clear explanations of answers compared to their male counterparts. The indicator pertaining to the restatement of a concept can be deemed as being fulfilled by MS. Consistent with prior research findings, it was observed that female students exhibited higher ability in the sequential and systematic application of the steps, resulting in clear and neat writing with minimal errors attributable to aesthetic considerations (Faradillah et al., 2018).

2nd indicator: Classifying Objects According to Certain Properties Based on the Concept

In this indicator, researchers deployed technology assisted by QR codes to solve questions. According to the interview findings, FS expressed a high level of confidence in comprehending the structure of the questions that were being evaluated.

Interviewer : *What method do you use to solve this problem?*
FS : *The formula instructed in school had been used to determine the values of Sin, Cos, and Tan for the improvement of the village in question. First, the length of AC^2 was determined by employing the Phytagorean theorem and a right triangle ABC was also depicted for this purpose.*
Interviewer : *Are you sure with your answer?*
FS : *At school, we often only go as far as Sin, Cos, Tan, thus I am still looking for the solution to the Cosec value.*

However, FS also added that she did not fully understand the form of the questions because there was a question regarding the cosecant value for which she did not know the formula.

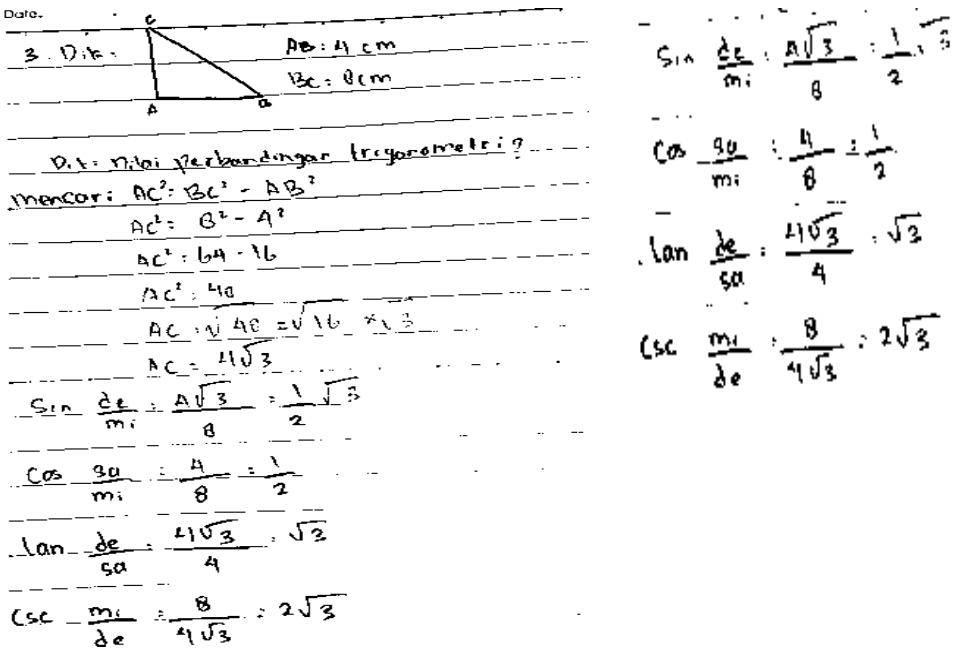


Figure 6. Results of FS's answer classify objects according to the Trigonometry

Based on Figure 6, the results of student's answers are not optimal since there are still students who are not independent in working on the questions; many of these students rely on internet searches to find the answers (Gebeyehu et al., 2021). MS said he did not fully get the format of the questions on this indication, but he did his best to answer them using formula number 1.

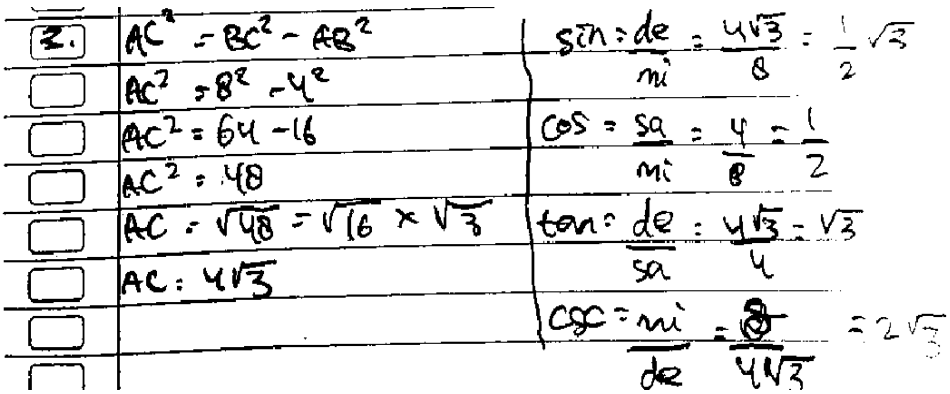


Figure 7. Results of MS's answer classify objects according to the Trigonometry

Interviewer : *What do you recognize to solve this problem?*
MS : *I was confused by this problem, but after giving it some more thought, I realized that its structure was very similar to that of problem 1. To solve this problem, I first applied the Pythagorean theorem to determine the unknown length, and then I used the sin cos tan formula that I had learned at school.*

Figure 7 shows that MS' answer in line with FS, he did not understand the cosecant concept and only memorized the formula taught at school.

Interviewer : *What made you write that solution?*

MS : *Looking back at the notes, I realized that we had briefly covered cosecant in class; yet I still did not really get the concept*

Consistent with prior research, it was observed that a significant number of students were unable to respond to the teacher's inquiry regarding the previously taught material during the preceding session. (Nurhayati & Hartono, 2017).

3rd Indicator: Applying the Concept Logically

FS said that in this problem, it is necessary to illustrate the picture first to be able to understand the form of the question properly.

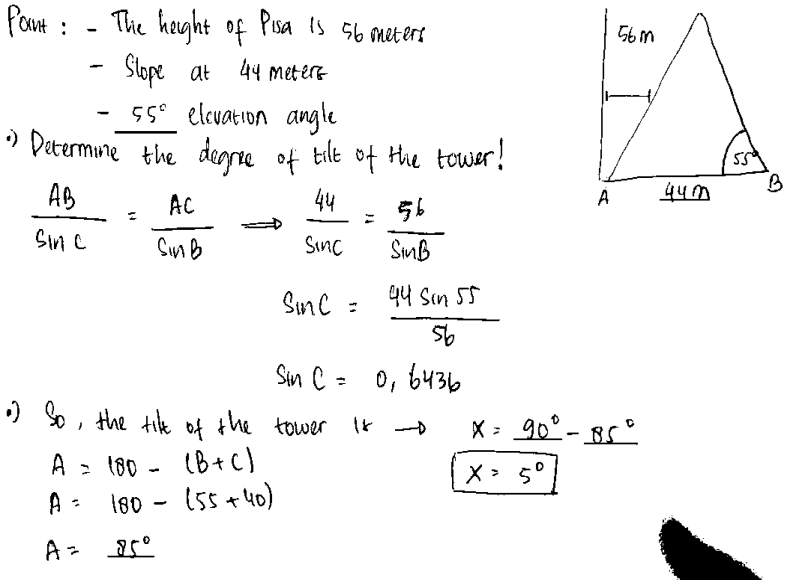


Figure 8. Results of FS's answer apply the concepts logically

Interviewer : *How do you recognize this problem? And explain the solution you wrote.*

FS : *It is stated in the question that 44 meter up from the ground, the Tower of Pisa begins to slope. The value of angle C was then calculated using the Sine rule. After determining the value of Sin C, I can find the value at angle A by substracting 180 from the sum of B and C (the alignment angle) resulting at 85°. Then since 90°-85°=5°. The leaning tower of Pisa leans at an angle to 50.*

FS satisfied the indicators of being able to apply concepts rationally based on the responses written (See Figure 8) and the results of the interviews. FS used visual aids to demonstrate its findings and offers advice on how to approach problems with assurance and order. This lends credence to the findings of prior studies, which found that female students, in comparison to their male counterparts, tend to generate a larger association between grades and achievement (Lim & Chapman, 2013). MS explained in the interview that he could not explain how to answer this question (Figure 9).

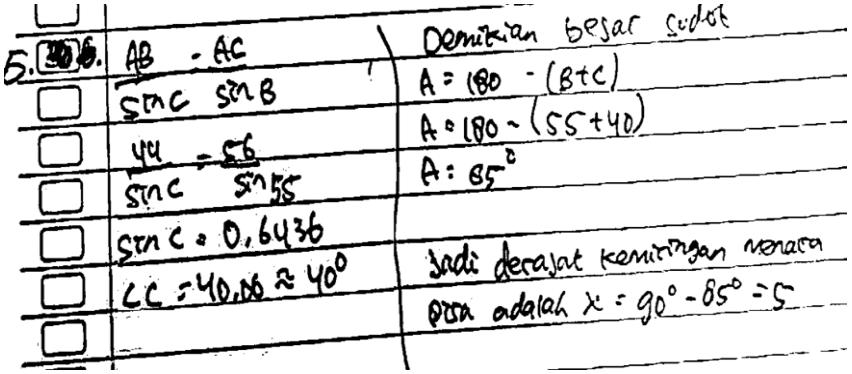


Figure 9. Results of MS's answer apply the concepts logically

Interviewer : *Do you understand the concept to solve this problem?*
MS : *I understand this number quite well, but I'm not sure yet.*
Interviewer : *What makes you not sure?*
MS : *I still do not understand the meaning of elevation angle, so maybe if my teacher explains it again, I will understand.*

MS continued by saying that he had learned certain things at school, but that he had to consult with his buddies to fully comprehend the questions. The answers show that students have a limited capacity to make connections between mathematical concepts and real-world situations (Legesse et al., 2020).

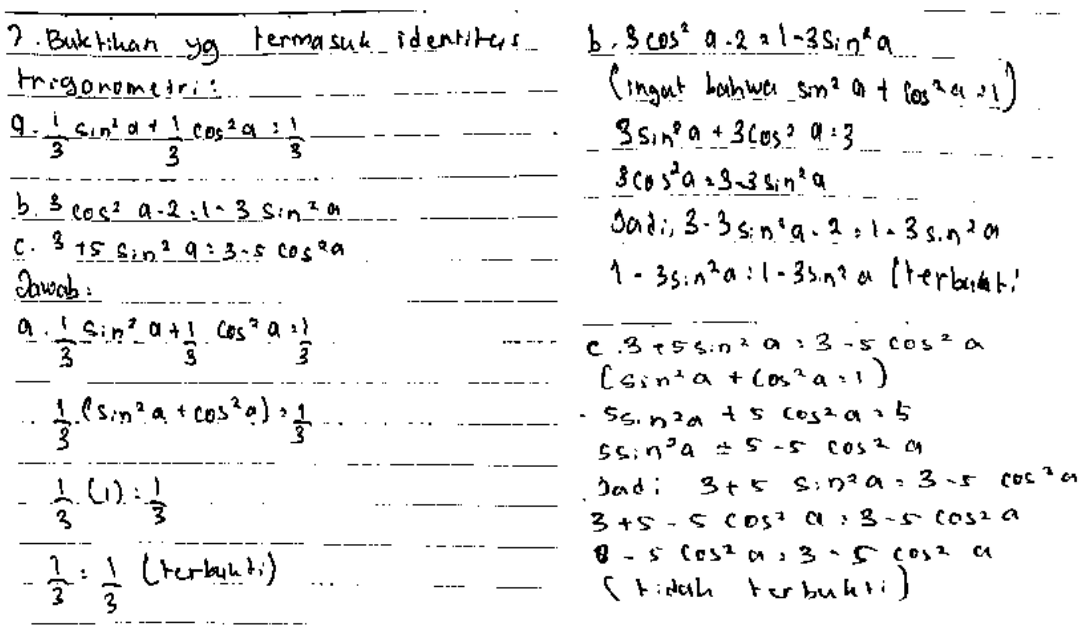
The MS's answer exhibits an interesting characteristic of utilizing non-sequential steps and putting first the final answer over intermediate calculations. This approach results in extraneous markings and a lack of emphasis on aesthetic presentation and problem-solving sequence. The observation aligns with Gallagher's findings that male students possess the capability to accurately solve non-traditional problems by utilizing their logical reasoning and comprehension skills (Gallagher et al., 2000). The findings of this investigation provide evidence that the inclination of MS to fulfill the criteria of employing concepts in a logical manner has an impact on the capacity to comprehend concepts.

4th Indicator: Providing Examples and Non-Examples of a Concept They Have Learned

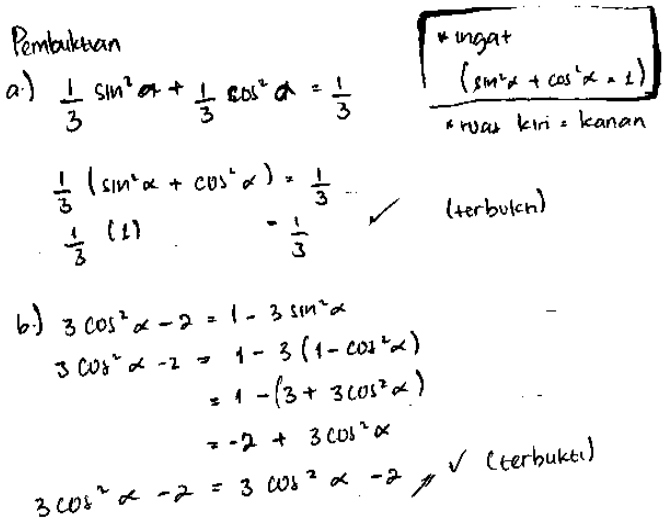
The student taking the FS exam demonstrates a clear and organized approach to answering questions, beginning with responses labeled as a, b, and c.

Interviewer : *How do you prove that this problem is an example of a trigonometric identity?*
FS : *I understand the methodology behind this proof, wherein I manipulated the formula by transposing the left and right sides. This trigonometry identity has been taught at school and it appears to have no alternative solution.*

FS employed the formula for the three trigonometric identities called for in the issue, which is $Sin^2a + Cos^2a = 1$. Answers and findings from interviews with researchers show that FS completed the indicator of providing examples that are concrete rather than only theoretical ones.



FS Student's answer



MS Student's Answer

Figure 10. Results of answers in providing examples and non-examples

In Figure 10, there is a clear distinction between the responses provided by FS and MS. FS responses can fully address questions, whereas MS responses do not possess this capability. MS only fills in points a and b, while point c is empty. This difference was confirmed through interviews with MS students.

Interviewer : *Explain your solution to prove this trigonometric identity.*
MS : *I did not prove it because I do not think it can be proven that point C is a trigonometric identity. Even though I studied trigonometry outside of school (through tutoring), I remember point c in my memory.*

Jurnal Pendidikan Matematika, Volume 18, No. 3, September 2024, pp. 313-328

According to prior studies' findings that students did not fully understand the idea, the latest findings suggested that students only memorized the formulas and lacked exposure to non-standard examples of trigonometric identity questions (Capraro & Joffrion, 2006).

5th Indicator: Presenting Concepts in the Form of Mathematical Representation

As a result of not completing the interview's answer sheet, FS was unable to demonstrate the indicators of being able to present concepts through mathematical representation. The learning environment significantly influences a student's capacity tp grasp new concepts (Hernández et al., 2020). The students' understanding of the concept was closely associated with the context that was involved in the process of learning.

Interviewer	:	*Why do not you write down the answer to this problem? Do not you understand it?*
MS	:	*The depression angle is something I do not understand. I studied this material in school, but I do not know why I had difficulty explaining the problem mathematically. I still do not understand exactly how to describe it.*

FS who holds stronger gender roles and beliefs may perceive themselves as having lower abilities in learning mathematics compared to their male classmates. This perception can lead to increased anxiety when engaging in mathematical tasks, ultimately resulting in lower mathematics achievement (Wen & Dubé, 2022). This is in contrast with MS who carefully followed the instructions and filled out all the answer sheets before conducting interviews to back up her findings.

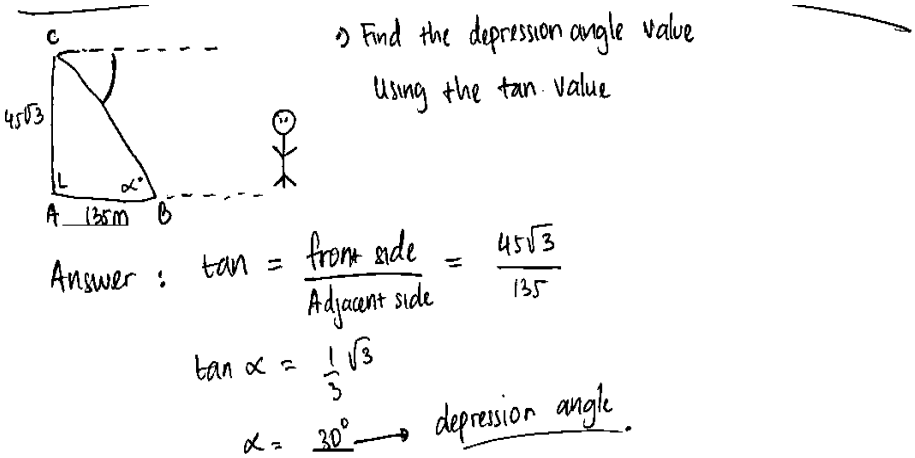


Figure 11. Results of MS's answer give examples and not examples

Based on the results of the answer and interviews (see Figure 11), it can be said that MS meets the indicators of being able to present concepts in the form of mathematical representation.

Interviewer	:	*How do you explain this question?*

MS : *There is a QR code, thus I am curious about the answer to this question. Naturally, I started by scanning the QR barcode, then looked at the image, and finally, I re-drew it on the answer sheet. I begin by calculating the depressive angle using the Tan value. This ends up resulting in a depression angle of 30° as Tan =1/3 √3.*

4 According to Goos et al., (2016), the differences of students' mathematical learning result influenced by gender differences has not been consistent, some studies have shown differences (male are better than female or vice versa) and some do not show differences both. In general, gender differences in mathematical learning achievement depend on the contents of the task, the nature of the assigned knowledge and skills, and the condition when working the task (Kamid et al., 2020).

7 ## CONCLUSION

Based on the results of data analysis of the research, it can be drawn that students' mathematical 1 concepts understanding ability in QR code assisted problem solving by gender are that female student exhibit greater levels of ability in restating a concept compared to their male classmate. Both male and female students show deficiencies in their ability to classify objects according to certain properties based on the concepts. In terms of the application of concepts in a logical manner, female student exhibits a higher level of ability compared to their male classmate. There are uncertainties regarding the ability of male students to successfully complete their education. Both female and male students demonstrate ability in providing examples and non-examples based on the concepts they have learned. They exhibit accuracy in solving questions as indicated by the results of interviews. Furthermore, male student outperforms female student on the final indicators, in which he can present concepts in the form of mathematical representation. This is because female students do not complete out the answer sheet, preventing this indicator from being reached.

ACKNOWLEDGMENTS

Thank you to all subjects and school principals for their willingness to participate and allow researchers to carry out this research. Furthermore, we also thank the expert validators for their assistance in reviewing this instrument.

REFERENCES

***Jurnal Pendidikan Matematika**, Volume 18, No. 3, September 2024, pp. 313-328*