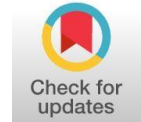


## ***Analysis of Student's Engagement in Mathematics Learning Reviewed From the Level of Mathematical Ability of Class XI High School Students***



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### **Abstrak**

Keterlibatan siswa merupakan salah satu komponen yang penting dan harus diberi perhatian secara khusus sebab dipandang sebagai penangkal rendahnya prestasi, tingkat putus asa, tingkat kebosanan dan ketidaksopanan yang tinggi. Salah satu hal yang mempengaruhi keterlibatan adalah perilaku dan kepribadian siswa. Melalui pembelajaran matematika siswa diharapkan dapat menumbuhkan keaktifan dan keterampilan dalam menerima materi dan menyelesaikan masalah matematika. Tujuan penelitian ini untuk mendeskripsikan analisis *student's engagement* dalam pembelajaran matematika dengan tingkat kemampuan matematika tinggi, sedang dan rendah. Jenis penelitian ini adalah penelitian kualitatif dengan menggunakan pendekatan deskriptif. Subjek yang digunakan adalah 3 siswa kelas XI SMA yang menjadi subjek pengerjaan soal dan subjek wawancara. Penulis adalah instrumen utama dalam penelitian ini serta didukung instrumen pendukung seperti lembar tes dan pedoman wawancara. Hasil penelitian menunjukkan : (1) analisis *student's engagement* berkemampuan tinggi dalam pembelajaran matematika siswa mampu memenuhi 5 indikator keterlibatan siswa yaitu terkait dengan mengingat, terkait dengan kelancaran matematika, terkait dengan orientasi pribadi atau masyarakat terhadap konsep, terkait dengan membuat perpaduan dan hubungan, serta terkait dengan kecermatan objektifikasi; (2) analisis *student's engagement* berkemampuan sedang dalam pembelajaran matematika siswa memenuhi 4 indikator keterlibatan siswa dengan baik yang terkait dengan mengingat, terkait dengan kelancaran matematika, terkait dengan orientasi pribadi atau masyarakat terhadap konsep serta terkait dengan membuat perpaduan dan hubungan; (3) analisis keterlibatan siswa berkemampuan rendah dalam pembelajaran matematika siswa hanya dapat memenuhi 3 indikator keterlibatan siswa dengan baik yang terkait dengan mengingat, terkait dengan kelancaran matematika serta terkait dengan orientasi pribadi atau masyarakat terhadap konsep, metode, sifat, hubungan dan implikasi

Keyword: *Student's Engagement*, Tingkat Kemampuan Matematis.

### **Abstract**

Student involvement is one of the important components and must be given special attention because it is seen as an antidote to low achievement, high levels of despair, high levels of boredom and impoliteness. One of the things that influences engagement is the behavior and personality of students. Through mathematics learning, students are expected to be able to cultivate activeness and skills in receiving material and solving mathematical problems. The purpose of this study is to describe the analysis of *student's engagement* in mathematics learning with high, medium and low levels of mathematical ability. This type of research is qualitative research using a descriptive approach. The subjects used were 3 students of class XI SMA who were the subject of working on the questions and interview subjects. The authors were the main instruments in this study and supported by supporting instruments such as test sheets and interview guidelines. The results showed: (1) the analysis of *student's engagement* with high ability in mathematics learning students were able to meet 5 indicators of student engagement, namely related to remembering, related to mathematical fluency, related to personal or community orientation to concepts, related to making combinations and relationships, and related to the accuracy of objectification; (2) *analysis of student's engagement*; being able to be in mathematics learning students meet 4 indicators of student engagement well related to remembering, related to the fluency of mathematics, related to personal or community orientation to concepts as well as related to making fusions and relationships; (3) analysis of the involvement of low ability students in mathematics learning students can only meet 3 indicators of student engagement well related to remembering, related to the fluency of mathematics as well as related to personal or community orientation to concepts, methods, traits, relationship and implications

Keyword: Level of Mathematical Ability, *Student's Engagement*.

## INTRODUCTION (10%)

Education is a form of effort to improve the level of welfare in human life which is realized by the existence of school activities. According to (Komalasari et al., 2019) the school is one of the educational institutions. In schools, there are several activities, one of which is teaching and learning activities that involve teachers and students. Of the many subjects that must be studied, the one that is widely applied in everyday life is mathematics. This is in line with opinion (Rachman & Purwasih, 2021) that the concept of mathematics can be seen from various sectors of human life such as technology, development, science, communication, economics, and so on.

Mathematics learning is learning that is colored by various student activities. The above statement has the intention that students do not imitate, plagiarize the concepts conveyed by the teacher, but students must have creations in their own way of thinking. Therefore, the involvement of students in the learning will make learning more conducive.

*Student's engagement* is an effort made by students by interacting with the school environment and participating in school activities. According to (Fredricks et al., 2004) *student's engagement* in schools is a multidimensional concept consisting of three components, namely behavioral, emotional and cognitive. Behavior consists of effort, attention, perseverance, as well as taking challenging classes. Furthermore, emotional consists of attraction, a sense of pride in learning success. And the last is cognitive which consists of evaluation in learning and student regulation that is important in learning in the classroom. According to (Dharmayana et al., 2012) that *student's engagement* consists of psychological aspects in schools that show attention, interest, involvement, effort, and involvement of students who are devoted to learning work at school.

*Student's Engagement* is one of the important components and should be given special attention because student engagement is seen as an antidote to low achievement, a high level of despair, a high level of boredom and impoliteness (Fredricks et al., 2003). In other words, *student's engagement* is very important to improve student achievement because if siswa is actively involved in the learning process, then students will feel comfortable and eager to learn so that the teacher must motivate students to continue learning.

Given the importance of *student's engagement*, various efforts have been made to increase *student's engagement*, both by the government and schools. This is supported by the Government Regulation of the Republic of Indonesia Number 32 of 2013 concerning National Education Standards article 19 (Randa, 2016) which states that the learning process in educational units is held interactively, inspiringly, fun, challenging, motivating students to participate actively, as well as providing sufficient places for initiative, creativity, and independence in accordance with students' talents, interests, and physical and psychological development. In addition, the efforts made by the teacher are to develop the art of teaching by applying various model techniques and new teaching methods that are useful in activating students in the learning process.

From the explanation above, the mathematics learning used is mathematics learning with a contextual approach. Learning using this approach helps the teacher relate the material presented to real world situations and encourages students to make connections between the knowledge they have and its application in everyday life (Hidayat, 2012). In other words contextual learning and teaching involves the students in important activities that help them relate academic lessons to the real life context they are facing.

Opinion (Karim, 2011) ability is the understanding of concepts with various approaches rather than procedural skills. Opinion (Wahyuddin & Ihsan, 2016) ability is something that concerns the understanding of ideas that are appreciated into the form of a word. According to (Alan & Afriansyah, 2017) ability is to explain a situation or action. A person is said to have the ability to explain or re explain the essence of the material of concepts he obtained independently.

The indicators of students mathematical abilities include:

- a) Able to restate concepts that have been learned.
- b) Able to classify objects based on whether or not the requirements that make up the concepts are met.
- c) Able to relate various mathematical concepts.
- d) Able to apply concepts into various forms of mathematical representation.

According to (Solaikhah et al., 2013) the criteria for students mathematical ability levels can be grouped into 3, namely high mathematical ability, medium mathematical ability and low mathematical ability, as in the following table:

**Table 1** Range of Assessments According to Solaikhah

No.	Nilai	Kategori
1.	$x \geq 80$	High
2.	$55 \leq x < 80$	Medium
3.	$x < 55$	Low

Below will be presented indicators related to student involvement according to (Febrilia & Patahuddin, 2018) can be seen in the following table:

**Table 2** Indicators of Student Engagement According to (Febrilia & Patahuddin, 2018)

A Related to remembering :	1.Conveying the focus of mathematics learning 2.Defining mathematical terms or expressing mathematical definitions 3. Showing/writing mathematical procedures/techniques.
B Related to the fluency of mathematics	1.Imitating methods, copying objects 2.Follow the procedure/steps 3.Search for answers by using.
C Related to personal/societal orientation towards concepts, methods, traits, relationship, and implications:	1. Using previous knowledge 2. Finding answers without knowing the procedure 3. Imagine/visualize 4. Identifying the characteristics/properties of mathematical objects 5. Identify variables 6. Looking for patterns 7. Comparing or classifying 8. Describe/explain 9. Explore diversity 10. Make informal formulations (inductions)/predictions 11. Make conclusions informally 12. Write mathematical objects with one characteristic 13. Write mathematical objects with several/many characteristics 14. Give examples 15. Expressing/expressing mathematical ideas using its own words 16. Identify relationships 17. Justifying (justifying)/reasoning 18. Summing up what has been done.
D Related to making fusions and relationships:	1. Clarify 2. Upholding ideas 3. Compounding 4. Re-describe 5. Summarize the development of ideas 6. Abstraction ability 7. Formalization

## 8. New definition

- |   |  |
|---|--|
| E Related to scrupulousness, objectification: | <ol style="list-style-type: none"><li>1. Explore the properties of new objects</li><li>2. Adapting/transforming ideas/ideas</li><li>3. Applying to more complex mathematical cases</li><li>4. Applying in other contexts</li><li>5. Evaluate the development of new ideas</li><li>6. Prove</li></ol> |
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**METHOD (15%)**

The type and approach used in this study is descriptive qualitative which is intended to obtain information about student involvement in class XI mathematics learning in depth and comprehensively.

The subjects in this study were taken based on *purposive sampling techniques*. In this study, researchers selected 3 students who were the recommendations of the teacher of mathematics lessons and on consideration of previous mathematics scores. Subjects selected by the researcher are given test questions to be analyzed based on their level of mathematical ability. Furthermore, 3 students will conduct interviews to find out their *student's engagement* in learning mathematics.

The research instrument uses test questions and interview guidelines. Data collection techniques use tests and interviews. Data analysis techniques in this study used reduction in data presentation, data presentation and drawing conclusions. Checking the validity of the data in this study is guided by the learning of trust which consists of three ways, namely observational persistence, triangulation (triangulation method), and discussion with peers.

**RESULTS AND DISCUSSION (70%)**

To find out *student's engagement* in mathematics learning, researchers made two instruments, namely tests and interviews. In data collection, it begins with providing test questions and then proceeds with conducting interviews with each subject. The results of the question work are intended to determine the level of mathematical ability of students and from the results of the interview intended to find out *student's engagement* in learning. Researchers involved 3 students to work on test questions and interviews, based on the results of discussions with mathematics teachers, 1 high-ability student, 1 medium-ability student and 1 low-ability student were obtained. As for student data from the results of discussions with mathematics teachers, who will be the subject of work on test questions and interviews can be seen in table 1 below.

**Table 1. Research Resources**

Category	Name	Code
Tall	RUZU	St
Keep	Nan	Ss
Low	R	Sr

**1. Description and Analysis of High Ability Student Engagement in Learning.**

## a. Related to remembering.

When faced with a given problem, the first thing high 1 subjects did was to be able to show/write mathematical procedures/techniques. The following is a written answer from a high subject 1.

SOAL	JAWABAN
	turunan pertama $y = ax^n = anx^{n-1}$

## b. Associated with mathematical fluency.

At this stage students imitate methods, copy objects; follow the procedures/steps; and look for answers using existing procedures. The following is a written answer from the subject of height 1.

SOAL	JAWABAN
$f(x) = 2x^3 - 5x^2 + 6x - 4$	<p>turunan pertama <math>y = ax^n = anx^{n-1}</math></p> <p><math>2 \cdot 3 \cdot x^{3-1} = 6x^2</math></p> <p><math>-5 \cdot 2 \cdot x^{2-1} = -10x</math></p> <p><math>6x^2 - 10x + 6</math> (turunan pertama) / <math>f'(x)</math></p> <p><math>f''(x) = 6 \cdot 2 \cdot x^{2-1} = 12x</math></p> <p><math>6(1) - 10 = -10</math></p> <p>Jadi <math>f'(x) = 6x^2 - 10x + 6</math></p> <p><math>f''(x) = 12x - 10</math></p>
	<p><math>f'(x) = 6x</math></p> <p><math>f''(x) = 6</math></p> <p><math>f(x) = -4</math></p> <p><math>f'(x) = 0</math></p>

- c. Related to personal/community orientation towards concepts, methods, characteristics, relationships and implications.  
 At this stage, ST 1 identifies the relationship between the concept and the questions given. The following is a written answer to ST 1.

SOAL	JAWABAN
$f(x) = 2x^3 - 5x^2 + 6x - 4$	turunan pertama $y = ax^n = anx^{n-1}$ $2 \cdot 3 \cdot x^{3-1} = 6x^2$ $-5 \cdot 2 \cdot x^{2-1} = -10x$ $6x^2 - 10x + 6$ (turunan pertama) / $f'(x)$ $f'(x) = 6x$ $f''(x) = 6$ $f(x) = -4$ $f'(x) = 0$ $f''(x) = 6 \cdot 2 \cdot x^{2-1} = 12x$ $f'(x) = 12x - 10$ $f''(x) = 12$

- d. Associated with making blends and relationships.  
 At this stage ST 1 can re-describe concepts that have been studied previously. The following is a written answer on the subject of height.

SOAL	JAWABAN
$f(x) = 2x^3 - 5x^2 + 6x - 4$	turunan pertama $y = ax^n = anx^{n-1}$ $2 \cdot 3 \cdot x^{3-1} = 6x^2$ $-5 \cdot 2 \cdot x^{2-1} = -10x$ $6x^2 - 10x + 6$ (turunan pertama) / $f'(x)$ $f'(x) = 6x$ $f''(x) = 6$ $f(x) = -4$ $f'(x) = 0$ $f''(x) = 6 \cdot 2 \cdot x^{2-1} = 12x$ $f'(x) = 12x - 10$ $f''(x) = 12$

- e. Related to the accuracy of objectification.  
 At this stage the high subject can prove the questions given into the concepts that have been written before. The following is a high subject answer.

SOAL	JAWABAN
$f(x) = 2x^3 - 5x^2 + 6x - 4$	turunan pertama $y = ax^n = anx^{n-1}$ $2 \cdot 3 \cdot x^{3-1} = 6x^2$ $-5 \cdot 2 \cdot x^{2-1} = -10x$ $6x^2 - 10x + 6$ (turunan pertama) / $f'(x)$ $f'(x) = 6x$ $f''(x) = 6$ $f(x) = -4$ $f'(x) = 0$ $f''(x) = 6 \cdot 2 \cdot x^{2-1} = 12x$ $f'(x) = 12x - 10$ $f''(x) = 12$

The conclusion from the description above is that high subjects can pass all the stages or indicators of involvement given.

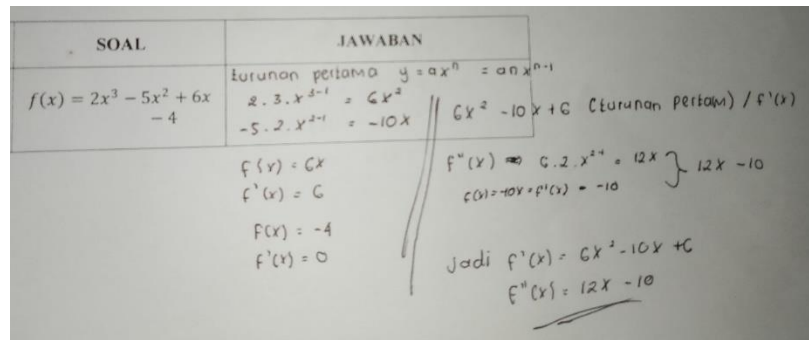
2. **Description and Analysis of Medium-ability Students' Involvement in Learning Mathematics.**

- a. Related to remembering.  
 At this stage the subject is being able to show/write mathematical procedures/techniques. The following is the answer from the subject being.

SOAL	JAWABAN
	turunan pertama $y = ax^n = anx^{n-1}$

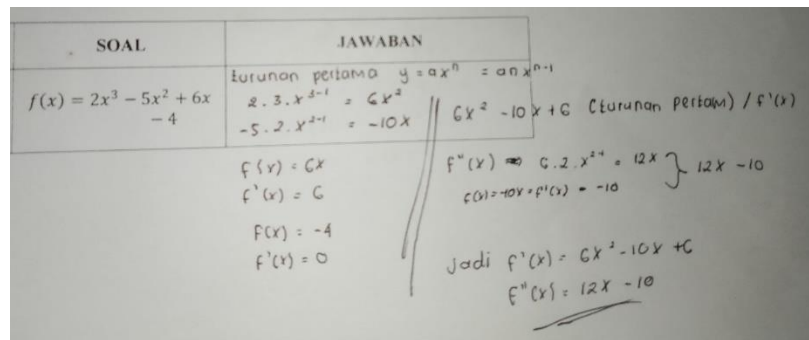
b. Associated with mathematical fluency.

At this stage the subject is able to imitate methods, copy objects; follow the procedures/steps; and look for answers using existing procedures. The following is the answer from the subject being.



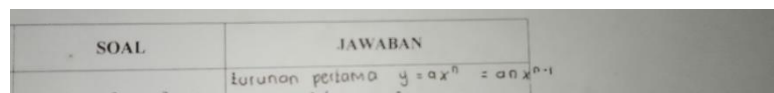
c. Related to personal/community orientation towards concepts, methods, characteristics, relationships, and implications.

At this stage the subject is able to re-describe concepts that have been studied previously. The following is a written answer from the subject being.



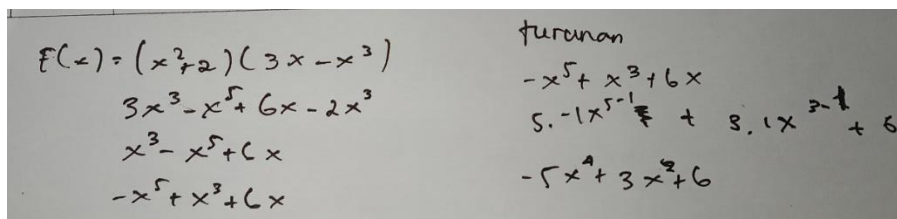
d. Associated with making blends and relationships.

At this stage the subject is able to re-describe concepts that have been studied previously to solve the given problem. The following is the answer from the subject being.



e. Related to the accuracy of objectification.

At this stage the subject is not yet able to prove the concepts that have been studied before on the questions given. The following is a written answer from the subject being.

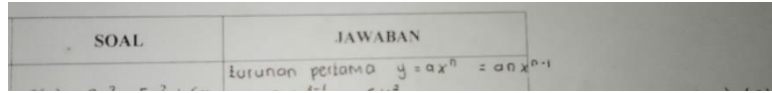


The conclusion from the description above is that the subject is currently only able to pass four of the five stages or indicators given.

**3. Description and Analysis of the Involvement of Students with Low Abilities in Learning Mathematics.**

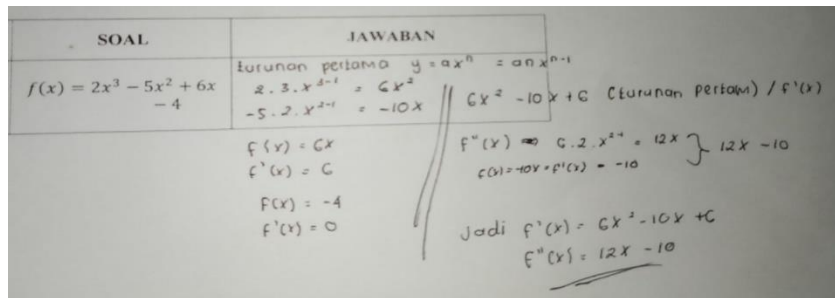
a. Related to remembering.

At this stage the subject is low able to show/write mathematical procedures/techniques. The following is a written answer from a low subject.



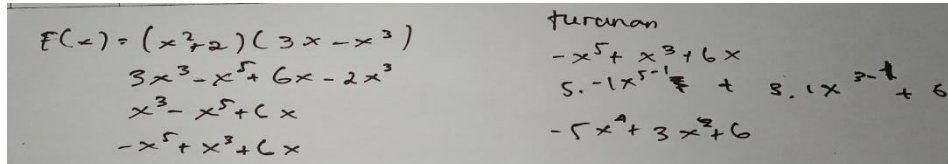
b. Associated with mathematical fluency

At this stage the subject is low able to imitate methods, copy objects; follow the procedures/steps; and look for answers using existing procedures. The following is a written answer from a low subject.



c. Related to personal/community orientation towards concepts, methods, characteristics, relationships and implications.

At this stage the low subject is able to identify the relationship between the concept and the questions given. The following is a written answer from a low subject.



d. Related to making combinations and relationships.

At this stage the low subject has not been able to re-describe the questions given.

e. Related to the accuracy of objectification.

At this stage, the low subject has not been able to prove the concepts that have been previously learned into the questions given.

The conclusion from the description above is that the subject is currently only able to pass three of the five stages or indicators given by.

It has been explained previously that the purpose of this study is to determine *student's engagement* in mathematics learning in terms of the level of mathematical ability of students. The discussion per subject regarding *student's engagement* in mathematics learning can be seen in the description below.

a. Analysis of highly capable *student's engagement* in mathematics learning: analysis of the involvement of highly capable students on related indicators considering that it shows or writes mathematical procedures students are able to pass through and are able to write down mathematical procedures that have previously been studied. In the indicator of mathematical fluency, namely imitating or copying objects, students are able to pass well. Furthermore, indicators are related to personal / community orientation to concepts, methods, traits, relationships, implications and making combinations and relationships, namely identifying and relating concepts students are able to pass well. The last indicator is related to the accuracy of objectification, namely applying or applying concepts to more complex mathematical cases students are able to pass well and get the right results.



- b. Analysis of *student's engagement* of moderately capable students in mathematics learning: analysis of the involvement of moderately capable students on indicators related to remembering, namely showing or writing down mathematical procedures students are able to pass well. Related to the fluency of mathematics, namely imitating or copying objects, students are able to pass through properly and correctly. Related to personal / community orientation towards concepts, methods, traits, relationships, implications and making combinations and relationships, namely identifying and relating concepts students are able to pass well. The latter is related to the accuracy of objectification, namely applying or applying concepts to more complex mathematical cases students are still unable to pass well and have not been able to produce the correct answer.
- c. Analysis of low-ability *student's engagement* in mathematics learning: analysis of the involvement of low-ability students on indicators related to remembering, namely showing or writing mathematical procedures or techniques students are able to pass through and are able to write down mathematical procedures or techniques well. Related to the fluency of mathematics, namely imitating or copying objects, students are able to pass through and are able to copy objects properly and correctly. Furthermore, it is related to personal or community orientation to concepts, methods, traits, relationships, implications and making fusions and relationships, namely identifying and relating concepts students have not been able to pass well and correctly. Finally, with the carefulness of objectification, namely applying or applying concepts to more complex mathematical cases, students are still unable to pass well and have not been able to produce correct answers.

## CONCLUSION (5%)

- a. Analysis of the involvement of highly capable students is able to pass 5 indicators of student involvement according to (Febrilia & Patahuddin, 2018) namely related to remembering (showing or writing down mathematical procedures or techniques that have previously been studied); related to the fluency of mathematics (imitating or copying objects); related to personal / community orientation to concepts, methods, properties, relationships, implications and making combinations and relationships (identifying and associating concepts); related to the accuracy of objectification (applying or applying concepts to more complex mathematical cases).
- b. Analysis of the involvement of moderately capable students is able to pass 4 indicators of student engagement according to (Febrilia & Patahuddin, 2018) namely related to remembering (showing or writing mathematical procedures); related to mathematical fluency (imitating or copying objects); related to personal / community orientation to methods, properties, concepts, relationships and implications), and assembled by making combinations and relationships (linking concepts into solved).
- c. Analysis of the involvement of low-ability students is able to pass 3 indicators of student engagement according to (Febrilia & Patahuddin, 2018) namely related to remembering (showing or writing down mathematical procedures); related to mathematical fluency (imitating or copying objects); related to personal / community orientation to concepts, methods, traits, relationships, implications and making combinations and relationships (identifying and relating concepts to problems mathematics).

## REFERENCES

- Alan, U. F., & Afriansyah, E. A. (2017). Students' Mathematical Comprehension Ability Through Auditory Intellectually Repetition And Problem Based Learning Learning Models. *Journal of Mathematical Education*, 11(1). <https://doi.org/10.22342/jpm.11.1.3890>.
- Dharmayana, I., Masrun, -, Kumara, A., & Wirawan, Y. (2012). Student Engagement as a Mediator of Emotional Competence and Academic Achievement. *Journal of Psychology UGM*, 39(1), 76–94.
- Febrilia, B. R. A., & Patahuddin, S. M. (2018). Investigation of Students' Level of Mathematical Involvement Through Design Analysis of Elpsa Learning Implementation And Its Implementation In The Classroom. *Journal of Mathematical Education*, 13(1), 55–72. <https://doi.org/10.22342/jpm.13.1.6326.55-72>
- Fredricks, J. A., Blumenfeld, P. C., & Paris, A. H. (2004). School engagement: Potential of the concept, state of the evidence. *Review of Educational Research*, 74(1), 59–109.

- <https://doi.org/10.3102/00346543074001059>
- Hidayat, M. S. (2012). Contextual Approaches In Learning. *INSANIA : Journal of Educational Alternative Thinking*, 17(2), 231–247.  
<http://ejournal.iainpurwokerto.ac.id/index.php/insania/article/view/1500/1098>
- Karim, A. (2011). Application of Guided Discovery Methods in Mathematics Learning to Improve Concept Understanding and Critical Thinking Ability of Elementary School Students. *National Seminar on Mathematics and Applied*, 32. critical  
<https://d1wqtxts1xzle7.cloudfront.net/49219245/37-52-1-PB-with-cover-page-v2.pdf?Expires=1642251245&Signature=f4Qn1phch0U2jNZMRRDkKVo-r3oco6KJJzMiWAm2Berpikir> is a thought process that occurs in a person and is intended to take
- Komalasari, Y., Naila, R., Tasya, N., Maryani, N., Nursalamah, F., Marlina, N., & Hidayat, W. (2019). Improving problem-solving skills through a contextual approach in class VIII students in west Bandung district. *Journal of Scholars: Journal of Mathematics Education*, 3(1), 187–196.
- Rachman, A., & Purwasih, R. (2021). Analysis of the mistakes of public high school students in cimahi city in solving math problems on trigonometry material. *Jpmi*, 4(3), 739–748.  
<https://doi.org/10.22460/jpmi.v4i3.739-748>
- Solaikhah, Afifah, D. S. N., & Suroto. (2013). Identification of Students' Ability to Solve Problems. *Journal of Mathematics Education STKIP PGRI Sidoarjo*, 1(1), 97–106.
- Wahyuddin, W., & Ihsan, M. (2016). Analysis of the Ability to Solve Mathematical Story Problems In Terms of Verbal Ability in Grade VII Students of Muhammadiyah Junior High School in Makassar City. *Suska Journal of Mathematics Education*, 2(2), 111. <https://doi.org/10.24014/sjme.v2i2.2213>
- Abdullah, M. Y., Bakar, N. R. A., & Mahbob, M. H. (2012). Student's Participation in Classroom: What Motivates them to Speak up? *Procedia - Social and Behavioral Sciences*, 51, 516–522. <https://doi.org/10.1016/j.sbspro.2012.08.199>
- Akdogan, E., & Sag, Y. (2018). An Investigation on How Prospective Mathematics Teachers Design a Lesson Plan. *Ondokuz Mayıs University Journal of Education Faculty*, 37(1), 81–96. <https://doi.org/10.7822/omuefd.313310>
- Ardawia. (2012). PROFILE OF SOLVING MATHEMATICAL PROBLEMS USING THE DIENES LEARNING STAGE IN TERMS OF THE MATHEMATICAL ABILITY OF JUNIOR HIGH SCHOOL STUDENTS. *Student Journal*, 1
- Astuti, S. I., Arso, S. P., & Wigati, P. A. (2015). Chapter II. *Analysis of Minimum Service Standards in Outpatient Installations at Semarang City Hospital*, 3, 103–111
- Attard, C. (2012). Engagement with mathematics: What does it mean and what does it look like? *Australian Primary Mathematics Classroom*, 17(1), 9–13.
- Chapman, E., & ERIC Clearinghouse on Assessment and Evaluation. (2003). Assessing student engagement rates. *ERIC Digest*, 1–7.
- Design, S. T., & Design, S. T. (2007). Chapter III Research Methods. *JP2M (Journal of Mathematics Education and Learning)*, 2002, 48–58.
- Nur, R. (2013). THE NATURE OF MATHEMATICS EDUCATION By: Nur Rahmah. *Al-Khawarizmi*, 2, 1–10
- Purba, J. E. L., Nababan, G., & Aji, K. A. (2021). Measuring Student Engagement In Online Learning Grade VII Students In Abc Schools On Math Learning. *Journal of Master of Mathematics Education (JUMADIKA)*, 3(2), 100–109.  
<https://doi.org/10.30598/jumadikavol3iss2year2021page100-109>
- Manurung, S. H. (2015). Analysis of Factors Affecting the Effectiveness of Mathematics Learning for Students of Mts Negeri Rantau Prapat Pelajaran 2013/2014. *EduTech: Journal of Educational And Social Sciences*, 1(01), 1–16.