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Numeracy Literacy in Moodle-Assisted PBL: A Self-Efficacy Perspective

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ABSTRACT

A person's capacity to make choices and find solutions to issues in life is significantly influenced by their self-efficacy and numeracy literacy level. Using technology in education is one way to try to make it better. One learning approach that uses technology is the Moodle-assisted Problem-based Learning (PBL) model, which blends the PBL paradigm with Moodle-assisted learning. This research aims to: (1) evaluate the impact of a Moodle-assisted problem-based learning model on students' numeracy literacy; and (2) investigate the impact of students' self-efficacy on their mathematical numeracy literacy. This study uses a mixed method approach, with more quantitative data than qualitative data and an explanatory sequential design. The pupils in grade VII at SMPN 5 Cimahi comprise the study's population. A simple random sample method was used to choose the quantitative data. Qualitative data was collected based on the high, medium, and low categories of student self-efficacy. Methods for quantitative data analysis using parametric statistics, including regression, classical completeness, and mean tests. Techniques for analyzing qualitative data include data reduction, presentation, and conclusion drawing. The study's findings demonstrated that (1) Moodle-assisted PBL successfully raised students' literacy in mathematics and numeracy. (2) In Moodle PBL learning, there was a relationship between students' self-efficacy and numeracy literacy.
Keywords: Numeracy Literacy, Self-Efficacy, PBL, Moodle

ABSTRAK

Kapasitas seseorang untuk membuat pilihan dan menemukan solusi untuk masalah dalam hidup secara signifikan dipengaruhi oleh tingkat efikasi diri dan literasi numerasi mereka. Menggunakan teknologi dalam pendidikan adalah salah satu cara untuk mencoba membuatnya lebih baik. Salah satu pendekatan pembelajaran yang memanfaatkan teknologi adalah model Problem-based Learning (PBL) yang dibantu Moodle, yang memadukan paradigma PBL dengan pembelajaran berbantuan Moodle. Tujuan dari penelitian ini adalah untuk: (1) mengevaluasi dampak model PBL berbantuan moodle terhadap literasi numerasi siswa; dan (2) menyelidiki dampak efikasi diri siswa pada literasi numerasi matematika mereka. Penelitian ini menggunakan pendekatan metode campuran, dengan proporsi data kuantitatif yang lebih besar daripada data kualitatif, dan desain sekuensial penjelasan. Populasi penelitian ini terdiri dari siswa kelas VII di SMPN 5. Metode cluster random sampling digunakan untuk memilih data kuantitatif. Berdasarkan kategori efikasi diri siswa yang tinggi, sedang, dan rendah, data kualitatif dikumpulkan. Metode analisis data kuantitatif menggunakan statistik parametrik, termasuk uji regresi, kelengkapan klasik, dan rata-rata. Teknik untuk menganalisis data kualitatif meliputi reduksi data, presentasi, dan penarikan kesimpulan. Temuan penelitian menunjukkan bahwa: (1) Instruksi PBL yang didukung oleh Moodle berhasil meningkatkan literasi siswa dalam matematika dan numerasi. (2) Dalam pembelajaran PBL Moodle, terdapat hubungan antara efikasi diri siswa dengan literasi numerasinya.
Kata kunci: Literasi Numerasi, Self-Efficacy, PBL, Moodle.

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Introduction

Education is the practice of acquiring and passing on the norms, practices, and body of human knowledge from one generation to another by formal and informal means such as classroom instruction, apprenticeship programs, and field studies. In line with (Ghazala & Elshall, 2020; Hwang & Tu, 2021; Kelley & Knowles, 2016), education is something that may be said to be very important for every human being because with an education every human being will be easier in solving the problems he is facing. Education plays an important role in the sustainability of human life because basically humans who are born on earth are not knowledgeable, therefore education is needed by every human being from the past until now, even in the future in order to create changes in a more advanced direction and welfare of life. Therefore, it is expected that the results of education are the formation of quality humans who have high intellectuals, good personalities, intelligence, noble morals and of course life skills (Zelhendri, 2017). In addition, education has another role, namely to provide useful knowledge to everyone. The role is performed by an educator or teacher (Martina, 2017).

Currently, education, especially in the field of mathematics, is seen as an important thing for every individual. Education can be developed starting from curriculum, strategy, media, and learning models. The rapid development of technology is one of the demanding factors in order to have the right knowledge. Extensive is also the latest. The demands in this society are not just understanding conceptual knowledge, but must be supported by creative and critical thinking in solving problems. In addition to critical and creative thinking skills, literacy skills must be developed to compete in the era of globalization. In Permendikbud there are 6 (six) basic literacy agreed by the World Economic Forum in 2015 that can be mastered by the community, namely literacy, cultural and civic literacy, scientific literacy, financial literacy, digital literacy, and numeracy literacy.

The capacity to understand and use quantitative data in a classroom setting, as well as the practical application of mathematical concepts and procedures, constitute what is known as numerical literacy. Numerical literacy requires logical thinking so that it makes it easier for a person to understand mathematics, so that having numerical skills will help a person both in understanding material, analyzing problems, and solving problems (Begum et al., 2021). Numeracy also includes the ability to analyze and interpret the quantitative information that exists around us which is displayed in various forms (graphs, tables and charts) mathematics that is studied in the classroom using a variety of real-world situations (Apriatni et al., 2022).

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Numeracy literacy in Indonesia is still low, it is known from the results of PISA, the numeracy literacy score obtained by Indonesia from 2000 to 2018 shows an average that is statistically far below the average in all countries registered in the OECD. Among the 74 nations that took part in the 2009 Programme for International Student Assessment (PISA), Indonesia came in at number 68. Not only that, out of 65 nations surveyed in 2012, Indonesia came in at number 64. The next year, out of 72 nations that took part in the program, Indonesia came in at number 63. The most current rating for Indonesia was 68th out of 74 nations in 2018. There were a total of 81 participating countries in PISA in 2022, with 37 being OECD members and 44 being partner nations. When comparing PISA 2018 with PISA 2022, the rankings reveal that Indonesia's literacy learning achievements jumped five or six spots.

Students at SMPN 5 Cimahi were given early numeracy literacy questions as part of the initial investigation, and the findings showed that while students were unable to write down the information presented in the questions correctly. Students simply rewrite the questions and redraw paper bags on the questions without giving an answer. From these answers, it shows that students do not clearly understand what is asked for in the math problem. As a result, he simply rewrites the questions and does not give a proper answer. Students may have difficulty interpreting the information available in a math problem and relating it to their knowledge. To be able to answer these problems, it is necessary to be trained in solving mathematical problems systematically by understanding the context of the question and identifying the steps needed to solve it.

Students' mathematical literacy is influenced by both the emotional aspect of their self-efficacy and the cognitive aspect of numeracy literacy. According to (Ordun & Akün, 2017; Peechapol et al., 2018; Waddington, 2023) self-efficacy refers to an individual's dynamic and multifaceted self-assurance in their capacity to overcome a range of challenges. In the context of online learning, it is having faith in our mental, motivational, emotional, and behavioral capabilities to exert the required effort toward achieving a certain objective or meeting a demanding demand. It's the idea that we "can do it," to put it simply, within a certain context or field. Furthermore, self-efficacy, as defined by (Bellemans & Devos, 2023) is the belief in one's own capacity to carry out actions that result in the desired outcomes. In (Noor et al., 2024; Tus, 2020) says the same thing Self-efficacy is an individual's belief in their ability to complete a task or achieve a goal, which is based on self-assessment of the appropriate action according to the situation at hand.

In addition, (Zulfayani et al., 2023) provide evidence that students' academic progress is influenced by their level of self-efficacy with regard to numeracy literacy. This is

seen by the 70% impact that self-efficacy makes to numeracy literacy. According to other study, self-efficacy and numeracy literacy are related, particularly when it comes to learning mathematics (Stephanou & Tsoni, 2019). Research continuously shows that middle school English and math performance is predicted by self-belief in one's capacity for achievement (Høigaard et al., 2015; You et al., 2015). Additional research indicates that gender differences in socialization may account for the variation in the impact of self-efficacy on student accomplishment (Guo et al., 2015).

According to this study, learning activities that support students in developing their mathematical reasoning abilities have to be given careful thought. The effectiveness of educational initiatives may be impacted by selecting the appropriate learning model. PBL is a dynamic and successful teaching approach that uses real-world issues and student-centered learning to assist students not only comprehend topics but also build critical thinking and future-ready abilities (Abushkin et al., 2018; Ali, 2019; Havenga & Athur, 2022; Prasad & O'Malley, 2022). Furthermore, PBL is a successful learning strategy, according to (Sousa, 2022; Wardono et al., 2018) particularly when assessed in terms of information retention and long-term application. Others claim that PBL is a teaching strategy that has gained recognition for emphasizing contextual learning (Guerra & Holgaard, 2019). PBL is an interesting pedagogical option in this endeavor because it has a long and promising history for contemporary needs (Blundell & Berardi, 2016; Ulger, 2018). Therefore, the use of the PBL model is quite influential in learning.

The goal of using this PBL methodology is to increase student literacy, including numeracy literacy. PBL attempts to strengthen students' numeracy literacy while also enhancing their critical thinking and problem-solving skills. This is accomplished by having students collaborate to find solutions to real-world issues that demand for critical thinking, data evaluation, and the development of workable solutions. Students are also urged to consider other viewpoints, pose questions, and base their judgments on facts. This is consistent with the Ministry of Education, Culture, and Technology's independent curriculum learning and assessment guidelines, which stipulate that learning implementation must provide students with a high-quality, engaging, and contextualized learning experience in addition to being continuously assessed to ascertain the extent to which students have met the learning objectives. Based on the above problems, the researcher aims to examine " Numeracy Literacy in PBL with Moodle Approach: A Self-Efficacy Perspective".

Research Methods

This study uses a mixed methodological approach, with quantitative research acting as the primary methodology and qualitative research acting as the auxiliary one. A

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pretest-posttest control group design was used to compare the PBL paradigm with a assisted by moodle. There were two participating classes from SMPN 5 Cimahi: a control class and an experimental class. While the control class completed standard problem-based learning assignments, the experimental class's students utilized moodles and participated in problem-based learning activities. All seventh-grade students at SMPN 5 Cimahi are included in the study population, and 64 individuals were chosen at random from the student body using cluster random sampling. Class 7A is the experimental class, whereas class 7C is the control class.

Two strategies are used in data analysis, which complements the mixed method's architecture. Descriptive and inferential statistics were employed to evaluate quantitative data, including results from self-efficacy surveys and numeracy literacy exams (indicate the particular test used, for example, independent sample t-tests). To find new trends and insights about students' experiences with PBL interventions, qualitative data from the difficulty quotient questionnaire and interview data were subjected to a thematic analysis.

Result and Discussions

Qualitative Data Results

Using expert-validated self-efficacy measures that were examined for validity and reliability, 36 experimental class learners (VII-A) were classified based on their level of self-efficacy. There are fifteen statements on the self-efficacy scale. This is a comprehensive effectiveness scale that students have completed, ranging from high to low level :

Table 1. Exposure Of The Results Of Students' Numeracy Literacy With Self-Efficacy

Student	Self-Efficacy Scale	Information
7	>156	High
20	107<x<156	Currently
5	<107	Low

The following Table 1 shows that seven students have a high degree of self-efficacy, 19 have a moderate level, and four have a low level. Six students were selected to be interview subjects in order to determine the self-efficacy of the students in the experimental class in terms of numeracy literacy.

Numeracy Literacy At High Self-Efficacy

The kids' effort in numeracy literacy has shown good outcomes, as seen by their work. The cognitive capacity of the person to comprehend complicated problems and

efficiently find workable answers is strong evidence of this. High self-efficacy learners can translate problems into written mathematical concepts, express mathematical problems as conceptual or visual models, provide written mathematical problem solutions in a methodical and structured manner, and assess mathematical concepts in a methodical and structured way.

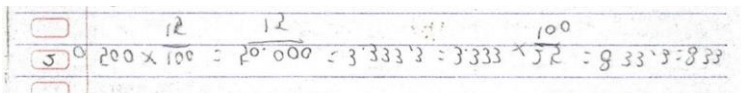

Figure 1. Numeracy Literacy Test Results With High Self-Efficacy (S-2)

The following is the interview transcript data between the researcher and S-2 for question number 2 on indicator 1.

P : "What do you think about problem number 2 that you have done?"
S-2 : "A little confused working on it ma'am."
P : "Is there any difficulty in answering question number 2a?"
S-2 : "No ma'am."
P : "What do you think is the problem presented in the question?"
S-2 : "Looking for grade B egg production, ma'am."
P : "Can you explain the steps to find the amount of grade B egg production?"
S-2 : "So the production of grade C eggs is 500 divided by the percentage of 15%, to find the product produced from 1%. That's the result per 1%, meaning for the production of grade B eggs 3.333 × 25% the result is 833.3 or 833 ma'am."
P : "Are you sure about your answer?"
S-2 : "God willing, sure ma'am."

Based on Figure 1 the results of the students' numeracy literacy test and the data analysis of the interviews led to this conclusion. Students with high levels of self-efficacy demonstrated a reasonable degree of proficiency in answering questions. Students that have a high sense of self-worth are able to meet all the requirements for numeracy literacy, which lends credence to this. These requirements include the ability to convert issues into written mathematical concepts, visualize or use models to depict mathematical difficulties, consistently and methodically deliver written answers, and assess one's own ideas in an orderly and systematic way.

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Numeracy Literacy At Moderate Self-Efficacy

The following is the interview transcript data between the researcher and S-3 for question number 2 on indicator 1.

P : "What do you think about problem number 2 that you have done?"
S-3 : "Yes, ma'am."
P : "Is there any difficulty in answering question number 2a?"
S-3 : "No ma'am."
P : "What do you think is the problem presented in the question?"
S-3 : "Looking for grade B eggs ma'am."
P : "Can you explain the steps to find the amount of grade B egg production?"
S-3 : "It is known that the number of grade C eggs is 500, meaning 15% or $\frac{15}{100}$ is 500. For the percentage of grade B, it is 25. So the percentage of grade B divided by the percentage of grade C is multiplied by the number of grade C eggs. $\frac{25}{15} \times 500$, 25 divided by 5 becomes 5, 15 divided by 5 becomes 3. $\frac{5 \times 500}{3} = \frac{2500}{3} = 833$."

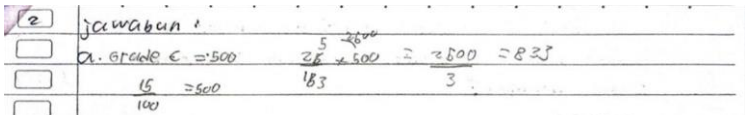

Figure 2. Numeracy Literacy Test Results With Moderate Self-Efficacy (S-3)

Based on Figure 2 the results of the students' numeracy literacy test and the data analysis of the interviews led to this conclusion. When it came to satisfying indications of numeracy literacy, such the ability to translate mathematical issues into written mathematical concepts and mathematical representations or models, learners with a moderate degree of self-efficacy reported having minimal trouble.

Numeracy Literacy At Low Self-Efficacy

The following is the interview transcript data between the researcher and S-7 for question number 2 on indicator 1.

P : "What do you think about problem number 2 that you have done?"
S-7 : "I don't understand ma'am."
P : "Is there any difficulty in answering question number 2a?"
S-7 : "Yes ma'am, I don't know how to calculate it. So I just answered the number 800."

Based on Figure 3 the results of the students' numeracy literacy test and the data analysis of the interviews led to this conclusion. Students find that they are well-

equipped to handle mathematical difficulties when they are able to exhibit their problem-solving abilities in a systematic and organized way and when they are able to evaluate mathematical ideas in writing, which are the only prerequisites for numeracy literacy.

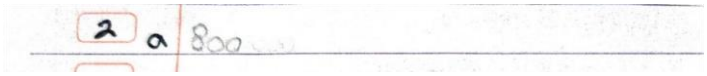

Figure 3. Numeracy Literacy Test Results With Low Self-Efficacy (S-7)

The Effectiveness Of The Moodle-Assisted PBL In Improving Students' Numeracy Literacy
It is believed that the PBL Learning Model with a Moodle would increase students' numeracy literacy if it passes three specified hypothesis tests. It is necessary to run precursor tests using SPSS, specifically the difference variant test with the Lavene Test and the normality test with the Chi-Square Test, before analyzing the hypothesis:

Quantitative Data Results
The first test to be done is the normality test. This test is used to assess if the data comprises regularly distributed data or not.

Normality Test
In Table 2, the final data comes from a normally distributed population when H_0 is accepted since the sig values of the two classes in the preceding table are 0.200 and 0.200, respectively, and they are greater than 5%. The sample is thus drawn from a normally distributed population (sig value).The final data comes from a normally distributed population when H_0 is accepted since the sig values of the two classes in the preceding table are 0.200 and 0.200, respectively, and they are greater than 5%. With a normally distributed population (sig value), the sample is drawn as a consequence

Table 2. Data Normality Test Results

Class	Sig.	Information
Eksperimen	0,200	Normal distributed data
Control	0,200	Normal distributed data

H_0= The numeracy literacy test data comes from a normally distributed population.
H_1= Numeracy literacy test data comes from non-normally distributed population.

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Homogeneity Test
In the Table 3 given above, the significance values are 0.381> 0.05. Given that the sig value is more than 5%, the acceptance of H_0 implies that the experimental class's variance is equal to the control class's.

Table 3. Data Homogeneity Test Results

Levene Statistic	df1	df2	Sig.	Information
1,031	3	124	0,381	Homogen

$H_0: \sigma_1^2 = \sigma_2^2$ (Numeracy literacy test data has the same variance)
$H_1: \sigma_1^2 \neq \sigma_2^2$ (Numeracy literacy test data does not have the same variance)

Hypothesis Test 1 (Test of Average Numeracy literacy)
In Table 4, H_0 was rejected when the value of T_{count}= 3.043> 1.64 = T_{table} was determined using the formula t. This indicates that the average test value of students' numeracy literacy after learning the PBL model assisted by Moodle is more than 65.

Table 4. Average Test Results for Numeracy literacy
The result t uses the formula

	N	Mean	Std. Deviation	t	Sig.(2-tailed)
NLT_Eks	32	79.1250	6.39934	3.043	0.000

$H_0: \mu \leq 65$ (The average score of students' numeracy literacy test after learning PBL model assisted by Moodle is not more than 65)
$H_1: \mu > 65$ (The average test value of students' numeracy literacy after learning the PBL model assisted by Moodle is more than 65.)

Hypothesis Test 2 (Classical Completeness of Numeracy literacy)
Table 5 shows that H_0 was rejected because the experimental class's z_{count} value was 2.546 > 1,64 and the control class's z_{table} value was 1,774. That is to say, over 70% of the final exam results for students' moodle-assisted PBL numeracy literacy are deemed complete and meet the requirements for classical completeness.

Table 5. Results of the Experiment Class Classical Completeness Test

Class	X	n	π_0	z_{count}	$z_{(0,5-\alpha)}$	Criteria	Results
Eks	29	32	0,70	2,546	1,64	$Z_{count} > Z_{table}$	H_0 rejected
Control	27	32	0,70	1,774	1,64	$Z_{count} > Z_{table}$	H_0 rejected

$H_0: \pi \leq 70\%$ (The proportion of students who score numeracy literacy in Moodle-assisted PBL learning does not reach 70% completeness.)

$H_a: \pi > 70\%$ (The proportion of students who score numeracy literacy in PBL learning assisted by Moodle reaches more than 70% completeness).

Hypothesis Test 3 (Test The Average Difference of Numeracy literacy)
Researchers employ an independent sample t-test, which is designed to ascertain the average difference between unpaired samples, to evaluate this third hypothesis. The following Table 6 displays the data from the hypothesis test results :

Table 6. Average Test Results of Numeracy literacy

F	Sig.	t	df	Sig (2-tailed)	Mean Difference	Std. Eror Difference
.453	.503	4.104	70	0,000	7.875	1.919

$H_0: \mu_1 \leq \mu_2$ (The average numeracy literacy test score of students who learn using the PBL learning model assisted by moodle is less than or equal to the average numeracy literacy test score of students who learn using the PBL model)
$H_a: \mu_1 > \mu_2$ (The average numeracy literacy test score of students who learn using the PBL learning model assisted by moodle is more than the average numeracy literacy test score of students who learn using the PBL model)

The H_0 was rejected as the data output had a sig value of 0.000 <0.05. This indicates that the average numeracy literacy test score of students who learn using the PBL learning model assisted by moodle is more than the average numeracy literacy test score of students who learn using the PBL model.

Hypothesis Test 4 (Test The Proportion Difference of Numeracy literacy)
Since the data output in Table 7 returned $z_{hitung} > z_{tabel}$, the H_0 was rejected. This shows that a greater proportion of pupils than those who learn via PBL teaching are able to numeracy literacy concepts through PBL utilizing a moodle. Since the data output returned $z_{hitung} > z_{tabel}$, the H_0 was rejected. It may be inferred from this that a greater proportion of students are able to numeracy literacy concepts via PBL by utilizing a moodle than through PBL teaching.

Table 7. Result Test The Proportion Difference Of Numeracy literacy

Proportion Difference Test						
π_1	π_2	$\hat{p}$	$\hat{q}$	z_{tabel}	z_{hitung}	*Result*
0,875	0,8125	0,8438	0,1562	1,64	2,3234	H_0 rejected

$H_0: \pi_1 \leq \pi_2$ (The proportion of students taught using the Moodle-assisted PBL learning model is less than or equal to the proportion of students taught using PBL)

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$H_a: \pi_1 > \pi_2$ (The proportion of students taught using the Moodle-assisted PBL learning model is more than the proportion of students taught using PBL)

Hypothesis Test 5 (Numeracy literacy Regression Test and Linearity Test)
The computation results in Table 8 yielded a value of F = 7.281 and a significance (Sig.) value of 0.024 because if H_0< 0.05, it is rejected. In other words, self-efficacy has an effect on numeracy literacy.

Table 8. Result Numeracy literacy Regression Test

Model	B	Std.Eror	Beta	t	Sig.
(Constant)	14.014	5.893		2.378	.024
Self-Efficacy	1.094	.150	.799	7.281	.000

H_0 : There is no linear relationship or no effect of self efficacy on numeracy literacy in PBL learning assisted by Moodle.
H_1 : There is a linear relationship or there is an effect of self efficacy on numeracy literacy in PBL learning assisted by Moodle.

Table 9. Result Numeracy literacy Linearity Test

Sum of Squares	Df	Mean Square	F	Sig.
143.611	10	14.361	0. 784	0,644

According Table 9 to the calculation findings, because > 0.05, the H_0 is rejected with a significance value (Sig.) = 0.644. That is, there is a clear correlation between students' self-efficacy and their ability to make numeracy literacy in PBL learning that is facilitated by moodle.

Qualitative Data Analysis
Seven pupils in the high category, twenty in the medium group, and five in the low category participated in this research. Two students each took the high, medium, and low categories, and two more students were chosen as qualitative study participants to characterize their numeracy literacy. Students in the high self-efficacy group often possess superior numeracy literacy. Numerous numeracy literacy indicators may be very successfully mastered by students with a modest level of self-efficacy. Furthermore, pupils who have poor self-efficacy also have worse mastery of numeracy literacy. students who scored quite well in the areas of endurance, range, control, and origin & ownership. When it comes to solving difficulties, pupils with high control scores are more adept at handling the circumstances.

Additionally, pupils in the medium self-efficacy group are able to find the right solution and solve the issue. They were happy with the outcome, however, so they decided not to examine the settlement that had been reached. They may not be aware of any resolution mistakes as a result of this. Pupils with a moderate level of self-efficacy possess the necessary skills to overcome challenges. They do, however, tend to feel quite confident in themselves and content with the outcomes they have attained. They could get demotivated to keep learning and developing as a result of this.

Conversely, students who lack self-efficacy are unable to find the right solutions to difficulties. This may be brought on by a number of things, including a lack of desire, a lack of critical thinking abilities, or a lack of comprehension of the subject matter. When faced with difficulties, students who have poor self-efficacy often quit up quickly. They also lack confidence in themselves and often place the blame for their shortcomings on others or the illness. According to the description given above, each subject with high, medium, and low self-efficacy has a distinct numeracy literacy when it comes to solving arithmetic issues. This is consistent with the findings of (Guo et al., 2015) who found that each of the three levels of self-efficacy has unique traits for problem-solving. Each level's student character has an impact on this. Students who have self-efficacy are fulfilling 2 indicators, namely using a wide variety of numbers and symbols related to basic mathematics to solve problems in various contexts of daily life, analyzing information displayed in various forms (graphs, tables, sections, diagrams, etc.). Students who have low self-efficacy only meet 1 indicator, which is to use a wide variety of numbers and symbols related to basic mathematics to solve problems in various daily life contexts. The results of the study showed that students with a high level of confidence reached 78.57%, which was included in the adequate category. When facing algebraic math problems in the form of essays, the average student activity scored 74.11%, which is included in the fair category (65%-74%), so it can be concluded that the higher the level of confidence of students, the better their numeracy literacy. Meanwhile, students with low self-efficacy meet 1 (one) indicator of numeracy literacy ability, namely the process of understanding problems. Therefore, the results of this study show that the better the self-efficacy of students, the better the sustainability of numeracy literacy. Observation From the debate, it is also evident that students' numeracy literacy in solving math problems is influenced by their level of self-efficacy.

Quantitative and Qualitative Analysis

By contrasting quantitative and qualitative research data, this analysis of quantitative and qualitative data is completed. Table 10 displays the findings of his study.

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Table 10. Quantitative And Qualitative Data Analysis

No	Quantitative	Qualitative	Conclusion
1	Literacy in numbers Students in moodle-based PBL models achieve above 75%	High self-efficacy learners may meet all requirements for numeracy literacy.	(1) Students' numeracy literacy is more effective with moodle-assisted PBL learning; and (2) Study participants with high self-efficacy were able to meet all numeracy literacy indicators.
2	When compared to PBL students, the average numeracy literacy of students in the PBL model with moodle is higher	Only two markers of numeracy literacy can be met by students with a medium level of self-efficacy.	
3	When it comes to PBL learning using Moodle, the percentage of students' numeracy literacy that is complete is greater than their capacity to engage with the material	Students who have poor self-efficacy can only satisfy one numeracy literacy criteria.	
4	Students that use Moodle for PBL learning have an impact on their self efficacy and capacity to make numeracy literacy		

Three categories of students' numeracy literacy were investigated. Three categories: high, medium, and low. based on the study's conclusions. According to the high category, self-efficacy has a beneficial impact on pupils' numeracy literacy. Students in the high or higher self-efficacy categories had better numeracy literacy than those in the medium and low self-efficacy categories. One way to characterize pupils' self-efficacy is as trust. High self-efficacy kids believe they can overcome the difficulty of numeracy literacy (Begum et al., 2021). This concept bolsters their tenacity and commitment. Learners who feel more confident in their abilities also have more willingness to study. Following that, students are urged to improve their numeracy literacy and gain understanding of mathematics. The results of the high category indicate that learners' potential for high category self-efficacy outcomes for numeracy literacy is favorably impacted by the quotient of problems. Students with a medium amount of self-efficacy have better numeracy literacy than students with a low level. Students' level of confidence is known as self-efficacy. Learners with self-efficacy in the medium range have somewhat more confidence than those in the low self-efficacy group, or even lower confidence than those in the high category when it comes to solving tasks requiring mathematical numeracy literacy. This concept motivates them to put forth more effort and persevere despite disappointments. Additionally, pupils

with medium category self-efficacy shown higher desire to study in comparison to those with low category self-efficacy. They are more driven to master mathematical numeracy literacy and comprehend mathematical ideas. Even among students who struggle with mathematics to a tolerable degree, the inability to write down answers to problems consistently and methodically endures. This results from their incapacity to choose the appropriate resolution for every challenge present in the issue. One may argue that because of their low self-efficacy, pupils in the low group have lesser numeracy literacy. Students with low self-efficacy had worse mathematical numeracy literacy than those with strong self-efficacy. Furthermore, compared to pupils in the high or medium categories, those in the low group also shown a decline in their willingness to study. They lack the motivation to become proficient in mathematics and develop their numeracy literacy.

Conclusion

The following conclusions emerged from the research's findings and discussion: (1) Students' numeracy literacy is more effective with moodle-assisted PBL learning; and (2) Study participants with high self-efficacy were able to meet all numeracy literacy indicators. Only two of the numeracy literacy markers could be met by subjects in the intermediate self-efficacy group and only one by those in the low self-efficacy group.

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