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Enhancing Literacy and Numeracy through Inquiry-Based Learning: The Impact of E-Lens as an Innovative Board Game

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Abstrak

Masalah yang dihadapi adalah rendahnya keterampilan literasi dan numerasi siswa, yang menjadi tantangan bagi pengajaran konvensional. Penelitian ini bertujuan untuk menganalisis efektivitas permainan pembelajaran berbasis inkuiri, E-Lens, dalam meningkatkan literasi dan numerasi siswa. Penelitian ini menggunakan desain kuasi-eksperimen dengan metode pre-test dan post-test, yang melibatkan dua kelompok: kelompok eksperimen yang menggunakan E-Lens dan kelompok kontrol yang menggunakan metode pembelajaran konvensional. Instrumen yang digunakan adalah tes literasi dan numerasi, kuesioner, dan observasi kelas. Data dianalisis menggunakan analisis statistik, termasuk ANCOVA, untuk membandingkan hasil kedua kelompok. Hasil penelitian menunjukkan bahwa penggunaan E-Lens secara signifikan meningkatkan kemampuan literasi dan numerasi siswa dibandingkan dengan kelompok kontrol. Analisis statistik juga mengungkapkan hubungan negatif yang kuat antara nilai pre-test dan peningkatan post-test, dengan siswa yang memiliki skor awal rendah mengalami peningkatan yang lebih besar. Evaluasi guru menunjukkan bahwa E-Lens mudah diterapkan dan meningkatkan keterlibatan siswa. Kesimpulan dari penelitian ini adalah bahwa E-Lens terbukti efektif dalam meningkatkan literasi dan numerasi siswa, serta dapat menjadi solusi inovatif untuk meningkatkan kualitas pendidikan di Indonesia.

Kata Kunci: *Literasi, Numerasi, Game, Inkuiri*

Abstract

The problem faced is the low literacy and numeracy skills of students, which pose a challenge for conventional teaching methods. This study aims to analyze the effectiveness of the inquiry-based learning game, E-Lens, in improving students' literacy and numeracy. The study employs a quasi-experimental design with pre-test and post-test methods, involving two groups: the experimental group using E-Lens and the control group using conventional teaching methods. The instruments used include literacy and numeracy tests, questionnaires, and classroom observations. Data were analyzed using statistical analysis, including ANCOVA, to compare the results between the two groups. The findings show that the use of E-Lens significantly improves students' literacy and numeracy compared to the control group. Statistical analysis also reveals a strong negative correlation between pre-test scores and post-test improvements, with students who initially scored lower showing greater gains. Teacher evaluations indicate that E-Lens is easy to implement and enhances student engagement. The conclusion of this study is that E-Lens has been proven effective in improving students' literacy and numeracy and can serve as an innovative solution to enhance the quality of education in Indonesia.

Keywords: Literacy, Numeracy, Game, Inquiry

1. INTRODUCTION

Literacy and numeracy skills are two critical aspects of education that significantly impact the quality of student learning (Anggraeni et al., 2024; Sari et al., 2023; Sasanti et al., 2024). Literacy encompasses the abilities to read, write, and comprehend texts, while numeracy involves the capacity to understand and apply mathematical concepts in everyday life (Kirom & Aini, 2023; Singh et al., 2021). These skills are fundamental elements in establishing a solid foundation of knowledge. Expanding on this, literacy and numeracy are crucial not only for academic achievement but also for developing students' cognitive abilities and problem-solving skills. Literacy allows students to critically engage with written content, improving their ability to comprehend information, express ideas clearly, and make well-informed choices.

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There are concerns about the low levels of student engagement in acquiring these crucial skills. This has been linked to the limited availability of interactive and innovative learning resources in educational environments. The feedback suggests that more dynamic and creative methods for teaching literacy and numeracy may be required to boost student motivation and participation (Elliott et al., 2021; Gonulates & Gilbert, 2023; Rohmah et al., 2022). By integrating interactive components, such as games, technology, or practical activities, the learning process could become more engaging and help deepen students' understanding of these fundamental skills. Good literacy skills enable students to access, analyze, and evaluate information effectively, while strong numeracy skills help them understand and solve complex mathematical problems (Salvia et al., 2022; Thangjai & Worapun, 2022). With a solid foundation in literacy and numeracy, students can develop critical and analytical thinking skills essential in various fields of study. Furthermore, high literacy and numeracy skills also enhance students' ability to quickly adapt to new changes and challenges, both in academic contexts and everyday life (Irawan et al., 2022; Ulfa et al., 2022). Good literacy and numeracy skills are also crucial in everyday life. Literacy enables individuals to communicate effectively, understand important documents, and follow written instructions, while numeracy aids in managing personal finances, understanding statistics, and making data-based decisions (Kusumawati et al., 2023; Song & Tang, 2023). In an increasingly competitive global context, high literacy and numeracy skills indicate students' readiness to participate in a knowledge-based society and economy (Febriani et al., 2023; Net et al., 2023). Therefore, it is essential for the education system to continually seek innovative and effective ways to enhance students' literacy and numeracy skills.

In this digital era, the ability to process information critically and numerically has become increasingly important (Agustina et al., 2022; Munahefi et al., 2023). Digital literacy, an extension of traditional literacy, enables students to navigate the online world, identify valid information, and avoid misinformation. Strengthening literacy and numeracy not only prepares students for academic success but also equips them with the skills needed to thrive in professional and personal life. Efforts to enhance these abilities must remain a top priority within the education system, employing innovative approaches that integrate technology, creativity, and interactive learning methods (Ainun et al., 2023; Kirom & Aini, 2023; Lare & Silvestri, 2023).

However, numerous studies indicate that literacy and numeracy skills among students in Indonesia remain at a concerning level (Anggraeni et al., 2024; Shalit & Ronen, 2019). This is attributed to various factors, including unengaging teaching methods and a lack of innovative and interactive learning resources. A major issue is the use of unappealing teaching methods that do not meet students' needs. Many teachers still employ traditional, one-way approaches (McNamara et al., 2023; Mdlalose et al., 2021) where students passively receive information without active involvement in the learning process. This often leads to boredom and decreased motivation among students, ultimately hindering their development of literacy and numeracy skills. Additionally, the limited availability of innovative and interactive learning resources is a significant issue (Fitri & Juliani, 2024; Kirom & Aini, 2023; Rohmah et al., 2022). In many schools, especially in remote areas, facilities and teaching materials are severely restricted. Textbooks often become outdated and fail to align with modern contexts. The lack of access to technology and digital media further hinders students' opportunities to engage in more dynamic and engaging learning experiences.

Furthermore, professional training and development for teachers are often inadequate. Many teachers do not receive sufficient training to develop and implement innovative teaching methods. They also frequently lack access to the latest resources that could enhance teaching quality. Without adequate training, these educators remain reliant on conventional teaching methods that may no longer be relevant to the current needs and characteristics of

students (Marmoah et al., 2023; Sukserm & Wasanasomsithi, 2023; Yu et al., 2024). For example, integrating technology into learning can create more interactive and engaging experiences for students. However, without access to the appropriate devices and applications, teachers cannot utilize these tools effectively.

Another contributing factor is the curriculum pressure that emphasizes exam results over the development of critical skills (Chukusol et al., 2024; Hu, 2024; Namakula & Akerson, 2024). This focus leads to a learning environment that is overly oriented towards final outcomes, neglecting the deeper and more meaningful learning processes. Additionally, the socio-economic conditions of students affect their literacy and numeracy abilities. Students from economically disadvantaged families often face various barriers, such as a lack of support for learning at home, limited access to reading materials, and the need to work to support their families, all of which can hinder their academic development.

Therefore, to improve literacy and numeracy skills among students in Indonesia, a holistic and sustainable approach is needed (I Gede Darma Susila et al., 2023; Lestari et al., 2024). The novelty of this study reforming teaching methods, increasing access to innovative learning resources, providing continuous professional development for teachers, and offering greater support to students from economically disadvantaged backgrounds. This study aims to analyze the effectiveness of the inquiry-based learning game, E-Lens, in improving students' literacy and numeracy. It is hoped that this approach will create a more engaging, inclusive, and effective learning environment for developing students' literacy and numeracy skills. Given the various challenges, "E-Lens" is expected to serve as an effective tool for enhancing students' literacy and numeracy skills, making the learning process more enjoyable, and helping students achieve better academic performance.

2. METHODS

This study employs a quasi-experimental design with pre-test and post-test methods to measure the effectiveness of "E-Lens" as an inquiry-based learning game in enhancing students' literacy and numeracy skills (Stratton, 2019). This design allows researchers to compare students' learning outcomes before and after using "E-Lens." Before the intervention, all students in both the experimental and control groups will undergo an initial test to assess their literacy and numeracy skills. This provides baseline data to determine the students' skill levels prior to the intervention. After the intervention is implemented, all students will take another test to measure their literacy and numeracy skills post-intervention. (Stratton, 2019)

Literacy and Numeracy tests are used to measure students' literacy and numeracy skills before and after the intervention, encompassing questions aligned with the national curriculum (Anggraeni et al., 2024). These assessments are crucial for determining how effective the "E-Lens" game is in enhancing students' literacy and numeracy skills. They are given to students both before and after the intervention (pre-test and post-test) (Magdalena et al., 2021). Student ability questionnaire uses a likert scale to assess changes in students' learning abilities before and after using "E-Lens." Classroom Observation is conducted to monitor students' learning activities and the implementation of "E-Lens" in the learning process (Ibrahim et al., 2018; Rukminingsih et al., 2020). Classroom Observation involves closely monitoring and assessing students' learning activities, as well as the implementation of the "E-Lens" tool in the classroom setting.

The collected data are analyzed using various statistical methods. First, a normality test is applied to ensure the data follows a normal distribution. Next, a homogeneity test is conducted to examine the uniformity of variances between the two groups. A paired t-test compares the pre-test and post-test results within the same group, while an independent t-test

compares the post-test results between the experimental and control groups. Then conducted analysis of covariance is a statistical technique that combines elements of analysis of variance (ANOVA) with regression (Muhid, 2019). The primary goal of ANCOVA is to test the differences in means between two or more groups while controlling for other variables that may influence the outcome. In this study, ANCOVA is used to evaluate the impact of "E-Lens" on improving students' literacy and numeracy skills, while controlling for the effects of other relevant variables.

3. RESULTS AND DISCUSSION

Results

SD Negeri 1 Taji is an elementary school located in a remote area of Malang Regency. This isolated location presents unique challenges in efforts to improve the quality of education, particularly in literacy and numeracy. Geographical conditions and limited access to information and educational resources are some of the factors contributing to the low levels of literacy and numeracy among the students at this school. The visual design of E-Lens is show in Figure 1.

Figure 1. E-Lens Board Design

The inquiry approach in E-Lens is evident as the game encourages students to actively engage in the process of investigation and problem-solving. Through the Question Cards, which contain literacy and numeracy questions, students are presented with challenges that require critical thinking and solution-seeking. These cards not only test students' understanding of the material but also encourage them to explore concepts in depth and find accurate answers. In this way, E-Lens implements the principles of inquiry, emphasizing active exploration and problem-based learning, allowing students to develop their literacy and numeracy skills in a more interactive and reflective context. Implementation of E-lens in learning is show in Figure 2.

Figure 2. Implementation of E-Lens in Learning

Before and after conducting mathematics lessons using E-Lens, students were asked to complete pre-tests and post-tests in two testing groups. They are the experimental group and the control group. In the experimental group, students will engage with "E-Lens," an inquiry-based learning game, as part of their educational activities. To evaluate the effect of this intervention, their literacy and numeracy skills will be measured using both a pre-test and a post-test. Before implementing "E-Lens," all students in the experimental group will take a pre-test to assess their initial literacy and numeracy levels. This test will provide baseline data, offering an understanding of each student's starting point in these areas.

After the pre-test, students will participate in lessons that incorporate "E-Lens." As an inquiry-based game, "E-Lens" fosters problem-solving, exploration, and critical thinking through interactive play. Students will be encouraged to apply their literacy and numeracy knowledge in different scenarios, making the learning process more engaging compared to traditional approaches. Following the use of "E-Lens," students will complete a post-test, similar to the pre-test, to evaluate any progress in their literacy and numeracy skills. Comparing the results from both tests will help assess how effective "E-Lens" was in enhancing these skills. Below is the data from the pre-tests and post-tests for the experimental group. Pre-test and post-test results for the experimental group is show in Figure 3.

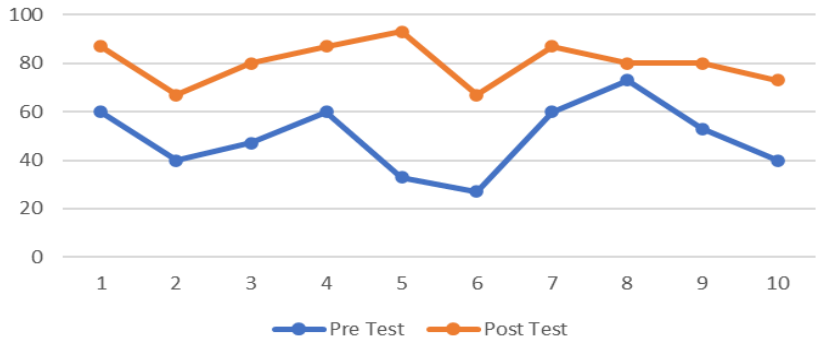

Figure 3. Pre-Test and Post-Test Results for the Experimental Group

Base on Figure 3, the pre-test and post-test data show a significant improvement in test results after the intervention. In the pre-test, scores ranged from 27 to 73, with an average

of around 47, while in the post-test, scores ranged from 67 to 93, with an average of around 78. This increase in scores indicates that the test participants made substantial progress in the skills or knowledge being assessed. For example, the highest pre-test score was 73, while the highest post-test score reached 93. Most participants showed consistent improvement, indicating the effectiveness of the teaching method or intervention applied.

In the control group, third-grade students will be taught using conventional teaching methods instead of the "E-Lens" game. To evaluate the effectiveness of these traditional methods, students will undergo both a pre-test and a post-test. Prior to starting the instruction, students in the control group will take a pre-test to measure their baseline literacy and numeracy abilities. This initial assessment will provide data on their starting proficiency levels. Throughout the intervention, students will continue learning through traditional approaches, including lectures, textbooks, and direct instruction, which follow typical classroom practices without incorporating inquiry-based games like "E-Lens." After completing the instruction, the students will take a post-test, similar to the pre-test, to assess any progress in their literacy and numeracy skills. Comparing the pre- and post-test results will help determine the level of improvement achieved through conventional teaching methods. Pre-test and post-test results for the control group is show in Figure 4.

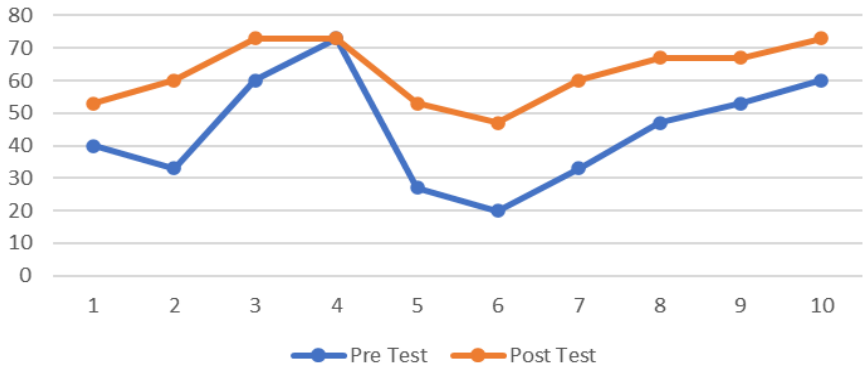

Figure 4. Pre-Test and Post-Test Results for the Control Group

Base on Figure 4, the pre-test and post-test data for the control group show a significant improvement in scores among participants. Out of 10 participants, all showed an increase in their scores on the post-test compared to the pre-test. For example, the first participant improved from 40 to 53, the second from 33 to 60, and the third from 60 to 73. There was one participant whose score remained the same at 73, but the rest showed increases ranging from 13 to 27 points. This indicates that the intervention or teaching method applied after the pre-test was effective in enhancing participants' understanding or skills, as evidenced by the consistent increase in post-test scores.

The data from the pre-tests and post-tests reveal a significant improvement in students' literacy and numeracy skills for those using "E-Lens." The experimental group, which used "E-Lens," recorded a higher average score increase compared to the control group. This demonstrates that the use of "E-Lens" is effective in enhancing fundamental literacy and numeracy skills. However, the analysis should not stop there; it is also necessary to test for a correlation between pre-test scores and the increase in post-test results following the "E-Lens" intervention. Correlations between pretest score and the increase in post test result is show in Table 1.

Table 1. Correlations between Pre-Test Score and the Increase in Post Test Result

		S	X
S	Pearson Correlation	1	-0.799
	Sig. (2-tailed)		0.006
	N	10	10
X	Pearson Correlation	-0.799	1
	Sig. (2-tailed)	0.006	
	N	10	10

Correlation is significant at the 0.01 level (2-tailed).

Base on Table 1, the Pearson correlation coefficient of -0.799 indicates a strong negative relationship between the two variables. This value, which is close to -1, suggests that as one variable increases, the other tends to decrease significantly. In other words, lower pre-test scores are associated with greater increases in post-test scores. Consequently, students with lower pre-test scores tend to show more significant improvement in their post-test scores compared to those with higher pre-test scores. The p-value of 0.006 indicates that this relationship is statistically significant, suggesting that this negative correlation is not due to chance but reflects a real relationship between the two variables in the analyzed sample. The next step is to examine the relationship between pre-test scores and the increase in post-test scores following the use of the E-Lens game in learning. This analysis will help further understand how the game impacts students with varying initial levels of proficiency. The results of the regression analysis, which evaluates the relationship between pre-test scores and the increase in post-test scores following the intervention with the E-Lens game. Table 2 show model summary relationship between pre-test scores and the increase in post-test scores.

Table 2. Model Summary Relationship between Pre-Test Scores and the Increase in Post-Test Scores

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.799	0.638	0.592	8.47426

Table 2 shows that pre-test scores have a strong and significant relationship with the increase in post-test scores following the E-Lens game intervention. Approximately 63.8% of the variation in post-test score increases can be explained by pre-test scores. The model also provides relatively accurate estimates with a standard error of 8.47426. The Adjusted R^2 indicates that, even after adjustment, the model remains effective in explaining data variability. The relationship between the two variables is further in Anova test as examined in Table 3.

Table 3. ANOVA (Relationship between the Two Variables)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1011.095	1	1011.095	14.080	0.006[b]
	Residual	574.505	8	71.813		
	Total	1585.600	9			

Base on Table 3 presents the results of the variance analysis for the regression model used to assess the relationship between the independent variable (X) and the dependent variable (S). The Sum of Squares for Regression is 1011.095, indicating how much of the variance in post-test scores can be explained by pre-test scores. Conversely, the residual

value of 574.505 reflects the variance that cannot be explained by the model. The total variance in the dependent variable is 1585.600. With a Mean Square for Regression of 1011.095 and for Residual of 71.813, the calculated F-ratio is 14.080. This F-ratio, which compares the Mean Square of the regression with the Mean Square of the residuals, assesses the effectiveness of the regression model in explaining the variance in the dependent variable. The significance value (p-value) of 0.006 indicates that the regression model is statistically significant, meaning that this model explains the variance in post-test scores in a significantly better way than a model without predictors. This confirms that the relationship between pre-test scores and post-test scores following the E-Lens game intervention is both real and significant. Coefficients relationship between pre-test scores and post-test scores is show in Table 4.

Table 4. Coefficients Relationship between Pre-Test Scores and Post-Test Scores

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	67.148	10.051		6.681	0.000
	X	-0.737	0.196	-0.799	-3.752	0.006

Base on Table 4, the SPSS output in the "Coefficients" section reveals that the regression model shows an intercept of 67.148, representing the baseline increase in post-test scores when the pre-test score is zero. The regression coefficient for pre-test scores is -0.737, indicating that each unit increase in pre-test scores results in a decrease of 0.737 units in the increase of post-test scores, reflecting a significant negative relationship between the two variables. The p-value of 0.006 for the pre-test coefficient confirms that this relationship is statistically significant, suggesting that the influence of pre-test scores on the increase in post-test scores is not due to chance. The high t-value for this coefficient further supports that the detected relationship is both real and significant. To assess the improvement in literacy and numeracy using the t-test on the pre-test and post-test results from both groups, the results are provided in Table 5.

Table 5. Paired Samples Test on the Pre-Test and Post-Test Results from Both Groups

Paired Groups	Paired Differences					t	df	Significance (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Differences				
				Lower	Upper			
Pair 1	-30.800	13.273	4.197	-40.295	-21.304	-7.338	9	0.000
Pair 2	-18.000	8.981	2.840	-24.424	-11.575	-6.338	9	0.000

Based on Table 5, the average difference between the pre-test and post-test scores for the experimental group is -30.80000, indicating that the average post-test score for the experimental group is 30.8 points higher than the pre-test score. The standard deviation of this difference is 13.27320, which measures the spread of the differences from the mean. The standard error of the mean difference is 4.19735, estimating how far the sample mean is from the population mean. The 95% confidence interval indicates that the average difference between pre-test and post-test scores in the population is estimated to be between -40.29507 and -21.30493. The t-value is -7.338, representing the t-statistic for the paired t-test, with 9 degrees of freedom (calculated as the number of pairs minus 1). The p-value is 0.000, which

is less than 0.05, leading to the conclusion that there is a statistically significant difference between the pre-test and post-test scores for the experimental group at the 5% significance level.

Based on these results, there is a statistically significant difference between the pre-test and post-test scores for both the experimental and control groups. The very small p-value (0.000) suggests that these findings are highly significant, indicating that the "E-Lens" learning game has a significant impact on students' literacy and numeracy skills. Furthermore, based on the correlation analysis previously discussed, which revealed a strong negative relationship, it is evident that the E-Lens game has a significant effect on improving students' literacy and numeracy skills. This is supported by the assessment results from the use of E-Lens in the classroom. Next is the ANCOVA test results for the use of E-Lens in the experimental group compared to the control group. The test of between subject effects is show in Table 6.

Table 6. Tests of Between-Subjects Effects

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	1571.413	7	224.488	31.646	0.031
Intercept	1259.548	1	1259.548	177.560	0.006
Change of control	3.813	1	3.813	0.537	0.540
Change of Experiment	1462.651	6	243.775	34.365	0.029
Error	14.187	2	7.094		
Total	**11072.000**	**10**			
Corrected Total	**1585.600**	**9**			

Based on Table 6, the ANCOVA model overall shows significance (p = 0.031), indicating that there is a significant difference in the changes in literacy and numeracy skills between the experimental and control groups after accounting for the variability from the covariate (pre-test scores). This means that the ANCOVA model applied was able to detect a significant difference between the experimental group (which used E-Lens) and the control group (which did not use E-Lens). The p-value of 0.031 indicates that the likelihood of this difference occurring by chance is less than 3.1%. In statistical analysis, when the p-value is less than 0.05, we conclude that the result is statistically significant, meaning that the observed difference or effect is very likely real and not due to chance. In this case, the experimental group that used E-Lens experienced a significantly different change compared to the control group. The analysis results show that the use of E-Lens has a significant impact on the changes in students' literacy and numeracy skills, rather than being influenced by other factors such as initial differences between the students in both groups.

Discussion

SD Negeri 1 Taji is an elementary school located in a remote area of Malang Regency. The challenging geographical conditions and limited access to educational resources present obstacles to improving students' literacy and numeracy skills. To address these issues, one approach is to develop educational game media. By utilizing the inquiry-based learning game E-Lens, the school adopts an innovative approach to tackle these challenges (Granić & Marangunić, 2019; Shine & Heath, 2020). Additionally, ongoing training for teachers on the use of technology and its integration into teaching is essential.

This will help them feel more confident and effective in leveraging technology for educational purposes.

E-Lens is an inquiry-based game that combines literacy and numeracy questions in a card format. The game offers an interactive approach that encourages students to think critically and solve problems. The inquiry-based approach in E-Lens is implemented through various mechanisms designed to motivate students in active exploration and problem-solving. In this game, question cards containing literacy and numeracy queries are used to prompt students to think critically and apply their knowledge practically (Eppe et al., 2022; Jufrida et al., 2019). Each question card presents challenges requiring deep understanding, compelling students to research and explore to find the correct answers, thus enhancing their engagement. The question cards often include problems that stimulate discussion among students, encouraging them to collaborate and work together to find solutions, which aids in developing problem-solving and collaboration skills (Diah Rusmala Dewi, 2019; Roll, 2021). By asking students to investigate and resolve issues, E-Lens supports active learning, where students not only receive information but also engage directly in the learning process through exploration and concept application. The question cards in the game encourage students to explore various solutions and strategies, aligning with inquiry principles that emphasize learning through investigation and experimentation. After completing tasks or answering questions, students can reflect on and evaluate their understanding, helping them to better grasp the material and identify areas needing improvement (Angiolini et al., 2020; Payu et al., 2022).

To enhance the interactive dimension, E-Lens incorporates reward and punishment cards that provide immediate feedback to students based on their answers. Reward Cards offer additional motivation for correctly answering questions, while Punishment Cards add challenges and encourage students to be more cautious (Karuniasih, 2022; Skaraki & Kolokotronis, 2022). The game's design, which includes competitive elements and rewards, keeps students engaged and motivated to continue learning and actively participating. By implementing an inquiry-based approach through various elements within the E-Lens game, students are encouraged to actively engage in the learning process, develop critical thinking skills, and improve their understanding of literacy and numeracy in an interactive and enjoyable context (Su et al., 2021; Supeni et al., 2019).

To enhance interactivity, E-Lens also utilizes reward and punishment cards that provide immediate feedback to students based on their answers. Reward Cards offer extra motivation for answering questions correctly, while Punishment Cards introduce additional challenges and encourage students to be more cautious. The game's design, which incorporates competitive elements and rewards, keeps students engaged and motivated to continue learning and participating actively. By integrating an inquiry-based approach through various elements in E-Lens, students are encouraged to actively engage in the learning process.

The findings of this study indicate that the use of E-Lens as an innovative board game can significantly enhance students' literacy and numeracy skills through an inquiry-based learning approach. The implications of these results suggest that integrating game-based learning media can serve as an effective alternative in educational settings, particularly in developing 21st-century skills such as critical thinking, collaboration, and communication. This approach can also support teachers in creating more interactive and engaging learning experiences for students, thereby increasing their motivation and participation. Furthermore, E-Lens has the potential to be adapted to various learning contexts by modifying the game content to align with different curriculum requirements.

This study has several limitations that should be acknowledged. First, the sample was limited to students from a single school, which may constrain the generalizability of the

findings to a broader population. Second, the duration of the study was relatively short, making it difficult to determine the long-term effects of using E-Lens on students' literacy and numeracy skills. Third, the study focused solely on the impact of the game on literacy and numeracy without considering other factors, such as students' social skills or creativity, which may also be influenced by the use of this media. Therefore, future research involving larger samples, extended implementation periods, and more comprehensive assessments of skills is recommended to strengthen these findings.

4. CONCLUSION

The study demonstrates that "E-Lens" significantly enhances students' literacy and numeracy skills more effectively than conventional methods. The experimental group showed a greater improvement in post-test scores, particularly among students with initially low scores. Teachers found "E-Lens" easy to implement and noted that it increased student engagement. With its interactive inquiry-based approach, "E-Lens" has proven effective in making learning more engaging and has the potential to improve educational quality in remote areas like SD Negeri 1 Taji. This success highlights the importance of innovative teaching methods and support for teachers

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