**Original Research Article**

**Strengthening Teacher Literacy and Numeracy Competencies through Academic Supervision using Interactive Multimedia: Mapping Study**

**ABSTRACT**

The empowerment of interactive multimedia by supervisors in conducting coaching is one approach in an effort to improve teacher literacy and numeracy competencies. This study uses a descriptive approach aimed at describing teacher literacy and numeracy competencies. The scope of teacher literacy and numeracy includes the learning environment, learning and assessment, and teacher literacy culture. Respondents were determined using a total sampling approach, namely, 60 Elementary School Teacher respondents who were coached by supervisors through an academic supervision approach in literacy and numeracy training activities. Data collection used a Likert scale questionnaire which was answered based on respondent perceptions and analyzed using a descriptive quantitative approach with a percentage formula. The results of the data analysis found that teacher literacy competencies were in the fairly good category with an achievement level of 83.24% and teacher numeracy competencies were in the less good category with an achievement level of 75.16%. Literacy and numeracy training in the implementation of academic supervision has not been supported by interactive multimedia, thus the development of interactive multimedia is a basic need for supervisors that can be used in academic supervision activities in an effort to strengthen the literacy and numeracy competencies of Elementary School Teachers.

***Keywords:*** *Strengthening Competence; Teacher Literacy and Numeracy; Academic Supervision; Interactive Multimedia; Mapping Study*

Introdction

Teachers with high literacy and numeracy skills are more open to innovating and adapting in learning. Analysis of literacy and numeracy competencies of teachers in elementary schools is very important to find out the extent to which teachers' competence in these two aspects can support educational goals (Purnomo et al, 2024; Sinaga & Simanjorang, 2024). Literacy is a basic ability in responding to problems in the development and implementation of learning. With literacy skills, teachers can assist students to access, use, interpret and communicate knowledge through various texts according to the needs of students Teachers who have high literacy skills can more easily teach reading and writing skills in an effective method (Syafutra et al., 2022). While numeracy is a skill related to counting and measuring, (Widiastuti et al., 2022). Teachers' numeracy skills are the ability to think with a conceptual approach, procedures, facts and tools to solve problems numerically with various types of contexts relevant to the needs of students, (Dewayani et al., 2021; Maghfiroh et al., 2021). Numeracy skills are very important because they are closely related to community life, (Munahefi et al., 2023; Nurjanah et al., 2022). With numeracy skills, teachers can carry out numerically-oriented learning critically by engaging attention to the relationships that exist in the field of knowledge and exploring ways to overcome learning problems that are carried out into empowering experiences.

Literacy and numeracy competencies are two important aspects that must be possessed by every teacher (Murtafiah et al., 2024), especially elementary school teachers, in order to improve the quality of education. Teachers who have literacy and numeracy skills can recognize the varied needs of students and provide appropriate support in developing students' potential. Literacy and numeracy competencies can affect the student learning process more optimally (Mea et al., 2024). Teachers can understand the development of students and use relevant learning methods and provide assistance to students who have learning difficulties.

The problem that occurs is that teachers have difficulty determining differences in students' cognitive levels, (Winarti et al., 2021). Some teachers are still unable to compile literacy and numeracy questions, (Ardellea & Hamdu, 2022). Teachers' literacy and numeracy skills are included in the learning loss category, (Andriana et al., 2023; Salvia et al., 2022). Strengthening literacy and numeracy is not limited to textbooks and lesson plans but includes a variety of experiences that shape students' perspectives, skills and character development ( Atth E et al, 2023). The problem of teachers' literacy and numeracy skills has an impact on teachers' ability to observe learning developments and provide assistance for students who have learning difficulties and has an impact on teachers' ability to develop innovative and effective teaching methods so as to affect the education system in a sustainable manner. (Syafutra et al., 2022); (Andriana et al., 2023); (Purnomo et al., 2024); (Sinaga & Simanjorang, 2024).

Accelerating the recovery of teachers' literacy and numeracy skills in primary schools is very important, (Ardellea & Hamdu, 2022; Musoffa, 2022; Susanti et al., 2024). The main challenge faced by teachers in improving literacy and numeracy skills is that it is not enough to get in-depth and continuous training to be able to help them develop more effective teaching methods, (Nurochmah & Mappincara, 2022). Literacy preparation programs and courses have a limited focus, (Shelton et al., 2025). This happens due to limited access to quality training and limited resources (Janawati, 2024).

A number of institutions/agencies, especially educational institutions, have provided teacher literacy and numeracy training programs both offline and online, as an effort to maintain the curriculum in line with the needs of educational progress, (Zulkifli et al., 2023), but in general, these training programs are still carried out conventionally using lecture and discussion methods (Marlena et al., 2022) has not been supported by relevant media, especially information technology media. For this reason, supervisors need attention in improving teacher competence, (Apriliya & M, 2024) by providing fun and useful rocks for teachers (Yusuf, 2023). Providing assistance to improve teachers' literacy and numeracy competence can be done through quality and continuous training activities with relevant multimedia support. Comprehensive teacher training can improve quality, (Apelehin et al., 2025). The relevance of training to needs can support meaningful learning experiences, (Yulastri et al., 2023). This should be the main concern for supervisors in fostering literacy and numeracy competencies for teachers.

Many studies have ended in the conclusion that supervisors can provide training to improve teachers' literacy and numeracy skills through academic supervision activities. Supervisors play a role in improving teacher competence so that meaningful learning is created(Dwikurnaningsih, 2020; Marheni, 2022; Musyadad et al., 2022; Sudargini, 2021). Academic supervision is a continuous process to improve the quality of education, (Susilo et al., 2024). Improving the quality of learning through the development of teacher professionalism is a process of academic supervision, (Husni et al., 2024; Suryani et al., 2025). Thus, it can be understood that throughacademic supervision, the development of teachers' literacy and numeracy competencies can be carried out with the empowerment of interactive multimedia by supervisors. Interactive multimedia is the transmission of data and manipulation of all forms of information, processed in the form of digital data that allows users to interact directly. (Zulqadri et al., 2023). Collaborative learning through digital platforms allows for the creation of shared content and interactive discussions so as to improve literacy skills, (Khumalo MA., 2025; Anastasopoulou et al., 2025). Proper academic supervision affects teachers' teaching ability to improve student achievement, (Alam et al., 2021). Supervisors can interact directly with teachers using interactive multimedia. The role of academic supervision in building interaction with teachers is a key component in improving teacher competence effectively. (Jaenam & Zulkifli, 2022).

The fundamental need for this systematic review is considering that teacher literacy and numeracy competencies are an integral part in preparing students to face the era of society 5.0, where literacy and numeracy skills play an increasingly important role. Therefore, this study aims to explore teacher literacy and numeracy skills. Ultimately, the findings of this study will contribute to a deeper understanding of how interactive multimedia can be empowered in academic supervision activities to strengthen teacher literacy and numeracy competencies.

**METHODOLOGY**

This research uses a descriptive approach, it is intended to describe systematically and in detail certain characteristics related to natural and engineering phenomena that have occurred or are occurring. (Zulkifli, et al. 2024). The mapping of literacy and numeracy competencies of elementary school teachers is the object of this research as a guideline in the development of interactive multimedia that will be used by supervisors in academic supervision activities to strengthen teachers' literacy and numeracy competencies.

The population of this study is Elementary School Teachers of Cluster One of Kecamata V Koto Kampung Dalam, Padang Pariaman Regency, which totals 60 teachers. This research sample was determined through the study of population research with consideration because the population was less than 100 (Arikunto, 2006) The entire population (60) was the respondents in this study. Data were collected using a likert scale questionnaire with alternative answers of Very Good (SB), Good (B), Quite Good (CB), Not Good (KB) and Not Good (TB). The respondent filled out the questionnaire by listing one of the alternative answers that was considered close to the questionnaire statement, filling out the questionnaire was carried out by the respondent through the googleform link.

Data analysis was carried out using a percentage approach assisted by the SPSS program. The criteria for measuring the percentage of literacy and numeracy ability of teachers use two approaches. Teachers' literacy and numeracy competencies are positive if the total score obtained by the respondents from the questionnaire > the total mean, and it is said to be negative if the total score obtained by the respondents from the questionnaire < the total mean. to determine the scale of teachers' literacy and numeracy competency levels using a formula (Sugiyono, 2013).

P=

Table 1-The scale achievement criteria:

|  |  |
| --- | --- |
| **Weight** | **Category** |
| 91-100 | Excellent |
| 86-90 | Good |
| 76-85 | Pretty Good |
| 66-75 | Not Good |
| <46-55 | Bad |

**RESULTS OF RESEARCH AND DISCUSSION**

**Results**

The empirical data described in this study is related to the identification of literacy and numeracy competencies of teachers. The identification of teachers' literacy and numeracy competencies includes aspects of the learning environment, learning and assessment, and cultural aspects of teacher literacy and numeracy.

1. Teacher Literacy Competence

The findings of the research on the aspect of teacher literacy competence from three sub-variables, namely, learning environment, learning and assessment, and the cultural aspect of teacher literacy can be presented in table 2 below.

**Table 2. Competence Teacher Literacy**

|  |  |  |  |
| --- | --- | --- | --- |
| **Indicator** | **Average** | **Achievement (%)** | **Category** |
| Learning environment | 4,11 | 82 | Pretty Good |
| Learningand assessment | 4,44 | 88,79 | Good |
| Teacher literacy culture | 3,95 | 78,93 | Pretty Good |
| **Total Grade Point Average** | **4,16** | **83,24** | **Pretty Good** |

Table 2 presents a descriptive analysis that examines the level of teacher literacy competency in the indicators of the learning environment, learning and assessment and literacy culture of Elementary School teachers. Descriptively, it shows that the indicators of the learning environment and teacher literacy culture are in the fairly good category with a score of 4.11 with an achievement level of 82%, and 3.95 with an achievement level of 78.93%. While learning and assessment are in the good category with a score of 4.44 with an achievement level of 88.79%. In general, the literacy competency of Elementary School teachers is in the fairly good category with a score of 4.16 with an achievement level of 83.24%. For more details, it can be described based on the following sub-indicators:

1. Learning Environment

**Table 3. Environmental Management Skills**

|  |  |  |  |
| --- | --- | --- | --- |
| **Indicator** | **Average** | **Achievement (%)** | **Category** |
| Understanding strategy | 3,95 | 79,09 | Pretty Good |
| Management | 3,82 | 76,36 | Pretty Good |
| Planning to make amends | 3,71 | 74,28 | Not Good |
| Collaborate | 4,40 | 88,05 | Good |
| Mentoring colleagues | 4,61 | 92,23 | Excellent |
| **Total Grade Point Average** | **4,11** | **82** | **Pretty Good** |

**Figure 1. Environmental Management Skills**

Table 3 Figure 1 presents a descriptive analysis that examines how the skills of managing the learning environment in the sub-indicator of guiding colleagues to manage the environment have been achieved in the very good category with a score of 4.61 at an achievement level of 92.23%, the indicator of collaborating to create an environment in the good category with a score of 4.40 at an achievement level of 88.05%, the indicator of designing and improving environmental management is in the less good category with a score of 3.71 at an achievement level of 74.28%. While the other three indicators are in the fairly good category, namely the indicator of understanding environmental management strategies with a score of 3.95 at an achievement level of 79.09%, and managing the environment with a score of 3.82 at an achievement level of 76.36%. Overall, teacher literacy competency in the indicator of skills in managing the learning environment with a score of 4.1 and a percentage achievement level of 82% is in the fairly good category.

From the description above, it is stated that of the five indicators of teacher skills in managing the environment, only the indicator of guiding colleagues to manage the environment has been achieved in the very good category, and the indicator of collaborating to create an environment has been achieved in the good category. While the other indicators, in general, the level of achievement is in the fairly good category. This means that each teacher is quite skilled in managing a multimodal text-rich environment to foster students' interest and literacy skills. Thus, it can be stated that teacher literacy competency in the indicator of skills in managing the learning environment is in the fairly good category.

1. Learning and assessment

Table 4. Learning Design and Assessment Skills

|  |  |  |  |
| --- | --- | --- | --- |
| **Indicator** | **Average** | **Achievement (%)** | **Category** |
| Understanding of implementing | 4,72 | 94,37 | Excellent |
| Implementing strategies | 4,31 | 86,21 | Good |
| Evaluate | 4,83 | 96,54 | Excellent |
| Collaborate | 3,92 | 78,33 | Pretty Good |
| Mentoring colleagues | 4,43 | 88,52 | Good |
| **Total Grade Point Average** | **4,44** | **88,79** | **Good** |

**Figure 2. Learning Design and Assessment Skills**

Based on table 4 and figure 2 above, it shows that the learning and assessment ability of each of the indicators there are indicators of understanding of implementation have been achieved in the very good category with an average score of 4.72 at an achievement rate of 94.37%, indicators of implementing strategies in the good category with an average score of 4.31 at an achievement rate of 86.54%, evaluation indicators are in the very good category with an average score of 4.83 at an achievement rate of 96.54%, The indicator collaborated in the Good category with an average score of 3.92 at an achievement rate of 78.33%, and the indicator guided colleagues in the Good category with an average score of 4.43 at an achievement rate of 88.79%. In general, the level of achievement of teachers' literacy skills in learning and assessment indicators with an average score of 4.44 and a percentage achievement rate of 88.79% is in the good category.

From the description above, there are two indicators that have been achieved in the very good category, namely implementing strategies and evaluating learning and assessment. Meanwhile, the other two indicators have been achieved in the good category, namely the skills of implementing strategies and guiding colleagues. Then there is an indicator of collaborating with colleagues achieved in the category of quite good. This shows that each teacher is skilled in designing learning and assessments that focus on improving students' literacy skills.

1. Teacher literacy culture

**Table 5. Learning Design and Assessment Skills**

|  |  |  |  |
| --- | --- | --- | --- |
| **Indicator** | **Average** | **Achievement (%)** | **Category** |
| Understanding the importance of activities | 4,66 | 93,25 | Excellent |
| Doing activities | 3,83 | 76,64 | Pretty Good |
| Using results | 3,85 | 76,92 | Pretty Good |
| Collaborate | 3,45 | 68,99 | Not Good |
| Mentoring colleagues | 3,94 | 78,86 | Pretty Good |
| **Total Grade Point Average** | **3,95** | **78,93** | **Pretty Good** |

**Figure 3. Teacher Literacy Culture**

Based on table 5 and figure 3 above, it shows that the culture of teacher literacy in each indicator is an indicator of understanding the importance of literacy activities that have been achieved in the very good category with an average score of 4.72 at an achievement rate of 94.37%, the indicator of doing activities in the category is quite good with an average score of 3.83 at an achievement rate of 76.64%, the indicator using the results is in the very good category with an average score of 3.85 at an achievement rate of 76.92%, The indicator collaborated in the poor category with an average score of 3.45 at an achievement rate of 68.99%, and the indicator guided colleagues in the category was quite good with an average score of 3.94 at an achievement rate of 78.86%. Overall, the achievement rate of teacher literacy culture with an average score of 3.95 and a percentage achievement rate of 78.93% is in the category of quite good.

From the description above, there is one indicator that has been achieved in the very good category, namely the understanding of the importance of literacy activities. Then one indicator of the level of achievement is not good, namely collaborating with colleagues. Meanwhile, the other three indicators, the level of achievement is in the category of quite good, namely, carrying out activities, using results and guiding colleagues. Thus, it can be stated that the literacy culture of teachers in fostering the habit of accessing, processing, interpreting, and criticizing information from various sources, as well as presenting ideas effectively through multimodal texts is in a fairly good category.

1. Teacher Numeracy Competence

Research findings on the aspects of teacher numeracy competence from three sub-variables, namely, learning environment, learning and assessment, and the cultural aspect of teacher numeracy can be presented in the following table 6.

**Table 6. Teacher Numeracy Competencies**

|  |  |  |  |
| --- | --- | --- | --- |
| **Indicator** | **Average** | **Achievement(%)** | **Category** |
| Learning environment | 3,76 | 75,12 | Not Good |
| Learningand assessment | 3,95 | 78,22 | Pretty Good |
| Teacher numeracy culture | 3,61 | 72,13 | Not Good |
| **Total Grade Point Average** | **3,76** | **75,16** | **Not Good** |

In table 6 above, it shows that the level of teacher numeracy competence from each of these indicators has two indicators at the achievement level of the poor category, namely the learning environment with an average score of 3.76 at an achievement level of 75.12%, and the teacher numeracy culture indicator with an average score of 3.95 at an achievement level of 78.22%. Meanwhile, the learning and assessment indicators are in the category of quite good with an average score of 3.61 with an achievement rate of 72.13%. In general, of the three sub-variables of teacher numeracy competence with an average score of 3.76 and a percentage achievement rate of 75.16%, they are in the poor category. For more details, it can be described based on each indicator as follows:

1. Learning Environment
2. Numeracy knowledge and experience possessed by students

**Table 7. Students' Numeracy Knowledge and Experience**

|  |  |  |  |
| --- | --- | --- | --- |
| **Indicator** | **Average** | **Achievement (%)** | **Category** |
| Understand | 3,52 | 70,32 | Not Good |
| Use | 4,37 | 87,43 | Good |
| Evaluate | 4,13 | 82,64 | Pretty Good |
| Collaborate identify | 3,84 | 76,87 | Pretty Good |
| Guiding colleagues using | 3,38 | 67,51 | Not Good |
| **Total Grade Point Average** | **3,85** | **76,95** | **Pretty Good** |

**Figure 4. Environmental Management Skills**

Based on table 7 and figure 4 above, it shows that the skills to manage the learning environment are in the components of numeracy knowledge and experience possessed by students. In each indicator, it was found that understanding students' numeracy knowledge and experience was achieved in the less good category with an average value of 3.52 at an achievement level of 70.32%, the indicator of using students' numeracy knowledge and experience was in the good category with an average value of 4.37 at an achievement level of 87.43%, the indicator of evaluating students' numeracy knowledge and experience was in the fairly good category with an average value of 4.13 at an achievement level of 82.64%, the indicator of collaborating with colleagues in identifying students' numeracy knowledge and experience was in the fairly good category with an average value of 3.84 at an achievement level of 76.87%, and the indicator of guiding colleagues in using students' numeracy knowledge and experience was in the fairly good category with an average value of 3.38 at an achievement level of 67.51%. Overall, teachers' literacy skills in the indicator of skills in managing learning environments with an average value of 3.85 and a percentage achievement level of 76.95% are in the fairly good category.

From the description above, it appears that the learning environment consists of five indicators of numeracy knowledge and experience owned by students, only indicators of using numeracy knowledge and experience owned by participants who have achieved in the good category. Meanwhile, the indicators evaluate and collaborate with peers in identifying the numeracy knowledge and experience brought by students with their achievement level in the category is quite good. Then in other indicators, it is in poor achievement. This means that the ability of elementary school teachers about the learning environment on the components of numeracy knowledge and experience that students have is in the category of quite good.

1. A learning environment (physical, social, emotional, and intellectual) that supports numeracy learning and mindset

**Table 8. Learning Environments that Support Numeracy Learning and**

**Mindset**

|  |  |  |  |
| --- | --- | --- | --- |
| **Indicator** | **Average** | **Achievement (%)** | **Category** |
| Understand | 3,59 | 71,76 | Not Good |
| Apply | 3,37 | 67,42 | Not Good |
| Evaluate | 4,33 | 84,50 | Pretty Good |
| Collaborate identify | 3,35 | 66,93 | Not Good |
| Guiding colleagues using | 3,79 | 75,77 | Not Good |
| **Total Grade Point Average** | **3,67** | **73,28** | **Not Good** |

**Figure 5. Learning Environments that Support Numeracy Learning and**

**Mindset**

Based on table 8 and figure 5 above, it shows that the skills of managing the learning environment in the components of the learning environment (physical, social, emotional, and intellectual) that support numeracy learning and mindset that in each indicator the level of achievement is in the category of less than good except for the component of evaluating the learning environment (physical, social, emotional, and intellectual) that supports numeracy learning and mindset is in the category of quite good with an average value of 4.33 and a percentage achievement level of 84.50%. Overall, the ability of Elementary School Teachers in this component is in the category of less than good with an average value of 3.67 at an achievement level of 74.38%.

Thus, it can be described that the competence of Elementary School Teachers in the learning environment indicator in the components of numeracy knowledge and experience possessed by students, and the learning environment (physical, social, emotional, and intellectual) that supports numeracy learning and mindset with an average value of 3.76 at an achievement level of 75.12% is in the category of less than good.

1. Learning and assessment

**Table 9. Learning and Assessment**

|  |  |  |  |
| --- | --- | --- | --- |
| **Indicator** | **Average** | **Achievement (%)** | **Category** |
| Opportunities and demands | 3,19 | 63,76 | Not Good |
| Learning plan | 4,09 | 81,88 | Pretty Good |
| Implementation of learning | 4,43 | 88,53 | Good |
| Assessment (cognitive and noncognitive) | 3,93 | 78,69 | Pretty Good |
| **Total Grade Point Average** | **3,95** | **78,22** | Pretty Good |

**Figure 6. Learning and Assessment**

Based on table 9 and figure 6 above, it shows that learning and assessment in the opportunity and demand component was achieved in the poor category with an average score of 3.19 at an achievement level of 63.76%, the learning design indicator in the category was quite good with an average score of 4.08 at an achievement level of 81.88%, the learning implementation indicator was in the good category with an average score of 4.43 at an achievement level of 88.53%, and assessment indicators (cognitive and non-cognitive) in the category are quite good with an average score of 3.93 at an achievement rate of 78.69%, In general, the achievement rate of teachers' numeracy skills in the learning and assessment indicators with an average score of 3.95 and a percentage achievement rate of 78.22% is in the category of quite good.

From the description above, there is one indicator that is not achieved, namely opportunities and demands. Meanwhile, the other two indicators have been achieved in the category of quite good, namely r learning plan and asession (cognitive and non-cognitive). Then there are indicators achieved in the good category, namely theimplementation of learning. This shows that each teacher has quite good abilities in the aspect of learning and numeracy assessment across subjects.

1. Teacher numeracy culture

**Table 10. Teacher Numeracy Culture**

|  |  |  |  |
| --- | --- | --- | --- |
| **Indicator** | **Average** | **Achievement (%)** | **Category** |
| Understanding the mindset | 2,70 | 53,93 | Bad |
| Implementing learning strategies | 3,57 | 71,32 | Not Good |
| Evaluate learning strategies | 3,34 | 66,76 | Not Good |
| Collaborate with colleagues | 4,61 | 92,20 | Excellent |
| Mentoring colleagues | 3,83 | 76,44 | Pretty Good |
| **Total Grade Point Average** | **3,61** | **72,13** | **Not Good** |

**Figure 7- Teacher Numeracy Culture**

Based on table 10 and figure 7 above, it shows that the teacher's literacy culture in the component of understanding the mindset is achieved in the bad category with an average score of 2.70 at an achievement level of 53.93%, the indicator of implementing learning strategies in the poor category with an average score of 3.57 at an achievement level of 71.32%, the indicator evaluating learning strategies is in the poor category with an average score of 3.34 at an achievement level of 66.76%, and indicator Bof collaboration with peers is in the very good category with an average score of 4.61 at an achievement rate of 92.20%, and the indicator of guiding peers is in the category of quite good with an average score of 3.83 at an achievement rate of 76.44%. In general, the achievement rate of teachers' numeracy skills in the literacy culture indicator with an average score of 3.61 and a percentage achievement rate of 72.13% is in the poor category. From the description above, the indicators of collaborating with colleagues have been achieved very well. As for other indicators, the level of achievement is below average. This shows that teachers lack numeracy cultural skills.

**Discussion**

The results of the study show that the level of literacy and numeracy competence of elementary school teachers is in the low category, where the level of teacher literacy competence in the category is quite good, with an achievement rate of 83.24%, and the level of teacher numeracy competence in the category is not good, the level of achievement is 75.16%. This shows that efforts to improve teachers' literacy and numeracy competencies have not yielded optimal results and need to be improved.

The results of the study also show that the teacher's literacy competence has two indicators at the level of achievement of the category that is quite good, namely the learning environment with an average score of 4.11 at an achievement level of 82%, and the teacher literacy culture indicator with an average score of 3.95 at an achievement level of 78.93%. The learning and assessment indicators are in the good category with an average score of 4.44 with an achievement rate of 88.79%. Teacher numeracy competence From each of these indicators, there are two indicators at the achievement level of the poor category, namely the learning environment with an average score of 3.76 at an achievement level of 75.12%, and the teacher numeracy culture indicator with an average score of 3.95 at an achievement level of 78.22%. The learning and assessment indicators are in the category of quite good with an average score of 3.61 with an achievement rate of 72.13%. Teachers as the main component in providing quality learning services are required to have literacy and numeracy competencies. Teacher literacy and numeracy competence is a basic ability to respond to a problem in the development and implementation of learning. In the framework of teacher literacy and numeracy competencies (Kemendikbudristek, 2022), it is stated that teachers' literacy and numeracy skills include the ability to manage the learning environment, teacher literacy culture, and the ability to implement learning and assessment.

Teacher literacy culture in the aspect of teacher literacy ability is a teacher's ability to cultivate the habit of accessing, processing, interpreting, and criticizing information from various sources, as well as presenting ideas effectively through multimodal texts. Meanwhile, in the aspect of numeracy, the teacher's numeracy culture is an ability for teachers to build a numeracy mindset and a culture of critical orientation in numeracy, both for educators and students. Teachers need to cultivate a numeracy culture to be able to understand, apply, evaluate and collaborate as well as guide peers in developing numeracy learning strategies that support the numeracy mindset and critical orientation culture of students. A number of institutions/agencies, especially educational institutions, have provided teacher literacy and numeracy training programs both offline and online, as an effort to maintain the curriculum in line with the needs of educational progress, (Zulkifli et al., 2023), but in general, these training programs are still carried out conventionally using lecture and discussion methods (Marlena et al., 2022) has not been supported by relevant media, especially information technology media. For this reason, supervisors need attention in improving teacher competence, (Apriliya & M, 2024) by providing fun and useful rocks for teachers (Yusuf, 2023). Providing assistance to improve teachers' literacy and numeracy competence can be done through quality and continuous training activities with relevant multimedia support. Comprehensive teacher training can improve quality, (Apelehin et al., 2025). The relevance of training to needs can support meaningful learning experiences, (Yulastri et al., 2023). This should be the main concern for supervisors in fostering literacy and numeracy competencies for teachers.

Supervisors can provide training to improve teachers' literacy and numeracy skills through academic supervision activities. The learning environment in the context of teachers' literacy skills is a skill of teachers managing a multimodal text-rich environment to foster students' interest and literacy skills. Teachers need to foster a fun and text-rich learning environment, give appreciation to students' activities and interests in reading and writing activities, integrate literacy activities with literacy activities (listening, speaking, and storytelling), and strengthening multimodal text-based learning in accordance with the characteristics and needs of students, (Ministry of Education and Culture, 2022).. In the context of numeracy, the learning environment is an ability in the aspects of numeracy knowledge and experience that students have, and the learning environment in physical aspects such as social, emotional, and intellectual that supports learning and numeracy mindset. Supervisors play a role in improving teacher competence so that meaningful learning is created, (Dwikurnaningsih, 2020; Marheni, 2022; Musyadad et al., 2022; Sudargini, 2021). Academic supervision is a continuous process to improve the quality of education, (Susilo et al., 2024). Improving the quality of learning through the development of teacher professionalism is a process of academic supervision, (Husni et al., 2024; Suryani et al., 2025). Thus, it can be understood that throughacademic supervision, the development of teachers' literacy and numeracy competencies can be carried out with the empowerment of interactive multimedia by supervisors.

Interactive multimedia is the transmission of data and manipulation of all forms of information, processed in the form of digital data that allows users to interact directly. (Zulqadri et al., 2023). Collaborative learning through digital platforms allows for the creation of shared content and interactive discussions so as to improve literacy skills, (Khumalo MA., 2025; Anastasopoulou et al., 2025). Proper academic supervision affects teachers' teaching ability to improve student achievement, (Alam et al., 2021). Supervisors can interact directly with teachers using interactive multimedia. The role of academic supervision in building interaction with teachers is a key component in improving teacher competence effectively. (Jaenam & Zulkifli, 2022). Teachers' literacy skills in learning and assessment are teachers' skills in designing learning and assessment that focus on improving students' literacy skills. Meanwhile, learning and assessment skills in aspen numeracy are an opportunity and demand to learn numeracy across subjects, and assessments that provide opportunities to demonstrate numeracy knowledge through various strategies (Kemendikbudristek, 2022). The foundation for the development of teacher literacy and numeracy competencies is a description of teacher competency criteria which is affirmed into a competency model category with dimensions of professional knowledge, professional learning practices and professional development. It is further stated that teachers' literacy and numeracy competencies are the ability of teachers to assist students in accessing, using, interpreting and communicating knowledge through various texts as needed.

**CONCLUSION**

The mapping results showed that teachers ' literacy competencies were in the category of quite good with an achievement rate of 83.24%. Meanwhile, the teacher's numeracy competence is not good with an achievement rate of 75.16%. Strengthening teachers' literacy and numeracy competencies can be done through academic supervision, especially in the form of training activities with interactive multimedia empowerment. The development of interactive multimedia that will be used in academic supervision activities to improve teachers' literacy and numeracy competencies by supervisors is urgently needed.

Disclaimer (Artificial intelligence)

Option 1:

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

Option 2:

Author(s) hereby declare that generative AI technologies such as Large Language Models, etc. have been used during the writing or editing of manuscripts. This explanation will include the name, version, model, and source of the generative AI technology and as well as all input prompts provided to the generative AI technology

Details of the AI usage are given below:

1.

2.

3.

**REFERENCES**

Alam, M. J., Haque, A. K. M. M., & Banu, A. (2021). Academic Supervision for Improving Quality Education in Primary Schools of Bangladesh: Concept, Issues and Implications. *Asian Journal of Education and Social Studies*, *14*(4), 1–12. https://doi.org/10.9734/ajess/2021/v14i330359

Anastasopoulou, E., Konstantina, G., Ioanna, S., Travlou, C., Evangelia, M., Lyrintzi, T., & Lyrintzi, M. (2025). Use of New Technologies in Primary Education. *Asian Journal of Education and Social Studies*, *51*(3), 386–396. https://doi.org/10.9734/ajess/2025/v51i31834

Andriana, E., Yuliana, R., & Yandari, I. A. V. (2023). Strengthening Literacy and Numeracy Competencies of Elementary School Teachers in Pandeglang Regency and Serang City, Banten. DEDICATION: Community Service Reports, 6(1), 27–36.https://doi.org/10.20961/dedikasi.v6i1.78975

Apelehin, A. A., Ajuluchukwu, P., Okonkwo, C. A., Enahore, I. C., & Iguma, D. R. (2025). Enhancing Teacher Training for Social Improvement in Education: Innovative Approaches and Best Practices. *Asian Journal of Education and Social Studies*, *51*(2), 244–255. https://doi.org/10.9734/ajess/2025/v51i21782

Apriliya, N., & M, S. K. (2024). THE ROLE OF PRINCIPAL GUIDANCE IN IMPROVING LEARNING QUALITY THROUGH LEARNING COMMUNITY AT SDN KALONGAN 01. 09.

Ardellea, F., & Hamdu, G. (2022). The Importance of Elementary School Teachers' Ability in Developing Literacy and Numeracy Test Questions Based on Education for Sustainable Development (ESD). Edu Cendikia: Scientific Journal of Education, 2(02), 220–227. https://doi.org/10.47709/educendikia.v2i02.1587

Arikunto, S. (2006). Classroom action research procedures. Bumi Aksara, 136(2), 2–3.

Atteh , E., Kwofie , W., Martin , G., & Boakye , A. (2023). Hidden Curriculum Activities on Numeracy and Literacy Development in Early Grade Education: Perspectives from Elementary School Teachers in Ghana. Advances in Research, 24(5), 260–268. <https://doi.org/10.9734/air/2023/v24i5976>

Dewayani, S., Retnaningdyah, P., Susanti, D., & Antoro, B. (2021). Literacy & Numeracy Strengthening Guidelines in Schools. https://repositori.kemdikbud.go.id/22599/1/Panduan\_Penguatan\_Literasi\_dan\_Numerasi\_di\_Sekolah\_bf1426239f.pdf

Dwikurnaningsih, Y. (2020). Implementation of academic supervision in early childhood education institutions. JMSP (Journal of Educational Management and Supervision), 4(3), 182–190.

Husni, H. H., Aan, A. K., & Dedy, D. A. K. (2024). Optimizing Academic Supervision to Improve the Quality of Educational Services. JPI (Jurnal Pendidikan Indonesia), 13(1), 173–179. https://doi.org/10.23887/jpiundiksha.v13i1.64443

Jaenam, J., & Zulkifli, Z. (2022). Supervision of Learning in Online Learning Perspective in the Pandemic Era of Covid 19. *Proceedings of the Annual Civic Education Conference (ACEC 2021)*, 191–195. https://doi.org/10.2991/assehr.k.220108.034

Janawati, D. P. A. (2024). Analysis of the Implementation of Reading Corners in Supporting the School Literacy Movement at SDN 3 Kawan. Journal of Narrative Science, 05(4), 351–363.

Ministry of Education, Culture, Research and Technology. (2022). Literacy and Numeracy Competency Framework for Elementary School Teachers. Directorate General of Teachers and Education Personnel.

Khumalo MA. (2025). Enhancing Digital Literacy for Learners in Inclusive Primary and Secondary Education in Lesotho. European Journal of Education and Pedagogy (EJ-EDU), 6(2), 12-21. [10.24018/ejedu.2025.6.2.928](https://doi.org/10.24018/ejedu.2025.6.2.928)

Maghfiroh, F. L., Amin, S. M., Ibrahim, M., & Hartatik, S. (2021). The Effectiveness of the Indonesian Realistic Mathematics Education Approach on Students' Numeracy Literacy Skills in Elementary Schools. Basicedu Journal, 5(5), 3342–3351. https://doi.org/10.31004/basicedu.v5i5.1341

Marheni, M. S. (2022). Improving Teachers' Ability to Prepare Lesson Plans through Continuous Academic Supervision. Journal of Education Action Research, 6(1), 1–7. https://doi.org/10.23887/jear.v6i1.44468

Marlena, L., Wahidin, W., & Al Azizah, U. S. (2022). Teacher Literacy and Numeracy Competency Training as Strengthening in Facing the Independent Curriculum. Friday Education: Community Service Journal, 3(3), 151–155.

Mea, F., Tinggi, S., Kristen, A., Bangsa, A., Guru, K., Guru, I., & Dinamis, K. (2024). TEACHER CREATIVITY AND INNOVATION IN CREATING. 4(3), 252–275.

Munahefi, D. N., Lestari, F. D., Mashuri, M., & Kharisudin, I. (2023). Development of numeracy literacy skills through integrated thematic learning based on projects. PRISMA, Proceedings of the National Mathematics Seminar, 6, 663–669

.

Murtafiah, W., Pratiwi, C. P., Listiani, I. Y., Krisdiana, I., Setyansah, R. K., & Masfingatin, T. (2024). Teacher Assistance in Developing Literacy and Numeracy Skills of Students at SDN Kebon 1. Jurnal Abdimas Indonesia, 4(2), 430–443. https://doi.org/10.53769/jai.v4i2.726

Musoffa, M. (2022). Learning loss and decreased literacy and numeracy competencies of elementary school students in Cikeusik sub-district, Pandeglang district, Banten. Journal of Islamic Education, 4(1), 63–80.

Musyadad, V. F., Hanafiah, H., Tanjung, R., & Arifudin, O. (2022). Academic Supervision to Improve Teachers' Work Motivation in Making Learning Tools. JIIP - Scientific Journal of Educational Sciences, 5(6), 1936–1941. https://doi.org/10.54371/jiip.v5i6.653

Nurjanah, M., Dewi, D. T., Al Fathan, K. M., & Mawardini, I. D. (2022). Numeracy literacy in thematic learning of grade 3 elementary school/MI students. Muallimuna: Journal of Elementary Schools, 7(2), 87–98.

Nurochmah, A., & Mappincara, A. (2022). Development of a Lesson Study-Based Continuous Training Model to Improve School/Madrasah Supervisor Competition. Journal Of Administration and Educational Management (ALIGNMENT), 5(2), 227–240. https://doi.org/10.31539/alignment.v5i2.4157

Purnomo, Y. W., Prananto, I. W., Sayekti, O. M., & Sulistyani, N. (2024). GUIDANCE IN THE COMPILATION OF RESEARCH-BASED TEACHERS' TEACHING PRACTICE MILIEU TO IMPROVE ABILITY. 8(5), 4–10.

Salvia, N. Z., Sabrina, F. P., & Maula, I. (2022). Analysis of students' numeracy literacy abilities in terms of mathematics anxiety. ProSANDIKA UNIKAL (Proceedings of the National Seminar on Mathematics Education, Pekalongan University), 3(1), 351–360.

Shelton, A., Hogan, E., & Fu, Y. (2025). Special Education Teacher Educators’ Focus on Emergent Multilingual Learners in Preservice Literacy Courses. *Teacher Education and Special Education*, *48*(2), 145–162. https://doi.org/10.1177/08884064251326573

Sinaga, M. E., & Simanjorang, M. M. (2024). *YANG MENGIMPLEMENTASIKAN KURIKULUM MERDEKA ANALYSIS OF THE NUMERACY LITERACY ABILITY OF PARMAKSIAN 1 PUBLIC HIGH SCHOOL STUDENTS WHO IMPLEMENT THE INDEPENDENT CURRICULUM*. *10*(2), 178–186.

Sudargini, Y. (2021). The Role of Academic Supervision and Work Motivation in Improving the Competence of State Senior High School Teachers in Pati. Journal of Industrial Engineering \& Management Research, 2(6), 13–21.

Sugiyono, D. (2013). Quantitative, qualitative and R\&D educational research methods.

Suryani, Y., Yuliejantiningsih, Y., & others. (2025). THE EFFECT OF ACADEMIC SUPERVISION, TEACHER PEDAGOGIC COMPETENCY AND CHILD-FRIENDLY SCHOOL CULTURE ON LEARNING QUALITY. Pendas: Scientific Journal of Elementary Education, 10(01), 221–235.

Susanti, L., Gistituati, N., Anisah, A., & Widiawati, W. (2024). DIGITAL-BASED NUMERATION LITERACY IMPROVEMENT STRATEGIES FOR PRIMARY EDUCATIONAL TEACHERS ACCORDING TO THE DEMANDS OF THE INDEPENDENT CURRICULUM. Journal of Community Service, 8(1), 276–296

.

Susilo, I., Aditya, E., Zamroni, E., & Muliana, L. (2024). The Influence of School-Based Management and Academic Supervision towards the Professionalism of Junior High School Teachers. *ICCCM Journal of Social Sciences and Humanities*, *3*(5), 27–32.

Syafutra, W., Remora, H., & Sovensi, E. (2022). Jurnal Pengabdian Pendidikan Masyarakat ( JPPM ) Jurnal Pengabdian Pendidikan Masyarakat ( JPPM ). *Jurnal Pengabdian Pendidikan Masyarakat (JPPM)*, *3*(2), 108–118.

Widiastuti, D., Ahmad, M., & Nugraha, A. (2022). Literacy and numeracy-based learning in grade IV of elementary school. Edu Cendikia: Scientific Journal of Education, 2(02), 248–257. https://doi.org/10.47709/educendikia.v2i02.1606

Winarti, W., Hairida, H., & Lestari, I. (2021). Description of Teachers' Ability to Create Questions Based on the 2013 Curriculum in Senior High Schools in Landak Regency. Wahana Pendidikan Scientific Journal, 7(2), 108–115. https://doi.org/10.5281/zenodo.4659018

Yulastri, W., Zulfa, Z., Juliardi, B., Zulkifli, Z., Rudagi, R., & Yulmiati, Y. (2023). Development of educational professional learning materials based on cultural discourse in higher education. *Journal of Pragmatics and Discourse Research*, *3*(1), 111–121.

Yusuf, M. (2023). Principal Supervision in Improving Teacher Professionalism at Smpn 2 Alalak Barito Kuala. Management of Education: Jurnal Manajemen Pendidikan Islam, 9(1), 75–86.

Zulkifli, Ho, P. V. P., Sholeh, M. I., & Sahri. (2023). Enhancing Student Achievement in Senior High School through Curriculum Management in Indonesia. *Tarbawi Junal Keilmuan Manajemen Pendidikan*.

Zulqadri, D. M., Nurgiyantoro, B., & others. (2023). Development of web-based interactive multimedia to improve cultural literacy and digital literacy of grade V elementary school/Islamic elementary school students. JOURNAL IPTEKKOM Journal of Science & Information Technology, 25(1), 103–120.