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# Improving Teacher's Numeracy Skills at Cisarua State Elementary School, West Java, Indonesia

**Asep Dikdik[1]*, Asep Suryana[1], Cepi Triatna[1], Yayah Rahyasih[1], Firyal Fatin Oktaviani[1]**
[1]Universitas Pendidikan Indonesia
Dr. Setiabudhi Street No. 229, Bandung 40154, West Java, Indonesia
*Corresponding Author. E-mail: asep.dikdik@upi.edu

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**Abstract**: Teachers occupy a pivotal role in the education system, including the imperative of attaining numeracy competence, a benchmark defined by governmental standards. The objective of this study is twofold: firstly, to assess the current state of numeracy competence among teachers at Cisarua State Elementary School, and secondly, to formulate a model to enhance their competencies in this domain. The research methodology is quantitative, incorporating a case study design that amalgamates descriptive and exploratory research methodologies. The study's participants comprised 15 teachers evaluated through a questionnaire-based training needs survey. Data was collected through a survey technique, with a questionnaire as the primary instrument. The collected data underwent quantitative analysis using descriptive analysis techniques. The results indicated that teachers' numeracy competence falls below the ideal standard set by government policy, with an average score of 40.6 out of a possible 42. This discrepancy underscores the necessity for human resource development in numeracy competence. In light of these findings, this study proposes a training model based on the ICARE approach (Introduction, Connection, Application, Reflection, Extension) to enhance teacher numeracy competence. The implications of this study underscore the necessity of systematic and sustainable training interventions to enhance teachers' numeracy skills, which will contribute to enhancing the quality of numeracy learning for students at the primary school level.
**Keywords**: numeracy, human resource development, training

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## Introduction

Teacher numeracy competence plays a pivotal role in enhancing the quality of mathematics education in elementary schools (Utama et al., 2023; Nurhikmah & Wibowo, 2024). However, numerous teachers encounter challenges in optimally mastering numeracy skills (Rohmah et al., 2022). This issue assumes even greater significance when considering that national reports indicate that less than 50% of primary school students in Indonesia have attained the minimum threshold in numeracy ( Hapsari et al., 2022). This substantiates the correlation between teachers' inadequate numeracy proficiency and students' suboptimal learning outcomes in this domain. If not addressed promptly, this discrepancy could adversely impact the efficacy of learning and the early development of students' logical thinking skills.

This research is predicated on the recognition of this urgency, and thus, it focuses on two main aspects, namely the identification of the level of numeracy competence of teachers in Cisarua State Elementary School and the development of a training model that can improve their numeracy skills. This endeavor is of paramount importance, as educators' role as learning leaders entails not only the delivery of academic material (Hamid, 2023) but also the cultivation of students' numeracy aptitudes through an efficacious, demand-driven approach (Winarno et al., 2024; Halimah & Wibowo, 2024; Harokah et al., 2024).

Within the paradigm of professionalism, the teaching profession necessitates the attainment of specific competencies that cannot be acquired immediately, but rather, these competencies must be cultivated through training and experience in the domain of education (Channa et al., 2025). From an educational perspective, the primary responsibility of teachers is the instruction of the subject matter (Zeb et al., 2024). To carry out this task effectively, teachers must possess a profound understanding and extensive insight to provide optimal learning experiences for students (Forster, 2024). Teachers must also have a deep understanding and broad insight to carry out these tasks effectively (Wati et al., 2022). Consequently, enhancing teacher competencies, including numeracy, should be a paramount concern in endeavors to elevate the caliber of fundamental education.

Teachers have expressed a strong desire to incorporate numeracy into their pedagogical practices, to enhance student learning outcomes (Singh et al., 2023). This underscores the significance of professional development initiatives designed to equip teachers with the requisite skills to enhance their numeracy teaching abilities. The importance of professional development workshops specifically designed to enhance numeracy skills cannot be overstated in improving teachers' competencies (Edwar et al., 2022). The involvement of education stakeholders in this training initiative is also emphasized as a collaborative effort to improve numeracy teaching. The training approach effectively improved numeracy outcomes for students with developmental disabilities and demonstrated the potential of innovative training approaches to improve teacher competence in numeracy (Aini et al., 2024). Targeted professional development, collaborative training initiatives, and innovative teaching strategies are essential to promote effective numeracy teaching in basic education.

The main tasks that teachers must perform include: (1) designing the content of the curriculum, which is the teacher's task to prepare the curriculum, such as preparing the annual, semester, weekly, and daily programs; (2) implementing the learning, which is the teacher's task to teach the learning objectives and materials by choosing the methods, as well as using the tools or media in the learning, (3) carrying out the evaluation or assessment, (4) carrying out the tasks with a full sense of responsibility, and (5) implementing the discipline in a broad sense (Faisal, 2023).

Professional teachers must have a philosophical perception and wise responsiveness to be better prepared to approach and carry out their work. "Professionalism is related to the commitment of those in the profession to continuously improve their professional skills and develop new strategies through a continuous learning process" (Dacholfany et al., 2023). Law No. 14/2005 on Teachers and Lecturers states that teachers are professional educators whose main task is to educate, instruct, guide, train, assess, and evaluate students in early childhood education through formal education, primary education, and secondary education (Ilyas, 2022). Successful learning does not depend on a single process but involves a variety of interrelated processes. Teachers and educational institutions need to demonstrate and optimize each process to create effective learning experiences. In addition, teachers must be prepared to deal with changing times, including changes in curriculum, learning media, and learning facilities.

In the contemporary era, marked by rapid advancements in technology and the ever-evolving demands of the job market, individuals need to possess highly dynamic competencies. This starkly contrasts the skills that were sufficient in the 20th century, a period when technology was in its nascent stages. The current landscape, characterized by the pervasive influence of technology in all facets of life, necessitates a significant shift in the competencies required of individuals. Education must evolve to meet these challenges as the primary agent of human development. Failure to do so may result in the production of individuals who cannot adapt to the demands of an ever-changing world and may even be threatened by change itself. Ali bin Abi Talib once said, "Educate your children according to their times" (Maulana, 2023). Ki Hajar Dewantara's pedagogical vision, as elucidated by (Alghifari et al., 2023), underscores the notion that each child evolves and flourishes by both their innate qualities and the prevailing circumstances. Consequently, education must be meticulously tailored to align with the demands of the contemporary era.

The 21st-century skills are the 4Cs: critical thinking, creative thinking, collaboration, and communication (Saad et al., 2024). These four things will be paralyzed if they are not supported by the competence to solve problems with mathematical knowledge, which is called numeracy. The link between the competencies needed by students in the 21st century in which they live and this numeracy competency shows how important numeracy competencies must be in every Indonesian student.

Teachers are learning leaders and have a strategic role. Therefore, the government sets competency standards for teachers, including numeracy competency. Teacher competency standards in

Indonesia can be classified as good and professional if they have several competencies, including teachers with a dynamic, active, and innovative mindset (Wijaya, 2023). This innovative meaning may be similar to numeracy literacy, which means solving problems with applied mathematics (Purwati & Sukirman, 2024; Alifah et al., 2024). Therefore, teachers need to have numeracy competence.

Teacher competence is a qualitative description of the nature of meaningful teacher behavior. From this statement, competence is defined and interpreted as a set of effective behaviors related to exploring and investigating, analyzing and thinking, paying attention, and perceiving that lead a person to find preventive steps to achieve certain goals effectively and efficiently (Hafsah & Fatonah, 2023). In addition, teacher competence is also a combination of personal, scientific, technological, social, and spiritual competencies that make up the teaching profession. These competencies include mastery of subject matter, understanding of students, pedagogical learning, personal development and professionalism. The new mandate regarding the competency standards for graduates of the Primary and Secondary Education Units focuses on the development of character by the values of Pancasila, as well as students' literacy and numeracy skills (Presiden Republik Indonesia, 2021). For example, the government requires teachers to have numeracy skills.

This policy was introduced with the hope that learning in all subjects could be integrated to strengthen students' numeracy skills. As a next step, the government established a policy on teachers' numeracy skills in the Regulation of the Director General of Teachers and Education Personnel of the Ministry of Education, Culture, Research and Technology No. 0340/B/HK.01.03/2022 on Literacy and Numeracy Competency Framework for Teachers in Primary Schools (Kemdikbudristek, 2022). This provision requires teachers to demonstrate relevant competencies as school human resources (HR) and as education professionals. Meanwhile, the Indonesian Education Report Card for 2022 shows that less than 50% of all primary school students in Indonesia can meet the minimum competency threshold in literacy and numeracy (Waluyo & Pujiastuti, 2023). The same is reported in a study conducted by (Setiawan, 2021), who cites the Program International Student Assessment (PISA) results that students still have difficulty solving even level 1 and 2 problems in numeracy.

In light of these findings, pre-research interviews conducted by the researchers also found evidence of a numeracy skills gap among teachers at Cisarua State Elementary School. If this information is true and ignored, there is a risk that the learning process organized there will not be integrated with the strengthening of students' numeracy competence. As a result, students' numeracy competence has the potential to be left behind and/or develop slowly. This study aims to confirm the truth of this information through a training needs survey approach and to recommend a design for numeracy competence development for teachers if the hypothesis is true. The formulation of our proposed design is based on a literature review of peer-reviewed scientific journal articles.

## Methods

This research employs quantitative methodologies (Charli et al., 2022) and a case study approach (Ratnasari & Sudradjat, 2023) to ascertain the level of numeracy competence among educators at Cisarua State Elementary School and to formulate a suitable training model. The research design combines a descriptive approach (Miksza et al., 2023) and an exploratory one (Roberts et al., 2023). The descriptive stage maps the current state of the teachers' numeracy competence. In contrast, based on the research findings, the exploratory stage aims to design strategies for improving their competencies. The participants in this study comprised 15 teachers who were selected by purposive samples (Andrade, 2021), with consideration given to the relevance of their teaching experience and the necessity to enhance their numeracy competence.

Data was collected through a survey technique, with a questionnaire as the primary instrument. The teacher numeracy competency framework developed the questionnaire, as stipulated in Director General GTK Regulation No. 0340/B/HK.01.03/2022. This framework categorizes teacher numeracy competency into four levels (Kemdikbudristek, 2022). The questionnaire was meticulously designed to assess 14 numeracy competency sub-indicators, thereby enabling the categorization of teachers into distinct groups based on their proficiency levels. The survey was conducted in schools through the self-assessment method (Kalykbayeva et al., 2021), with teachers completing it under the close supervision of researchers to ensure the accuracy of the data obtained.

The collected data underwent quantitative analysis using descriptive analysis techniques, with the mean scores of the questionnaire results serving to identify the discrepancy between actual competencies and expected standards. In addition, based on the results of teacher competency mapping, a relevant human resource development model was designed to enhance their numeracy competencies. The training model that emerged from this study is the ICARE (Introduction, Connection, Application, Reflection, Extension) approach, which was selected due to its systematic structure and documented effectiveness in enhancing numeracy skills through continuous learning (Antari et al., 2022).

The data analysis findings offer a comprehensive overview of the degree to which teachers' numeracy competencies have been achieved, as well as the necessity for more structured training interventions. This study presents empirical findings on the state of teacher competence at Cisarua State Elementary School and offers a concrete solution in the form of a training model based on the actual needs of teachers. The design of this intervention was informed by a comprehensive review of the extant literature, encompassing a range of peer-reviewed journal articles. The selection of these articles was guided by a set of inclusion and exclusion criteria delineated in Table 1.

**Table 1.** Inclusion and Exclusion Criteria

| Aspect | Inclusion | Exclusion |
|---|---|---|
| Source type | Peer-reviewed journals are indexed in the Google Scholar and Scopus database | Books, missing URLs, and duplicate articles |
| Year of publication | Articles published from January 2019 – January 2024 | Articles published before January 2019 |
| Context | Human resource development in the education sector | Non-educational human resource development (e.g., companies) |

Source: Modified from (Jr & Pogoy, 2023)

A manual search of Google Scholar yielded 77 articles; however, after screening based on predetermined inclusion criteria, only 40 articles were deemed eligible. Fifteen articles sourced from Scopus were also included, bringing the total number of articles used in this study to 55. A comprehensive analysis was conducted, with select articles serving as the primary reference in addressing the study's research questions and others providing the foundation for the formulation of recommendations concerning a staff development model aimed at enhancing primary school teachers' numeracy competencies.

## Results and Discussion

### Result

To obtain research findings, the author internalized the 14 sub-indicators of teachers' numeracy competence contained in the Regulation of the Director General of Teachers and Educational Personnel of the Ministry of Education, Culture, Research and Technology No. 0340/B/HK.01.03/2022 as the basis for preparing the questionnaire instrument. The training needs analysis activities were conducted with a training needs survey through questionnaire techniques during one working day at Cisarua State Elementary School on November 29, 2023, conducted directly (on-site). We deliberately chose the face-to-face model for optimal implementation in this training needs survey.

**Figure 1.** Distribution of Training Needs Survey Instruments

The activity began with a briefing by the school principal and the author as the fieldworker. In addition to describing the urgency and importance of human resource development needs analysis activities, the author also had the opportunity to explain the standards for teacher numeracy competence that are currently in place in Indonesia. The briefing session also emphasized the differences in descriptions between levels of teacher numeracy competence used in the instrument to minimize the potential for error in completing the questionnaire. Each respondent completed the questionnaire directly with other respondents in the presence of the author. The results of the questionnaire are presented on the Table 2.

**Table 2.** Compiling the Results of the Training Needs Assessment Tool

| **Level 1** | | | | **Level 2** | | | | | **Level 3** | | | | **Level 4** | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Develop | | | | Worthy | | | | | Competent | | | | Proficient | | | |
| **Research** | Sub-Indicators and Level Numbers Based on the Results of The Questionnaire | | | | | | | | | | | | | | | Level |
| **Subject Code** | 2.3 | 2.4 | 2.5 | 2.6 | 2.7 | 2.8 | 2.9 | 2.10 | 2.11 | 2.12 | 2.13 | 2.14 | 2.15 | 2.16 | | Calculation Score |
| S1 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | | 42 |
| S2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | | 42 |
| S3 | 2 | 3 | 4 | 3 | 3 | 4 | 3 | 3 | 3 | 3 | 4 | 4 | 3 | 3 | | 45 |
| S4 | 3 | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 3 | 3 | 2 | | 35 |
| S5 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 4 | 3 | 3 | 3 | | 43 |
| S6 | 3 | 3 | 3 | 3 | 2 | 2 | 3 | 3 | 4 | 3 | 3 | 3 | 3 | 3 | | 41 |
| S7 | 3 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 4 | 3 | 4 | 3 | 3 | | 43 |
| S8 | 3 | 3 | 2 | 2 | 2 | 3 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 2 | | 36 |
| S9 | 3 | 3 | 2 | 3 | 4 | 3 | 2 | 3 | 3 | 2 | 3 | 3 | 3 | 3 | | 40 |
| S10 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | | 42 |
| S11 | 3 | 2 | 2 | 3 | 3 | 2 | 3 | 2 | 3 | 3 | 3 | 3 | 2 | 3 | | 37 |
| S12 | 3 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | | 41 |
| S13 | 3 | 3 | 3 | 3 | 3 | 3 | 4 | 3 | 3 | 3 | 3 | 4 | 4 | 3 | | 42 |
| S14 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 4 | 3 | 3 | | 42 |
| S15 | 3 | 2 | 2 | 3 | 4 | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 2 | 3 | | 39 |
| **Average** | **2.9** | **2.7** | **2.8** | **2.9** | **2.9** | **2.8** | **2.8** | **2.8** | **2.9** | **3** | **3** | **3.2** | **2.9** | **2.8** | | **40.6** |

## Discussion

The majority of respondents in this study indicated that their numeracy competence was at a level that had not reached the ideal standard, a finding of great significance for educators in educational institutions that implement independent curriculum programs. According to the analysis, if the maximum level of proficiency (4) is multiplied by the number of sub-indicators (14), the ideal score is (56). Conversely, if the numeracy competency standard is adjusted to level 3, assuming a gradual improvement trajectory, the ideal score would be 42. However, the average score obtained was only 40.6, with only eight respondents achieving the ideal score. The majority of respondents obtained a score below the expected standard.

The findings of this investigation indicate a discrepancy between the ideal numeracy competencies stipulated by government policy and the current competencies of teachers at Cisarua State Elementary School. This discrepancy underscores the necessity to enhance teachers' human resource capacity, particularly in the domain of numeracy. If this discrepancy is not addressed promptly, there is a risk to the effective development of students' numeracy competence within the educational institution. In light of this finding, deliberations were conducted with the school principal to address the urgency of cultivating teachers' competencies.

These discussions agreed that the school should implement a structured human resource development approach to improve teachers' numeracy skills. This initiative aims to ensure that the teachers of Cisarua State Elementary School achieve numeracy proficiency level (4) according to the 14 numeracy sub-indicators measured. This recommendation is based on an academic study stating that a planned and systematic intervention within a relatively short period is required to address the competency gap. Consequently, the enhancement of teachers' numeracy competencies is identified as a strategic measure to support the acceleration of students' numeracy skills, aligning with the expectations of the Ministry of Education and Culture.

Before recommending a development design that is considered the most appropriate for the case of teacher numeracy competency gaps at Cisarua State Elementary School, we first explore the content in HR development that corresponds to different categories of teacher numeracy competency level achievements. Because it is shown that for different gaps, different HRD content approaches are needed. Teachers who reach the decent level and the proficient level, both need to be trained with numeracy discussion materials including numeracy process, content, and context. The difference is in the depth of the material. For teachers who reach the proficient level, the goal of staff development should be to encourage:

1. Participants will be able to identify and explain the context profile of a numerical problem.
2. Participants will be able to identify and explain the numerical content profile of a numerical problem.
3. Participants will be able to identify the dominant process category in a correctly presented problem.

As for teachers who reach the proficient level, staff development goals should encourage them to do so:

1. HRD participants will be able to use the necessary context when solving numerical problems.
2. HRD participants will be able to apply the necessary content to solve numerical problems appropriately.
3. Participants will be able to identify and distinguish the dominant process categories in an appropriately presented problem.

**Recommendations for Teacher Numeracy Skills Development Models in Cisarua State Elementary Schools**

The recommendation used to develop teachers' numeracy competence is training using the ICARE approach model. Training with the ICARE approach is conducted to improve teachers' skills in developing numeracy assessment stimulus devices. The ICARE approach model is a learning approach that consists of five stages: introduction, connection, application, reflection, and extension. Introduction is a stage where the teacher provides an understanding of the learning content to be taught and provides learning objectives. Connection is a stage where the teacher tries to connect new learning material with something that students already know from previous learning or experience. Application is a stage that provides opportunities for students to practice and apply knowledge and skills. Reflection is a stage to summarize or conclude the learning that has been gained, and extension is a stage to increase mastery of understanding of material outside of class time, which can be done by assigning homework (Putu et al., 2020).

(Yasa et al., 2019) suggested that the ICARE approach model positively affects the ability to understand mathematical concepts. A good understanding of concepts can help understand problems and facilitate the problems that are given. The ICARE approach ensures that students have the opportunity to apply what they have learned so that learning becomes more meaningful and students can enhance the essence of learning.

The ICARE approach was chosen in this study because of the systematic and structured steps that can be used to make trainees more active, to guide participants to conclude the lessons given, and as a way to meet the needs of appropriate mathematics learning. The ICARE approach in each of its stages has a positive effect on learning. This approach can develop character in a person and prioritize the acquisition of material. However, there is a need for application in real life.

Efforts can be made to develop teachers' numeracy skills through teacher training activities in primary schools. The ultimate goal of these activities can be known through project tasks and tool development. Outputs are the results of a program, activity, or policy. Measuring outputs is more difficult, especially for social services such as education. In addition, outputs can be controlled from within the institution, as can be seen in this study through the self-assessment of teachers as trainees (Rahayu et al., 2023).

Teacher competency development to improve numeracy assessment skills is currently a necessity for schools to improve the quality and adaptive attitude of schools. There are various strategies to meet the needs of teacher competency development, one of which is the implementation of continuous teacher training and coaching (Supriyati & Muqorobin, 2021). This strategy must be jointly formulated and adapted to the context of the needs and socio-cultural conditions of different communities (Putri, 2021).

Therefore, as an academic who studies the development of educational human resources, researchers are interested in helping to overcome the problem of low numeracy competence of teachers.

Numeracy is not the same as mathematical literacy; both are based on the same knowledge and skills, but the difference lies in the empowerment of these knowledge and skills (Taufik et al., 2023). Mathematical knowledge alone does not make someone numerate. Numeracy involves the ability to apply mathematical concepts and rules in real-life situations, where problems are often unstructured, have many possible solutions or even no complete solution, and are related to non-mathematical factors. (Sudarti, 2022). In the context of Human Resources (HR) management in educational institutions, as described by Sholihah, the result is that the implementation of HR management is carried out through: (1) planning based on vision, (2) recruiting competent teaching and educational personnel, (3) determining selection and placement based on academic qualifications and competence, (4) conducting training and exchange of ideas and knowledge, comparative studies, internal presentations, evaluation, and coordination, (5) evaluation, administration and supervision, (6) compensation, (7) health insurance, and (8) communication (Mubarok, 2021).

One of the ways to implement human resource management is through training. Training is one of the most important aspects of improving teachers' numeracy skills. Therefore, training is a key pillar in the teacher development strategy, where training aims to improve the quality of teaching and teachers' skills. This involves identifying training needs through performance assessments, student feedback, and monitoring classroom learning (Karoso et al., 2024). With a clear understanding of these needs, training programs can be carefully structured to cover topics such as new teaching methods, the use of educational technology, or improving classroom management skills.

One of the factors that can affect the numeracy competence of teachers is professional training. Based on the Regulation of the Minister of Interior No. 31 of 2007 concerning the Guidelines for the Implementation of Training within the Ministry of Interior and Local Government, one of the efforts to realize a professional apparatus can be implemented through education and training (Harahap et al., 2024). Training activities are a process of increasing the competence of the apparatus to produce optimal performance through the transfer of certain knowledge, attitudes, and skills to qualify to carry out their work (Mamaqi, 2023).

It is undeniable that training is one of the main approaches in human resources development. This is done as an approach because education and training have a strategic role in achieving organizational goals, especially for civil servant teachers or state civil apparatus. Training is a systematic and planned effort to change or develop new knowledge, skills, and attitudes to organizational needs (Hasnianti, 2022). The provision of training is intended to enable teachers to master their work so that efficiency and effectiveness in performing their duties are realized (Siswati et al., 2023).

Through training, schools can have competent teachers to compete, especially in global competition and increasingly diverse community demands as a manifestation of the educator development function. Human resources owned by the organization must be trained in technological and economic developments to anticipate other developments and new conditions that encourage organizations to develop comprehensive training programs (Sava & Tirsu, 2023). Training, together with education, is one of the determinants of a person's high and low ability to perform functions and tasks in his position (Hnizdilova et al., 2023).

Formal educational institutions generally provide students with basic problem-solving skills. Education and training aim to train discipline and responsibility for their work. This is very important to be done by government agencies to improve the ability and produce professional teachers in their fields, as well as efforts to improve efficiency and professionalism in the implementation of tasks. Teacher functions and duties that need to be carried out are planning, procurement, teacher quality development, placement, promotion, and payroll. The expected results of the training are an effective communication process, a common understanding of the tasks to be performed, compliance by all parties with various normative provisions that are generally accepted and established by competent government agencies, a good organizational climate for the growth of all teachers and making the organization a more pleasant place to work.

The implementation of training aims to improve teachers' mastery of knowledge and skills to improve their performance. Teacher training activities are an integral part of human resource management in schools and are an effort to develop teachers' knowledge and skills to gain a competitive

advantage and provide the best possible service. In other words, they can work more productively and improve the quality of their performance.

One of the identical skills teachers must have in teaching mathematics is mathematical numeracy. The development of numeracy is important to note because numeracy is the initial skill that every individual must possess to live in the future. Numeracy is defined as a person's ability to use reasoning (Kurniati et al., 2024). The focus of numeracy is that students can formulate, apply, and interpret mathematics in various contexts that involve mathematical reasoning and use mathematical concepts, procedures, facts, and tools to describe, explain, and predict phenomena in everyday life.

Yayuk et al. (2023) revealed that mathematical literacy is very important because it can help a person understand the role or use of mathematics in everyday life. There are three competencies in learning mathematics that students need to master: mathematical problem solving, mathematical communication, and mathematical representation. Students must possess a combination of the three competencies to apply mathematical knowledge in everyday life. The ability that encompasses these three competencies is mathematical literacy.

The teacher's ability to develop numeracy competence plays a very important role because numeracy competence is the basic skill that students, especially elementary school students, must have (Gunawan et al., 2023; Brilatin & Wibowo, 2024; Viantorus et al., 2024). This numeracy competence plays a role in improving students' ability to think critically. However, evidence from the field shows that teachers' skills in developing numeracy test questions are still relatively low, which greatly impacts students who are also not used to working on and solving test questions that require reasoning and critical thinking. Teachers' perception that their ability to develop numeracy-based test questions is still low. Teachers still find it difficult to determine the cognitive level, context, and content of each item, so they need training and the right examples of how to prepare and develop numeracy-based test questions. The local education office needs to be active in conducting socialization or special training for teachers on how to develop the right numeracy test questions so that teachers can apply them to students in school, and students' numeracy skills will be more refined because teachers can develop these types of test questions and can apply and familiarize students with numeracy-based test questions.

In addition to the above statement and based on the data analyzed by researchers regarding the staff development needs, identifying the forms of numeracy competency development needs of Recommendations for teacher numeracy skills development models in Cisarua State Elementary Schools teachers according to the category of teacher numeracy competency levels found by researchers shows that developing the numeracy competency of Recommendations for teacher numeracy skills development models in Cisarua State Elementary Schools teachers to the proficient level (4) can be done with a training approach. The training method we mean is to provide participants with direct experience in compiling and developing numeracy-based questions (Novita et al., 2022; Efendi et al., 2024) with the principle of on-the-job training. This training is considered appropriate using the ICARE approach, including the stages of introduction, connection, application, reflection, and extension sequence activities. The training design is presented below.

**1. Name of Activity**

Teacher numeracy training.

**2. Activity Objectives**

Through the teacher numeracy competency training activity, Cisarua State Elementary School teachers are expected to achieve an advanced level of numeracy competency (4).

**3. Target Activity Results**

The target outcome of the numeracy training activity is for Cisarua State Elementary School teachers to demonstrate consistent practice of the 14 numeracy sub-indicators at the proficient level (4).

**4. Training Curriculum**

This training was designed with an on-the-job training pattern. The training pattern was carried out using the ICARE approach with the introduction, connection, application, reflection, and extension sequence. The training material includes three main points:

a) Appropriate development of numeracy problems or tasks in any context;
b) Appropriate development of numeracy problems or tasks in each content area; and
c) Practice learning by using the developed math questions or problems.

This material is based on the training module on improving numeracy skills for teachers in the advanced category (Rahmadeni et al., 2023; Liswantiani et al., 2024; Wibowo et al., 2024) . Each material is ideally trained in 8 and 9 hours, so the total time allocation for discussing the material is 25 hours. Meanwhile, reflection activities are allocated 6 JP, and participant feedback is 1 JP. To give a more detailed picture, the training design is organized to accumulate to a time allocation of 32 JP, but it is not limited to the design provisions compiled in the next section.

**5. Activity Implementation Stages**

**Table 3.** Stages of Training Implementation

| No. | Activity Stages | Activity Details | Target Results | Insurer Answer | JP |
|---|---|---|---|---|---|
| 1. | Preparation | Creation of training curriculum based on TNA data | Training planning design | Training designer | |
| | | Request for approval from school leadership | Top management approval | Training designer, principal | |
| | | Formation of the Executive Committee | Training implementation committee working group | Principal | |
| | | Coordinate with resource persons and trainers | Obtain commitment from resource persons and trainers to follow the training session outline and explain the training curriculum | Committee | |
| | | Coordination with relevant political stakeholders | Send invitations and requests to provide general direction on the opening agenda for the training session | Committee and principal of Cisarua State Elementary School | |
| | | Shop for training materials | Provide training support materials such as markers, sticky notes, and paper. Includes printing of participant assessment tools, etc | Committee | |
| 2. | Organizing | Pre-training briefing | The committee and participants | Training committee | |

| No. | Activity Stages | Activity Details | Target Results | Insurer Answer | JP |
|---|---|---|---|---|---|
| | | | understand the design description of the training to be conducted | and instructor | |
| | | Learning style assessment | Understand learner's learning style preferences | Training Instructor | |
| | | Grouping of participants | S3, S5, and S7 will each become leaders of two groups of participants, divided according to the same skill level scores and learning style preferences | Training Instructor | |
| 3. | Implementation | Opening | Prayers, ceremonies, and influence from elements of the Cisarua State Elementary School | Principal and committee | |
| | | Material: developing numeracy questions or tasks in each context appropriately | Learners can make changes by changing the type of questions or questions with the same context | Source person | 8 JP |
| | | Reflection | Training participants share questions they have developed using the instructions in material 1 | Training instructor and participants | 2 JP |
| | | Material 2: developing questions or numeracy tasks for each content appropriately | Learners can make changes by changing the context with the same content or question type | Source person | 8 JP |

| No. | Activity Stages | Activity Details | Target Results | Insurer Answer | JP |
|---|---|---|---|---|---|
| | | Reflection | Training participants share questions they have developed using the instructions in material 2 | Training instructor and participants | 2 JP |
| | | Material 3: learning practice using developed numeracy questions or tasks | Students can make modifications by changing the mathematical content in the same context | Source person | 9 JP |
| | | Reflection | Training participants make presentations and give each other feedback on their practical learning experiences with the numeracy questions they have developed | Training instructor and participants | 2 JP |
| | | Participant feedback on training implementation | The committee receives input for the quality development of future training | Training participants and committee | 1 JP |
| 4. | Closing | Briefing and closing | Emphasize that participants practice the numeracy skills they have learned in each learning activity and conclude the training activity | Resource persons, instructors, committee members, training participants, and principals of Cisarua State Elementary School | |
| 5. | Evaluation | Learning observations | Measure teacher's numeracy skills through learning | Training instructor with the principal | |

| No. | Activity Stages | Activity Details | Target Results | Insurer Answer | JP |
|---|---|---|---|---|---|
| | | | activities within one month of training | | |
| 6. | Reporting | Preparation of reports | Report comprehensive training results for teacher staff development in the next period | Committee | |
| Amount: | | | | | 32 JP |

The evaluation of this training is proposed using observation techniques (Fatana & Mulyono, 2023), as it highlights how teaching and learning activities are organized by trainees who are challenged to present numeracy-based learning strategies regardless of the subject they teach.

**6. Target Training Participants**

The target participants of the numeracy skills training are 15 Cisarua State Elementary School teachers who have not reached the advanced level in the categorization of teachers' numeracy skills according to Perdirjen GTK No. 0340/B/HK.01.03/2022, namely S1, S3, S4, S5, S6, S7, S8, S9, S10, S11, S12, S13, S14 & S15.

**7. Resource Persons & Trainers**

The following are resource persons and trainers who are believed to have relevant competencies to promote the numeracy competence of Cisarua State Elementary School teachers.

1) Source Person
   a. CH (9th Generation Teacher Facilitator).
2) Training Instructor
   a. JK (Practical Instructor for Class 1 Teachers, Facilitator for Class 5 Teachers, Instructor for Class 9 Teachers, Principal of Harapan Mekar State Elementary School).

**8. Training Time and Place**

It is hereby proposed that the Numeracy Teacher Competency Training be conducted on January 8-17, 2023, at Cisarua State Elementary School, which is situated at Kampung Cisarua RT 001 RW 007 Kertawangi Village, Cisarua District, West Bandung Regency.

The source of financing for the training used is the School Operational Assistance (BOS), which is categorized as allowed to be used for the development of teachers' competencies. The source of financing is specified by (Kemendikbudristek, 2022) in Article 39, including the components of the use of regular BOS funds referred to in Article 38 paragraph (2), including: organizing activities to improve professional competence; organizing activities to support the absorption of graduates.

## Conclusion

This study finds that the numeracy competency level of teachers at Cisarua State Elementary School falls below the standard set by government policy, with an average score of 40.6 out of a target of 42. Only a small proportion of teachers meet the minimum standard of numeracy competency, while the majority are below the expected level. This gap indicates an urgent need for human resource capacity development, particularly through structured training.The investigation proposes a training model based on the ICARE approach as a promising solution to enhance teachers' numeracy competence. This approach offers a systematic learning structure and facilitates the direct integration of numeracy concepts into teaching practices. The study's primary implication is the significance of ongoing training interventions to enhance teachers' numeracy skills. This enhanced proficiency is anticipated to foster improved student learning outcomes, particularly in numeracy skills, which is of paramount importance in aligning with the demands of 21st-century education.

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