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Teachers' Perceptions of Students' Numeracy Competency Measured by Using the Minimum Competency Assessment

Abstract

Teachers have positive perceptions about the implementation of the Minimum Competency Assessment (MCA) and reading literacy. However, mathematics teachers also need to have a perception of students' numeracy skills that are assessed using the AKM instrument. Teachers experience various challenges and difficulties in improving learning to strengthen numeracy. This study aims to describe teachers' perceptions of students' numeracy competencies measured using AKM and to identify efforts made by teachers to strengthen students' numeracy competencies. This type of research is descriptive research with a qualitative approach. The results of this study indicate that teachers' perceptions of students' numeracy competence measured using the AKM instrument are positive (agree) so that teachers can make appropriate efforts in improving the quality of learning and strengthening numeracy. The efforts that teachers can make are looking for information on achievement results, reading report card data, identifying the root of the problem, and fixing the problem. Positive teacher perceptions encourage teachers to make appropriate efforts in strengthening students' numeracy competencies and support schools to develop data-based programs.

Keywords: Numeracy, Minimum Competency Assessment, Perceptions, Efforts

Abstrak

Guru memiliki persepsi *positif tentang pelaksanaan Asesmen Kompetensi Minimum (AKM) dan literasi membaca. Namun, guru matematika juga perlu memiliki persepsi tentang kemampuan numerasi siswa yang dinilai menggunakan instrumen AKM. Guru mengalami berbagai tantangan dan kesulitan dalam memperbaiki pembelajaran untuk menguatkan numerasi. Penelitian ini bertujuan untuk mendeskripsikan persepsi guru tentang kompetensi numerasi siswa yang diukur menggunakan AKM dan untuk mengidentifikasi upaya yang dilakukan oleh guru sebagai penguatan kompetensi numerasi siswa. Jenis penelitian ini merupakan penelitian deskriptif dengan pendekatan kualitatif. Hasil penelitian ini menunjukkan bahwa persepsi guru tentang kompetensi numerasi siswa yang diukur menggunakan instrumen AKM adalah positif (setuju) sehingga guru dapat melakukan upaya yang tepat dalam memperbaiki kualitas pembelajaran dan melakukan penguatan numerasi. Adapun upaya yang guru dapat lakukan adalah mencari informasi hasil capaian, membaca data rapor pendidikan, mengidentifikasi akar permasalahan, dan membenahi masalah. Persepsi guru yang positif mendorong guru agar dapat melakukan upaya yang tepat dalam menguatkan kompetensi numerasi siswa dan mendukung sekolah menyusun program berdasarkan data.*

INTRODUCTION

Mathematics, Numeracy, and Mathematical Literacy

Mathematics and numeracy have a close relationship with each other. Mathematics is at the core of numeracy development, but numeracy is not limited to mathematics alone (Hu, 2020). Numeracy can be viewed as a basic mathematical thinking skill, which is the ability and disposition to use and apply mathematics in a variety of contexts beyond the mathematics classroom (Perso, 2011). Numeracy is the ability to use mathematics effectively in a variety of contexts related to personal life, the workplace, and civic responsibilities (Geiger et al., 2014a). Numeracy helps a person become skilled at using mathematics, and for that, it is not enough to rely on basic mathematical skills; one must be able to relate mathematics to real-life situations, which requires problem-solving skills and critical justification outside the mathematical context (Geiger et al., 2014b). Students are said to have numeracy when they develop the knowledge and skills to use mathematics confidently in all areas of school learning and in their lives more broadly (Australian Curriculum, Assessment, and Reporting Authority (ACARA), 2022).

Teachers who teach mathematics at both primary and secondary school levels have a role and responsibility to improve students' numeracy skills. Numeracy should be taught early so that students can strongly predict the solution or answer to mathematical problems so that this skill can be improved (Nguyen et al., 2016). Numeracy is also important to be taught through a cross-subject approach, as emphasized by Steen (2001), who said that for numeracy learning to be effective, numeracy must be taught in a variety of contexts across all subjects, not just mathematics. Teachers who teach subjects other than mathematics play a role in improving numeracy skills because numeracy can also be found in subjects outside mathematics (Carter et al., 2015). Teachers must have the same perception that numeracy is not only specialized and taught in mathematics but in other subjects. It is useful to equip students to face their lives, and therefore, numeracy skills are beneficial for them.

The focus of numeracy is the use of mathematics in real life and preparing students to utilize mathematics so that they have the skills needed as a survival effort, for example, in terms of their career or work later as adults (Goos et al., 2011). Similarly, the Organization for Economic and Cooperation Development (OECD) conducted a Program for the International Assessment of Adult Competencies (PIAAC) survey and defined numeracy as the ability to access, use, interpret, and communicate information and ideas and to engage in and manage mathematical demands in various situations in adult life (OECD, 2018). In parallel, the OECD used the definition of numeracy with the term mathematical literacy to survey the abilities of 15-year-olds. In 2000, the OECD organized the Program for International Student Assessment (PISA) to survey the reading literacy, mathematics literacy, and science skills of 15-year-olds. This activity is routinely carried out every three years (OECD, 2000).

In PISA 2018, mathematical literacy is defined as the capacity of individuals to formulate, use, and interpret mathematics in various contexts, including reasoning mathematically and using concepts, procedures, facts, and tools to describe, explain, and predict phenomena (OECD, 2018). Indonesia has participated in PISA since 2000 and then reflected on the results of PISA to improve education.

Minimum Competency Assessment

Indonesia conducted a national assessment to measure literacy and numeracy using the Minimum Competency Assessment (MCA) instrument. MCA adopted PISA and termed math literacy as numeracy to distinguish it from reading literacy. Numeracy skills involve using mathematical concepts, procedures, facts, and tools in thinking to solve everyday problems in a variety of situations that are relevant to individuals as Indonesian citizens and as global citizens (Ministry of Education and Culture, Republic of Indonesia, 2020).

Indonesian students and teachers already have a good perspective on minimum competency assessment after participating in the socialization process and using online education platforms (Rokhim et al., 2022). In addition, teachers have also prepared themselves to facilitate minimum competency assessment-focused learning, which can be seen in the preparation of learning tools based on higher-order thinking skills, preparing learning modules, and attending training or workshops (Nurhikmah et al., 2021). Teachers who have a positive perception of minimum competency assessment have made efforts to overcome obstacles faced by students, such as being slow to operate computers and not understanding the meaning of the questions. Efforts made by teachers to overcome these obstacles by training students to operate computers, practicing questions, getting used to reading liter-

acy activities, and maximizing the library or reading corner (Nur'ainah et al., 2022). There-fore, teachers face various challenges to improve numeracy skills, especially those who teach mathematics in primary or secondary schools.

One of the main challenges is evaluating and improving students' numeracy skills ef-fectively. With the MCA as an instrument to measure students' numeracy skills, teachers' perceptions emerged, and they considered this instrument effective in measuring numeracy skills. Teachers who teach mathematics in elementary schools need to prepare grade five students to be sample subjects in the MCA. Whereas at the secondary school level, teachers need to prepare grade eight and eleven students to be the sample subjects in the MCA. Un-der the conditions in the field that occur, there are variations in the readiness of students and teachers to face MCA both technically and cognitively (Rokhim et al., 2021).

The instrument of minimum competency assessment (MCA) does not only use multi-ple choice questions; there are also other objective tests such as multiple choice, short form, matching, and structured description. Teachers have become accustomed to using multiple-choice questions to evaluate student understanding. This method allows for objective and reliable assessment, quick and standardized feedback, and meaningful comparison of scores and students (Ebel, 2019). Standardized tests can provide useful and more objective infor-mation for teachers than class evaluations. Standardized tests are usually scored and inter-preted in a standardized way, requiring all test takers to answer the same questions in a con-sistent manner with the same testing directions, time limits, and scoring (Woolfolk, 2007). In contrast to the MCA instrument, tests to measure numeracy do not require students to answer the same questions with the same scoring, but rather according to their initial abili-ties. The MCA test instrument uses the Multistage Adaptive Test (MSAT), where students can take the test according to their competency level (Ministry of Education and Culture, Republic of Indonesia, 2020).

One of the obstacles faced by teachers in preparing the MCA is making numeracy skills assessment instruments independently. Some teachers have difficulty making numeracy skills assessment instruments and rarely provide assessments with the aim of measuring stu-dents' numeracy skills. Most teachers still focus on the cultivation of mathematical concepts, which are also challenging to teach to diverse students. The proportion of applying mathe-matical concepts and procedures to non-routine problems is lower in the classroom, and stu-dents have become accustomed to doing routine problems that have been exemplified by teachers and textbooks. As a result, when facing MCA numeracy problems, students cannot remember formulas that are relevant to real problems and even make mistakes in answering problems involving simple arithmetic operations.

Teachers' understanding of the Minimum Competency Assessment (MCA) follow-up is still low, so socialization of teachers needs to be carried out so that teachers can make efforts to improve the quality of learning (Julianti et al., 2022). To prepare students for the MCA, teachers consciously need to make efforts to improve one of them by asking literacy and numeracy questions during class learning. However, despite the facts that occur in the field, some teachers still have difficulty preparing numeracy questions due to their lack of knowledge (Rahayu and Ulya, 2022). In addition, teachers also make efforts to overcome the obstacles faced by students in solving numeracy problems through unstructured (non-routine) problem solving. This is due to the implementation of learning that does not strengthen problem solving and mathematical reasoning, so that students are not accus-tomed to solving non-routine problems. As a result, students make mistakes in answering questions (Mahmud and Pratiwi, 2021).

The results of national numeracy learning outcomes based on the 2022 Public Education Report Card released by the Ministry of Education and Culture Research and Technology state that numeracy skills for all levels, from elementary to senior high school or vocational high school, in all provinces are still below the minimum competency. This means that less than 50% of students have reached the minimum competency limit for numeracy. There is no difference in numeracy achievement between urban and rural areas or by socioeconomic group. Meanwhile, in the global numeracy achievement (mathematics literacy) in the 2018 PISA event released on December 3, 2019, Indonesian students received an average score of 379, ranking 72 out of 79 countries. The score obtained is still far from the average score of OECD countries, which is 489. Participants who take part in the MCA and PISA surveys are indeed taken as random samples, but the results of their achievements represent the overall quality of numeracy. Not all students and teachers are aware of the PISA study and the 21st century skills that are currently the focus of government attention. Not all teachers also know the reason for organizing MCA by measuring literacy and numeracy skills, which should be the main goal of every lesson.

As an effort and support of mathematics teachers for the Indonesian government's focus on improving 21st century skills, especially in mathematical literacy (numeracy), teachers must have the same perception or agree on numeracy as measured using the Minimum Competency Assessment instrument. In addition, teachers must also be able to utilize the MCA results data for reflection and make efforts to improve the quality of learning. Thus, the research on mathematics teachers' perceptions of students' numeracy competency on the MCA and the efforts that teachers can make to enhance numeracy. How are mathematics teachers' perceptions of students' numeracy competency measured using the MCA instrument, and what efforts can teachers make to enhance students' numeracy competency? Looking at these problems, the purpose of this study is to describe the perceptions of mathematics teachers at the primary and junior secondary school levels about students' numeracy competency assessed using the MCA instrument, identify efforts made by teachers in using the assessment data, and enhance student numeracy.

METHOD

This is descriptive research with qualitative approach which conducted in March 2023. This study involved mathematics teachers who teach in high-grade elementary schools and junior high schools in South Sumatera Province, Indonesia. The participants were 47 elementary school teachers and 59 junior high school math teachers willing to fill out the questionnaire. The total number of teachers is 105, with the criteria of being registered in the Basic Education Data (Dapodik), elementary school teachers teaching in grades four to six, junior high school mathematics teachers in grades seven to nine, and teachers who have a minimum teaching experience of 2 years. From the 105 teachers, 6 teachers, consisting of 3 elementary school teachers and 3 junior high school teachers, were selected with certain considerations (purposive sampling) (Sugiyono, 2022), namely that the teacher actively participates in learning community activities or numeracy training, has additional duties as deputy principal/principal/extracurricular coach, and has a strategic role in strengthening literacy and numeracy at school. A total of six people were purposefully selected to be interviewed to obtain in-depth information.

The data collection techniques used in this research are interviewing and document analysis. The main instrument is the researcher himself, while other instruments act as supporting instruments (Sugiyono, 2022). The non-test instruments used are questionnaires, interview guidelines, and documents. Interviews were conducted with questionnaires and verbal interviews. The questionnaire is a data collection technique through a form containing questions that are asked in writing to a person or group of people to get answers, responses, and information needed by researchers (Herman et al., 2022). There are 14 statements contained in the questionnaire, which will be distributed to 105 teachers via Google Form. The statements contained in the questionnaire are adjusted to the perception component of numeracy in the Minimum Competency Assessment. The response uses a Likert scale (1–5). Participants had to indicate agreement with the statements (items) on a metric scale (from strongly disagree to strongly agree) (Joshi et al., 2015). More in-depth teacher perceptions of students' numeracy competency as well as efforts made by teachers to improve the quality of learning were followed by verbal interviews with three primary school teachers and three junior secondary school teachers. The interview technique for collecting data involves the presentation of oral stimuli in the form of oral-verbal responses (Kothari, 2004). The documents analyzed were the education report card for 2022 and the activity program that teachers have prepared as information related to teachers' efforts in improving numeracy skills (improving the quality of learning).

The data analysis technique for the questionnaire results was carried out by downloading the responses on Google Form in the form of Excel and PDF visual analytic results. Determination of the percentage of answers used the formula:

$$P = \frac{f}{n} \times 100\% \qquad (1)$$

Description: P = Percentage of responses; f = frequency of responses; n = number of teachers (participants)

Teacher perceptions are obtained through an average score using the formula:

$$\bar{x} = \frac{\sum x}{n} \qquad (2)$$

$\bar{x}$ = Average Score; $\sum x$ = Total Score; n = number of teachers (participants)

The maximum score in this study is 70, and the minimum score is 14. The interval used is 12 and is grouped based on Table 1.

Table 1. Teacher Perception Categorization Intervals

Category	Average Score
Very Positive	62–73
Positive	50–61
Neutral	38–49
Negative	26–37
Very Negative	14–25

The interpretation of each category is explained in the following. Very positive means teachers feel that the numeracy MCA provides clear guidance in assessing students' numeracy skills, teachers see the MCA as an effective tool to identify students' learning needs and design appropriate interventions and teachers see the AKM as an opportunity to strengthen students' understanding of numeracy concepts. Positive means although there may be

some challenges, teachers consider the numeracy MCA as a useful instrument to evaluate students' numeracy skills and teachers see value in this approach to understand students' numeracy development in more depth. Neutral means teachers may not have a very strong opinion about numeracy AKM and teachers may see it as a natural part of their duties as educators without judging it significantly positive or negative. Negative means some teachers may feel that AKM numeracy adds to their workload without providing comparable benefits and teachers may feel limited by the format or procedures followed in the numeracy AKM. Very negative means some teachers may have a very negative perception of the numeracy MCA, perhaps because they feel that it is irrelevant or inaccurate in evaluating students' numeracy skills and teachers may see it as a disruptive addition to an already crowded curriculum.

To provide more in-depth information on teachers' perceptions, researchers analyzed the interview transcripts to detect emerging themes or patterns in narrative form (Abdussamad, 2021). As well as getting in-depth information about teachers' efforts to improve the quality of learning. Activities in data analysis consist of data reduction, data display, and conclusion drawing or verification (Miles, Huberman, and Saldana, 2014). Document analysis was conducted by interpreting the results of numerical achievements on the 2022 Education Report Card obtained by researchers from six teachers in the selected education units during verbal interviews. The data from document analysis was summarized in a matrix or table consisting of four categories: root causes (teachers deeply identify the causes of low or declining numeracy skills and understand the underlying aspects), prioritizing problems (Teachers effectively prioritize issues based on their impact on students' numeracy learning), determining improvement activities (Teachers develop a comprehensive and measurable action plan to improve students' numeracy skills), and activity programs (Teachers implement the activity program in a timely manner and adapt it according to students' development).

RESULTS AND DISCUSSION

Results

This study aims to analyze the perceptions of elementary and secondary school mathematics teachers about numeracy skills assessed using the Minimum Competency Assessment (MCA). The research was conducted using a questionnaire as a research instrument distributed to 105 elementary and junior high school mathematics teachers in South Sumatera Province through Google Form. From the results of the questionnaire, the data were then analyzed and presented in a frequency distribution Table 2 (percentage) and Figure 1 (*see appendix*) according to the Likert scale categories (1–5) with approval of a statement relating to numeracy.

Based on Table 2, 91.43% of teachers agree that numeracy measured through the Minimum Competency Assessment measures the ability of students to use mathematical concepts, procedures, facts, and tools to solve everyday problems in various types of contexts that are relevant to individuals as citizens of Indonesia and the world. This statement is supported by the opinion of teachers with the same percentage (91.43%) that numeracy questions that utilize stimulus in the form of personal, socio-cultural, and scientific contexts are closely related to real life. A total of 95.24% of teachers agreed with the cognitive level measured in numeracy, which consists of 3 levels, namely the levels of knowing, applying, and reasoning. The content (domain) used in MCA numeracy includes numbers, geometry

and measurement, algebra, data, and uncertainty, with 94.28% of teachers agreeing.

In this questionnaire, teachers were also given examples of problems adapted from the TIMSS and PISA events. A total of 81% of teachers agreed that the modified questions from TIMSS could stimulate mathematical reasoning skills. However, students still have difficulty deciphering the question requiring more understanding and reasoning because it took a lot of time in the process (Rahadyan and Kurniawan, 2022). Then as many as 92.38% of teachers agreed that the questions modified from the PISA event not only involved numeracy skills but also the ability to argue or explain the results of mathematical calculations. Teachers also agreed (89.52%) that the types of problems presented (modified from PISA problems) are types of problems at the level of application of mathematics. The numeracy problems in MCA were adapted from the TIMSS and/or PISA frameworks so that students need critical and creative thinking skills in solving MCA problems (96.19%). This is in line with research by Saidah et al. (2023) that said that numeracy tasks require process and creative math skills. In addition, 89.52% of teachers also agreed that the problems used in MCA Numeracy must be solved by students using higher-order thinking skills (HOTS) (Supandi et al., 2021). The characteristic of MCA Numeracy questions is the stimulus in the form of discourse (text), infographics, images, tables, or diagrams where students must understand the problem and use mathematics to solve it. A total of 96.19% of teachers agreed with the use of such questions to measure numeracy skills. The main consideration of mathematics education is to improve students' ability to solve problems (Schoenfeld, 1992).

The test technique in MCA, including numeracy, uses the Multistage Adaptive Learning System, where students work on questions according to their initial abilities (from easy to difficult). A total of 83.81% of teachers agree with this test system so that students do not feel burdened when answering questions. The form of questions used in this assessment also varies, not only in the form of multiple-choice questions but also in matching, complex multiple choice, short form, and description. The test system is designed to detect student responses, and student answers can be analyzed by the computer system. Such an assessment system is supported by the opinions of teachers, who agree by as much as 91.43%.

One of the negative statements in this questionnaire was found in item 13 about the questions used in MCA Numeracy being difficult (not easy) to do by students. Only about 30.48% of teachers disagreed with the statement. Meanwhile, 29.52% stated that they were neutral with the statement that the questions in MCA Numeracy were easy or difficult because they depended on the initial ability of the students. Therefore, 95.24% of teachers agreed that the obstacles experienced by students when working on AKM problems can be overcome by how teachers and students prepare for MCA Numeracy. Teachers need to train learners to work on problems that are like MCA Numeracy during mathematics learning.

To find out the teacher's perception of numeracy as measured using the Minimum Competency Assessment instrument, it is necessary to calculate the average score obtained. Of the 105 teachers who have filled out the questionnaire, there is one respondent who has the maximum score of 70, and no one has the lowest score of 14. In this study, the lowest score was 43. The total score found by the researcher is 5,994. After getting the total score, it is then divided by the number of teachers who have filled out the questionnaire, namely 105 people, so that the following results are obtained:

$$\bar{x} = \frac{5994}{105} = 57.09 \qquad (3)$$

Based on the above calculations, the result of teacher perception is 57.09, which is in

the interval 50–61 with a positive perception category. These results indicate that mathematics teachers who teach in South Sumatera at the elementary and junior high school levels have a positive perception of numeracy as measured using the Minimum Competency Assessment instrument. These findings are also in line with research conducted by Herman et al. (2022) on teachers' positive attitudes towards the Minimum Competency Assessment (MCA) and Familiyana et al. (2022) on teacher perceptions of reading literacy. MCA questions are very welcome and positive, and Nur'ainah (2022) on teacher perceptions of the implementation of the National Assessment are positive (agree). Positive teacher attitudes and perceptions (agree) with the National Assessment, Minimum Competency Assessment, and the questions used as assessment instruments make it easier for teachers to manifest subsequent positive behavior (Herman et al., 2022). Further positive behaviors will be related to the steps and efforts that can be taken by teachers to improve students' numeracy skills. It shown in Figure 2 (*see appendix*).

The next objective of this study is to identify the efforts made by teachers to improve students' numeracy skills based on the assessment data. The researcher used data from interviews with six teachers (three primary school teachers and three junior high school teachers), which were transcribed in the form of interview transcripts.

The findings in this study are also in line with research conducted by Rokhim et al. (2022), which found that Minimum Competency Assessment (MCA) provides space for teachers to improve the quality of learning. Efforts that teachers can make include using assessment data with the aim of improving students' numeracy skills. These efforts are made to address the challenges of implementing MCA, such as the low initial ability of students, the lack of MCA socialization and teacher training, and the lack of optimal performance caused by the lack of teacher knowledge and skills about MCA (Asmaida et al., 2023).

The first effort that teachers can make is to find information related to the results of the assessment. Information search strategy is a person's behavior to get information from the right source (Purnama, 2021). The right source of information in the school environment is the national assessment proctor or school operator. Teachers will get technical information to access the results of the assessment, namely in the form of an education report card. The report card shows meaningful feedback on teaching quality and the educational system; it's function is not just to simply report them but also to improve outcomes (Bellini et al., 2019). However, if the report card has not been downloaded, the proctor or school operator will recommend accessing it online through the portal at https://raporpendidikan.kemdikbud.go.id/login.Teachers use their account to log in to the page.

The second effort made by teachers is to read the data from the education report card. This is done online and offline. Online, teachers read the data through the education report card portal. Meanwhile, offline, teachers first download the education report card in the form of Excel and save it on local storage media on computers or devices. In reading the assessment achievement data, teachers focus on (a) the percentage of numeracy competency achievement results that have been obtained, (b) the meaning or meaning of numeracy competency achievements, and (c) comparing with the previous year's achievement results. Teachers analyze the results of numeracy competency achievements that have been obtained by determining the difference between the percentage of achievements experiencing an increase or decrease and the average percentage of numeracy competencies below the minimum criteria or exceeding it.

The third effort teachers make is to identify the root of the problem. Every problem has a direct cause, but the cause is not necessarily the root cause. Therefore, it is important

to identify the root cause, which is the core of the process or system that causes high impact or loss (Guidance for Performing Root Cause Analysis with Performance Improvement Projects, 2011). In the education report card, there is a root cause study feature that makes it easier for teachers to find the main cause of the numeracy competency achievement results. Teachers can access the distribution of ability levels of students who are sampled in the assessment, where the data shows the percentage of students at the proficient, proficient, basic, and need intervention levels. From the data displayed, teachers can find out where the root of the numeracy competency problem is. Most teachers get the lowest results at the basic level and need intervention. Thus, teachers reflect on the mathematics learning process that has taken place. In addition to the distribution of competencies, teachers can find the root of the problem in the indicators that need to be improved in each domain and cognitive level. In the education report card, the percentage of each achievement of the two criteria is presented so that teachers can find out what domains have low percentages and what cognitive levels have low percentages. This makes it easier for teachers to note the root of the problem based on the assessment results.

The fourth effort that teachers make is to fix the root of the problem. This stage is carried out by designing and determining an improvement plan. This stage is the key to the root cause analysis activity when finding the root cause and preventing the problem from recurring (Guidance for Performing Root Cause Analysis with Performance Improvement Projects, 2011). In the education report card, the government provides suggestions or recommendations to fix the root of the problem by presenting three (three) inspirations to improve numeracy skills, namely improving teacher competence, overall learning implementation, and education units should facilitate policies and budgeting related to numeracy strengthening efforts in schools. Inspiration is also recommended by the government through the emancipated teaching platform, which can be accessed for free by teachers online, so that it helps teachers improve competence independently. After getting inspiration, teachers choose which recommendations can be prioritized, especially in terms of improving teacher competence.

Discussion

In this study, almost all teachers (91.43%) agreed that numeracy is the use of mathematical concepts, procedures, facts, and tools in thinking to solve daily problems from various situations that are relevant to individuals as Indonesian citizens and as global citizens (Ministry of Education and Culture, Republic of Indonesia, 2020). The definition of numeracy is in line with the opinions of Hu (2020), Perso (2011), Geiger et al. (2014a), and ACARA (2023) that numeracy does not only include mathematics but is broader than that, namely the use of mathematical abilities and skills to solve contexts (problems) in real life. Although there are still opinions that distinguish between the terms numeracy and mathematical literacy, such as Jablonka (2003), who believes that numeracy only refers to numerical aspects and uses the term mathematical literacy to indicate a broader approach to mathematics, including the ability of individuals to use and apply mathematical know-ledge to specific contexts, the OECD (2018) uses numeracy and mathematical literacy as parallel terms that have almost the same meaning. Numeracy has an important role in problem definition and problem statement in the problem-solving process (Xiao, 2019).

Despite the contradiction in the use of the term's numeracy and mathematical literacy, through this research, teachers need to equalize the perception of numeracy. Numeracy

does not contradict mathematical literacy. Both terms are related, and indeed, solving problems in various contexts also involves numerical calculations, but it does not only focus on one domain of numbers and their operations. What needs to be emphasized here is that numeracy is not only about the basic command of performing numerical calculations but also includes other domains such as algebra, geometry, and measurement, as well as data and uncertainty (94.28%). Then numeracy emphasizes students' ability to solve problems where the stimulus can be in the form of discourse, infographics, images, tables, or diagrams (96.19%), and the context of the problems used also varies, including personal, socio-cultural, and scientific contexts related to real life (91.43%).

With the holding of the Minimum Competency Assessment (MCA), especially to measure numeracy skills, the questions used adapt from the form of instruments for mathematics competitions such as TIMSS and PISA. The questions used in the numeracy MCA instrument aim to measure math skills at three levels: knowing, applying, and reasoning. The percentage of question distribution based on cognitive level is 50% at the Applying level, while the rest is at the knowledge and reasoning level (Ministry of Education and Culture, Republic of Indonesia, 2020). Half the number of questions requires students to solve problems in the form of application, which includes aspects of choosing strategies, stating, or modeling strategies, applying, or implementing strategies, and interpreting the problem solving obtained. However, as many as 40% of teachers said that the questions on the MCA numeracy were still relatively difficult for students to work on. According to the teacher's recognition, their students find it difficult to work on MCA numeracy questions, starting with understanding the stimulus (discourse), choosing a solution strategy, using procedures, and arguing. Students made conceptual, procedural, and technical errors in answering MCA numeracy questions (Anggraini et al., 2023). In further research, it can be diagnosed and overcome by designing learning as an effort to enhance students' numeracy competence.

This study also found that teachers' perceptions of MCA numeracy are positive (agree), and this means teachers feel that the numeracy MCA provides clear guidance in assessing students' numeracy skills, teachers see the MCA as an effective tool to identify students' learning needs and design appropriate interventions and teachers see the AKM as an opportunity to strengthen students' understanding of numeracy concepts. Although there may be some challenges, teachers consider the numeracy MCA as a useful instrument to evaluate students' numeracy skills and teachers see value in this approach to understand students' numeracy development in more depth. By having this perception, it certainly encourages other positive teacher behaviors in seeking teacher follow-up (efforts) to improve numeracy skills. As a form of active participation in providing numeracy reinforcement, teachers take appropriate actions based on the data from the assessment results. The follow-up efforts made by teachers are in line with the school program and adjust to the school budget or data-based planning. Education units should facilitate, support, and empower teachers to improve the quality of learning through the implementation of numeracy reinforcement programs. Based on the results of interviews with teachers, there are four steps or efforts made: finding information, reading data, identifying the root of the problem, and fixing the problem.

Implication of Research

Teachers mentioned several efforts, including self-development through an emancipated

teaching platform, attending seminars and workshops with the theme of enhancing numeracy (Palinussa et al., 2023), preparing numeracy literacy questions (Abdullah et al., 2023), using technology to increase exploration and connection with mathematics (Rita and Herman, 2021), and learning strategies that are fun and meaningful [45]. Teachers also develop numeracy reinforcement program plans and implementation plans in the classroom. Schools also should provide sourcebooks that effectively improve literacy and numeracy skills (Patahuddin, 2013). The teacher mentioned implementing a drilling program for students, both technically and cognitively, so that they are better prepared to work on MCA numeracy questions. Teachers mentioned that the success of the program is inseparable from the support of various parties, including coordinating with peer teachers who teach in other classes, and that planning program activities requires a budget that can be discussed with the treasurer and principal.

As a follow-up to teachers' efforts to improve self-competence, teachers also carry out self-reflection activities. Teachers' efforts to reflect are carried out by linking the learning design or planning with the learning process that has been carried out in the classroom. This effort can be done continuously to improve the quality of learning (Suryadi, 2013), especially by strengthening students' numeracy competence. Numeracy-based learning can be developed by being oriented towards achieving learning objectives and paying attention to students' learning barriers and trajectories on non-routine mathematical problems. Thus, teachers need to design learning didactically and pedagogically in accordance with students' learning needs (Suryadi, 2016).

The efforts made by teachers to improve numeracy competence or strengthen numeracy should be based on data on numeracy achievement results. The follow-up to this finding is that education units can develop Data-Based Planning by involving teachers. School units can work together, and with the spirit of cooperation from all stakeholders, the numeracy and literacy strengthening activity program can be realized to improve the quality of education units. As a recommendation from this study, further research is needed on how to implement strengthening numeracy literacy in education units based on Data-Based Planning and its evaluation.

Limitation

The limitation of this study is that the interview process was conducted only with research subjects (teachers) who have high motivation to strive to strengthen numeracy in their schools. The diversity of teachers' motivation, especially teachers who have negative perceptions or low motivation about MCA Numeracy, could not be detected by filling out the questionnaire. In addition, students were not involved in this study, which should have allowed the data on the difficulty of working on numeracy MCA questions to be examined more deeply. In future research, it is highly recommended to examine the difficulties of students working on numeracy MCA questions and how teachers can design learning didactically to improve students' numeracy literacy skills.

CONCLUSION

In this study, the perceptions of mathematics teachers at the primary and junior secondary school levels about students' numeracy competency assessed using the MCA instrument were described, and the efforts made by teachers in using the assessment data to enhance

students' numeracy were identified. The results showed that teachers have a positive perception (agree) about numeracy assessed using the MCA instrument, which will encourage other positive behaviors in seeking teacher follow-up (efforts) to improve students' numeracy skills. The efforts made by teachers are to carry out four stages: finding information, reading data, identifying the root of the problem, and fixing the problem. Teachers made efforts based on the data on numeracy competency achievements, so they are in line with the data-based planning process and the preparation of activity programs.

Through the findings obtained in this study, the four steps or efforts taken by teachers to improve data-based numeracy competencies can be used as guidelines for other teachers or education units that focus on strengthening numeracy literacy based on the results of the Minimum Competency Assessment (MCA) achievements in their schools. Teachers can develop activity programs based on recommendations (inspiration) for good practices in strengthening numeracy by conducting reflective activities and self-development so that they can implement them in learning. Research that examines the difficulties faced by students in working on numeracy MCA questions also needs to be done. This step can provide benefits for teachers by obtaining data from cognitive diagnosis assessments. From the diagnosis data, teachers can design didactical mathematics learning that can improve students' numeracy skills and competence. Education units should also empower, involve, and support teachers' efforts to realize activity programs by facilitating activities according to the school budget. The education unit, in preparing the budget, should also refer to data-based planning.

Acknowledge

Appendix of Teachers' Perceptions of Students' Numeracy Competency Measured by Using the Minimum Competency Assessment
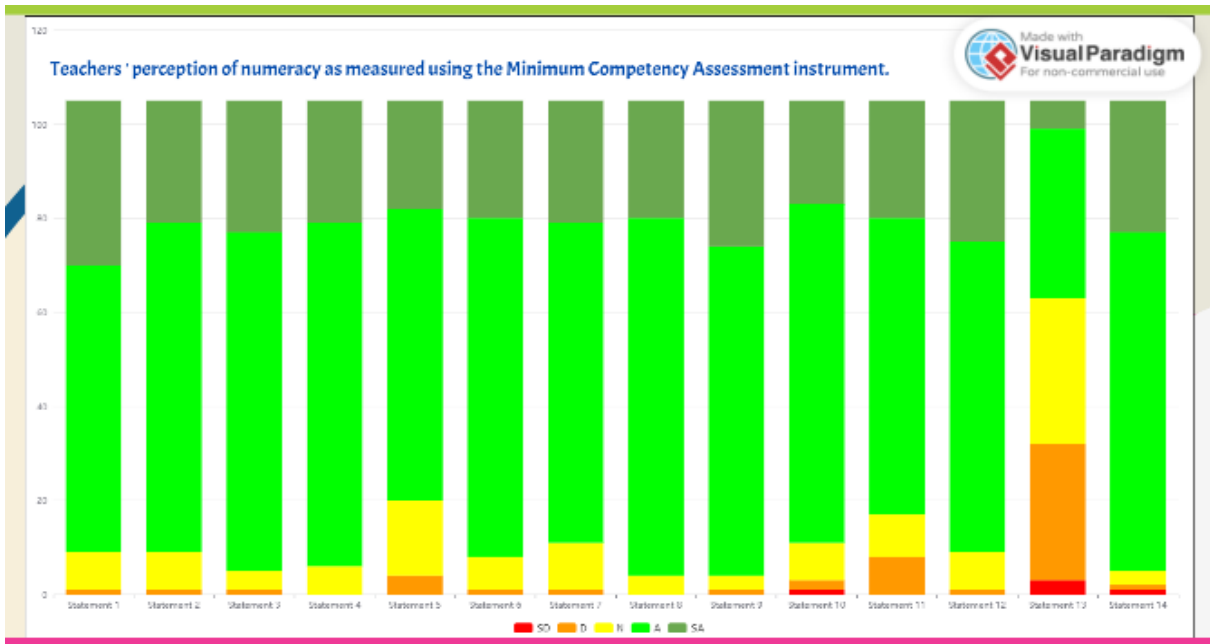

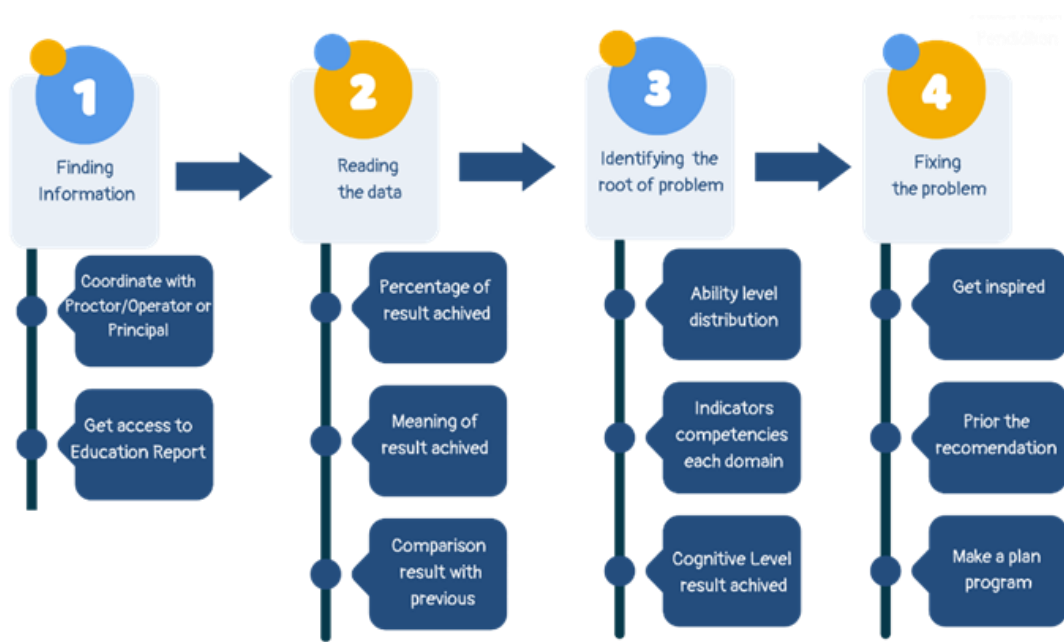*Figure 1. Teachers' Response on Numeracy Minimum Competency Assessment*

Figure 2. Teachers' efforts to improve students' numeracy competency.

Table 2. Percentage of Teachers' Response on Numeracy Minimum Competency Assessment

Nu.	Item	SA	A	N	D	SD
1	I understand numeracy in MCA as the ability of learners to think using mathematical concepts, procedures, facts, and tools to solve everyday problems in various types of contexts that are relevant for individuals as citizens of Indonesia and the world.	33.33%	58.1%	7.62%	0.95%	0%
2.	I think the numeracy skills in MCA use problems with personal, socio-cultural, and scientific contexts that relate to real life.	24.76%	66.67%	7.62%	0.95%	0%
3.	The cognitive level measured in the MCA numeracy is appropriate, which is divided into 3 levels, namely the Knowing level, Applying level, and Reasoning level.	26.67%	68.57%	3.81%	0.95%	0%
4.	The MCA Numeracy domain content is complete, namely number, geometry and measurement, algebra, data, and uncertainty.	24.76%	69.52%	5.71%	0%	0%
5.	The problems used in the following MCA numeracy (presented as examples of TIMSS problems) can stimulate students' reasoning skills.	21.9%	59.1%	15.24%	3.81%	0%
6.	The problems used in the following MCA numeracy (presented as examples of PISA OECD problems) do not only ask students to calculate but also to explain/argue the results of their calculations.	23.81%	68.57%	6.67%	0.95%	0%
7.	The problems used in the following MCA numeracy (presented as examples of PISA OECD problems) are problems on the application of mathematical concepts.	24.76%	64.76%	9.52%	0.95%	0%
8.	The problems tested in MCA numeracy require students to think creatively and critically.	23.81%	72.38%	3.81%	0%	0%
9.	MCA numeracy uses stimulus in the form of reading (text), infographics, pictures and diagrams on problems where students must understand the problem and then use math to solve the problem.	29.52%	66.67%	2.86%	0.95%	0%
10.	Problems in MCA numeracy are solved using higher order thinking skills (HOTS).	20.95%	68.57%	7.62%	1.9%	0.95%
11.	The numeracy questions in MCA use a multistage adaptive learning system. Each participant works on the questions in order of easy to difficult according to their initial ability.	23.81%	60%	8.57%	7.62%	0%
12.	The forms of MCA numeracy questions consist of multiple choice, complex multiple choice, matching, short form and description and the computer system has been designed to detect student responses.	28.57%	62.86%	7.62%	0.95%	0%
13.	The numeracy questions on the MCA are very difficult so they are not easily done by students.	5.71%	34.29%	29.52%	27.62%	2.86%
14.	Before the MCA starts, teachers need to train learners to work on problems that are similar to the MCA numeracy literacy questions.	26.67%	68.57%	2.86%	0.95%	0.95%

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