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# Numeration Problems in Elementary School Mathematics Learning in Semarang from the Teacher's Perspective

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## Abstract

**Purpose**: Learning is a series of activities arranged by the teacher that involves both mental and physical processes through the interaction of students and teachers with the learning environment and learning resources as well as between students and students to achieve the specified competencies. One of them is numeracy learning in mathematics learning, which cannot be separated from the attention of educational researchers, practitioners, and experts. Numeration is a person's ability to reason, analyze, formulate, interpret, and solve problems. Ability in numeracy becomes very important for elementary school students to have. This study will look at problems related to numeracy in elementary school mathematics learning in Semarang district and Semarang city. The importance of this research is to find out the problem why numeracy in Semarang district is still low, of course aspects of why low numeracy can be seen in some existing management in schools.

**Methodology:** In this qualitative-descriptive study which is used to analyze the phenomenon of problems related to low numeracy in elementary schools in Semarang district and Semarang City, whose purpose is to present a detailed description of the setting of the mathematics learning process which is intended to explore how the existing numerations in mathematics learning can be aligned to address a number of variables relating to the problem under study. Data analysis in qualitative research was carried out before entering the field, while in the field, and after finishing in the field. The steps of qualitative data analysis include data reduction, display and drawing conclusions. The research subjects were selected purposively, consisting of elementary school class teachers in Semarang. The instrument in this study was questionnaires, observations, and interviews with elementary school class teachers.

**Findings:** The study›s results indicate that several aspects affect the implementation of numeracy in elementary school mathematics learning. Problems in learning mathematics related to numeracy include low teacher competence, lack of infrastructure that supports numeracy, incomplete teaching resources, and parental support in learning numeracy in elementary school mathematics learning.

**Significance:** This research contributes to the knowledge of numeracy in learning mathematics. It is recommended for teachers to be able to apply numeration in learning mathematics in the classroom.

**Keywords**: numeracy, mathematics learning, elementary school class teachers, numeracy learning.

## Introduction

In the past few years, the international and national education officials have put a greater focus on education quality, the learning content that students study in schools, and how relevant the learning skills are after they leave the schools. The concerns have been validated by the new Sustainable Development Goals, which were established in 2016. Its fourth goal is "To ensure inclusive and equitable quality education and promote lifelong learning," and in particular, the target 4.6 stated: "By 2030, we must ensure that all youth and most adults, both male and female, will have achieved literacy and numeracy" (United Nations, 2016). Therefore, the current learning outcomes have become critical to donors and national governments. Recent studies in developing countries has indicated if a successful program may include several intervention components, such as student books, teacher guides based on daily lesson plans, teacher professional development, information and community technology (ICT) interventions, community interventions, and teacher coaching. Note that there might be various component programs in one study; a meta-analysis of similar research does not result in a set of materials that are proven to be able to be chosen by the

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educational planner. Despite the fact that a broader variety of studies has explored certain components of highly targeted literacy programs on quality upgrading, for example the supply of structured textbooks and instructor aids, the literature remains uneven and contentious. Given a few comprehensive studies in Southern countries, there is even less data on the precise aspects necessary to improve numerical results (Piper et al., 2014)these programs have not been designed to evaluate which ingredients of the interventions are most essential to improve literacy outcomes. Policy makers therefore lack evidence as to whether program ingredients such as teacher professional development (PD

A study (discussed below) involving professional development instructors is the simplest form of the intervention given in this study. Given that the student-teacher relationship is crucial to reading development and that the majority of teaching methodology in Kenya is didactic in nature, which has not been supported by current research (Dubeck et al., 2012), following the limited interactions between teacher and student (Ackers & Hardman, 2001), literacy and numeracy pedagogical skills must be retrained in classroom teachers. Despite the fact that not all professional development programs for teachers are successful, research in Kenya has shown that they can enhance teacher literacy knowledge (Piper et al., 2018)these programs have not been designed to evaluate which ingredients of the interventions are most essential to improve literacy outcomes. Policy makers therefore lack evidence as to whether program ingredients such as teacher professional development (PD.

There is evidence in East Asia of contradictions between "traditional methods" and "Western ideas" about the student-centered learning and an emphasis on non-academic realms of child development. Memorization, drills, and practice have always been used in Chinese society to teach literacy and numeracy (Rao et al., 2010; Lam and McBride-Chang, 2013).

One of the important aspects of education that elementary school students need to have is numeracy ability. Numerical ability is only a small part of mathematics because everyone needs the ability to face problems both in learning mathematics and in real life. Studies undertaken of early grade learning in Kenya have shown poor performance at the lower schooling levels. For example, the 2012 Uwezo survey findings showed that children are not acquiring basic competencies in literacy and numeracy at the right age or grade (Piper, 2018). As Lynn (2015) Numeracy is not the same as mathematics, nor is it an alternative to mathematics. Mathematics is abstract and Platonic, offering absolute truths about relations among ideal objects. Numeracy is concrete and contextual, offering contingent solutions to problems about real situations. Whereas mathematics asks students to rise above context, quantitative literacy is anchored in the messy contexts of real life. Truly, today's students need both mathematics and numeracy. Therefore, humans must be able to solve problems by understanding the problem, planning to solve it, implementing the plans, and reviewing the process and results of problem-solving (Tout, 2020). Problem-solving is a critical activity in learning mathematics because its learning objectives are related to everyday life. Numeration is important and is needed in students' lives, but it contradicts with the findings of PISA research to determine the students' numeracy literacy abilities.

Therefore, it is essential to undertake extensive study on numeracy problems in learning mathematics from the point of view of elementary school teachers.

## Methodology

This research is qualitative descriptive research, aims to provide an overview of the current numeracy problems in schools, to explore how current mathematics learning can address student numeracy. Before conducting data analysis, researchers should carry out testing techniques the trustworthiness of the data to be analyzed to make research conclusions. Test technique The trustworthiness of the data used by researchers is the triangulation technique, namely to test Data trust is done by checking the data that has been obtained through several methods sources in various ways. In the process of triangulation as a process of strengthening evidence from the results of the records in the field of observation, interviews and documentation that aims to improve accuracy in a study. The research subjects were elementary school teachers in the Semarang Regency, and it was selected randomly without distinguishing the class teacher. The research instruments were questionnaires, observation sheets, and unstructured interviews. Fifteen representative teachers filled out the questionnaire. The researcher conducted unstructured observations and interviews with 15 elementary school teachers from different schools, regardless of the school's ranking. The observations were made during the learning and have also considered and involved school-supporting infrastructure. In order to get in-depth interviews, the researchers conducted unstructured interviews with fifteen teachers. The data obtained were then reduced, analyzed, and conclusions were drawn.

## Results

### Numerical Learning Supporting Facilities

Many aspects have affected the efficiency of how the process of learning and teaching is carried out, one of which is the availability of sufficient educational facilities and infrastructure as well as their efficient application, and management (Direktorat Jenderal Peningkatan Mutu Pendidik dan Tenaga Kependidikan, 2007). Educational facilities and infrastructure are the main facilities that are felt either directly or indirectly by the students in learning activities.

In this context, facilities are all devices, equipment, materials, and furniture that are directly used during school education. Meanwhile, infrastructure is a set of equipment used indirectly to facilitate the implementation of education in achieving educational goals.

Appropriate facilities and infrastructure support a good learning environment to accommodate the students learning needs and support the problems solving during the learning process. There are levels in the facilities and infrastructure used by current education, namely infrastructure for class and school levels (Miranda et al., 2021). The facilities and infrastructure needed in numeracy learning consider the completeness of numeracy in the classroom that is adequate and innovative, and the existence of equipment connected to others can influence the student learning well. Relevant infrastructure for the classroom level is the arrangement of a student learning environment with collaborative spaces, shared learning, and a comfort zone (Han H, Moon H, Lee H, 2019).

Within the scope of a school or institution, the use of facilities and infrastructure includes not only educational methods, but also managerial processes and services. Schools and other educational organizations also need to facilitate the space for a greater learning environment and seek space as well as best practices for teachers, students, and even staff in their institutions. Therefore, facilities and infrastructure in an institution need to include collaboration, recreation, comfort, sustainability, and accessibility (Miranda et al., 2021).

In this context, supporting infrastructure for numeracy learning means the completeness of both classrooms and equipment that support numeracy material. It can be in the form of adequate classrooms to accommodate students to collaborate, supporting equipment such as stationaries, and numeracy support equipment related to real life. The purpose of supporting infrastructure is to make numeracy learning achieve its goals, and it can be applied by students well.

## Teacher Competence in Numerical Learning

The teacher is someone who has the main task of educating students. Educating is the same as developing one's character so that the person can develop into a capable, active, creative, and independent person. Van Brummelen (2009) stated that educating means stimulating and developing students' understanding, views, and abilities. It is difficult because educating students to take longer than just teaching them knowledge or skill. According to Slameto (2014), Slameto (2014), teachers have a strategic role in the area of education which serves as the driving force behind attempts to enhance the service quality and educational outcomes. Macmillan (Koswara and Halimah, 2008) has defined a teacher as "someone who is respected by other people and a person to go for advice about a particular subject." They are respected people and places to ask for advice on certain issues.

In current education, teacher competence is described as a cognitive performance disposition that is functionally adaptive to any circumstances and demands in a certain area (Kaiser and König 2019). Several research on professional competence have included the cognitive and affective-motivation aspects (Blömeke, 2017). In terms of cognitive aspect, according to the current knowledge of teachers, it is usually different to distinguish between knowledge related to teacher understanding of the material or content, pedagogical content knowledge (PCK), and general pedagogical knowledge (GPK) (Guerreiro, 2017)more than ever before, must be professionals who make decisions based on a robust and updated knowledge base. This publication presents research and ideas from multiple perspectives on pedagogical knowledge - the knowledge of teaching and learning - and the changing nature of the teaching profession. It provides a modern account of teachers' professional competence, and how this relates to student learning. The report looks at knowledge dynamics in the teaching profession and investigates how teachers' knowledge can be measured. It provides precious insights into 21st century demands on teacher knowledge. This volume also offers a conceptual base for a future empirical study on teachers' knowledge. It will be a useful resource for those interested in understanding the different factors underlying high quality teaching through examining and outlining the complexity of the teaching profession. In particular, this publication will be of interest to teacher educators, educational leaders, policy makers and the research community.","author":[{"dropping-particle":"","family":"Guerreiro","given":"Sonia (ed.. To deal with the fundamental issues of teaching, educators must rely on a wide range of professional expertise and integrate it into a cohesive understanding and expertise (Mishra & Koehler, 2006)while addressing the complex, multifaceted, and situated nature of this knowledge. We argue, briefly, that thoughtful pedagogical uses of technology require the development of a complex, situated form of knowledge that we call Technological Pedagogical Content Knowledge (TPCK.

The most well-known model was created by Mishra & Koehler (2006)while addressing the complex, multifaceted, and situated nature of this knowledge. We argue, briefly, that thoughtful pedagogical uses of technology require the development of a complex, situated form of knowledge that we call Technological Pedagogical Content Knowledge (TPCK, who established the idea of teacher competencies as technology-related knowledge. Furthermore, they stated that teacher competencies are related to technology, pedagogical, affective, and cognitive knowledge.

Teacher competence in numeracy learning refers to the teacher's ability to assist students in accessing, using, interpreting, and communicating mathematical information and ideas to manage various situations in everyday life.

### Availability of Numerical Learning Support Media

Media is considered a factor that increases learning effectiveness because it has strategic roles and functions that can affect psychological functions and visualize abstract material being taught so as to facilitate the students' understanding. Good media can also activate the students by providing feedback and encouraging them to be actively involved in learning. It is also used to optimize the students' five senses in the learning process. They can see, feel, hear, and feel the object being studied. In addition, it is able to make learning more interesting, messages and information clearer, and able to manipulate objects that are difficult for students to reach.

According to Kemp & Dayton (Benny, 2004: 5): Through accepted learning theory, the quality of learning may be increased, education can be offered when and where desired or necessary, and students' positive attitude toward what they are learning and the learning process itself can be strengthened. The previous sentence means that the delivery of messages from the media is easy to understand. It is not too complicated (standard), the media has more fascinating impression, learning becomes more participatory, students easily understand the teachings, the amount of time necessary for instruction may be shortened, and the quality of learning can be increased. Moreover, the guideline is more effective on when and where it is desired or needed. The students' positive attitudes towards what they want in the learning process can be enhanced.

In general, learning media is a tool for teaching and learning. It is anything that may be utilized to stimulate ideas, feelings, attention, abilities, or learning skills in order to facilitate learning. AECT (Association of Education and Communication Technology) in Azhar Arsyad (2002: 3) stated that limiting the media as a form and channel to convey messages or information is needed. Teachers must be knowledgeable about and comprehend the learning media. Hamrlik said in Azhar Arsyad (2002: 2) that knowledge and understanding include: 1) The use of media as a communication tool to improve the effectiveness of teaching and learning. 2) The significance of the media in achieving educational goals. 3) The complexity of the learning process. 4) The connection between teaching methods and educational media. 5) The significance or usefulness of educational media in learning. 6) Selection and application of educational media 7) A variety of educational media tools and strategies. 8) Educational media in all subjects. 9) Educational media innovation initiatives.

Based on some of the opinions above. It can be concluded that learning media related to numeracy learning are elements that can convey information and encourage students' ideas, feelings, and attitudes to foster the development of a numeracy learning process. Learning media is a component of learning resources that can stimulate students to learn things related to numeracy material.

### The Accuracy of Numerical Learning Support Guideline

A guideline can positively affect learning results and simplify the process for educators to acquire new approaches (Reeves, 2010). In the United States, reviewers have concerned about the written lesson plans, which may limit the curriculum and educators' capacity to change learning materials to make them more relevant to their pupils (Milner, 2014). The role of guidelines in learning is very important, and the students can learn from the blackboard, while they cannot read the exposure to various reading materials (Kim et al., 2016). Teachers in the resource context highly value the guideline as a tool to increase students' pedagogic abilities (Lee & Zuilkowski, 2015).

All guidelines may be a component of successful literacy. In very limited resource settings, policymakers need more detailed evidence on the appropriateness of the guidelines that can improve the results of literacy and numeracy of the students (Piper et al., 2014)these programs have not been designed to evaluate which ingredients of the interventions are most essential to improve literacy outcomes. Policy makers therefore lack evidence as to whether program ingredients such as teacher professional development (PD

The accuracy of the numerical learning guideline is related to the accuracy of the module with numeracy material and its evaluation tools, as well as the suitability of the material with the numeracy material itself.

### Student Motivation in Learning

In the field of education, particularly in learning activities, intellectual and non-intellectual aspects impact the continuity and effectiveness of the teaching and learning process in establishing one's learning outcomes, one of which is the student's capacity to inspire oneself. Citing the opinion of Daniel Goleman (2004: 44), only 20% of success is due to intellectual intelligence (IQ); while, the remaining 80% is due to other factors, for example emotional intelligence or Emotional Quotient (EQ), which is the ability to inspire oneself, regulate desires, overcome frustration, establish mood, empathize, and collaborate. Motivation is essential in learning activities because it encourages the spirit of learning and vice versa. The students' drive to learn will diminish as a result of a lack of motivation. It is crucial because a learner who studies without motivation (or with insufficient motivation) will not perform optimally.

Learning motivation is a state in which an individual feels compelled to attain anything in order to reach a goal. Motivation, according to Mc Donald in Kompri (2016: 229), is a transformation of energy in a person's personality described by the development of affective (feelings) and behavioral reaction to attain goals. As a consequence, the appearance of motivation is marked by a shift in a person's energy, which

can or cannot be achieved. According to Woodwort in Wina Sanjaya (2010: 250), a motive is a combination of factors that might motivate people to take action in order to attain their goals. Therefore, motivation is an urge that might lead to particular behaviors aimed at reaching a specific objective. A person's behavior or acts to accomplish specific goals are determined by their motivation. As stated by Arden in Wina Sanjaya (2010: 250) that the strength or weakness of a person's efforts to accomplish their goals is defined by the strength of their reasons and intentions.

Furthermore, motivation is a set of attempts to create particular conditions in order for someone to be willing to perform something. If they detest it, they will strive to erase or prevent that displeasure. As a result, while external factors might boost motivation, it develops within a person. The environment is one of the external factors that might influence someone's motivation to study.

According to Kompri (2016: 233), the motivation significance in learning is more than providing the right direction for learning activities; a person with motivation will receive positive considerations. Motivation is crucial as follows: it gives enthusiasm to the students in their learning activities and guidance for their behavior. It has an important position in achieving the learning objectives. The development of motivation is not simply the responsibility of the students, but also the educators, who must engage themselves in order to encourage the students' learning. The presence of motivation will give excitement and allow the students to identify the purpose of their study. If they want to learn, they will be motivated to study.

## Parental Support in Supporting Numerical Learning

According to Sarafino & Smith (Amira Diniaty, 2011), parental support refers to the perceived pleasure, appreciation, concern, and acceptance of support obtained from the parents or other groups. It shows that parents are also information that requires someone to believe that they are cared for, loved, and understood so the students' feelings of happiness will arise. Furthermore, Johnson & Johnson (Amira Diniaty, 2011) stated that parental support as the presence of other people can be relied on for help, encouragement, and acceptance when individuals experience difficulties or problems. It means that parental support is not only directly from the parents but also from other people. For example, relying on other people around the students to help them when they have difficulties or problems, and the help could be in the form of encouragement and acceptance.

One factor influencing student achievement is parental support (Ningsih & Nurrahmah, 2016)test data analysis requirements, and hypothesis testing. </pre><pre>Test requirements analysis of the data used, the normality test, linearity and </pre><pre>multicollinearity test. Based on the results of the study it was concluded that: (1. The attention given by the parents in learning activities at home for students can be in the form of support, direction, and guidance so that the students can get comfort and motivation in learning. The support provided by parents can be interpreted as an ability given to an activity carried out by the students in the learning process or others. With the support from the parents, the students will have high motivation to learn mathematics. In addition, the role of parents' attention at home in the students' mathematics learning motivation is also significant in terms of support and direction, and guidance. Stimulation and encouragement given by parents become the basis of motivation for someone to behave at home and school. In order to increase the students' learning motivation, persistence and activeness in learning mathematics must be further improved and developed (Kurniasari, 2019).

Parents are the first and main educators of their children (Mol & Neuman, 2014). They are supporters of the development of numeracy learning. Numeracy learning is carried out at home by repeating the students' knowledge of things taught at school by providing stimulation to them. Therefore, numeracy learning must also be improved in the family. The role of the family is crucial in improving numeracy. Based on the educational perspective, the family, as the smallest unit in society, is the first and most important learning environment for children. There are a lot of potential literacy and numeracy learning resources in the family that are even in line with four (4) numeracy content in PISA, namely Uncertainty and Data, Space and Shape, Change and Relationships, and Numbers (OECD, 2021). Parents are one of the keys to the success of increasing a child's numeracy so that they are expected to be more aware of the importance of the family environment as an educational means of learning numeracy.

In this study, questionnaires and interviews were used to obtain information related to the numeracy learning process and the obstacles experienced by students in five elementary schools in Semarang.

Based on the interviews with respondents at SDN Ungaran 01, the following information was obtained: First, the availability of facilities and infrastructure in implementing numeracy learning is adequate. There is the availability of learning places (classrooms) and learning tools such as a blackboard. However, there is a lack of facilities/ infrastructure in schools that hinders numeracy learning, such as teaching aids or learning media that are not available. Therefore, to anticipate the blackness, the teacher uses tools or objects around as learning media so that numeracy learning continues and can support student success. The tools include pebbles, sticks, straws, candies, and others to help the students understand numeracy learning concepts. Second, the obstacle regarding the teacher's competence in implementing numeracy learning is in planning the learning

activities, namely during making group, the students tend to choose their friends, and sometimes the respondents have difficulty overcoming it. There are no difficulties in selecting media, but the module material employs difficult material for children who are still level 1, so the teachers need to simplify it to make the students understand. In classroom learning, the teacher provides motivation and rewards to students who motivate other students. In addition, the learning guide is clear and can facilitate the learning process. However, based on the condition of students' abilities with the material in the module, it is still not appropriate. Third, the availability of media or numeracy learning aids from the school in facilitating the procurement of learning media related to numeracy learning is helpful. This facility is such as providing media tools and multiplying worksheets. Fourth, the accuracy of the numeracy learning guideline needs improvement because several things must be improved, such as the level of student ability and the assessment instrument, which is not following the module being studied. In addition, the learning material is combined with local wisdom that is close to the student's environment. Fifth, the student's motivation and enthusiasm for classroom participation are excellent. It is because the learning is interesting, and the students can learn to mingle with the students from different classes. Sixth, the parental support in learning numeracy for students is very positive, where parents are happy and motivated to guide their children at home.

Based on the interviews with respondents at SDN Jubelan 01, the following information was obtained: First, the availability of facilities and infrastructure for implementing numeracy learning is still inadequate. It can be seen from the availability of learning places (classrooms) that are less so that they use narrow library space for the learning process. It greatly affects the learning process because the students become uncomfortable during the learning. The second point concerns the obstacles to teacher competence in implementing numeracy learning in planning the activities. There are no significant difficulties in using the learning media, but some difficulties are in preparing the daily learning media. In classroom learning, the teacher provides feedback and motivates the students. In addition, the learning guide is clear and can facilitate the learning process. However, it still needs improvement based on the condition of students' abilities with the material in the module. Third, the availability of learning media or aids from the school in facilitating the procurement of learning media related to numeracy learning is very helpful. The aids include printers, paper, markers, double tips, scissors, LCDs, speakers, storybooks, and other stationaries. Fourth, the accuracy of the numeracy learning combination is appropriate. The module already contains activity steps that are systematically arranged so that the learning process becomes more organized and systematic. Fifth, the student's motivation learning participation is very enthusiastic. Due to the use of learning media, they become more active in asking and answering questions, and games also complete the learning. Therefore, the learning is not teacher-centered but student-centered. Sixth, the parental support in learning numeracy is excellent and positive, where the parents are very enthusiastic in supporting students' numeracy learning.

Moreover, based on the interviews with respondents at SDN Susukan 04, the following information was obtained: First, facilities and infrastructure in implementing numeracy learning are adequate. However, there is a lack of numeracy learning such to the unavailability of learning media. The second point concerns the obstacles to teacher competence in implementing numeracy learning in planning learning activities, namely limited time. In classroom learning, the teacher provides feedback, and the learning guideline is clear; it can facilitate the numeracy learning process. Third, the availability of learning media from the school in facilitating the procurement of learning media related to numeracy learning is limited. Fourth, the accuracy of the numeracy learning combination is appropriate. Fifth, the student's motivation to participate in numeracy learning activities is still lacking. Sixth, parental support in learning numeracy students are deficient.

Other results of interviews with respondents at SDN Sambiroto 01 and the obtained information are as follows: First, the availability of facilities and infrastructure in implementing numeracy learning is adequate. There is facilities/infrastructure in schools that support learning, such as teaching aids or learning media. In addition, the teacher also uses surrounding tools or objects as learning media so that the learning can run and support the student's success. The learning includes objects around the students so that it can help them to understand the learning concepts. The second point concerns the obstacles related to the teacher's competence in carrying out numeracy learning in planning the learning activities, namely the limited time. The teacher sometimes feels that it is still difficult to overcome. There are no significant difficulties in selecting the learning media, but the module material is too difficult for the children who are still in level 1. Therefore, the teachers need to simplify it to increase the students' understanding. In classroom learning, the teacher provides motivation and rewards to students who motivate others. In addition, the learning guideline is clear and can facilitate the numeracy learning process. However, the module material is still not appropriate based on the condition of students' abilities. Third, the availability of learning media or aids from the school in facilitating the procurement of learning media related to numeracy learning is very helpful. The aids include providing media tools and multiplying worksheets. Fourth, the accuracy of the numeracy learning combination is appropriate. It can be seen from the module, which already contains systematic activity steps to make the learning process

more organized and systematic. Fifth, the motivation and enthusiasm of students in learning participation are excellent, and it is because the learning is interesting. The last point is that parental support in students' numeracy learning is positive.

The interviews with respondents at SDN Patemon 02 have the following results: First, the availability of facilities and infrastructure for implementing numeracy learning is still inadequate. It can be seen from the absence of classrooms that support numeracy learning. The second point concerns the obstacles to teacher competence in implementing numeracy learning in planning the learning activities. The teachers have difficulty preparing the daily learning media due to limited time. Meanwhile, in classroom learning, the teacher provides feedback and motivates students. In addition, the learning guideline is clear and can facilitate the numeracy learning process. However, it still needs improvement based on the condition of students' abilities with the material in the module. The third point is about the availability of learning media or aids. In terms of learning media or aids, it has been very helpful. Fourth, the accuracy of the numeracy learning combination is appropriate where the module already contains systematic activity steps so that the learning process becomes more organized and systematic. Fifth, the student's motivation in learning participation is excellent. The use of visual media in learning makes the students more active during the learning. The last point is related to parental support, which is very supportive, and the parents are enthusiastic about supporting the learning.

Based on the results of the observations above, the implementation of the numeracy learning component in elementary school mathematics learning is as follows:

In Figure 1, the recapitulation of each component of the availability of facilities indicators in the implementation of numeracy learning is presented. The classroom component is sufficient for learning. There are 80% of yes for the implementation component and 20% of no for the implementation component. It shows that the classroom is sufficient for learning numeracy. In the main facility components, such as blackboards, chalk/markers, tables, chairs, and lighting in the classroom, there are 80% of yes for the implementation component and 20% of no for the implementation component. It shows that the main facility components such as blackboards, chalk/markers, tables, chairs, and lighting in the classrooms are sufficient.

In Figure 2, the recapitulation of each component is presented in the indicators regarding teacher competence in implementing numeracy learning. In the component of teacher ability to plan the numeracy learning, 87% yes for the component implementation and 13% of no for the component implementation. It shows that the teachers have been quite capable of planning numeracy learning. In the component of teacher ability to use learning media and aids based on each lesson, there are 89% yes for the component implementation and 11% of no for the component implementation. It shows that the teachers have used appropriate learning media and aids for each lesson. In the component of teacher ability to carry out the numeracy learning according to the guideline, there are 89% yes for the component implementation and 11% of no for the component implementation. It shows that the teachers have carried out the learning steps according to the rules. In the component of the teacher's ability to give feedback well and appropriately to the students, there are 90% yes for the component implementation and 10% of no for the component implementation. It shows that the teachers have provided students with fairly good and appropriate feedback.

On the components of teaching aids and supporting media for numeracy learning is sufficient to carry out learning, there are 77% yes for component implementation and 23% no for component implementation. It is concluded that the availability of teaching aids and supporting media has been sufficient for numeracy learning.

In Figure 4, the indicators of the accuracy of the numeracy learning guideline on the module components and student worksheets regarding numeracy are presented. There are 91% of yes for the component implementation and 9% of no for the component implementation. It shows that the module

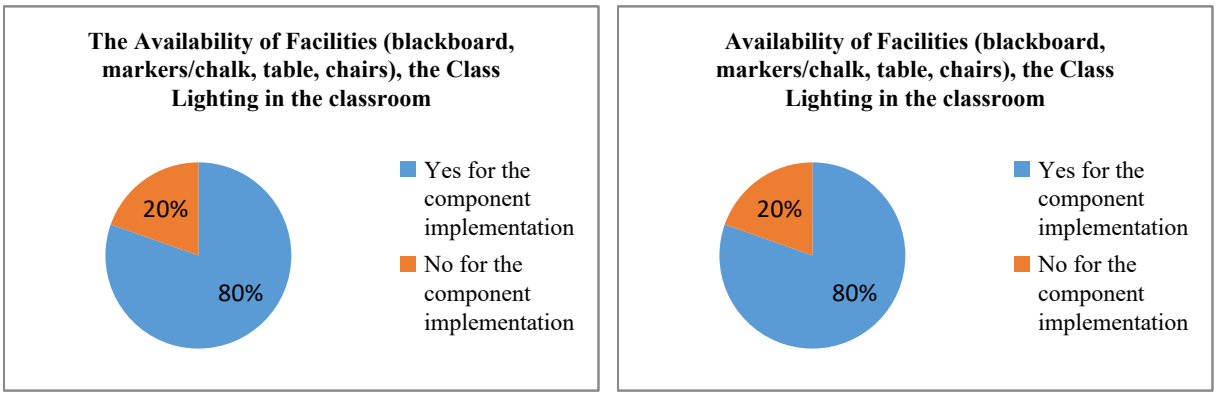


**Fig. 1:** The Recapitulation of the Availability Indicators of the Facility and Infrastructure in Numeracy Learning

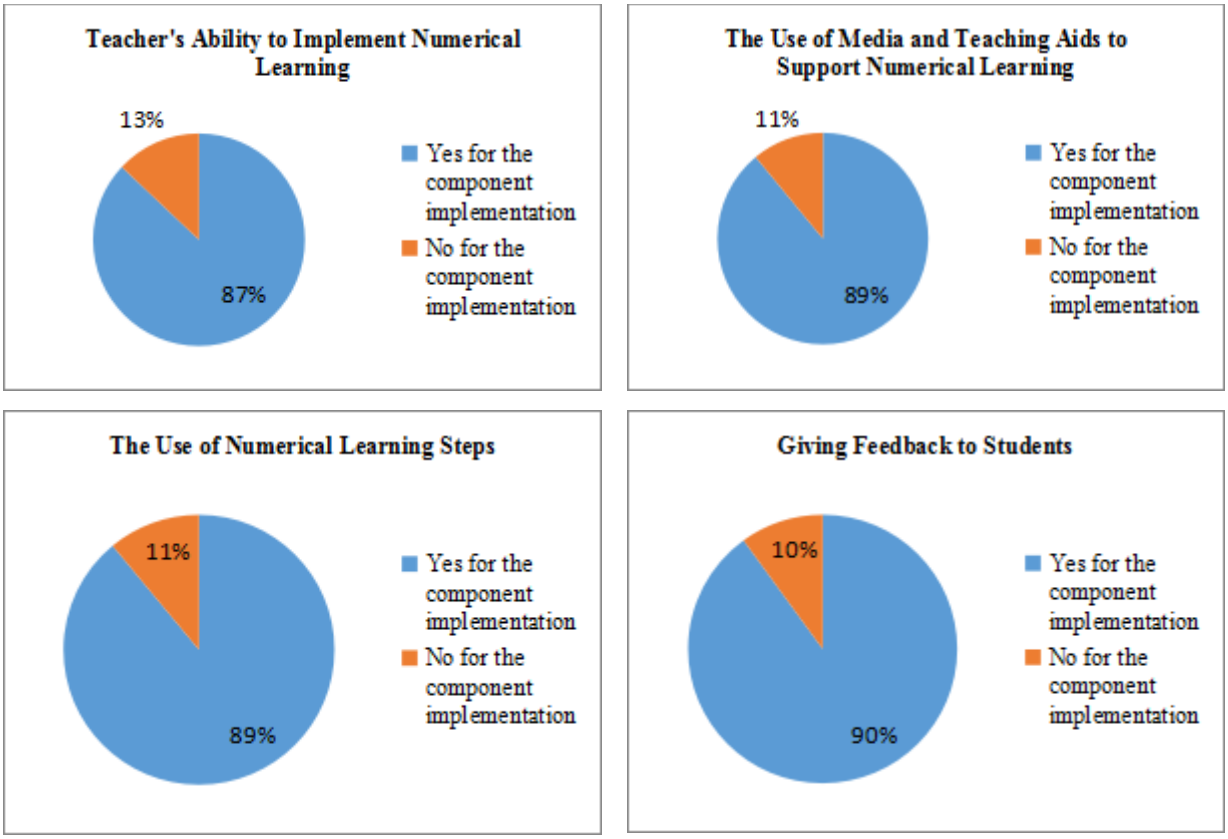


**Fig. 2:** Recapitulation of Teacher's Competence Indicators in Implementing Numeracy Learning

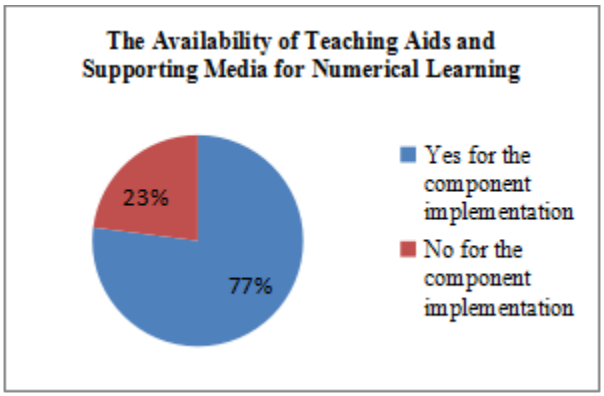


**Fig. 3:** The Recapitulation of Availability Indicators of Numeracy Learning Supporting Media

and student worksheets on numeracy need to be improved to match the material. Regarding material availability for material comprehension regarding numeracy, there are 84% yes for the component implementation and 16% no for the component implementation. It shows that the availability of the material in the module needs to be improved according to the students' ability to comprehend the material about numeracy.

In Figure 5, the indicators of student motivation in numeracy learning are presented. On the component of student attendance in numeracy learning, there are 88% yes for the component implementation and 20% of no for the component implementation. It shows that several components of student attendance in numeracy learning need to be improved. On the student enthusiasm component during numeracy learning, there are 85% yes for the component implementation and 15% of no for the component implementation. It shows that the implementation that supports students' motivation needs to be improved in terms of the learning process so that it follows students' abilities. They are enthusiastic about comprehending the material about numeracy.

## Discussion

### Availability of Facilities and Infrastructure in Numerical Learning

According to the observations results, four important components affect numeracy learning in elementary schools. The first component is regarding the availability of the required facilities and infrastructure. All four schools stated that the classrooms have been sufficient to meet the standards for learning. However, there is one school that experiences a lack of supporting facilities and infrastructure because the number of facilities and infrastructure for study groups does not match. It has become one of the obstacles in the learning process and affected the comfort of student learning. It follows

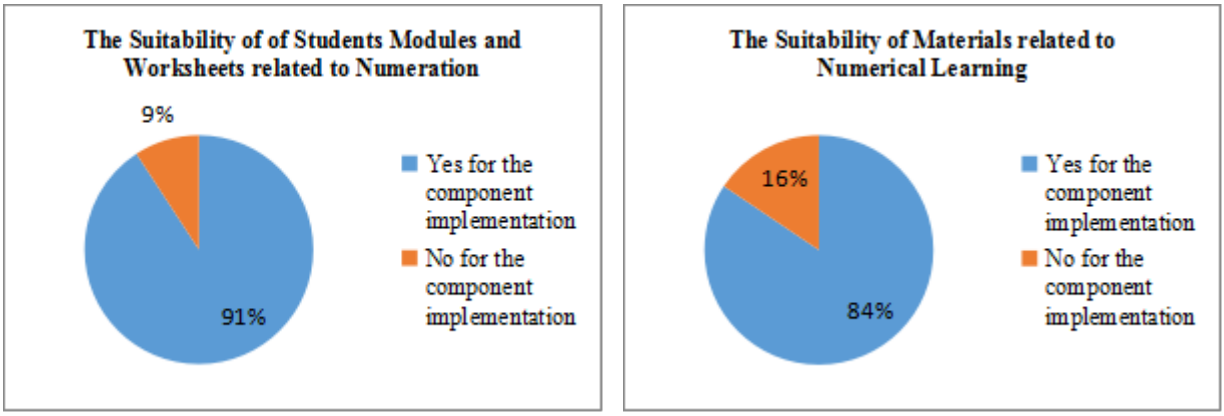


**Fig. 4:** The Recapitulation of Accuracy Indicators of Numeracy Learning Supporting Guideline

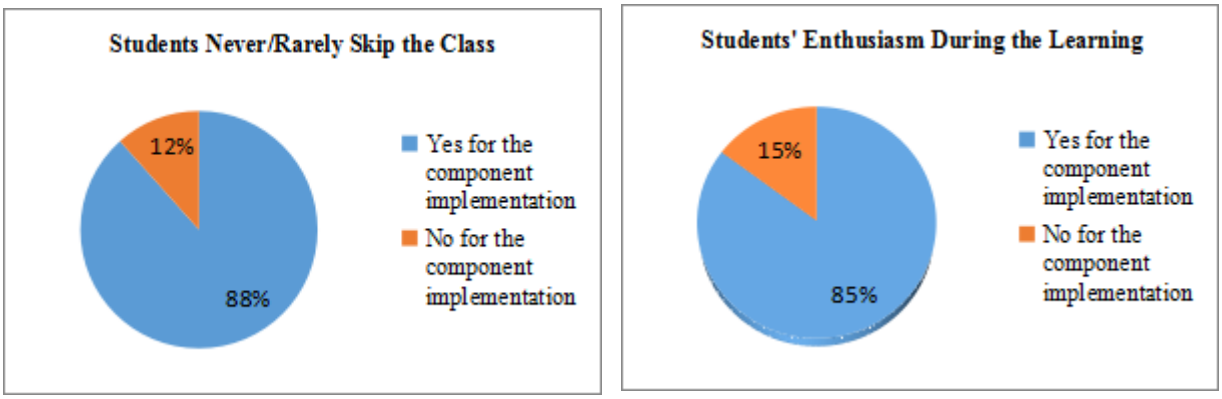


**Fig. 5:** The Recapitulation of Students' Motivation Indicators in Numeracy Learning

the opinion of Nasrudin & Maryadi (2019) that the availability of infrastructure in learning, such as classrooms, chairs, tables, blackboards, and other learning aids, can optimize teaching and learning activities in schools. (Herawati et al., 2020) stated that the non-fulfillment of educational facilities and infrastructure could hinder schools' learning and teaching process.

## Teacher Competence in Implementing Numeracy Learning

The second component is related to teacher competence in implementing numeracy learning. Based on the observations, the teachers have sufficient competence in numeracy. It is a fairly positive value in the implementation of numeracy learning. Teachers' ability or competence impacts the students' learning motivation, and it can also provide a good reciprocal relationship between teachers and students (Fauth et al., 2019). Teachers play an important role in the implementation of education at schools. They must have sufficient abilities and skills (Maba, 2018). However, there are obstacles experienced by teachers in learning numeracy. The obstacle is the difficulty in designing or planning the learning. The teachers have some difficulty in planning a good numeracy lesson. It can greatly impact the learning and expected learning outcomes. The teachers must be equipped with good learning preparation. Therefore, they are able to plan the learning in order to direct it and make it suitable for the goals they want to achieve (Hewett & Powers, 2007). Preparing good teachers is one of the efforts to improve student achievement (Boyd et al., 2009). It means that if the teacher is competent in the pedagogical field, they will be aware that learning preparation is important. The use of learning media during numeracy learning is significant. Ten teachers from five schools have stated that the school has provided them with enough learning media for the numeracy learning activities. However, the learning media provided are still limited. The availability of mathematics learning media greatly supports the achievement of students' comprehension of numeracy material. It is in accordance with an idea (Widodo et al., 2018) stated that the selection of mathematics learning media is a crucial aspect for the learning's success. The students can get a concrete picture of things or abstract mathematical concepts. Mathematical literacy as numeracy ability is an important thing for students to have (Hidayati et al., 2020). The use of visual representations of abstract mathematical concepts in lower grade students is able to improve their learning outcomes and understanding (Bryant et al., 2011). Therefore, the use of media is a significant thing that should be taken into account and planned.

### The Accuracy of the Numeracy Learning Guideline

The third component is related to the accuracy of the numeracy learning guideline and the instruments. They are already quite good, even though there are some teachers who complain about errors in the student module. There is a discrepancy between the student's level and the given module, as well as a lack of synchrony with the evaluation tools. It is an important note because the teaching materials are also one of the main components of learning. The use of learning modules that are in accordance with students' abilities is very helpful for them in understanding the material (Lestari et al., 2021). One of the teachers stated that there is a need for additional contextual content with the value of local wisdom so that it will be in accordance with the character of education in Indonesia. One of them is ethnomatics-based learning which can be a solution that can be given for the improvement of the learning module preparation. It is because by using ethnomatics learning, the students can understand abstract mathematical concepts and learn about the characters and culture around them (Widiantari et al., 2022).

### Student Motivation in Numeracy Learning

The fourth component is related to the student motivation in learning numeracy. The students' motivation at SDN Jubelan 01 is still less compared to the other four schools. It is very unfortunate because it is one of the fundamental aspects of learning. The student's interest and motivation in learning are often triggered by the question, "what is the point of this for me?" (Frymier & Shulman, 2009). It is because they also have an idea of the contribution of the material they study for the short-term conditions. Several efforts can be made to increase the students' learning motivation. The efforts include clarifying learning objectives, creating a pleasant learning atmosphere, using interesting learning models, and providing well as well as constructive feedback to the students (Suprihatin, 2015).

## Conclusion

Based on the results and discussion above, the researchers found that numeracy is defined as a person's ability to reason, analyze, formulate, interpret, and solve problems. Meanwhile, the ability to numeracy is significant for elementary school students. There are several crucial aspects in the success of numeracy learning from the point of view of elementary school classroom teachers; they include the availability of infrastructures such as classrooms, blackboards, tables, chairs, and markers/chalks. Some of the schools have provided them, but some others which have more learning groups have less or inadequate learning infrastructures. The teacher's competence in carrying out the learning is sufficient, but there are some obstacles that some teachers have. The obstacles are in the form of difficulty in planning conducive numeracy learning. The availability of media and teaching aids to support numeracy learning is also quite good, although there are some obstacles. The obstacles are that teachers have financial limitations. Therefore, creativity is needed to use some items around them to become media or teaching aids. In terms of the learning guideline, some schools are already sufficient, but some others have obstacles related to the findings and input from teachers that the materials need to be related to local culture. Finally, the student motivation is also quite good, although there are still some students who do not have the motivation to learn, so some of them still experience an inability to follow the lesson well. Based on the findings, the results of the research show that students' numeracy skills in learning mathematics currently need improvements, including the need for adequate infrastructure support in learning mathematics so that students' numeracy levels can increase, teachers also need to have competence regarding understanding numeracy because most teachers are still motivated how to complete learning objectives with the demands of the school's academic calendar so that students' understanding of numeracy has not emerged, numeration support guides (learning tools) also need to be adapted to the context of numeration in the actual mathematics curriculum, and the level of student motivation is still low in learning because the learning provided is still monotone has not implemented the actual concept of numeration. Some recommendations that might be considered for increasing numeracy in learning mathematics include focusing on teaching to understand basic knowledge and skills, teacher demonstrations with active student participation, small group work, individual guidance, adjusting the existing curriculum, building active and fun classrooms, increase the Human Resources required by training.

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