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Implementing school programs supporting numeracy: What we can learn from a junior high school in Surakarta

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Abstract

Mathematical literacy or numeracy has gained more attention in the education world in Indonesia. This can be seen through various efforts by the Ministry of Education to continually improve it. The research aims to provide an overview of the implementation of mathematics learning in junior high schools in Surakarta, resulting in the numeracy outcomes of students. This study adopts a qualitative approach with a case study strategy. The research data includes the implementation of numeracy, teacher activities, student activities, school environment, and documents. Data sources come from informants, including teachers and students. Data collection techniques involve interviews and documentation. The research findings reveal that the implementation of mathematics learning that strengthens numeracy at SMP Negeri 11 Surakarta and SMP Muhammadiyah Special Program Surakarta is in the stages of habituation and development. Mathematics teachers play roles as motivators, guides, and facilitators. Activities undertaken include providing books, familiarizing students with solving numeracy problems, assigning tasks, motivating students, organizing activities related to numeracy improvement, imparting knowledge, and allowing students to conduct studies.

Keywords: mathematical literacy, numeracy, school program

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INTRODUCTION

The current challenges in the education aspect in Indonesia are in the form of a learning loss caused by the COVID-19 pandemic, leading the government to issue the Merdeka Belajar—literally means freedom to learn—policy. The Ministry of Education and Culture initiated the curriculum policy options as part of the efforts to mitigate learning loss and as a form of learning recovery (Hanafiah, et al., 2022). The steps taken include the implementation of the Merdeka curriculum. The characteristics of the Merdeka curriculum include the development of soft skills and character, a focus on essential materials, and flexible learning approaches (MOECRT, 2022). These efforts align with the competencies that must be fulfilled in the Graduates' Competency Standards (SKL) in primary and secondary education units, aiming to produce students who are faithful and devoted to the Almighty God, possess noble character, instill good values, and foster literacy and numeracy competencies to pursue further education (MOECRT, 2022).

In both the government regulation and the ministerial regulation, literacy refers to language literacy, while numeracy refers to mathematical literacy.

Sujadi (2022) defines numeracy as the ability to think using mathematical concepts, procedures, facts, and tools to solve everyday problems in various relevant contexts for individuals as Indonesian and global citizens. Students are expected not only to be able to perform calculations but also to apply mathematical concepts in utilizing the realities and environments around them (Halimah, 2014). However, nowadays, numeracy remains a challenge for basic mathematics education (Murtiyasa, 2016).

One part of the Merdeka Belajar policy is the improvement of the education evaluation system through the national assessment (AN), as stated in Permendikbudristek No. 17 of 2021. The AN consists of three main instruments, namely the Minimum Competence Assessment (Asesmen Kompetensi Minimum or AKM), Character Survey, and Learning Environment Survey (Pusmendik, 2022a). AKM is an assessment of fundamental competencies required by all students to develop their capacities and participate positively in society (Pusmendik, 2022b). AKM is designed to measure students' achievements in cognitive learning outcomes, specifically reading literacy and mathematical literacy (numeracy), which are essential prerequisites for contributing to society.

In Indonesia, mathematical literacy is referred to as 'numerasi' or mathematical literacy and is considered crucial for students to possess. Numeracy is deemed essential as it becomes a focal point in the successful development of Indonesia in the 21st century by mastering six basic literacies, which are language literacy, numeracy, science, digital, financial, as well as cultural and civic literacy (MOEC, 2017). The Programme for International Student Assessment (PISA) survey conducted by the Organization for Economic Cooperation and Development (OECD) in 2018 revealed that the achievement of Indonesian students, particularly in numeracy, still remains relatively low compared to other countries (OECD, 2019). The comparison of PISA 2018 scores between Indonesia and neighboring countries is shown in Table 1.

Table 1. The comparison of PISA 2018 scores between Indonesia and neighboring countries

No	Country	Literacy Ability Scores		
		Reading	Mathematics	Science
1.	Singapura	549	569	551
2.	Malaysia	415	440	438
3.	Brunei Darusalam	408	430	431
4.	Thailand	393	419	426
5.	Indonesia	371	379	396
6.	Filipina	340	353	357

In order to achieve satisfactory numeracy outcomes, various supports are needed, including the process of mathematics learning. This aligns with the characteristics of the Merdeka Curriculum, which emphasizes flexible learning. This means that the learning is adapted to the criteria outlined in the Standard Process, which includes lesson planning, implementation, and assessment. Sobarningsih et al. (2019) state that the success of mathematics learning is influenced by the teachers' mastery of the subject matter and the appropriate choice of teaching strategies. A well-conducted mathematics learning process will impact students positively when acquiring mathematical knowledge, consequently affecting numeracy outcomes as well. The researchers are

interested in further investigating the mathematics learning of junior high school students in Surakarta to ensure their numeracy achievements are satisfactory.

RESEARCH METHOD

This research is a qualitative study with a case study approach. The subjects of this study are teachers and students. The process of selecting the subjects was conducted through a pre- field study to identify mathematics teachers and students at SMP Negeri 11 Surakarta and SMP Muhammadiyah Special Program Surakarta. Afterward, their consent was obtained to participate as subjects in this research. The data in this study consist of information about the teachers' strategies in teaching mathematics, particularly conceptual knowledge, to students in order to achieve satisfactory numeracy outcomes. The data sources in this research include field notes collected during observations, recorded interviews, and interview transcripts with the research subjects.

The data collection techniques used in this research are observation and interviews. Observation is employed to directly observe the process of mathematics learning in the classroom. Interviews are used to obtain verbal information directly from the research subjects regarding the strategies used to teach mathematics, particularly conceptual and procedural knowledge, to students to ensure satisfactory numeracy outcomes. The main instrument in this study is the researcher themselves, aiming to seek and collect data directly from the data sources. The first auxiliary instrument in this research is the observation guide, while the second auxiliary instrument is an unstructured interview guide created by the researcher as a tool for data collection during fieldwork.

RESULTS AND DISCUSSION

Education process standard

Sanjaya (2009) emphasizes several points regarding the understanding of "Standar Proses Pendidikan" which are as follows: (a) Education Process Standards are national education standards, meaning that they apply to every formal educational institution at a specific level of education, regardless of the location of the educational institution within the country; (b) Education Process Standards are related to the implementation of teaching and learning, implying that they outline the challenges of how the teaching and learning process should take place. Therefore, these standards can serve as guidelines for teachers in managing the teaching and learning process, and (c) Education Process Standards are directed towards achieving the Graduates' Competency Standards (Standar Kompetensi Lulusan or SKL). Hence, the Graduates' Competency Standards serve as the primary source or reference in determining the Education Process Standards. In essence, the Education Process Standards can be formulated and implemented once the Graduates' Competency Standards have been established.

Sanjaya (2009) states that "the weakness of the learning process developed by teachers nowadays is one of the problems faced by the education world." For example, some teachers diligently implement their teaching management, while others do it in a more casual manner. Teachers who are dedicated and committed to their work can produce better quality graduates compared to those who handle their teaching and learning process casually.

Standar proses as a standard for the implementation of learning can be influenced and related to other standards, namely content standards, graduate competency standards, assessment standards, infrastructure standards, educator and staff standards, and financing standards (See Figure 1).

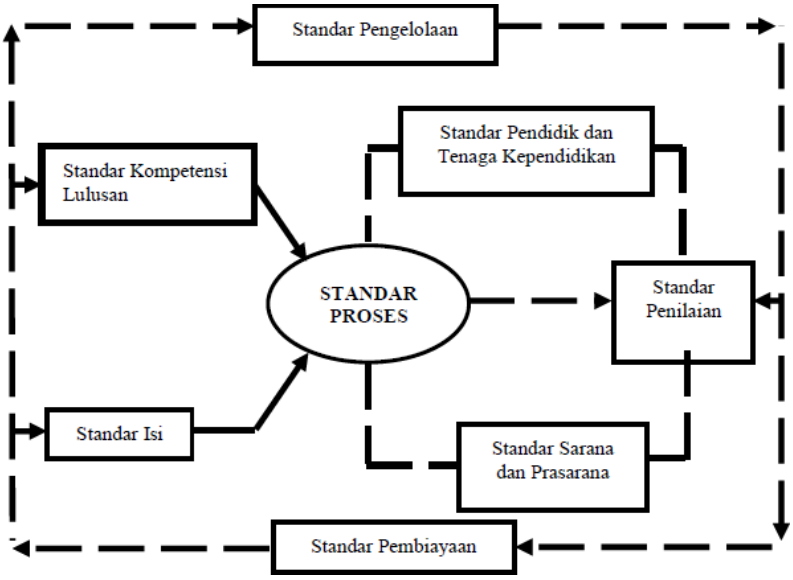

Figure 1. Relationship between education process standard and the other standards.

Figure 1 illustrates several aspects that need to be considered, one of which is that the effectiveness and smooth implementation of education process standards can be influenced or dependent on educators and educational staff, as they play a crucial role in the education process. Additionally, the availability of facilities and infrastructure is also vital, as they serve as tools and media for delivering the learning process.

The process that teachers need to understand in teaching based on the education process standards includes: (1) Planning the Learning Process, which involves determining the content taught in the learning activities, the teaching strategies, and the evaluation methods used to measure the learning outcomes. The planning of the learning process in the education process standards includes the Learning Objectives Flow (Alur Tujuan Pembelajaran or ATP), Learning Outcomes (Capaian Pembelajaran or CP), Teaching Modules, learning objectives, time allocation, teaching methods, learning activities, learning assessment, and learning resources; (2) Implementing the Learning Process, which is carried out by teachers and plays a crucial role. This is because teachers are the first party involved in implementing the education process standards in the classroom. In the application of the education process standards, teachers should understand at least three aspects outlined in Kemendikbudristek No. 16 of 2022 are understanding in planning the learning process, understanding in implementing the learning process, and understanding in the assessment/evaluation process.

Mathematics learning

Learning activities are activities of imparting knowledge carried out by teachers to make students more skilled and knowledgeable. To achieve effective learning processes, one of the methods used by teachers is conditional learning. In

managing the teaching and learning activities, teachers often become less creative due to being constrained by rigid rules. This can lead to a less harmonious relationship between teachers and students. Teachers may become less interested in understanding the individual needs, health, difficulties, interests, feelings, abilities, and aspirations of their students. Instead, they focus more on enforcing strict rules and sanctions for students who are absent or lack enthusiasm in participating in the lessons (Harefa, 2020).

The learning process is related to what students acquire after completing the learning activities. The learning process aims to ensure that students can experience, understand, and apply the knowledge they have acquired (Ricardo & Meilani, 2017). Mathematics is a discipline that is integrated into the compulsory subjects in the educational curriculum of every country. The technical and cognitive abilities of mathematics teachers need to be developed. Mathematics is considered a dynamic and constantly evolving correlation system (Peker & Ulu, 2018).

The learning process is a collection of information during the teaching and learning activities for students. To achieve a good learning process, it is an integral part of the teacher's role to effectively monitor the teaching and learning process. An effective learning situation is created by the teacher as the lesson planner, providing excellent opportunities for students to actively participate in the teaching and learning process.

From the explanations of several theories above, it can be concluded that the mathematics learning process is an activity carried out by educators (teachers) and students in the transfer of knowledge, enabling students to think logically, critically, perseveringly, creatively, and with initiative.

Mathematical literacy (numeracy)

Every individual possesses literacy skills, but what sets them apart is how each person hones those abilities. Mathematical literacy is the capability of an individual to formulate, use, and interpret mathematics in various situations, including mathematical reasoning and the utilization of mathematical concepts, processes, facts, and tools to describe, explain, and predict events (OECD, 2019). Therefore, this skill is valuable for students to understand the role of mathematics in life and to make constructive and reflective assessments and decisions. Internationally, mathematical literacy is referred to as mathematical literacy, while in Indonesia, it is known as mathematical literacy or numeracy.

According to Abidin et al. (2018), there are three main focuses of the process that students demonstrate when actively engaged in the process of solving mathematical problems, namely formulating, employing, and interpreting. In addition to the aspects of mathematical processes, there are six fundamental abilities underlying the mathematical problem-solving process, which are communication, representation, mathematizing, using mathematical tools, devising strategies for solving problems, and using symbols. The content in the PISA questions: A Teacher's Guide to PISA Mathematical Literacy (Thomson et al., 2013) is divided into four parts, which are space and shape, change and relationships, quantity, and uncertainty.

Students who are accustomed to being given PISA-type questions will achieve satisfactory results in their numeracy Minimum Competence Assessment (AKM). This is crucial as it is related to the National Assessment of Basic Competencies (ANBK) in the school. Therefore, the role of the teacher as a facilitator is essential in bridging the students in improving their numeracy skills.

Numeracy program at schools in Surakarta

Based on observations and interviews conducted by the researcher with mathematics teachers and students at SMP Negeri 11 Surakarta and SMP Muhammadiyah Special Program Surakarta, it was found that there are strategies implemented by the schools to strengthen students' numeracy. Primarily, various efforts were made to support the transfer of knowledge. At SMP Negeri 11 Surakarta, the school organized a literacy week program. This was done to familiarize students with both language literacy and numeracy literacy. At SMP Muhammadiyah Special Program Surakarta, the school provided extra hours to strengthen students' numeracy. Moreover, during the lessons, teachers introduced numeracy-type questions that were based on the Minimum Competence Assessment (AKM).

These efforts made by the school were supported by the role of teachers during the teaching and learning process. Students were able to enhance their numeracy skills through practicing numerical problems and discussions during mathematics lessons. The interactions provided were more intensive during the learning process. As a result, in accordance with the characteristics of the Merdeka Curriculum, which emphasizes flexible learning, teachers adapted their teaching to the criteria outlined in the Education Process Standards, including planning, implementation, and assessment of the learning process. As facilitators, teachers were always ready to guide students in their learning journey. Therefore, at the end of the numeracy assessment, students could be classified into the group of proficient learners, capable of meeting the six literacies that support 21st-century skills.

CONCLUSION

Numeracy of students has become essential in the current era of education. Therefore, schools need to take action to strengthen students' numeracy skills. The researcher conducted observations at SMP Negeri 11 Surakarta and SMP Muhammadiyah Special Program Surakarta regarding school programs that enhance students' numeracy. Both schools prioritize intensive mathematics learning processes and provide additional learning support outside of regular class hours. One of the approaches is organizing literacy weeks, covering both language literacy and numeracy. Furthermore, the results of this research are expected to serve as a reference for relevant authorities to innovate programs aimed at strengthening students' numeracy skills.

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