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LITERACY AND NUMERACY RESEARCH TRENDS FOR ELEMENTARY SCHOOL STUDENT: A SYSTEMATIC LITERATURE REVIEW

M. Zainudin¹⁾, Doni Abdul Fatah²⁾, Junarti³⁾

¹⁾ IKIP PGRI Bojonegoro, Bojonegoro, Indonesia
E-mail: mzainudin@ikippgribojonegoro.ac.id

²⁾ Universitas Trunojoyo Madura, Bangkalan, Indonesia
E-mail: doni.fatah@trunojoyo.ac.id

³⁾ IKIP PGRI Bojonegoro, Bojonegoro, Indonesia
E-mail: junarti@ikippgribojonegoro.ac.id

Abstract. Literation and numeracy are among the basic skills needed by primary school-aged children to develop 21st-century skills. This triggered massive innovations in educational research related to literacy and numeracy. This content analysis study aimed to systematically analyze the trends of literacy and numeracy research of elementary school students based on articles published in national and international journals. Based on the established inclusion criteria, 20 articles were collected for analysis using the Paper Classification Form (PCF) instrument. The results of the analysis showed the dominance of the topic of literacy and numeracy implementation (45%) themed on daily activities (41.67%) with the case study method (35%). The most common integration pattern found was contextual learning (38.46%). Interest (58.33%) and problem-solving (16.67%) were the dominant variables associated with implementing literacy and numeracy in primary school students. Therefore, it is necessary to conduct various literacy and numeracy studies of elementary school students on other potential issues to help the government achieve national education goals.

Keywords: Literacy; numeracy; research trends; systematic literature review; elementary school.

I. INTRODUCTION

Elementary school education is a series of activities developed following regional characteristics and socio-cultural of the local community to facilitate the development of children's potential at the age of 6 to 12 years (Oktavia et al., 2021); (Rahmi & Hijriati, 2021); and (Sabani, 2019). In line with this, Istiqomah & Suyadi (2019) explained that children's education in elementary schools is in the form of conscious and planned efforts, which are realized in the form of a learning process for children in the middle childhood phase (6-9 years) and late childhood (10-12 years). Furthermore, Kosilah & Septian (2020) explained that education for students aged 6 to 12 is crucial for developing religious, spiritual power, self-control, personality, noble morals, and skills. Thus, primary school education is a series of conscious and planned efforts embodied in the learning process for children aged 6 to 12 years so that the child has the basis for developing religious, spiritual power, self-control, personality, noble morals, and skills.

Daliyawati (2016) ; Elihami (2022); Faubert (2012) explains that primary school education is a means to equip a person to pursue higher education. This is also explained by Rosdiana (2017); Zuhdi & Noor (2019); Lodge et al. (2018); Kuh et al. (2006) that students whose basic abilities are

optimally developed have the opportunity to master material at a higher level of education easily and smoothly. Thus, elementary school education is crucial for a person to prepare themselves to develop their potential and learn more complex materials.

Patriana et al., (2021) ; Rakhmawati & Mustadi (2021) explained that one of the important aspects that an elementary school child should have is literacy and numeracy. Further Setiawan & Sukanto (2021); Ojose (2011); Arslantas & Gul (2022) literacy as the basic skills that a person needs to analyze information critically, as well as implement it for decision-making in life. While Perdana & Suswandari (2021); Chan & Scalise (2022); Seitz & Weinert (s2022) numeracy as a basic skill in implementing the concept of numbers and counting operations in everyday life, as well as the ability to interpret quantitative information encountered in the vicinity. Therefore, literacy and numeracy are basic skills needed by children in primary school to analyze quantitative and qualitative information critically and implement such information for decision-making.

Several studies linking literacy and numeracy have been empirically proven to improve various competencies in 21st-century learning, such as critical thinking and problem solving, creativity, communication skills, and collaboration (Rohman, 2022); (Muliastri, 2020); (Prime & Suswandari,

2021); (Dyah Worowiras tri Ekowati et al., 2019); (Ashri & Pujiastuti, 2021); (Patriana et al., 2021); (Dantes & Handayani, 2021); (Fauziah, 2022). Furthermore, from an affective perspective, students' literacy and numeracy skills can be used to develop decision-making competencies, self-efficacy, and learning motivation (D et al., 2022); (Pangesti, 2018). Therefore, strengthening literacy and numeracy is one of the important aspects of preparing the 21st century generation to become a policy direction in the development of education.

Literacy and numeracy are currently the aspects that have received attention from the Indonesian government (Fadilah, 2022); (Mulantara & Suarni, 2022); (Asnawati et al., 2020); (Kohar, 2022); (Yawan, 2022). Furthermore, the Indonesian government has issued an official policy regarding strengthening literacy and numeracy through an independent curriculum (Zulfikri, 2021); (Shofa, 2021); (Vicky Dwi Wicaksono, 2022); (Saidah & Imron, 2022). The official launch of the independent curriculum starts on February 11, 2022. The implementation of literacy and numeracy strengthening reforms in schools can be observed from a relatively high level of involvement, demonstrated by the emergence of various empirical studies during the covid-19 pandemic in 2020. This fact can be proven through a Google Scholar search with the keywords "literacy," "literacy," "numeracy," and "numeracy," which yielded more than 100,000 findings. However, several studies show that the literacy and numeracy of elementary school students in Indonesia are still low (Rakhmawati & Mustadi, 2022); (Shabrina, 2022); (Ridha Aulia Putri, 2021); (Fitriana & Khoiri Ridlwan, 2021). Numeracy literacy is important as knowledge and skills in planning and managing activities well. Apart from that, numeracy literacy is important for calculating and interpreting data in everyday life. This is the reason for replacing the national exam with literacy and numeracy. Strengthening literacy and numeracy for flat school students who are new, innovative, following the characteristics of students, and able to close theoretical gaps can be done easily if effective research trends in this area can be identified. Therefore, a systematic study is needed to examine the tendency of effective research to strengthen the literacy and numeracy of elementary school students in Indonesian context.

Systematic reviews that explore status and trends in certain themes have become commonplace in educational research, such as systematic literature reviews of number sense research trends by Ghazali et al. (2021), research trends numeracy by Dieckmann (2008), research trends in Literacy and Numeracy by The Australian Council for Educational Research (ACER) (2013), interventions in adult literacy and numeracy by (Pellegrini et al., 2021), and a meta-analysis study on Effective Programs in Elementary Mathematics. However, a systematic literature review that combines holistic and comprehensive research on the literacy and numeracy of primary school children in Indonesia has not been carried out. Therefore, this study aims to systematically analyze research trends that can effectively improve Indonesian elementary school children's literacy and numeracy skills based on articles published in national and international journals. The

details of the research questions that guide the analysis process are as follows: (1) what topics are most explored in the research on strengthening children's literacy and numeracy elementary school?; (2) what methods are most commonly used in research on strengthening the literacy and numeracy of primary school children?; (3) what themes are most commonly used in research on strengthening the literacy and numeracy of primary school children?; (4) how the pattern of integration of literacy and numeracy of elementary school children in learning; (5) what research topics have the most potential to be developed in the future?

II. METHODS

This qualitative study used a content analysis approach with systematic literature review techniques to analyze literacy and numeracy research trends for elementary school students. A systematic literature review is secondary research that combines findings from various primary studies to answer research questions (Newman & Gough, 2020).

The variables in this research are literacy, numeracy, trend. Literacy is a person's ability to process and understand information when carrying out the process of reading and writing. Numeracy literacy is the ability to use various numbers and symbols related to basic mathematics to solve practical problems in various contexts of daily life. Meanwhile, trends are researchers' tendencies in choosing research methods and the concepts being studied.

The present study adopted the review process by Ardwiyanti et al. (2021), which is described as follows: (1) formulate research questions; (2) establish inclusion criteria (Table 1); (3) search for articles in various databases (Google Scholar, ERIC, DOAJ, ProQuest, sage, JSTORE, Science Direct, Springer, journal websites) by typing in the keywords "literacy," "literacy," "numeracy" and "numeracy"; (4) article coding using a Paper Classification Form (PCF); (5) identify patterns throughout the article; (6) synthesize these patterns to answer research questions.

The collected articles were filtered using the PRISMA diagram shown in figure 1; a total of 8,968,101 articles were obtained from various database sources. After being merged, there were 8,962,762 research articles of the same. Thus, the total research articles were 5,339. Then the articles that were adjusted to the title and abstract obtained only 94 articles, of which 78 articles did not meet the inclusion criteria, so there were 20 articles left that were adjusted again to the inclusion criteria.

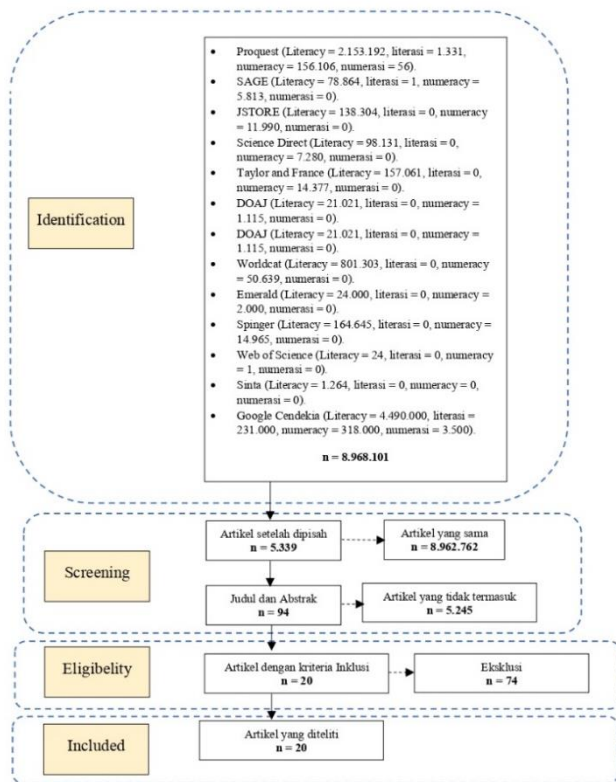


Figure 1. Diagram PRISMA

The PCF-adapted coding instrument was developed by Kizilaslan et al. (2012). The instrument has met the requirements of validity and reliability. The collected data were analyzed using percentage calculations.

TABLE I.
THE INCLUSION CRITERIA

Category	Inclusion Criteria
Type of publication	Scientific articles published in journals
Journal specifications	National peer-reviewed journal accredited minimum grade 3 (Sinta 3); internationally peer-reviewed journal indexed Scopus
Publication year	2017 - 2022
Research setting	Indonesian
Researcher's nationality	Indonesian or the combination of Indonesian and foreigners
Independent variable	Literacy, numeracy, and all kinds of integration patterns
Field	Numeracy literacy and reading literacy
Type of Study	Empirical and theoretical
Research subject	Students and teachers at elementary school

TABLE II

THE DISTRIBUTION OF ARTICLES BASED ON THE JOURNALS' IDENTITY

Journal type	Status	Journal name	Quantity
National	Grade 2 (Sinta 2) accredited	Premiere Educandum: <i>Jurnal Pendidikan Dasar Dan Pembelajaran</i> (Journal of Basic Education and Learning)	2

		<i>Jurnal Prima Edukasia</i>	3
		<i>Jurnal Ilmiah Sekolah Dasar</i> (Elementary School Scientific Journals)	2
		Elementary: Islamic Teacher Journal	1
		<i>Al Ibtida: Jurnal Pendidikan Guru MI</i> (Elementary School Teacher Education Journal)	1
Grade 3 (Sinta 3) accredited		<i>Sekolah Dasar: Kajian Teori dan Praktik Pendidikan</i> (Primary School: Study of Educational Theory and Practice)	1
		<i>Muallimuna: Jurnal Madrasah Ibtidaiyah</i> (Journal of Elementary School)	2
		<i>Profesi Pendidikan Dasar</i> (Elementary Education Profession)	1
		<i>Jurnal Inovasi Pendidikan Dasar</i> (Journal of Elementary Education Innovation)	3
		Journal of Primary Education	2
International	Indexed by Scopus (Q2)	<i>International Journal of Emerging Technologies in Learning (iJET)</i>	1
	Indexed by Scopus (Q3)	Elementary Education Online	1

Based on Table 2, this study involved 20 articles published in national and international journals. There are 18 articles published in national journals, while two are three articles according to the criteria published in international journals.

This literature review uses a PRISMA (Preferred Reporting Item for Systematic and Meta-analysis) diagram. Researchers obtained the database through exploring ProQuest, PubMed, Sage Journals, JSTORE, Science Direct, Taylor and Francis, DOAJ, WorldCat, Emerald, and SpringerLink with a range of 2018-2022. Search for articles related to keywords: "literacy", "numeracy", "literasi", "numerasi", "education for elementary school". The corresponding article is taken for further analysis.

III. RESULT

A. Research Topics on literacy and numeracy of elementary school children

Literacy and numeracy research is carried out on various topics. For example, table 3 shows that the topic of literacy and numeracy implementation (45%) dominates literacy and numeracy research, followed by learning media (30%). On the other hand, learning strategies (5%), literacy and numeracy concepts (10%), and learning approaches (10%) are minor topics. This finding aligns with the research trend of mathematics education in elementary school students' learning models/theories/curriculum designs and student abilities (Simanungkalit et al., 2021). In addition, the findings in this study are in line with the trend of International research during 1999-20 19 published in the Hiroshima Journal of Mathematics Education which shows that it is wrong; its main focus is on the topic of student abilities or characteristics (Pang, 2020).

TABLE III.
 THE LITERACY AND NUMERACY RESEARCH TOPICS TRENDS

Research Topic	Percentage (%)
Implementation of literacy and numeracy	45
Learning Media	30
Learning strategies	5
The concept of literacy and numeracy	10
Learning Approach	10

Figure 1 shows that literacy and numeracy research attention was widely carried out in 2019. This is in line with the national literacy movement, which intensified in 2016 (Darwanto et al., 2020). As a result, it is no wonder that literacy and numeracy research begins with a fundamental topic that focuses on measuring students' literacy and numeracy abilities in schools.

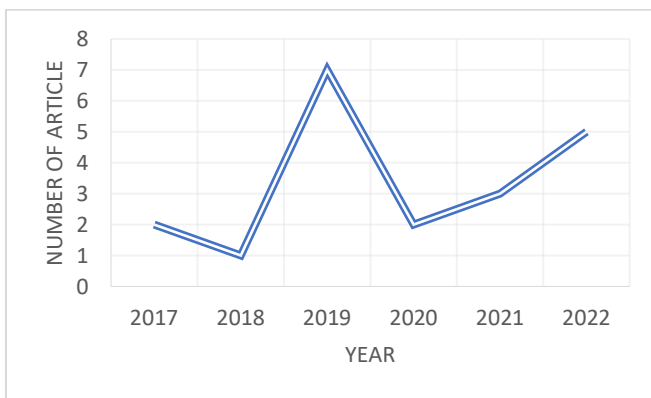


Figure 1. The distribution of literacy and numeracy articles published annually

B. Literacy and numeracy research methods of primary school children

The current systematic literature review reveals case study methods (35%) and Experiments (20%) as trends in literacy and numeracy research (Table 4). The trend of research methods follows the trend of the topic. Topics that are widely

explored are related to strengthening literacy and numeracy in schools which are broadly carried out through case studies.

TABLE IV.
 THE LITERACY AND NUMERACY RESEARCH METHODS TRENDS

Approach	Research Methods	Percentage (%)
Quantitative	Experiment	20
	Survey	5
Qualitative	Literature Review	10
	Case Studies	35
	Phenomenology	5
The others	Research and development	15
	Mix method	10

Meanwhile, learning media are developed through experimental methods and development research. These findings require that researchers' interest in qualitative research is relatively high, such as case study research. Therefore, especially in the development of the theme of literacy and numeracy in Indonesia, which developed starting in 2016, it is natural to start with an analysis of the context and processes related to theoretical issues which are being studied so that it is relevant to the characteristics of case study research (Nur'aini, 2020); (Prihatsanti et al., 2018).

C. Themes of literacy and numeracy research for elementary school children

Daily activities and the surrounding environment dominate the theme of literacy and numeracy research of elementary school students. Table 5 shows that daily activities (41.67%) and the surrounding environment (16.67%) are the trends in elementary school students' literacy and numeracy research. This is relevant to the results of research that shows that students in elementary schools will be more proficient in the material if it is associated with the daily activities of concerned students (Hariyani, 2019). Moreover, everyday activity is also part of contextual matter or everything concrete (Astuti & Indianto, 2014); (Astuti & Indianto, 2014), so the trend of the theme of literacy and numeracy research of elementary school students who use daily activities is relevant to the characteristics of children at the stage of formal operational thinking.

TABLE V.
 THE LITERACY AND NUMERACY RESEARCH THEME TRENDS

Research Methods	Percentage (%)
Daily activities	41,67
Environment	16,67
Traditional dances	8,33
Traditional games	8,33
Geometry	8,33
Myself	16,67

The theme in the elementary school curriculum has been adapted to the character of child development (Perdana & Suswandari, 2021); (Setiawan & Sukamto, 2021). However, based on Table 5, literacy and numeracy studies conducted between 2017 and 2022 were dominated by daily activities. Using the theme of daily activities helps students connect learning activities with the activities that have been carried out so that students will find new knowledge based on the situation faced in the learning process (Sulianto, 2008).

Therefore, daily activities can be used as an alternative theme to strengthen the literacy and numeracy of elementary school students.

D. Patterns of integration of literacy and numeracy of elementary school children in learning

The measurement of literacy and numeracy abilities of elementary school students can be integrated into pre-learning, lecture learning, contextual, extracurricular, project-based learning, and electronic-module. Table 6 shows that contextual learning (38.46%) and problem-based learning (23.08%) set the trend of primary school students' literacy integration and numeracy patterns. The hat is in line with the explanation by (Amaliyah & Rahmat, 2021); (Dai, 2020); (Hu, 2016); and (Subotnik et al., 2019) that a person's self-potential can develop optimally if learning in a situation that follows the characteristics he has. Meriyati (2015) there are differences in the characteristics of elementary, junior high, and high school students. In line with that Eccles (1999); Hyman et al., (2020); Hayati et al. (2021); Alawiyah (2017); Zeinstra et al. (2007); (Rahmi & Hijriati, 2021) explained that children aged 6 to 13 years have different developmental characteristics from children over the age of 13. Furthermore, Marinda (2020) explained that children in elementary schools generally can think concrete operationally so that children begin to be able to sort, classify, and consider something as a problem-solving solution, get to know mutual relationships, and translate general concepts into real-life. Therefore, to develop of literacy and numeracy of children aged 6 to 12 years must be based on the characteristics of their development, namely wrong one relates to the real world or contextual problem.

TABLE VI.

THE LITERACY AND NUMERACY INTEGRATION PATTERN TRENDS	
Research Methods	Percentage (%)
Pre-learning	15,38
Lecturing	7,69
Contextual learning	38,46
Extracurricular	7,69
Problem-based learning	23,08
e-module	7,69

Strengthening literacy and numeracy through contextual learning empirically has been proven effective (Perdana & Suswandari, 2021), (patriana et al., 2021), (Dantes & Handayani, 2021); (Vicky Dwi Wicaksono, 2022). Students feel helped in improving their abilities through daily activities or familiar objects. Therefore, it is rational to integrate literacy and numeracy with contextual learning models.

E. Related Variables

Literacy and numeracy in existing studies are associated with certain variables. For example, table 7 shows that interest (58.33%) and problem-solving (16.67%) are the most important variables related to literacy and numeracy of primary school students. Analysis of this systematic literature review shows that there has been a diversification in the literacy and numeracy research of primary school students.

Interest is a persistent tendency to focus on and remember some activities (Rusmiati, 2017). A person's willingness and ability to read will affect a person's knowledge and skills (Anisa et al., 2021). By reading a lot, the person will certainly have much knowledge that will help him in doing many things that he was not previously good at so that people who read a lot will have a quality of knowledge more than people who have no interest in reading activities. Therefore, one's interest will be related to elementary school students' literacy and numeracy ability so that students with high interest will form an individual who can read critically and count.

TABLE VII.

THE LITERACY AND NUMERACY ASSOCIATED VARIABLES TRENDS	
Associated Variables	Percentage (%)
independent character	8,33
Student activity	8,33
Interest	58,33
Problem-solving	16,67
Counting operation capability	8,33

F. What research topics have the most potential to be developed in the future

Referring to the identified trends in literacy and numeracy research of elementary school students, several topics have not been optimally worked. Based on these findings, the following recommendations are proposed: (1) it is necessary to conduct quantitative and qualitative research to formulate a program to strengthen literacy and numeracy of school students basic taking into account the characteristics of the stage of development of the child's thinking; (2) the use of local art and culture as an alternative theme so that literacy and numeracy strengthening programs can be carried out, as well as the preservation of Indonesia's cultural wealth ; (3) development of teaching materials and information technology-based learning media to align research trends in literacy and numeracy research trends in the digitalization era; (4) Shifting research focus from conventional associative variables (learning outcomes, mastery of concepts, learning motivation) to 2 1st century-based variables (Computational, critical thinking, collaboration, communication, compassion, complex problem solving, creativity, people management, emotional intelligence, judgement and decision-making, service orientation, and negotiation skills) needs to be done immediately to prepare students to become the workforce required by the international labor market.

IV. CONCLUSION

The literacy and numeracy research trend of elementary school students are dominated by the implementation of literacy and numeracy with the theme of daily activities with the case study method. The most common pattern of integration is contextual learning. Student interest is the dominant variable related to literacy and numeracy. Several issues have not been optimally addressed, including the connection between children's thinking stages and literacy and numeracy strengthening programs, the use of art and culture in literacy and numeracy strengthening learning, the development of teaching materials and information

technology-based learning media, and the improvement of 21st-century skills (e.g., computational thinking). Some limitations in this research are that it does not involve articles published in national journals. Even though articles published in national journals may have complex data. So that a review can be carried out again to ensure the accuracy of the research results.

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