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Parents' Policy in Developing the Numerical Literacy of Their Teenage Children: A Descriptive Qualitative Study

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Abstract: The Program for International Student Assessment (PISA) states that the literacy and numeracy of students in Indonesia are in the low category. Indonesia scored 366 and ranked 68 out of 81 countries. Previous research discussed parental involvement in developing early childhood literacy. This study aims to investigate parents' policies in developing numerical literacy in adolescent children. This study used a qualitative descriptive method. Data were collected through questionnaires filled in by parents and interviews related to the interaction between parents and children in the context of numerical literacy. There are 9 respondents, namely mothers of adolescent children who will be studied. The results showed that parents' policies in supporting numerical literacy include providing direct support in learning mathematics, providing adequate learning resources, and implementing daily activities related to numeracy. Obstacles to implementing this policy include parents' limited time, children's lack of interest in numerical literacy, and others. This study concludes that parents view the development of numerical literacy as "very important". Parents' policies support the development of numerical literacy in adolescent children by involving children in financial management and playing an active role in their activities of adolescent children.

Keywords: adolescents; numerical literacy; parental policies, qualitative descriptive study.

INTRODUCTION

The Program for International Student Assessment (PISA) states that the literacy and numeracy of students in Indonesia are in the low category. From the acquisition of PISA scores in 2022, it is known that the numeracy skills of students from year to year have decreased, with the lowest decline in 2022. Although Indonesia's PISA ranking increased, the math skills score still decreased compared to 2006. Indonesia scored 366 with a rank of 68 out of 81 countries (OECD, 2024). The PISA results show that Indonesia has decreased students' interest in literacy and numeracy. Difficulties in solving PISA questions include students' ability to understand the problem, connect with real life into mathematical modeling, perform arithmetic operations, and interpret the results of mathematical solutions to real life. Teachers and students need to get used to facing contextual questions and contextual problems, so that students are accustomed to analyzing the problem-solving process based on problem-solving skills (Kholid et al., 2022).

According to (Spangenberg, 2012), mathematical literacy is the process of students learning practical skills in obtaining concrete solutions to numerical, spatial, and statistical problems in everyday life. Numerical literacy emphasizes the ability to solve solutions in the form of numbers or data to evaluate statements against concrete problems in the real world (Wijaya, 2016). Numerical literacy is seen as a need that must be mastered by teachers, learners, parents, and the external and internal environment of the school (Ferianti & Irna, 2020; Sulfiana, 2020). According to (Meliyanti et al., 2021), the family is the main key to improving numerical literacy, but there are several misconceptions, such as that the overall responsibility is delegated to the school, home is not a learning resource, and there is a less than maximum between theory and implementation in daily activities at home.

Educational policies that focus on numeracy development at home are often oriented towards literacy at school, while informal numeracy activities receive less attention. This can be seen in the study of (Yildiz et al., 2018), which revealed that parents were more often

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involved in literacy activities such as reading books or storytelling than in numerical activities. Involvement in numerical activities, although less frequent, is proven to have a significant impact on the development of children's math skills. Parents' active participation in their children's learning, in teaching basic math concepts, can help reinforce the learning acquired at school (Rezeki et al., 2024). It is important for parents to actively develop policies and approaches that balance literacy and numeracy in everyday life.

Adolescence is a transitional period when individuals grow from childhood to maturity. During adolescence, there are changes in the environment and internal characteristics (Herdiani et al., 2023). Children entering adolescence also adjust their thinking to incorporate new ideas because the more information, the deeper their understanding (Santrock, 2018). A person at this stage will move from being part of a family group to being part of a peer group and finally being able to stand alone as an adult (Santrock, 2011). According to (Wahyuni, 2021), entering adolescence, a person has extraordinary thinking abilities, equivalent to adults. The innervation system in the adolescent brain is still very active due to rapid development so it can affect attitudes and behavior, so it the important for the role of parents to be able to continue to accompany the process of brain development. With many changes in adolescent behavior, parents often misinterpret, so parents consider children at this time difficult to give input.

The results of research related to family numerical literacy have been widely conducted. Previous studies have discussed numerical literacy focusing on early childhood, while this study focuses on adolescents. Here are some studies related to numerical literacy, including the first research results of (Salminen et al., 2021) early childhood skills in literacy and numeracy develop better when parents are involved in related activities at home, including reading and counting with children. In addition, parents' education level also plays a role, where parents with higher education tend to provide more effective support for their children's literacy and numeracy. Secondly, (Fatonah, 2018) examined parental involvement as providing facilities, activities and fostering early childhood literacy awareness. Many studies involve parents in developing literacy in early childhood. This study aims to provide an overview of parents' policies in developing numerical literacy in adolescent children.

METHODS

This study uses a descriptive qualitative method and data analysis techniques in narrative analysis to provide an overview of parents' policies regarding the development of adolescents' literacy skills today. Qualitative research is used to gain an in-depth understanding of concepts of meaning, definitions, characteristics, metaphors, symbols, and other things related to description (Firmansyah et al., 2021). The research subjects were 9 respondents (mothers) who had teenage children aged 13-18 years. The age range of respondents was 35-54 years old. Data were collected through questionnaires and structured interviews. The questionnaire was used to obtain information from respondents in the form of their experiences, perceptions, or views related to parents' policies in developing numerical literacy skills in adolescent children with several selected questions and open questions. Respondents opened the link to the questionnaire given in the form of optional and open-ended questions, and then the respondents filled in the questionnaire based on the questions given. Structured interviews were used to obtain more detailed information from the respondents. Respondents in this study were the first mother (P1), second mother (P2), third mother (P3), fourth mother (P4), fifth mother (P5), sixth mother (P6), seventh mother (P7), eighth mother (P8), and ninth mother (P9). Interviews were conducted face-to-face with 2 respondents, namely the first mother (P1) and the second mother (P7).

RESULTS AND DISCUSSION

Based on the research results collected from 9 respondents, it was found that various forms of involvement influenced teenagers' numerical skills, both through formal and informal activities at home. Respondents consisted of several educational backgrounds, namely 55.6% of high school graduates, 22.2% of diploma graduates, and 22.2% of bachelor graduates. Employment backgrounds also varied from housewives, civil servants, self-employed, and private employees. Of all respondents, 5 out of 9 had children aged 13-14 years, 3 aged 15-16 years, and 1 child aged 17-18 years.

Numerical literacy is recognized as an essential skill that is important for academic and life success for children (Ayuningrum et al., 2023). In parents' view, numerical literacy is not just about the ability to count or perform basic mathematical operations but also about understanding and applying mathematical concepts in practical situations, such as shopping, managing finances, or planning a household budget. Parents who understand the importance of numerical literacy tend to be more proactive in supporting the development of numerical literacy skills at home.

According to (Azizah et al., 2023), literacy skills can be improved through various activities such as reading books, telling stories, and introducing the alphabet, while numeracy skills can be improved through counting, comparing sizes, and learning numbers. Parents' awareness of the importance of numeracy plays the most important role in developing adolescents' numeracy skills. Respondents (P2, P3, P4, P6, P7, P8, P9) chose the "very important" category and respondents (P1, P5) chose the "important" category in developing numerical literacy. According to all respondents, numerical literacy plays a role in the academic success of adolescents such as understanding and using numbers in children's activities, and plays a role in solving problems related to numbers and data. According to the respondents (P2, P6, P7), good numerical literacy will help improve the child's future career opportunities. According to respondents (P2, P6, P7), good numerical literacy will help improve children's future career opportunities. According to respondent (P7), adolescent children need to understand numerical literacy because at this age, children can think logically and realistically.

Overall, respondents understood that numerical literacy plays an important role. Children's ongoing learning process during adolescence has an impact in the future. Numerical literacy can be used as a provision to gain success on the future. Based on the research results collected from the respondents, there are some key findings related to parents' roles and policies in supporting adolescent numerical literacy. From the questionnaire results, respondents (P5-P9) stated that parents are "rarely" involved in helping their children with math exercises or numerical activities, especially when their children have entered adolescence. Respondents (P1-P4) stated that their involvement was only "a few times a week" according to their children's requests. Respondent (P7) said, "My child is already independent, if he has difficulty in learning, my child always talks and asks for tutoring on his own, so I rarely get involved in helping with math assignments. I also do not understand middle school math material". Parents support by providing facilities in the form of courses and providing additional learning materials related to numeracy, such as books, applications, learning videos, and others. Respondents (P2, P3, P5, P7, P8) stated that parents always try to provide facilities that support the development of numerical literacy, while respondents (P1, P4, P6) stated "rarely", and respondent (P9) stated "never". Parents who stated "never" gave the argument that their children already get everything from school and teenage students can independently find their own learning videos as needed. From the data obtained, respondents

have their own reasons for providing policies related to developing numerical literacy in their children. Parents tend to try the best for their children.

Respondents (P2, P3, P4, P6, P7, P8) stated that they often invite children to be directly involved in daily activities that involve numeracy. For example, calculating shopping budgets, measuring ingredients when cooking, and others. However, respondents (P1, P5, P9) stated that it is "rare" to involve children in daily activities, according to them, children only need to study hard and be involved enough in calculating pocket money.

According to all respondents, parental involvement in improving children's numerical literacy is very important, as parents have a role in practicing numeracy skills, honing critical thinking skills, and making easy decisions for teenagers. Parents actively participate in planning specific activities to help their children improve their numerical literacy. There are several types of numerical activities that parents can do with their teenagers at home. According to respondents, the activities that most involve teenagers are managing family finances or budgeting (pocket money) and reading books or watching educational videos that contain numerical literacy. Other activities include playing games that involve numbers, such as puzzles, chess, monopoly, cards, and others. Children are also involved in measuring or counting in daily activities such as cooking, gardening, carpentry, and others.

Based on the results of questionnaires and interviews, children's responses when parents engage in numerical activities together, some children are enthusiastic, and the rest of the children's responses tend to be rejected after entering adolescence. Respondents (P2, P3, P5, P7, P8) stated that parents “often” educate and discuss with their children the importance of numerical literacy. Meanwhile, respondents (P1, P4, P6) stated “sometimes” and respondent (P9) stated “rarely” discuss numerical literacy in daily activities. According to respondents, schools can help parents to be more involved in their children's numerical literacy development by providing easily accessible learning resources, providing practical guidance on how to support children at home, involving parents in numeracy-related school activities and providing training or seminars for parents. As parents, their role has a “very big” impact on their children's numerical skills. However, some parents stated that their role has “little” impact because they are rarely involved in their children's activities, especially those related to numerical literacy. Teachers play a key role in empowering literacy and numeracy, such as effective teaching strategies that are oriented toward developing students' critical thinking skills (Rezeki et al., 2024).

Entering adolescence, children's attitudes and mindsets are different. According to respondent (P1);

> “*The way children learn is different; when they enter adolescence, my child starts to be able to discuss, given responsibility for taking care of personal needs, calculating income and expenses from selling, and responsible for school assignments*”.

According to respondent (P7);

> “*Children entering adolescence are very difficult to communicate with. We parents have to actively ask questions without being patronizing so that children are comfortable telling us about their difficulties. I started to accustom my children to taking care of their own finances, calculating their needs every month, but I did not involve them in actively participating in household finances*”.

Figural 1. Interview with Respondent P1

In Figure 1, the research conducted an in-depth interview with respondent P1 regarding parents' views on providing policy options to support and help children improve numerical literacy at home.

> *"...I hope that the school provides practical guidance for parents so that they can still accompany their children to study at home and be actively involved in the learning process. I provide private tutoring to help children resolve difficulties, involve children in family activities, provide encouragement, and adequate facilities for children to learn."* (P1)

Given the importance of numerical literacy in children, parents understand several things that want to be conveyed related to the role of parents in the development of numerical literacy in adolescent children.

Figural 2. Interview with Respondent P7

In Figure 2, the researcher interviewed with respondent P7. According to respondent P7, there are several challenges during the child's learning process, especially related to numerical literacy.

> *"...the role of parents is very important in the development of children's learning process but with the education system and curriculum always changing, parents are confused about where to teach first. Parents must learn together if the child is having difficulty, schools should provide many questions so that children are accustomed to learning, must often invite children to discuss, and communicate*

well. Parents should also accompany their children to study math, facilitate and support their children's enthusiasm for learning". (P7)

There are several challenges that parents face in supporting their children's numerical literacy development at home. The most common challenge encountered by parents is their lack of understanding of mathematical concepts, especially for numerical literacy. Other challenges include parents' short time to assist their children due to busy work schedules, children's lack of interest in mathematics and the lack of appropriate learning materials or resources. Respondents also revealed other barriers that affect the development of numerical literacy in adolescent children.

"...children's interest in learning is now declining due to games, children are lazy to read and study, teenagers are difficult to communicate well, prefer to play cellphones, children from elementary school level do not understand numerical literacy which causes children to lag behind and so they do not understand the lessons at the next level". (P7)

Children's interest in learning is one of the influences in developing numerical literacy skills. According to (Nizar & Hajaroh, 2019), the intensity of the use of gadget games affects the decline in students' interest in learning at school and at home and the impact of prolonged use of gadget games can also endanger children's health and social. Therefore, it is important for parents' policies to continue to provide child support and provide facilities according to children's needs in developing children's numerical literacy skills.

The support provided by parents must be tailored to the needs of the child. The rapid development of the times, children are equipped with technology to be able to support their knowledge. With the existence of increasingly advanced technology makes it easier for students to quickly obtain information. The following are respondents' views on technology to develop numerical literacy skills:

Table 1. Interview Results related to Technology

Respondents	Use of technology and learning tools
P1	The use of technology in learning, my child more often utilizes YouTube to find answers or explanations of material. In my opinion, learning videos are quite effective. My child understands more quickly with concrete explanations and brief explanations in the video. My child often plays on cell phones, but my child prefers to play games. Games that are currently popular, not educational games.
P7	My child uses the cell phone to look for answers to problems that he cannot do. I provide a PC for my child, but the PC is more often used to play online games that are not related to educational games. To improve numerical literacy, I think technology is very helpful for students, but there is no guidance or direction from teachers to use certain applications for learning, so parents also do not know which applications are good for children. Moreover, parents are limited to learn more in accordance by the times.

Parents' policy to provide technology is a good choice, but there are some obstacles that parents must consider in terms of benefits. According to (Sarnoto et al., 2023), the use of technology can provide good benefits for the learning process, such as increasing learning efficiency and effectiveness, facilitating student skills, and enriching learning content; however, the use of technology has negative impacts, such as dependence on technology, potential concentration disorders, potential digital divide, potential inappropriate use, and

potential health effects. So parents should be able to assist their teenagers to manage and balance the use of technology properly. Proper use of technology can maximize the development of numerical literacy and increase teenagers' interest in learning.

CONCLUSION

In conclusion, parents' awareness of the importance of numerical literacy plays the most important role in developing adolescents' numerical literacy skills. Parents view the development of numerical literacy, such as understanding and using numbers and data as "very important" for adolescent development in daily life. Numerical literacy is considered to play a role in academic success and improve adolescents' future career opportunities. Parents' policies in supporting their teenagers' numerical literacy development include providing private and classical math courses. Some parents are rarely involved in helping their children with math assignments. Parents provide facilities in the form of additional learning materials related to numeracy, such as books, applications, learning videos, and others.

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