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Analysis of Literacy and Numeracy Learning Policy at the Early Childhood Education (PAUD) Level in West Nusa Tenggara to Support the Policy of the Minister of Primary and Secondary Education of the Republic of Indonesia

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ABSTRACT : Literacy and numeracy in early childhood education (PAUD) is an essential foundation for shaping excellent human resources from an early age. Since the inauguration of President Prabowo Subianto in 2024, strengthening literacy and numeracy has become a priority policy in national education to build a generation adaptive to the challenges of the 21st century. This policy is supported by the Minister of Primary and Secondary Education, Abdul Mu'ti, who emphasizes contextual, play-based learning and the use of simple mathematical concepts in PAUD. West Nusa Tenggara (NTB) is a priority region because of its low Human Development Index (HDI) and community literacy and numeracy rates that are below the national average. This study aims to analyze the implementation of the literacy and numeracy policy in NTB PAUDs, identify the obstacles encountered, and develop a local wisdom- and technology-based learning model to support this national policy. The mixed-methods approach (qualitative and quantitative) used includes policy studies, surveys of teachers and parents in various NTB PAUDs, in-depth interviews, Focus Group Discussions (FGDs), and a model pilot test in 3 sample PAUDs. The results show that the implementation of the literacy and numeracy program in NTB has begun but is not yet evenly distributed; constraints were found in educator competence, limited facilities, and low parental participation. Nevertheless, innovative local strategies proved effective in increasing children's interest and numeracy skills, including through the integration of local culture (traditional games, woven motifs) and the utilization of simple educational technology. The pilot test of the local and technology-based learning model in 3 PAUD pilots resulted in a positive impact: children were more enthusiastic, and basic numeracy achievement increased (e.g., the percentage of children able to count 10 objects rose from $\sim$50% to 80% after model implementation). It can be concluded that strengthening literacy and numeracy from an early age in NTB requires policy adaptation to the local context, enhanced teacher capacity, provision of learning resources, and the involvement of parents and the community. The local wisdom- and technology-based learning model developed in this study is effective in supporting the national literacy and numeracy policy and is thus recommended for further replication and refinement.

KEYWORDS: Literacy numeracy, PAUD, education policy, West Nusa Tenggara, local learning model, educational technology

I. INTRODUCTION

Early Childhood Education (PAUD) is the primary foundation for developing high-quality and competitive human resources. At this early stage, forming basic skills such as literacy and numeracy is a priority to support children's holistic development. Numeracy literacy encompasses the ability to understand numbers, patterns, logic, and simple mathematical concepts, which are key components for preparing children to enter the next level of education. Emphasis on early literacy and numeracy is not only to improve academic abilities but also to equip children with life skills relevant in the modern era. The OECD (2019) asserts that early numeracy skills contribute to a child's critical thinking, logical reasoning, and problem-solving later in life. Likewise, UNICEF (2020) mentions that children with good early numeracy literacy tend to be more ready for primary education and have better problem-solving abilities.

Following the inauguration of President Prabowo Subianto in 2024, the Indonesian government established literacy and numeracy as one of the main pillars for developing superior human resources adaptive to global challenges. President Prabowo affirmed that education must begin from an early age, focusing on developing foundational skills that serve as the basis for lifelong learning. To support this vision, the national literacy and numeracy policy focuses on: (1) contextual learning based on local wisdom, (2) capacity building for educators, and (3) provision of adequate educational infrastructure down to 3T (disadvantaged, frontier, and outermost)

Regions. The Minister of Primary and Secondary Education, Abdul Mu'ti, supports this policy by formulating a play-based learning approach for mathematics in PAUD. Its core principles include: emphasizing basic mathematical concepts through daily activities, using fun creative play methods, and avoiding the introduction of complicated arithmetic material to young children. For instance, children are introduced to patterns, sequences, and sizes through play and daily activities (counting nearby objects, reading clocks, number puzzle games, etc.) instead of formal arithmetic instruction. This approach positions numeracy as a life skill—a basis for daily problem-solving—not merely an academic ability. Thus, this new policy aims to make literacy and numeracy an integral part of shaping an independent, innovative, and adaptive generation amidst technological developments.

West Nusa Tenggara (NTB) Province is seen as a strategic priority area for implementing the literacy and numeracy policy at the PAUD level. The NTB region faces significant challenges in the quality of basic education; NTB's Human Development Index (HDI) is low, and the literacy and numeracy levels of the adult population remain far below the national average. Data from the Central Statistics Agency (2022) indicates that educational achievement in NTB lags behind many other provinces. This condition is exacerbated by limited educational infrastructure, insufficient teacher training, and low parental involvement in children's education, particularly in rural and remote areas. Consequently, the readiness of NTB children in basic literacy and numeracy skills is relatively low. Internal disparities are also evident: PAUDs in urban areas are generally more advanced than those in remote villages in terms of resources and learning quality.

To overcome these challenges, local policy adaptation is needed. A local culture-based approach in NTB has the potential to enhance the relevance of learning and children's motivation. NTB local wisdom, such as traditional games and daily community activities, can be integrated into numeracy instruction. For example, teachers can engage children in counting seeds in a traditional spinning top game, recognizing patterns through Sasak woven fabric motifs, or role-playing "selling in the market" to introduce counting and transaction concepts. This contextual approach makes children more enthusiastic and helps them understand number concepts in real-life situations. Additionally, the use of simple educational technology such as **tablets** or educational applications is also being introduced in some PAUDs to increase the effectiveness of numeracy learning. Interactive technology has proven capable of making children more focused and engaged, provided its use is accompanied by teacher guidance so that it complements the educator's role, rather than replacing it.

This research was conducted to support the direction of the national literacy and numeracy policy, taking into account the local context of NTB. The **research gap** to be addressed is the lack of in-depth studies on the implementation of literacy and numeracy policies in disadvantaged regions like NTB and how innovative learning models can improve the numeracy achievement of PAUD children in those areas. Based on the background above, the research focus includes: (1) analyzing the implementation of the literacy and numeracy policy in NTB PAUDs after the new national policy, (2) identifying the obstacles arising at the regional level, and (3) formulating strategies and a contextual learning model based on local culture and technology to strengthen children's literacy and numeracy. The results of this study are expected to provide empirical recommendations for education policymakers, at both the central and regional levels, to synchronize national policy with NTB's local needs and potential. This aligns with the vision of President Prabowo and Minister Abdul Mu'ti in building Indonesia's golden generation through strengthening early literacy and numeracy, especially in regions that have historically lagged behind.

II. RESEARCH METHODOLOGY

This study uses a **mixed methods** design, combining qualitative and quantitative approaches. This approach was chosen to gain a complete picture of the policy implementation and the effectiveness of the developed intervention model. Research subjects include PAUD education stakeholders in NTB, such as PAUD teachers, parents, and regional education officials/supervisors. The scope and stages of the research are explained as follows:

Preliminary Study and Policy Analysis : The initial stage involved reviewing national policy documents related to literacy and numeracy (e.g., the **National Strategic Education Policy: Literacy and Numeracy in PAUD** document from Kemendikdasmen 2024) and secondary data on education indicators in NTB. This initial analysis aimed to understand the vision of the central policy and the basic conditions of the region (e.g., HDI data, basic education achievement) as the research context.

Quantitative Field Survey : The researchers conducted a field survey in 2025 to map the actual condition of early numeracy literacy skills of PAUD children in NTB. This survey reached several representative PAUDs across various regencies/cities in NTB, covering both urban and remote rural areas. Survey respondents included PAUD teachers and parents, with instruments measuring children's basic numeracy achievement – for example, the ability to recognize numbers 1–10, count simple objects, recognize patterns, and basic comparison concepts. The quantitative data collected provides a quantitative picture of the level of early numeracy achievement and its variation between regions. For instance, the survey found that children's ability to recognize numbers 1–10 and perform simple counts varied greatly; generally, children in urban PAUDs showed better achievement than children in remote area PAUDs. These survey findings were then compiled as primary quantitative data, which also served as the basis for designing the intervention.

Interviews and FGDs (Participatory Qualitative Approach) : To delve into the factors behind the survey numbers, in-depth interviews were conducted with $\sim$15 key informants, including senior PAUD teachers, principals, local education officials, and parents. Additionally, 3 **Focus Group Discussion (FGD)** sessions were held, involving groups of teachers and parents in different PAUD communities. Interviews and FGDs focused on exploring experiences of implementing numeracy learning in the field, perceptions of the literacy and numeracy policy, constraints faced, and local aspirations or ideas for improving numeracy learning. The qualitative data obtained (interview and FGD transcripts) were analyzed thematically to identify key themes such as: implementation barriers, existing learning strategies, the role of parents, and policy support. This participatory approach ensured that the voice and local context of NTB were accommodated in the formulation of the solution model.

Development of Local & Technology-Based Learning Model : Based on the analysis of initial data (surveys, interviews, FGDs, and literature review), the research team designed a **numeracy literacy learning model** that integrates NTB local wisdom and the use of simple educational technology. This model was formulated into learning materials (syllabus, lesson plans, teaching materials, learning media) incorporating elements of local culture (traditional games, NTB community daily life context) and the use of interactive teaching aids (for example, local picture number cards, animated videos, and basic numeracy applications on tablets). The model design involved content validity testing through internal **expert review**. The learning model produced at the end of the first year of this study was a **draft model** ready for pilot testing.

Pilot Implementation in 3 PAUDs : To test the effectiveness of the developed model, a limited pilot test was conducted in 3 pilot PAUDs for several weeks. These three PAUDs were chosen to represent variations in context: (1) an urban PAUD in Mataram, (2) a rural PAUD on Pulau Lombok, and (3) a remote PAUD on Pulau Sumbawa, NTB. Before implementation, teachers at the pilot PAUDs received intensive training on using the new learning model, including how to integrate local cultural activities and technology in the classroom. During the pilot test, researchers conducted classroom observations and provided mentoring to teachers. Each pilot PAUD involved $\sim$20 children (total around 60 children) as subjects receiving the intervention, and not less than 50 parents were involved through a parallel parenting program. The parenting program consisted of short workshops for parents at each PAUD on how to support children's numeracy at home with simple games and activities. Data collection during the pilot stage included: (a) assessment of children's numeracy skills pre- and post-intervention (by teachers, using observation sheets/simple task checks), (b) researcher observation notes on children's engagement and response during learning, and (c) evaluative questionnaires/FGDs to gather feedback from teachers, parents, and children on the applied learning model.

Data Analysis : Quantitative data from the survey and pilot test results were analyzed descriptively (mean, achievement distribution, simple pre-post intervention comparison). Meanwhile, qualitative data (interviews, FGDs, observations) were analyzed thematically. Data triangulation was performed by comparing qualitative and quantitative findings to ensure consistency. The analysis results were then compiled to answer the research questions and evaluated against the theoretical framework and previous research findings. Research ethics were maintained by obtaining written permission from the PAUD management and consent from participants (teachers/parents) before data collection. All collected data was kept confidential and used only for research purposes.

III. RESULTS AND DISCUSSION

Literacy and Numeracy Policy in NTB : Based on 2025 data, the implementation of the literacy and numeracy learning policy in NTB PAUDs **has begun but is not yet evenly distributed** across all regions. In general, the literacy and numeracy program has been adopted in the field according to national directives, but the level of

implementation varies between urban and rural areas. Survey findings indicate that the **outcome** of early numeracy skills of PAUD children in NTB differs, tending to be better in areas with more adequate educational facilities (urban) and lower in areas with limited facilities (rural/remote). This suggests a gap in the quality of PAUD services between regions.

From the analysis of primary data (surveys, interviews, FGDs), several **main obstacles** were identified that prevent the optimal implementation of literacy and numeracy in NTB:

- **Limited Teacher Competence:** Many PAUD teachers in NTB have not received adequate training related to numeracy literacy teaching strategies. Consequently, some teachers lack confidence and are less skilled in teaching basic numeracy concepts effectively. A heavy curriculum load and minimal technical assistance also lead teachers to tend to use conventional methods.
- **Limited Infrastructure and Facilities:** Supporting facilities for numeracy learning in PAUDs are still minimal, especially in remote areas. Many PAUDs lack concrete learning media (e.g., numeracy teaching aids, picture books for counting). Limited access to electricity and internet in some NTB locations also hinders the utilization of educational technology.
- **Low Parental Participation:** The culture of literacy and numeracy in the family environment has not been strongly established. Some parents in NTB are less involved in children's learning activities at home, due to busy schedules, low parental education levels, or the perception that numeracy education is solely the school's responsibility. Consequently, children's numeracy stimulation outside of school is still limited.
- **Local Context and Accessibility:** NTB has an archipelagic geographical condition (Lombok and Sumbawa) with scattered settlements, meaning the distribution of programs from the center is not uniform. Differences in local languages and cultures also challenge **top-down** policy implementation without adjustments. National policy needs to be translated into the local NTB context to be easily accepted by teachers, children, and parents.

These obstacles result in varying levels of PAUD children's literacy and numeracy skills between regions, and the teacher capacity building program has not been evenly delivered to all schools. For example, teachers in Mataram city find it relatively easier to access training than teachers in remote villages; the availability of numeracy teaching aids is also better in regions with NGO or CSR support, while PAUDs in remote areas are forced to rely on teacher creativity with simple tools. This finding is consistent with Nurhadi (2021) which found that literacy and numeracy implementation in remote NTB was hampered by a lack of training and resources. The condition in NTB reflects the need for special efforts to make the national literacy and numeracy policy inclusively accessible to disadvantaged regions.

On the other hand, this research also found several **local strategies that are already running and have proven effective** in improving the quality of numeracy learning in NTB PAUDs, namely:

- **Integration of Local Culture in Learning:** NTB PAUD teachers who link numeracy material with local cultural and daily life contexts see higher child enthusiasm. Examples include the use of **traditional regional games** as a medium for learning to count – children are invited to count seeds or objects in a traditional spinning top game (**gasing**), recognize patterns through Sasak woven fabric motifs, or role-play buying and selling in a traditional market to introduce concepts of numbers and simple operations. This contextual approach based on local wisdom makes basic mathematical concepts more concrete and meaningful for children. Teacher reports show that children find it easier to understand concepts of quantity, sequence, and comparison when linked to objects or activities familiar in their environment.
- **Utilization of Simple Educational Technology:** A number of PAUDs are starting to utilize simple digital devices for numeracy learning. **Educational tablets** containing basic counting applications, playing local-themed animated videos, or using a laptop projector for interactive games, have been trialed on a limited basis. Observations show that technology can make the learning experience more interactive and engaging for children. In one pilot PAUD, for example, children took turns playing an educational counting **game** on a tablet and appeared more focused and enthusiastic. Teachers at that PAUD had been trained to utilize digital devices, so technology is used as a supplementary tool that complements learning, **without replacing the role of the teacher**. Initial results show that children do not get bored quickly, and numeracy material can be conveyed with easier-to-understand visualizations. This finding is consistent with the research of Sari & Hidayat (2020), which shows that the integration of technology in numeracy instruction can increase the interest and understanding of young children.
- **Involvement of Parents and Community:** Collaborative strategies involving families and local communities proved supportive of the success of the literacy and numeracy program. Some local initiatives in NTB organize **parenting programs** on literacy and numeracy, where parents are given simple activity

guides to practice numeracy at home (e.g., counting the number of plates during a meal, introducing numbers through daily games). Teachers also hold short workshops for parents on how to teach number concepts in household activities, such as when shopping or cooking. Support from local community figures, such as the role of **Bunda PAUD** (PAUD foster mother figure in the village), also helps campaign for the importance of early literacy and numeracy. Research data shows that in PAUDs where parents are actively involved, children tend to be more fluent in recognizing numbers and basic numerical concepts compared to PAUDs where parents are passive. This collaboration between school, family, and community is seen as key to the sustainability of the literacy and numeracy program in NTB.

Pilot Test of the Learning Model in 3 PAUD Pilots : The pilot test of the local and technology-based literacy and numeracy learning model was carried out in 3 pilot PAUDs in 2025. Over several weeks of implementation, observations and evaluations showed **positive** results. Teachers reported an **increase in children's basic numeracy skills** in the pilot classes compared to before the intervention. In the post-learning evaluation, more children were recorded as being able to: recognize numbers 1–10, count objects up to 20, and understand simple comparison concepts (e.g., greater vs. smaller) compared to pre-pilot results. This increase was seen in all three pilot PAUDs, although with varying degrees.

One quantitative indicator measured was the children's ability to count objects up to a certain number. For example, at PAUD "A" (urban pilot), the percentage of children able to count objects up to 10 increased from around 50% (before using the model) to **80%** after several weeks of model application. Similar increases were also recorded at PAUD "B" and "C" (rural and remote), though the percentages were slightly lower than the urban PAUD. In addition, the average child in the pilot class was able to correctly recognize more number symbols and showed an understanding of the concept of sequence (which number is larger/smaller). The **increase graph** (pre vs. post) for several basic numeracy indicators shows a positive trend in all pilot schools (contained in the full research report, not displayed here). Although this increase is still initial and the pilot duration is relatively short, this finding aligns with the expectation that contextual and interactive learning will facilitate children's understanding of numeracy concepts.

From the perspective of the **learning process**, observations noted changes in children's behavior and motivation during the pilot test. Children appeared **more active and enthusiastic** during numeracy learning using traditional games and tablet applications, compared to conventional lecture/worksheet methods previously used. For instance, when the teacher engaged them in "market role-play" to learn money counting, the children were fully involved, talked actively, and unconsciously performed simple addition/subtraction in the context of play. Interactivity with tablet devices (playing educational counting games) also allowed children to focus longer, compared to previously getting bored easily during sitting-and-listening sessions.

Feedback from teachers and parents at the three pilot PAUDs was generally positive. Teachers felt that the developed learning model was **relevant** to the local context and helped them convey numeracy material in a more engaging way. Teachers in rural PAUDs stated that by linking the material to children's daily life examples (such as counting livestock, garden produce, etc.), their students understood faster than with textbook methods. The simple technology included (tablets with numeracy games) was also considered effective in adding variety to learning activities; **"the children were very happy, now they look forward to the counting game every numeracy session"**, said one teacher. Parents admitted to better understanding their role in supporting learning at home. Through the parenting program, parents were given examples of easy activities (counting plates, asking children to say numbers while walking, etc.) which turned out to make children accustomed to practicing numeracy naturally. **Feedback** from parents showed they saw children practicing counting more often at home and were enthusiastic about telling stories about numeracy activities at school.

Overall, the pilot test results indicate that this local and technology-based learning model is **worth further development**. The draft learning model tested is one important **output** of the 2025 research, and researchers have identified areas for refinement for wider-scale implementation. Several points to be improved include: simplifying the module so it can be understood by teachers with varied educational backgrounds, adjusting local cultural content for each area in NTB (e.g., local games in Lombok vs. Sumbawa), and enhancing the features of the numeracy application to be more interactive yet lightweight given the device limitations in the field.

IV. DISCUSSION

The results of this study indicate that the national policy on strengthening literacy and numeracy must be implemented with consideration for local conditions and needs. The **uneven implementation in NTB** illustrates

the common challenge in executing education policies in disadvantaged areas. Findings regarding low teacher competence, minimal facilities, and lack of parental involvement align with previous education policy reviews. The **World Bank** (2021) report identified that the quality of early childhood education in Indonesia varies greatly between regions, and enhancing educator capacity and providing learning resources are key recommendations for strengthening basic education. The NTB case confirms this – interventions such as teacher training, provision of numeracy media, and infrastructure support (electricity/internet) need to be prioritized so that the literacy and numeracy policy reaches its targets in remote areas.

Furthermore, the geographical and cultural barriers in NTB emphasize the importance of **decentralized approaches**. Central policies should allow room for adaptation in the regions. This is also recognized by the Ministry of Primary and Secondary Education in their strategic policy documents, which call for the adjustment of literacy-numeracy program implementation according to local wisdom. The strategy of integrating **local wisdom** proved effective in increasing children's interest and understanding, which supports contextual learning theory. Young children learn best when the material is linked to the real world they know. Our findings show that children are more enthusiastic and easily grasp numeracy concepts when learning through traditional games and local culture. This is consistent with the principles of contextual education and international study findings. UNICEF (2020) and UNESCO (2021) both emphasize that literacy programs for children will be sustainable if they involve their cultural and community context. The local culture-based approach in NTB such as traditional gasing games and Sasak weaving aligns with the **contextual learning** approach recommended for early childhood education in various multicultural countries. By integrating local culture, the curriculum feels more "their own" for local teachers and children, thus reducing resistance to new programs. This shows that **top-down** policies can be well-received when accompanied by a **bottom-up** approach from the community. The success of local culture integration in NTB can be a model for other regions with strong cultural characteristics.

The use of **educational technology** in the context of disadvantaged areas like NTB presents its own potential and challenges. Pilot results show that digital technology (tablets with numeracy applications) can improve children's focus and numeracy learning outcomes significantly. This supports the framework that technology, if well-adapted, can enrich the learning experience in PAUD (Sari & Hidayat, 2020). However, it needs to be noted that the success of technology utilization is inseparable from the role of the teacher. Teachers were actively involved and trained, so technology is used proportionally as a tool, not a replacement. This aspect is crucial because several pieces of literature remind us that technology in early childhood education must be accompanied by social interaction with educators and peers for optimal results (UNICEF, 2020). Infrastructure limitations in NTB (electricity, internet network) are also a note: the solution chosen by the research team was to use low-power **offline** devices with local content, so they could be implemented even with minimal infrastructure. The **World Bank** (2022) notes that the implementation of digital education in developing countries requires innovation to suit local conditions, including the development of relevant content and the provision of affordable devices. The experience in NTB supports this view – even simple technology can be beneficial as long as it is adapted to the regional context and user capabilities.

The involvement of **parents and the community** is another key factor identified. The research results underscore that children's literacy and numeracy cannot solely rely on school-based learning; the family and community environment play an important role. PAUD children who receive consistent numeracy stimulation at home show faster progress. This fact supports Bronfenbrenner's **ecological systems theory**, where synergy between school, family, and community environments will strengthen child development. The parenting program piloted proves that many parents are actually willing and able to be involved if given practical guidance. Low parental participation previously may have been influenced by a lack of knowledge about their role. After being involved through workshops, NTB parents began to realize that simple activities at home could also be a means for numeracy learning (learning through play). UNESCO (2021) highlights that literacy (including numeracy) from an early age contributes to sustainable development, and investment in family and community education is part of the global strategy to increase literacy. Thus, a multi-sectoral approach involving schools, families, local communities, and support from local government should become the model for implementing literacy and numeracy policies in regions like NTB.

The pilot test of the local-technology-based learning model provides conceptual evidence that national policy can be **operationalized** effectively in the regions with local innovation. This model supports the vision of President Prabowo and Minister Abdul Mu'ti in introducing early literacy and numeracy as the foundation for improving the quality of human resources. Prabowo & Mu'ti (2024) in the national PAUD policy framework emphasize strengthening numeracy through creative methods and the use of appropriate technology. Our

research findings confirm that this can be achieved: when teachers are equipped with contextual methods and appropriate technological aids, young children in NTB are able to achieve better basic numeracy competencies. In other words, efforts to **synchronize central policy and local initiatives** yield a real impact in the classroom. Nevertheless, this research is limited by the relatively short duration of the pilot test and the wide coverage of the NTB region. The long-term impact of this learning model has not been measured; continuous mentoring is needed to ensure the sustainability of the results. Furthermore, external factors such as regional budget support and follow-up policies will influence the replication of the program. Therefore, researchers recommend intensive cooperation with the NTB local government to integrate this model into official education department programs, including massive teacher training and the provision of technology facilities in more PAUDs.

V. CONCLUSION

This research concludes that the literacy and numeracy learning policy at the PAUD level in West Nusa Tenggara requires **strengthened implementation through local adaptation**. In brief, the main findings and their implications are as follows:

- **Policy Implementation:** The implementation of literacy and numeracy in NTB PAUDs is underway following national directives, but it is not yet evenly distributed. PAUDs in urban areas tend to be more prepared and have better achievement compared to rural/remote PAUDs. Therefore, special efforts are needed to reach and strengthen PAUDs in disadvantaged areas to reduce the gap.
- **Main Obstacles:** Implementation barriers include limited teacher competence, minimal infrastructure and facilities, low parental participation, and the geographical and cultural challenges of NTB. These factors are interconnected and cause the literacy and numeracy program to be suboptimal. Addressing these obstacles must be a priority, for example through continuous teacher training, investment in numeracy learning facilities (including technology), and parental empowerment programs.
- **Effective Strategies:** The integration of local wisdom and technology proved effective in improving the quality of numeracy learning in NTB. The contextual approach utilizing traditional games and local culture makes children more interested and easily understand numeracy concepts, while the use of educational technology (simple tablets/applications) adds interactivity and learning effectiveness. The involvement of parents and the community is also a key element driving the success of the program at the PAUD unit level.
- **Model Pilot Test:** The local and technology-based learning model developed by the researchers has been tested in 3 PAUD pilots and showed promising results. There was an increase in children's basic numeracy skills (e.g., the ability to count objects 1–10 increased significantly) as well as positive feedback from teachers and parents regarding this model. This proves that with the support of the right methods and tools, early childhood literacy and numeracy in NTB can be improved in line with the national policy vision.

Based on these findings, the **recommendations** that can be given include: (1) The NTB local government, along with stakeholders, needs to adopt and expand this local-technology-based learning model to other PAUDs, accompanied by a massive teacher training program; (2) The integration of literacy and numeracy programs with family/community empowerment must be formalized (e.g., through local content curriculum or the Bunda PAUD program) to increase parental participation; (3) Sustained policy support and funding are required, for example the provision of educational technology facilities in remote PAUDs and incentives for innovative teachers in 3T areas. The sustained implementation of these strategies is expected to not only increase the literacy and numeracy of NTB children but also **support the achievement of national education targets** in producing a golden generation that is numerately literate from an early age. This effort aligns with the national policy framework post-2024 that prioritizes PAUD literacy and numeracy, and simultaneously addresses local challenges so that **no child is left behind** in acquiring these crucial basic skills.

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