



Empowering Early Childhood Education Teachers through digital early literacy assessment program

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ABSTRACT

This community service program addressed the limited capacity of early childhood education (PAUD) teachers to conduct systematic and contextual initial literacy assessments. The program aimed to improve teacher competence through practice-based training and mentoring supported by digital application technology. It was implemented at PAUD Kampung Emas, Krpyak, Sleman, Yogyakarta, involving 20 PAUD institutions and 33 teachers, and was conducted in three stages: needs identification, training, and evaluation. The results showed an increase in teachers' assessment comprehension scores from 58 to 88 percent, with monitoring indicating that 46.7 percent of teachers were able to independently implement the assessment while others still required technical assistance. Overall, the program improved assessment quality and promoted data-based learning practices, demonstrated strong potential for sustainable replication with contextual adjustments, and supported cross-institutional collaboration to enhance the quality of early childhood education in Indonesia. Furthermore, the success of this initiative demonstrates that integrated training and technological support effectively shift teacher paradigms, repositioning assessment as a vital tool for instructional development rather than a mere administrative obligation.

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1. INTRODUCTION

Early literacy is a critical component of early childhood development that shapes children's academic readiness for subsequent levels of education. Including not only the recognition of letters and words, but also oral language proficiency, the ability to interpret symbols, and other foundational communication skills that emerge through rich and interactive experiences from an early age (Altun, 2019; Weadman et al., 2022). Within the context of early childhood education (PAUD), early literacy functions as a core foundation for sustained learning and the cultivation of lifelong learners.

However, numerous studies indicate that early literacy assessment practices in early childhood education continue to face substantial challenges. Teachers frequently depend on subjective and

informal observations without the support of standardized, valid, and reliable assessment instruments. This practice limits the accuracy and continuity of efforts to map children's literacy development over time (Christianti, 2024; Joensuu et al., 2021).

A similar condition is observed in the PAUD system at Kampung Emas. Findings from initial observations during the community service activities revealed that the absence of systematic child development assessments has direct implications for classroom learning practices. These include: (1) Insufficiently documented data on children's literacy development, resulting in broadly descriptive progress reports; (2) Daily lesson planning that is not grounded in children's actual developmental needs but instead driven by routine practices or predetermined themes; and (3) Limited teacher capacity to identify children who require targeted support in early literacy. As a result, literacy stimulation tends to be uniform and less responsive to individual differences in children's abilities.

The partner institution for this activity was PAUD Kampung Emas, located in the UNY Golden Village development area in Krapyak, Sleman, Yogyakarta. Based on the results of the initial survey and interviews, most teachers in the partner institutions, including SPS Ceria, PP Cantik, and PP Ananda, reported difficulties in conducting systematic child development assessments. Teachers were not familiar with valid assessment instruments, and assessment practices were largely incidental and poorly documented. In addition, large class sizes, limited parental involvement, and the lack of assessment-related training further exacerbated these challenges. This condition is consistent with the findings of Christianti (2025), which indicate that many PAUD teachers experience difficulties in understanding and implementing data-based initial literacy assessments.

To address these challenges, the service team implemented appropriate technology in the form of an application-based initial literacy assessment using the platform (<https://alaindonesia.id>). This assessment instrument has undergone validity and reliability testing and has received intellectual property rights protection (Christianti, 2024). The implementation of appropriate technology functions not only as a measurement tool, but also as a means of supporting teachers' understanding of individual children's literacy development. Initial implementation results indicate that teachers are increasingly able to systematically document children's literacy progress, independently interpret assessment results, and use the data as a basis for planning subsequent learning activities.

The effectiveness of digital-based initial literacy assessments has also been documented in previous community service initiatives. The use of technology in early literacy assessment has been shown to improve the accuracy of mapping children's abilities and to support more targeted learning interventions (Abrami et al., 2016; Verhoeven et al., 2020). Other studies further confirm that the digitization of literacy assessments in early childhood education positively contributes to teacher professionalism and the overall quality of learning services (Lloren & Chavez, 2025; Maunula & Lähdesmäki, 2022). These findings reinforce the relevance and appropriateness of the appropriate technology applied in this community service activity.

Initial observations revealed that the partner PAUD institutions have a strong motivation to improve assessment competence but face limited resources, including access to experts, training opportunities, and appropriate instructional materials. Simultaneously, the availability of technological resources, such as laptops and stable internet access, presents a valuable opportunity to introduce technology-based innovations. Based on these conditions, the mentoring program was designed to address the partners' priority challenges, namely: (1) Difficulties faced by PAUD teachers in conducting systematic assessments of early literacy development; (2) The lack of valid and reliable assessment instruments to serve as references; and (3) Limited resources for implementing research-based assessment practices. The overall problem-solving framework for this program is presented in Figure 1.

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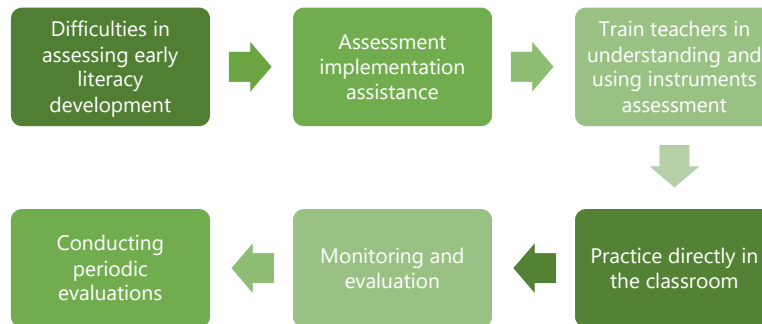


Figure 1. Troubleshooting and solution framework

This community service program aims to enhance the capacity of partner PAUD teachers to implement early literacy development assessments through sustained, research-based training and direct mentoring at PAUD Kampung Emas, Krpyak, Sleman, Special Region of Yogyakarta. Strengthening teachers' capacity to use digital application-based early literacy assessments is expected to have a direct impact on students by: (1) Providing more accurate and individualized mapping of children's early literacy skills; (2) Improving the quality of literacy stimulation in accordance with children's developmental needs and stages; (3) Enabling early identification of children who require additional support; and (4) Fostering a more meaningful, inclusive, and child-centered learning process. Overall, this activity is expected to bridge the gap between theory and practice and to promote the implementation of more accurate, meaningful, and contextual assessment practices in early childhood education.

2. METHODS

Description of Partners, Locations, and Participants

This community service activity was conducted at PAUD Kampung Emas, located in the Golden Village development area of Yogyakarta State University in Krpyak, Sleman Regency, Special Region of Yogyakarta. The program involved 20 PAUD units, including SPS, KB, and POS PAUD, with a total of 33 PAUD teachers actively participating in all stages of the activities. The participating teachers had diverse educational backgrounds, and most had not previously received systematic training in technology-based initial literacy assessment.

Design and Approach

The methods were designed to support early childhood education teachers in implementing early literacy development assessments in a practical, systematic, and contextual manner. The approach combined practice-based training with direct classroom mentoring, enabling teachers not only to understand assessment concepts but also to apply them effectively in real learning situations.

The implementation of the program was organized into three main stages: (1) Needs identification and analysis; (2) Training and implementation mentoring; and (3) Evaluation and follow-up, as summarized in Table 1.

Concept of Early Literacy Assessment and Technology Used

The initial literacy assessment was based on fundamental early childhood competencies, including phonological awareness, symbol and letter recognition, oral language comprehension, written language

skills, and grapheme–phoneme correspondence (Christianti, 2024). The assessment was implemented using a web-based digital application, *alaindonesia.id*, which enables teachers to measure children’s literacy abilities individually in a documented and data-driven manner.

Technically, teachers used the application through several steps, including entering child data, conducting assessments through age-appropriate activities, and interpreting assessment results presented as a summary of children’s literacy achievements. This technology is considered appropriate because it is easy to operate, aligns with the early childhood education context, and supports data-based decision-making in learning planning.

Table 1. Stages of program implementation

Stages		Times
Stage 1	Identification and Analysis of Needs	
Purpose	Mapping the initial conditions of literacy assessment practice in PAUD Mitra	February 2025
Activities	<ul style="list-style-type: none"> - Initial observation and informal interviews with partner PAUD teachers to explore the main problems in the implementation of the assessment of early literacy development. - Analysis of the assessment instruments that have been used, both in terms of form, content, and usefulness in learning. This activity obtained contextual data to compile training materials. 	3 rd week of March 2025
Stage 2.1	Training	
Purpose	Improving teachers' understanding and skills in using digital application-based initial literacy assessments	June 14 th 2025
Activities	The training was carried out by a team of lecturers assisted by students, using presentation and question and answer methods, simulation and hands-on practice, individual coaching and class observation, and reflection on group discussions.	
Stage 2.2	Mentoring	August 2025
Purpose	Knowing the difficulties and obstacles faced by teachers in the application of assessments to children in the form of mentoring	
Activities	Direct assistance in class for one month. In this stage, the teacher is accompanied by the implementation team when the teacher practices the assessment directly to the child. This mentoring activity starts with filling in instruments, reading the interpretation of the results, to planning follow-up learning.	
Stage 3	Evaluation and Follow-up	
Purpose	Assess the effectiveness of training and mentoring	End of August 2025
Activities	Evaluation is carried out through observation of teachers' practices, analysis of assessment results produced by teachers, and reflective interviews. Based on the results of the evaluation, the service team compiled recommendations for improving the implementation of the assessment and designed a follow-up training plan as an effort to sustain the program.	

Technical Implementation Method

This activity employed several implementation approaches, including presentations and question-and-answer sessions, simulations and hands-on practice, individual coaching and classroom observation, as well as reflection and group discussions. The community service activity positioned PAUD teachers as the primary implementers of the initial literacy assessments, with students providing support as technical assistants during the training sessions and classroom implementation.

Modules and Teaching Materials

The training module is designed to help teachers understand the basic concepts of early literacy, technical guidance for using assessment applications, and the use of assessment results as a basis for differential learning. Modules are shared electronically and used as a guide during the training and mentoring process.

Success Evaluation Design

The training applied three criteria as the main benchmarks for evaluating the achievement of the program. First, the success of activity implementation was determined by the completion of the program according to the agreed schedule and number of sessions, as well as by participant attendance of at least 80 percent of the invited teachers.

Second, participant success was measured by their ability to apply early literacy assessments in classroom learning and to use the results to support learning development. Instruments developed to assess the successful implementation of early literacy assessments were based on several indicators. These indicators, which served as measures of participant achievement, are presented in Table 2.

Table 2. Observation sheet

Aspect	Indicators
Application of Assessment in schools	1. Teachers are able to run alaindonesia.id website to conduct literacy assessments for children 2. Teachers are able to assist the child when doing the assessment according to the instructions 3. Teachers are able to direct children to be able to do assessments using simplified language 4. Teachers are able to use the results of the assessment to follow up in learning 5. Teachers are able to use assessments to develop technology-based learning in the classroom for early childhood children

Third, the benchmark for success from the implementing team was their ability to clearly explain the initial literacy assessment and the importance of this activity in PAUD learning processes. The clarity and effectiveness of the implementation team were evaluated through questionnaires completed by each training participant, which included assessments of the resource persons and the organizing committee.

3. RESULTS AND DISCUSSION

Implementation of Needs Identification and Analysis Stage

The community service activity began with a field visit to one of the partners PAUD institutions, PP Cantik, which represents the general conditions of PAUD units in Kampung Emas. At this stage, the service team conducted direct observations of existing teaching and assessment practices, along with initial discussions to identify the partners' actual needs (Figure 2).

The results of the needs identification indicated that most PAUD teachers in Kampung Emas did not have formal educational backgrounds in early childhood education. This condition contributed to limited understanding of child development assessment concepts, particularly in early literacy. Assessment practices were largely incidental and unstructured and were not used as a basis for learning planning. These findings informed the service team's decision to design a knowledge transfer strategy that was practical, contextual, and responsive to teachers' needs.



Figure 2. Initial coordination and needs analysis

Implementation of the Initial Literacy Assessment Training Stage

The second stage is in the form of initial literacy assessment training which will be held on June 14, 2025, and attended by 33 teachers from 20 partner PAUD units. This training is designed as a process of knowledge and skill transfer, not just the delivery of material. Therefore, the training activities emphasized the direct practice of using digital application-based initial literacy assessments.

In the early stages of training, teachers are introduced to the basic concepts of early literacy and the principles of early childhood development assessment. Furthermore, the service team facilitates teachers to practice the use of the initial literacy assessment application, starting from input child data, child assistance during assessments, to read the assessment results produced by the system (Figure 3). Observation results indicated that most teachers were not accustomed to using technology-based assessments and therefore required intensive support. This condition highlights the crucial role of the service team and students in ensuring that the knowledge transfer process was carried out effectively (Figure 4).



Figure 3. Early literacy assessment training activities

Figure 4. Teacher training and mentoring during the workshop

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Implementation of Mentoring and Monitoring Stages in Partner Schools

Following the training, the activity continued with mentoring support for the implementation of initial literacy assessments at partner schools. Of the 20 participating schools, 15 agreed to proceed to the monitoring stage. Mentoring was conducted directly at each school according to a mutually agreed schedule. At this stage, teachers began to apply early literacy assessments individually with children, supported by the service team. The mentoring focused on strengthening teachers' technical and pedagogical skills, including using assessment guidelines, accessing the application, supporting children during the assessment process, and interpreting assessment results as a basis for follow-up learning activities (Figure 5).



Figure 5. Assessment assistance and monitoring in schools

The monitoring results showed that some teachers were able to carry out assessments independently, while others still needed further assistance, especially in the technical aspects of using the application and interpreting assessment results (Table 3). These findings confirm that continuous mentoring is the key to the successful implementation of technology-based assessments in early childhood education.

Table 3. Field findings

Findings	Number of Schools	Follow-up
Teachers haven't read the guide	10	Re-mentoring at school, step-by-step explanation
Confused teacher logins to the page	8	Students help with technical login
Teachers can conduct self-assessments	7	No need for additional assistance
Teachers don't know how to assess children	8	Provided a direct example by a companion
Teachers understand alaindonesia.id assessment tools as learning & assessment materials	15	Prepared advanced training

Evaluation of Implementation and Strengthening of Teacher Capacity

The evaluation of activity implementation was conducted through reflective discussions with partner teachers following the training and mentoring processes. The reflection results indicated that teachers developed a new understanding of assessment as a tool to support learning, rather than merely as a means of reporting children's development. Teachers also expressed readiness to use digital-based initial literacy assessments in their daily teaching practices, although some technical challenges remain and require continued assistance.

Impact and Contribution of Service Programs

The implementation of this community service program produced several tangible impacts for the partner institutions, including: (1) Increased teacher understanding that early literacy assessments can be conducted flexibly and integrated into children's play activities; (2) A shift in assessment practices from manual methods to digital-based assessments; and (3) The development of a reflective culture among teachers in using assessment results as a basis for learning planning.

The contribution of this program extends beyond enhancing individual teacher capacity to the development of a practice-based early literacy assessment model that can be replicated in other PAUD units. The web-based early literacy assessment innovation implemented in this program demonstrates strong potential to support the establishment of a more systematic and sustainable assessment system in early childhood education.

Discussion

The results of the training and mentoring activities on initial literacy assessment in Kampung Emas indicate both a clear need for and a tangible impact of the interventions implemented. Based on the sequence of activities, the discussion of these results is organized into the following main themes. The initial visit to PP Cantik revealed that most PAUD teachers in Kampung Emas were not graduates of early childhood education programs but instead came from non-educational backgrounds or served as community volunteers, such as *posyandu* cadres. This condition indicates low initial pedagogical readiness and a high need for structured training. These findings align with the principles of needs assessment in community education, which emphasize the importance of identifying actual needs before implementing interventions (Christianti et al., 2025; Delcker et al., 2025; Nordin et al., 2021; Thiagarajan, 1974).

A one-day training involving 33 teachers from 20 partner institutions showed that most teachers already had experience conducting assessments, particularly through documentation methods such as photographs (85 percent) and anecdotal records (70 percent). However, their understanding of comprehensive assessment types, including diagnostic, formative, and summative assessments, remained limited. The training broadened teachers' perspectives by introducing contemporary concepts such as assessment *as*, *for*, and *of* learning, as well as deep learning-based assessment approaches. These findings confirm the role of training as an essential form of professional development, demonstrating that contextual and targeted teacher training can significantly improve the quality of learning (Abrami et al., 2016; Baird et al., 2017; Bulger & Davison, 2018; Maunula & Lähdesmäki, 2022).

During the training, it was found that most teachers were not aware that playground equipment could be used as a medium for assessment. In addition, many teachers experienced difficulties with digital assessment procedures, including logging into the application and understanding the user guidelines. These challenges indicate a gap between the training content and teachers' practical readiness. The involvement of undergraduate (S1) and graduate (S2) PAUD students as mentors played a crucial role in bridging this gap. These findings are consistent with Vygotsky's theory of the zone of proximal development and the concept of scaffolding, which emphasize the need for direct guidance to support the development of new competencies. Similarly, formative assessment practices rely heavily on timely support and feedback, as noted by Voinea (2018).

Of the 20 partner schools, 15 proceeded to the monitoring stage. The data show that while all 15 schools were introduced to web-based assessment tools, 10 schools had not yet reviewed the assessment guidelines, and 8 teachers were still unable to log into the application independently. This finding highlights the need for follow-up support in the form of repeated training or modular refresher

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sessions. Nevertheless, 7 schools were able to implement the assessments independently, indicating measurable progress in teachers' pedagogical practices.

After the training, teachers reported gaining new knowledge related to assessment and expressed a willingness to implement it in their teaching practices. Evaluations of the resource persons and organizing committee also yielded high ratings. In addition, teachers identified several areas for further professional development, including lesson planning, classroom management, and deep learning-based instructional approaches. These results indicate that the program was successful not only in improving assessment literacy, but also in enhancing teacher motivation and fostering deeper pedagogical reflection.

This activity generated several key impacts. First, it facilitated a shift from manual to digital assessment practices. Second, teachers developed a clearer understanding that play activities can serve as effective tools for assessment. Third, the program fostered synergy among teachers, students, and lecturers. Further contributions that can be developed from this initiative include collaborative mentoring models for early childhood assessment development, practice-based teacher learning communities, and the design of a national early childhood teacher training curriculum grounded in digital assessment and deep learning approaches. Thus, this activity is not only a one-time intervention but becomes the seed of systemic change in the practice of assessment and professional development of PAUD teachers in the future.

4. CONCLUSION AND RECOMMENDATIONS

The training and mentoring activities for early literacy assessment in Kampung Emas, Sleman, were successful in identifying teachers' needs, expanding their knowledge, and improving PAUD teachers' practical skills in implementing technology-based assessments. Teachers demonstrated enthusiasm and readiness to adopt more relevant and modern assessment approaches. This intervention also succeeded in establishing a mentoring network among lecturers, students, and teachers, while creating opportunities for more comprehensive and inclusive innovations in PAUD assessment practices.

Gradual (modular) advanced training needs to be prepared to deepen teachers' understanding, especially in the practice of deep learning-based assessment. The development of a continuous mentoring system through the teacher learning community is highly recommended to maintain the impact of training. Expanding the use of website-based assessments in other PAUD by strengthening digital literacy and providing supporting infrastructure. This activity can be replicated in the form of national-level training that integrates the PAUD curriculum, digital technology, and assessment innovation. Documentation and publication of the results of activities need to be carried out periodically so that this innovation can become an inspiration and national reference.

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