

## Enhancing Primary School Teachers Competence through Training on the Implementation of Deep Learning in Barru Regency

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**Abstract.** This community engagement initiative was designed to strengthen the professional competencies of primary school teachers in Barru Regency by introducing deep learning strategies in response to the growing demand for more student-centered and reflective teaching practices. A two-day training was conducted on July 21–22, 2025, at the Barru District Education Office in collaboration with lecturers from Universitas Negeri Makassar. The training program, implemented in three phases namely preparation, implementation, and reflection covered Growth Mindset, the Deep Learning Framework, and principles of learning experiences. Teachers engaged in interactive discussions, collaborative learning, and hands-on exercises, followed by reflection sessions to design school-specific follow-up plans. The program enhanced participants' understanding of deep learning concepts and improved their ability to design student-centered classroom practices. Teachers demonstrated increased confidence in applying reflective and innovative teaching approaches. The outcomes suggest that the training effectively fostered professional growth and promoted a shift toward deep learning practices. These findings highlight the potential of similar programs to support long-term improvements in teaching quality and student engagement in primary schools across Barru Regency.

**Keywords:** Deep Learning Strategies; Teacher Professional Development; Student-Centered Learning; Primary Education; Community Engagement

### 1. Introduction

Education is a system in which many parties are involved, one of the most important being teachers (McCarthy et al., 2023; Urdaneta-Ponte et al., 2021). When teachers possess strong competencies, they will shape students with strong abilities as well (Bai et al., 2022; Lase et al., 2021). The role of primary school teachers in shaping students' character and 21st-century skills is undeniable (Elmira et al., 2022; Wei & Maat, 2020; Wijnen et al., 2023). Teachers are not merely transmitters of information, but also facilitators and mentors who can create meaningful learning experiences. They are the key determinants of success in any educational endeavor, as they are central to the learning process and in shaping the quality of students. Therefore, efforts to improve teacher quality must be continuously carried out both formally and informally, either by the government or by teachers through their own awareness, to ensure that their professional

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and personal competencies are maintained and even improved over time (Zulhimma, 2015). According to Law No. 14 of 2005, Article 1, Clause 10 on Teachers and Lecturers, competence is defined as a set of knowledge, skills, and behaviors that must be possessed, internalized, and mastered by teachers or lecturers in carrying out their professional duties (Friedrich et al., 2013; Нурманова, 2022). Considering the importance of the teacher's role, it is essential to provide them with adequate education, training, development, and experience to enhance their quality, enabling them to fulfill their duties and responsibilities effectively (Hassan, 2022; Hosen et al., 2024; Jain & Khurana, 2017). Therefore, teacher competence must be continuously developed to preserve their professional and personal qualities. This competence includes the knowledge, skills, and behaviors necessary for performing their professional tasks.

In many primary schools in Indonesia (Rasmitadila et al., 2020; Sulistiyo et al., 2020; Yulianti, 2023), teaching practices are still predominantly characterized by conventional, teacher-centered approaches such as one-way lectures, rote memorization, and assessments that focus solely on final outcomes. These methods often limit active student engagement and provide little opportunity for deep conceptual understanding. In the face of growing demands for more critical, reflective, and collaborative learning, such approaches are increasingly seen as inadequate. Therefore, alternative instructional strategies are needed to address these challenges one of which is deep learning. One learning approach that can enhance the quality of education is deep learning. Deep learning is an approach that emphasizes conceptual understanding, reflective thinking, and problem-solving skills (Biggs & Tang in Hasanah & Pujiati, 2025).

To address the increasing complexity of educational challenges, it is necessary to have competent teachers who can implement innovative teaching strategies, including deep learning. This approach requires teachers to take an active role in designing learning activities that encourage students to explore, connect concepts, and build meaningful knowledge. In this context, teacher leadership in managing the classroom is key to the successful implementation of this approach (Mulyanto et al., 2025). Deep learning emphasizes conceptual understanding, critical thinking, collaboration, and deep reflective capacity, all of which are essential for students to become adaptive lifelong learners (Ganaie et al., 2022; Janiesch et al., 2021). Primary school teachers, therefore, need to strengthen their understanding and practical skills to design lessons that promote active student engagement and deeper comprehension. Deep learning is defined as an approach that focuses on conceptual understanding and critical application of knowledge. It prioritizes the creation of a supportive learning environment, where the process is conscious, meaningful, and enjoyable (Khun-Inkeeree et al., 2022; Ortiz-Revilla et al., 2023; Wullur & Werang, 2020).

However, the reality in the field shows that not all teachers possess the necessary understanding and skills to implement deep learning strategies effectively in the classroom. This is due to several factors, such as limited access to relevant professional development, lack of opportunities to share best practices, and the persistence of conventional, teacher-centered teaching methods. Therefore, enhancing teacher competence is a critical aspect that must continuously be promoted through various training and mentoring programs. A study conducted by Salmi et al. (2023) revealed that the implementation of deep learning in formal education still faces obstacles such as limited teacher understanding, inadequate infrastructure, and a lack of relevant learning modules. Hence, a strategic approach is needed to bridge these gaps by providing targeted



training and professional development for educators.

In response to these needs, the Barru District Education Office, in collaboration with lecturers from Universitas Negeri Makassar, organized a training event titled Training on the Implementation of Deep Learning held on July 21–22, 2025. The training targeted primary school teachers from various areas in the Barru Regency, with the main goal of enhancing their capacity to design and implement deep learning in a contextualized manner in the classroom. This initiative represents a concrete form of synergy between higher education institutions and local governments in supporting ongoing professional development for teachers (Pfeiffer & Pfeil, 2018).

The training was structured in three main phases namely preparation, implementation, and reflection. During the preparation phase, the organizing team developed the training materials, presentation aids, writing tools, and other logistical supports. The implementation phase took place over two days using a participatory approach, in which participants engaged in discussions, simulations, and hands-on practice related to deep learning. The core topics included: (1) Growth Mindset in Deep Learning, (2) Deep Learning Framework, and (3) Principles and Learning Experiences in Deep Learning. All sessions were designed to foster active teacher engagement, peer collaboration, and reflective practice on their teaching methods.

The reflection stage served both as an evaluation and a follow-up planning session. In this phase, participants developed contextualized implementation plans for deep learning strategies tailored to their students' needs and school conditions. These plans are expected to be the initial step for teachers to transform classroom instruction to become more meaningful, inclusive, and focused on the holistic development of student potential. This training demonstrates that teacher professional development is not merely a transfer of knowledge, but a platform for growth that fosters dialogue, idea exchange, and instructional innovation. With the active involvement of teachers, support from the Education Office, and contributions from academics, this training is expected to have a long-term positive impact on improving the quality of primary education in Barru Regency. Going forward, programs like this should continue to be expanded and adapted to reach more teachers and to meet the evolving challenges of education in the digital transformation era and the globalized learning landscape.

## 2. Methods

This community engagement activity employed a training-based approach to enhance the professional competence of primary school teachers. The program, titled Training on the Implementation of Deep Learning, was conducted at the Barru District Education Office on July 21–22, 2025. The training was facilitated by a collaborative team from the Barru District Education Office and lecturers from Universitas Negeri Makassar, with participants consisting of actively teaching primary school teachers across Barru Regency. Participants were selected purposively by the local education office, following the principle that purposive sampling is suitable when participants possess specific characteristics relevant to the research objectives (Etikan, 2016). The main focus of the training centered on three topics: Growth Mindset, the Deep Learning Framework, and Principles of Learning Experiences in Deep Learning.

The training was structured into three phases namely preparation, implementation, and reflection. In the preparation stage, the organizing team designed training modules, developed contextual case studies, and arranged logistical support. The implementation



phase was carried out over two days using a participatory learning approach. Such an approach emphasizes active teacher engagement through discussions, collaborative learning, and hands-on exercises, which aligns with sociocultural theory that highlights the importance of social interaction in the learning process. During this stage, teachers were encouraged to exchange experiences, engage in group discussions, and design classroom practices that fostered student-centered learning.

Data collection was conducted through documentation, observation, and reflection sessions. Observations focused on teacher participation, responses to the training, and their ability to design follow-up plans relevant to their school contexts. Reflection sessions provided qualitative insights into teachers' perceptions, challenges, and opportunities in applying deep learning strategies. The qualitative data were then analyzed thematically to identify patterns of teacher understanding and application, a method consistent with Braun and Clarke's (2006) thematic analysis framework. This three-phase structure ensured that the training did not only transfer knowledge but also encouraged teachers to adapt deep learning strategies into their professional practices.

### **3. Results and Discussion**

#### *3.1. Preparation Stage*

The preparation stage was a critical foundation for the success of the training program. At this stage, the organizing committee from the Barru District Education Office, in collaboration with lecturers from Universitas Negeri Makassar, worked together to design and arrange both technical and material aspects of the program. Careful preparation was necessary to ensure that the training would run smoothly and achieve its intended outcomes of strengthening teacher competencies.

One of the primary tasks during this stage was the development of training materials that addressed three core themes namely Growth Mindset in Deep Learning, the Deep Learning Framework, and the Principles and Learning Experiences in Deep Learning. Each topic was carefully structured to balance theoretical concepts with practical applications, so that teachers could easily relate the materials to their classroom practices. The involvement of university lecturers ensured that the content was not only academically sound but also aligned with contemporary educational needs.

In addition to material development, the organizing team prepared a range of supporting tools to facilitate the delivery of training sessions. These included presentation equipment, visual aids, and interactive learning resources designed to make the sessions more engaging. Stationery, printed handouts, and other logistical items were also arranged to ensure that participants could follow the activities effectively. Such attention to detail reflected the committee's commitment to creating a professional learning environment.

Logistical arrangements were equally important in this preparation stage. The team ensured that the training venue was well-organized, with seating arrangements conducive to group work and collaborative learning. Break schedules, meals, and transportation support for participants were also planned in advance, as these seemingly minor details play a significant role in maintaining participant focus and comfort during intensive training sessions. Effective logistics are often highlighted as a key determinant of training success, particularly in professional development programs.

The preparation stage was designed to create optimal conditions for participants to engage meaningfully in the training process. By carefully integrating academic content,



supportive tools, and logistical readiness, the organizers provided a solid foundation for the implementation stage. This thorough planning ensured that teachers were not only able to receive knowledge but also to participate actively in discussions, simulations, and reflective exercises, which were central to the objectives of the deep learning training program.

**Table 1** Activities in the Preparation Stage

Preparation Aspect		Activities Conducted
Training Material Development		Designing modules on Growth Mindset, Deep Learning Framework, and Principles of Learning
Supporting Tools		Preparing presentation equipment, visual aids, interactive learning resources
Logistical Arrangements		Organizing venue, seating arrangements, meals, and transportation support
Administrative Support		Preparing participant lists, schedules, handouts, and documentation
Coordination		Collaboration between Barru District Education Office and Universitas Negeri Makassar

Table 1 summarizes the main activities undertaken during the preparation stage, which covered academic, technical, and logistical dimensions. The development of training materials ensured the relevance and applicability of content, while supporting tools and logistical arrangements provided a conducive environment for learning. Administrative support and coordination between the Barru District Education Office and Universitas Negeri Makassar further strengthened the organizational structure of the program. Together, these elements created a comprehensive foundation that enabled participants to engage actively and benefit optimally from the deep learning training.

### 3.2. Implementation Stage

The training was conducted over two days, on July 21–22, 2025, at the Barru District Education Office. The event was attended by primary school teachers from different regions across Barru Regency. The diverse backgrounds of the participants enriched the discussions, as each teacher contributed unique experiences, challenges, and expectations related to classroom practice. The training atmosphere was designed to be inclusive and supportive, allowing participants to feel comfortable engaging actively throughout the sessions.

The training employed a participatory approach, positioning teachers not as passive recipients of information but as active contributors to knowledge construction. Participants were encouraged to engage in group discussions, simulations, and practical exercises. This strategy aligns with the principles of andragogy, which emphasize that adult learners benefit more when they are actively involved and given opportunities to reflect on their experiences. As a result, the sessions became more dynamic, with meaningful exchanges of ideas between facilitators and teachers.

During the sessions, participants were introduced to the concept of *deep learning*, focusing on the development of critical thinking, reflective skills, and collaborative practices. Core topics included *Growth Mindset*, the *Deep Learning Framework*, and the *Principles of Learning Experiences*. Through interactive discussions and simulations,





teachers were not only able to understand theoretical concepts but also gained practical insights into how these ideas could be applied within real classroom contexts. This helped bridge the gap between theory and practice.

Hands-on practice formed an essential component of the implementation stage. Teachers worked collaboratively in small groups to design simple lesson plans that integrated deep learning principles into student-centered activities. Facilitators provided guidance while giving participants space to exercise creativity and adapt learning designs to their school environments. This process encouraged teachers to experiment with innovative strategies and envision practical ways to foster student engagement.

In addition to practice, reflection sessions were held at the end of each training day. These sessions allowed teachers to share their experiences, challenges, and strategies developed during the exercises. The reflection process aimed to help participants identify potential obstacles and collectively explore solutions. Consequently, the implementation stage not only strengthened teachers' conceptual understanding but also equipped them with practical skills and reflective attitudes essential for sustaining deep learning practices in Barru's primary schools.



**Figure 1** Training on Enhancing Primary School Teachers' Competence

Figure 1 shows the atmosphere of the training aimed at enhancing the competence of primary school teachers in Barru Regency. In the image, the participants teachers from various areas in Barru are seen attending the activity with enthusiasm and attentiveness. The training was facilitated by a team from the Barru District Education Office in collaboration with lecturers from Universitas Negeri Makassar. The materials presented included Growth Mindset in Deep Learning, the Deep Learning Framework, and the Principles and Learning Experiences in Deep Learning. In addition to receiving direct instruction, participants were also invited to reflect on their learning experiences through discussions, simulations, and instructional video screenings. This image reflects the seriousness and active engagement of teachers in their efforts to improve their understanding and skills in implementing deeper and more meaningful learning strategies.





**Figure 2** Active participation of teachers during Deep Learning Training

Figure 2 illustrates the active participation of primary school teachers during the Deep Learning Implementation Training held in Barru Regency. It is evident that the participants were not merely passive listeners but were enthusiastically involved in various activities such as group discussions, presentations, and learning simulations. This engagement reflects a participatory and contextual training approach, in which teachers were given space to share experiences, explore concepts, and practice applying deep learning strategies suitable for their respective school environments. This image reinforces that the training was interactive and succeeded in encouraging teachers to be more reflective and innovative in designing meaningful learning.

### *3.3. Reflection Stage*

The reflection stage served as a crucial component of the training, allowing participants to consolidate their learning and design follow-up plans tailored to their respective school environments. Teachers were encouraged to think critically about how deep learning strategies could be applied in classrooms considering their students' needs, available resources, and institutional contexts (Phillips, 2023; Wijnands et al., 2022). This stage provided a structured opportunity for teachers to move beyond theoretical understanding and begin envisioning practical applications that could lead to long-term improvements in teaching and learning.

During group discussions, participants reflected on their perceptions of teaching before and after the training. Initially, most teachers equated teaching with a unidirectional transfer of knowledge, focusing primarily on the completion of curriculum requirements and assessment outcomes. However, through the training, they realized that deep learning is less about delivering content and more about facilitating active engagement, critical thinking, and conceptual understanding. This shift highlighted a growing awareness of the need to transform traditional classroom practices.

The follow-up plans developed by participants illustrated this shift in perspective. Many teachers incorporated strategies such as project-based learning, the use of open-ended questions, and the design of reflective classroom activities to promote deeper student thinking. These strategies emphasized student agency, collaborative learning, and meaningful assessment rather than rote memorization. The commitment shown in these



plans indicated participants' readiness to experiment with innovative approaches, even within the constraints of their respective schools.

Despite their enthusiasm, participants also identified challenges that might hinder the implementation of deep learning. Common concerns included limited preparation time, insufficient resources, and resistance from school environments that still prioritize exam-oriented learning. Teachers also mentioned administrative burdens and a lack of opportunities for collaboration as significant barriers. These insights revealed that while individual motivation was strong, systemic and institutional support would be necessary to ensure sustainable change.

The findings from this reflection stage suggest that the training successfully enhanced teachers' understanding and motivation, but effective implementation will require ongoing support mechanisms. Future initiatives should consider providing continuous mentoring, access to best practice models, and opportunities for collaboration through professional learning communities. These follow-up efforts would not only strengthen teachers' confidence in applying deep learning strategies but also help them navigate the structural and cultural challenges present in their schools.

**Table 2** Summary of Reflection Stage Outcomes

Aspect	Before Training	After Training
Understanding of Teaching	Teaching seen as one-way information delivery	Teaching seen as facilitating engagement, critical thinking, and conceptual learning
Student Assessment	Focus on final outcomes and test results	Emphasis on process, reflective activities, and meaningful assessment
Instructional Strategies	Reliance on memorization-based methods	Use of project-based learning, open-ended questions, and collaborative activities
Identified Challenges	Not explicitly recognized	Limited time, lack of resources, exam-oriented culture, administrative burdens
Future Needs	Not articulated	Mentoring, access to best practices, teacher learning communities

Table 2 highlights the transformation in teachers' perspectives and practices as a result of the training. Before the program, teaching was largely understood as a content delivery process with assessments centered on final outcomes. After the training, teachers recognized the importance of student-centered learning, reflective activities, and critical thinking. However, the reflection stage also revealed challenges that must be addressed to ensure effective implementation, underscoring the need for sustained mentoring, resources, and collaborative platforms for teachers.

#### 4. Conclusions

The Training on the Implementation of Deep Learning, conducted in Barru Regency on July 21–22, 2025, proved effective in strengthening the professional competence of primary school teachers. Through three structured stages namely preparation, implementation, and reflection, the program successfully introduced teachers to the principles of deep learning while fostering their ability to translate theory into classroom





practice. The participatory approach encouraged active involvement, critical reflection, and collaborative problem-solving, which not only enhanced teachers' conceptual understanding but also motivated them to design student-centered and innovative learning activities tailored to their school contexts.

The reflection stage revealed a meaningful shift in teachers' perspectives, from viewing teaching as a one-way transfer of information to recognizing it as a process that prioritizes student engagement, critical thinking, and deeper learning outcomes. Follow-up plans designed by participants demonstrated their readiness to apply strategies such as project-based learning, the use of open-ended questions, and reflective classroom practices. However, teachers also highlighted structural and cultural challenges, including exam-oriented traditions, administrative burdens, and limited resources. These findings suggest that while individual motivation is strong, systemic support such as mentoring, access to best practices, and professional learning communities is essential for sustaining change.

Despite its positive outcomes, this training had several limitations. The program was relatively short in duration, limiting opportunities for in-depth exploration and long-term monitoring of classroom implementation. Additionally, the study relied primarily on qualitative reflection and observation data, which may not fully capture the measurable impact of deep learning on student achievement. Future research should therefore adopt longitudinal and mixed-method approaches to assess the sustained effects of teacher professional development on teaching quality and student learning outcomes. Expanding similar initiatives to diverse educational contexts and integrating policy-level support will also be crucial for scaling and institutionalizing deep learning practices.

### Conflict of Interest

The authors declare no conflict of interests.

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