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Empowering Vocational Teachers in Indonesian Vocational High Schools through In-House Training on Deep Learning-Based Instructional Management

Mohamad Sodikin[1*]
Sekolah Tinggi Ilmu Ekonomi Cendekia Karya Utama, Indonesia
Correspondence author email: sodikinmohamad73@gmail.com

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Abstract: *This community service initiative aims to strengthen the pedagogical competence of vocational teachers in Indonesia through an In-House Training (IHT) program focused on Deep Learning-Based Instructional Management. Conducted at SMK Diponegoro Semarang, Indonesia on September 29, 2025, the activity involved 18 teachers from diverse vocational disciplines. The training adopted an andragogical and participatory design emphasizing active learning, reflection, and collaboration. Data were collected through reflective journals, and focus group discussions. The results indicated substantial improvement in teachers' conceptual understanding and practical application of deep learning strategies in lesson planning and classroom management. The program successfully fostered a professional learning culture and strengthened teachers' readiness to implement student-centered, reflective, and innovative pedagogy. This initiative demonstrates that school-based in-house training can effectively empower vocational teachers and enhance instructional quality in Indonesia's vocational education system.*

1. INTRODUCTION

The quality of teachers remains the most influential factor in determining the success of education systems worldwide (Ainley & Schulz, 2025). In the context of Indonesian Vocational High Schools (Sekolah Menengah Kejuruan, SMK), teacher competence holds a particularly strategic role because vocational education directly links schools to industrial practices and employability outcomes (Mulyadi et al., 2017; Soenarto et al., 2020). To prepare students for a rapidly changing industrial landscape, teachers must be equipped not only with technical expertise but also with advanced pedagogical capacities that promote critical thinking, creativity, and problem-solving skills.

Traditional instructional models in many Indonesian vocational schools still tend to rely on surface learning approaches teacher centered methods emphasizing memorization and reproduction of information (Wibawanto et al., 2021). This approach limits students' ability to develop higher-order thinking and real-world problem-solving capabilities. In contrast, the deep learning paradigm emphasizes meaningful understanding, knowledge transfer, and

metacognitive engagement, all of which are critical for 21st-century skills (Baeten et al., 2010; Fullan et al., 2017; Hattie, 2023).

To support this transformation, teacher professional development must move beyond short, lecture-based training toward contextual, reflective, and collaborative learning models (Darling-Hammond et al., 2017). Among these, In-House Training (IHT) has emerged as an effective form of school-based professional development, enabling teachers to learn in their authentic environment, collaborate with colleagues, and immediately apply new knowledge in practice (Lei et al., 2025; Weng et al., 2023).

This community service project was designed to enhance the instructional quality of SMK teachers through IHT on Deep Learning-Based Instructional Management. The program sought to empower teachers to design and implement deep learning strategies suited to the vocational education context.

2. METHOD

1. Training Design

   The In-House Training (IHT) program adopted a participatory and andragogical design, aligning with the principles of adult learning that emphasize self-directedness, practical relevance, and experience-based reflection (Knowles, Holton, & Swanson, 2015). The framework combined theoretical sessions, collaborative workshops, and reflective evaluation to promote sustained professional learning. The training followed three main phases: Preparation, Implementation, and Evaluation, inspired by the *Professional Development and Deep Learning Pedagogy* framework proposed by (Baeten et al., 2010; Weng et al., 2023).

2. Preparation Phase

   A needs assessment was conducted through discussions with school leaders and teachers to identify key pedagogical challenges, especially regarding the integration of deep learning in vocational subjects. Based on the assessment, the facilitator designed a structured one-day training module including:

   a. Conceptual understanding of deep learning and student-centered pedagogy;
   b. Lesson planning techniques emphasizing critical thinking and problem-solving;
   c. Classroom management strategies fostering reflective and autonomous learning.

3. Implementation Phase

The training took place on September 29, 2025, at SMK Diponegoro Semarang, involving 18 vocational teachers from mechanical, electrical, and business programs. The sessions were structured as follows:

a. Concept Session: Presentation on the philosophy and principles of deep learning, highlighting its relevance to vocational education.
b. Workshop Session: Collaborative redesign of existing lesson plans into deep learning-oriented models.
c. Simulation Session: Role-play and peer teaching exercises applying inquiry-based and project-based methods.
d. Reflection Session: Group discussions on challenges, implementation readiness, and action planning.

Active learning strategies—case studies, peer learning, and experiential exercises—were emphasized to model deep learning in practice.

4. Evaluation Phase

Training effectiveness was evaluated through a mixed-method approach, combining quantitative and qualitative data:

a. Pre- and post-training questionnaires to measure conceptual understanding;
b. Reflective journals for assessing personal insights and self-efficacy;
c. Focus group discussions for capturing collaborative reflections on implementation feasibility.

The evaluation framework referred to Kirkpatrick's four-level model of training evaluation, focusing on reaction, learning, behavior, and results (Kirkpatrick & Kirkpatrick, 2006).

3. RESULT

Significant pedagogical and attitudinal improvements were found among participants after the In-House Training (IHT) program, according on a qualitative review of teachers' reflective journals and group discussions. Three main motifs surfaced:

1. Improved instructional design that prioritizes creativity and higher-order thinking.

Participants said they felt more confident creating lesson plans that foster creativity, critical

thinking, and problem-solving. They showed how instructional approaches that are more participatory and inquiry-based have replaced teacher-centered delivery. Project-based learning, contextual problem-solving exercises, and formative feedback systems are a few examples.

2. Better student involvement and classroom management.

   Instructors observed increased understanding of classroom dynamics and the application of facilitation strategies to promote engaged student involvement. In order to promote deeper learning engagement, reflective entries emphasized techniques including organized group work, open-ended questions, and the use of formative assessment.

3. A shift toward professional cooperation and facilitative instruction.

   Participants were inspired by the IHT experience to redefine their roles as learning facilitators and content broadcasters. Significantly, through collaborative lesson planning, shared reflection, and peer observation, teachers strengthened their collegial collaboration. These cooperative behaviors point to the development of long-term professional learning communities.

Overall, the data shows that the IHT format was successful in promoting professional development when it was placed within the teachers' institutional context and bolstered by peer interaction. According to (Darling-Hammond et al., 2017) and (Opfer & Pedder, 2011), the combination of contextual learning, reflective practice, and collegial support is consistent with good professional development concepts. Documentation of the implementation of IHT activities is shown in Figure 1 below.


Figure 1. Documentation of Implementation of IHT activities

4. DISCUSSION

Teachers' professional practices, attitudes, and collaborative culture underwent significant changes as a result of the In-House Training (IHT) program. This section examines the results in light of pertinent international literature on effective teacher professional development (TPD) in order to better understand how and why these outcomes happened. Along with the wider implications for vocational education in the Indonesian setting, the discussion also looks at the underlying mechanisms that led to teachers' learning and pedagogical transformation.

4.1. Conformity to International Frameworks for Successful Teacher Professional Development

The program's results align with global Teacher Professional Development (TPD) frameworks that prioritize contextualization, cooperation, and continuity (Darling-Hammond et al., 2017; Desimone, 2009). These frameworks define effective TPD as having a clear focus on pedagogical content, active learning processes, sustained duration, and coherence with teachers' professional practice.

By offering collaborative, reflective, and school-based learning opportunities, the IHT model effectively operationalized these qualities. It allowed for instant experimentation, feedback, and peer learning, all of which have been shown to improve the transfer of professional learning into classroom practice. It was situated inside the participants' actual teaching situations (Avalos, 2011; Vescio et al., 2008).

4.2. Change Mechanisms: Collaborative, Reflective, and Contextual Learning

The IHT model contains a number of interrelated mechanisms that are responsible

for the beneficial change in instructors' practices. These mechanisms demonstrate how professional learning functions best when it is located in real-world settings, collaborative, and reflective. When taken as a whole, they clarify why the IHT program was successful in converting professional development opportunities into observable classroom enhancements.

First, authenticity and relevance were promoted via placed professional learning in schools. In line with situated learning theory and communities of practice, teachers gained knowledge through real-world issues and contextualized challenges (Wenger, 2011). Teachers are better able to connect new educational concepts with their own institutional realities in such environments.

Second, a significant pedagogical change in vocational education is represented by the integration of deep learning concepts. Research by (Fullan et al., 2017) and (Baeten et al., 2010) shows that deep learning-focused professional development improves students' engagement and teachers' innovative teaching. The IHT promoted instructional strategies that support deep, as opposed to surface, learning approaches through reflective cycles and contextual problem-solving.

Third, peer cooperation has become a key component of sustainability. A sense of shared ownership and professional accountability was fostered by teachers' group reflection and co-design of lessons. This result is consistent with the findings of (Vescio et al., 2008), who discovered that when professional learning communities are integrated into school systems, they greatly enhance teaching practices and student results.

These results align with the impactful campus program in Indonesia, which promotes flexible and student-centered learning paradigms. As part of this change, vocational education calls for educators who can create meaningful, authentic, and contextual learning opportunities. The current program serves as an example of how these national goals can be operationalized at the micro level through focused school-based training.

Additionally, this exercise demonstrates the strategic role that community service programs from higher education may play in connecting theory and practice. The initiative fostered an academic-practical synergy that enhanced the teachers' professional development and the institution's social commitment by enlisting university academics as

facilitators. There are still issues, though, such as maintaining post-training engagement and guaranteeing institutional support for long-term transformation. These results corroborate the findings of (Darling-Hammond et al., 2017) and (Hattie, 2023), who stress that effective TPD needs to be ongoing, cooperative, and included into teachers' daily work.

Based on these results and discussions, this IHT model shows how contextual, reflective, and cooperative training can act as a stimulant to improve the quality of teaching in Indonesian vocational education.

5. CONCLUSION

This community service program successfully empowered vocational teachers in Indonesian vocational high schools by enhancing their pedagogical competence through in-house training on deep learning-based instructional management. The andragogical and participatory training design effectively bridged conceptual understanding and classroom application. Teachers demonstrated improved ability to design reflective, student centered, and problem-solving-oriented instruction. The findings highlight the potential of school-based professional development as a sustainable model for strengthening teacher quality in vocational education. To sustain these gains, schools are encouraged to establish follow-up mentoring programs and professional learning communities. Future initiatives may explore longitudinal impacts and digital integration to further scale the benefits of deep learning pedagogy in Indonesia’s vocational sector.

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