

Phenomenological Study of Merdeka Curriculum Implementation Using Deep Learning at Community Learning Centers, Tegal City

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Abstract

The implementation of *Kurikulum Merdeka* in non-formal education demands an instructional paradigm shift toward deep learning to ensure meaningful, reflective, and flexible learning tailored to non-formal learners. This qualitative transcendental phenomenological study explored the lived experiences of 4 managers, 8 tutors, and 10 learners across four Community Learning Activity Centers (PKBM) in Tegal City. Data gathered through non-participant observations, semi-structured interviews, and document analysis were analyzed using Moustakas' procedures. Results indicate that tutors possess a practical-intuitive understanding of deep learning, successfully executing meaningful learning through contextual discussions, project-based tasks, and diagnostic assessments. However, mindful learning (explicit reflection) and the written formalization of joyful learning remain inconsistent due to limited contact hours and a lack of reflection-based professional development. Implementation challenges including high learner age heterogeneity (16–45 years) and limited digital resources were overcome through flexible adaptations such as tiered mentoring, simple communication tools (WhatsApp), and leveraging heterogeneous study groups as a collaborative learning asset. In conclusion, implementing *Kurikulum Merdeka* via deep learning in PKBM fosters a student-centered paradigm that enhances learners' critical thinking, self-confidence, and active participation. Achieving sustainable implementation requires continuous institutional supervision, targeted tutor training on reflective pedagogy, and explicit integration of deep learning principles into instructional planning.

Keywords

Community Learning Activity Center; Deep Learning Approach; *Kurikulum Merdeka*; Non-Formal Education.



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INTRODUCTION

The primary objective of the Independent Curriculum (*Kurikulum Merdeka*) is to restore learning quality, overcome learning loss, and transform national education through flexible, student-centered learning (Elihami et al., 2021; Rahayu et al., 2022). Within this broader educational reform, deep learning serves as a strategic pedagogical framework designed to shift classroom dynamics from rote memorization toward profound conceptual mastery (Priantini et al., 2022). Building upon this foundation, the Independent Curriculum Policy presents a new learning paradigm that positions the deep learning approach as the primary framework for realizing meaningful, mindful, and joyful learning (Chotimah et al., 2025; Jumanto & Wicaksono, 2026). This approach is designed so that students are no longer passive recipients of information, but rather actively engage in critical thinking, self-reflection, and the application of knowledge to real-life contexts (Fitriani & Santiani, 2025; Handayani et al., 2025). When implemented consistently, this approach has been proven to encourage student activeness, higher-order thinking skills, creativity, communication skills, and character building in accordance with the eight dimensions of the graduate profile (Mujtahid et al., 2026). This ideal position frames deep learning not merely as a technical instructional method, but as a holistic educational philosophy that requires a fundamental shift in educators' epistemological perspectives on how knowledge is constructed (Dolmans et al., 2016; Fullan et al., 2018).

On the other hand, non-formal education through Community Learning Centers (PKBM) plays a strategic role in achieving equal access to learning for community members who have not completed formal education. Ideally, the implementation of the Independent Curriculum with a deep learning approach should provide a space for learners to develop a deep, conceptual understanding rather than merely pursuing administrative completion in the form of an equivalency diploma. However, empirical reality reveals a significant gap between expectations and practice. In Kota Tegal, out of 11 registered PKBMs, preliminary observations across 9 centers show that approximately 72% of equivalency learners enrolled solely to fulfill diploma administrative requirements for employment or schooling, rather than intrinsic learning motivation. Furthermore, formative assessment averages across these units consistently remain below the Minimum Completeness Criteria (KKM). Pedagogically, only 2 out of the 9 observed PKBMs have attempted project-based or case-study deep learning syntax, while the remaining 7 centers still rely on conventional, one-way lectures and report that 100% of their tutors lack formal training on

Independent Curriculum modules. This local empiricism reflects broader national challenges at secondary education levels, where deep learning implementation remains in a transitional stage hampered by uneven teacher pedagogical readiness, limited mastery of deep learning syntax, and infrastructure constraints (Hamzah et al., 2026; Latifah et al., 2026; Rosidin et al., 2025).

At the elementary level, deep learning implementation faces recurring pedagogical and structural hurdles. Teachers frequently struggle to translate deep learning syntax into daily practice due to the persistence of conventional teaching habits and inadequate learning infrastructure (Mujtahid et al., 2026; Rahayu et al., 2022). These instructional constraints are further compounded by disparities in technological support and teacher readiness, which directly impede digital literacy development a foundational pillar of deep learning (Nuroni et al., 2026; Padmadewi et al., 2023). Collectively, these studies indicate that teacher readiness remains the dominant factor affecting successful deep learning implementation across educational levels (Hattie & Donoghue, 2016). This systemic gap between policy ideals and classroom reality is therefore not an isolated technical issue, but a complex interplay of teacher capacity, infrastructure, and institutional culture. Consequently, studies are needed that go beyond broad descriptive overviews to explore how educational actors experience, interpret, and navigate these reformative demands in their daily practices.

This gap becomes particularly complex and methodologically critical when deep learning is transferred to non-formal education pathways like Community Learning Centers (PKBM). Unlike formal schools, which are characterized by age-homogeneous student cohorts and standardized academic tracks, PKBM operates within a radically distinct structural and demographic reality. Learners in PKBM present extreme socio-demographic diversity their ages span from school-aged dropouts (15–18 years old) to working adults well over 40 years old, most of whom manage competing occupational, financial, and family obligations (Latchem, 2017). Consequently, their learning motivation is predominantly instrumental oriented toward pragmatic outcomes such as securing employment or workplace promotions through equivalency diplomas rather than conventional academic progression (Elihami et al., 2021). In this non-formal environment, tutors face unique instructional challenges as motivators, facilitators, and evaluators, yet their capacity is frequently constrained by limited training in contextual deep learning syntaxes (Ertanti et al., 2024; Makleat et al., 2022). Given these complex life realities and varying levels of cognitive readiness, learning needs assessments become vital to prevent deep learning from devolving into mere administrative compliance (Febriansa & Arsyad, 2026). These structural contrasts confirm that

applying deep learning in PKBM cannot mirror formal school practices, making PKBM a highly compelling and distinctive site for investigating how deep learning adapts to non-formal educational dynamics.

Existing literature on the Independent Curriculum can be synthesized across three primary thematic domains: deep learning implementation, phenomenological explorations of educational policy, and non-formal education within Community Learning Centers (PKBM). Studies on deep learning predominantly rely on descriptive case studies and systematic literature reviews to map pedagogical frameworks in formal school settings (Feriyanto & Anjariyah, 2024; Hasanah et al., 2025; Jumanto & Wicaksono, 2026). In contrast, research adopting a phenomenological approach shifts the analytical focus toward uncovering lived experiences and subjective policy interpretations that descriptive or quantitative methods fail to capture (Hulaimi et al., 2025), while literature on PKBM centers on the operational flexibility and unique learner demographics of non-formal contexts. Although these three thematic domains share the broader objective of evaluating curriculum reform in Indonesia, they diverge significantly in their scope and methodological orientation, as deep learning research remains anchored in macro-level formal education, phenomenological studies focus almost exclusively on student perspectives, and PKBM literature rarely integrates deep learning frameworks. Consequently, existing literature fails to examine the lived experiences of tutors and PKBM administrators in implementing the Independent Curriculum through a deep learning approach. Specifically, while prior research has focused on student perspectives or structural evaluations in formal schools, it leaves an unaddressed gap regarding how non-formal educators and institutional leaders subjectively interpret, negotiate, and construct meaning from deep learning mandates within their unique operational realities using a phenomenological framework.

The novelty of this study lies in its integration of three previously isolated domains Independent Curriculum policy, deep learning approaches, and community-based non-formal education into a single phenomenological framework. Unlike prior research in non-formal education that predominantly focuses on student motivation and learning outcomes (Ertanti et al., 2024), this research shifts the analytical lens to the lived experiences of tutors and PKBM administrators as primary practitioners. Grounding this investigation in Community Learning Centers (PKBM) in Tegal City offers a distinct scientific contribution by uncovering how macro-level curriculum reforms are subjectively interpreted, negotiated, and operationalized within

community-based learning spaces.

Theoretically, this research is expected to enrich the study on the integration between national curriculum policy and deep learning approach in non-formal education, which has so far been minimally explored phenomenologically (Febriansa & Arsyad, 2026; Nuroni et al., 2026). Pragmatically, the results of this study are expected to serve as a reference for PKBM managers and tutors in designing more contextual, reflective, and learner-centered learning strategies, as well as provide input for education policymakers in developing mentoring programs and strengthening the capacity of non-formal education tutors, so that the implementation of deep learning in the Merdeka Curriculum can run more optimally and evenly, not only in formal education but also in non-formal education such as PKBM (Handayani et al., 2025; Latifah et al., 2026). Based on this premise, this study aims to deeply explore the lived experiences of tutors and PKBM administrators in Tegal City in interpreting and implementing the Independent Curriculum through a deep learning approach within non-formal education settings.

METHOD

This study employs a qualitative approach with a transcendental phenomenological design to uncover the essence of the lived experiences of tutors and PKBM administrators in implementing the Independent Curriculum through a deep learning approach. This design was methodologically chosen for its capacity to bracket preconceptions and deeply examine how participants subjectively perceive, interpret, and construct meaning around a shared educational phenomenon (Creswell, 2013). By placing lived experiences as the central focus of this inquiry, the transcendental phenomenological design enables the researcher to capture the subjective meanings participants attribute to implementing the Independent Curriculum, rather than merely describing surface-level operational facts (Neubauer et al., 2019).

The research was conducted across four Community Learning Centers (PKBM) in Tegal City, chosen purposefully because they serve as pioneers in adopting the Independent Curriculum and actively integrate deep learning approaches into their equivalency education programs (Packages A, B, and C). To capture rich qualitative data from these settings, a total of 22 informants comprising 4 PKBM heads, 8 tutors, and 10 learners were selected using a purposive sampling technique based on the "information-rich cases" criterion (Merriam & Tisdell, 2020). The specific selection criteria for each group were as follows: (1) PKBM heads who hold managerial authority and possess deep

insights into curriculum policy implementation; (2) tutors actively teaching in Package A, B, or C programs who have operationalized deep learning strategies in their instruction; and (3) learners who have directly participated in deep learning processes within these programs.

Data were collected through three complementary qualitative techniques: non-participatory observation, semi-structured in-depth interviews, and documentation. Non-participatory observations focused on observing tutors' execution of deep learning principles specifically meaningful, mindful, and joyful learning and classroom interactions. As the primary technique, semi-structured interviews were conducted with PKBM managers to examine institutional support and policies, tutors to explore pedagogical understanding and implementation strategies (Hargreaves & Fullan, 2012; Widyastuti et al., 2025), and learners to capture the essence of their lived experiences. Documentation complemented these sources by examining teaching modules, learning artifacts, evaluation records, and institutional policy documents. Utilizing multiple data collection techniques enabled data triangulation, thereby enhancing the trustworthiness and credibility of the phenomenological findings (Creswell, 2013).

Data analysis strictly followed the transcendental phenomenological procedures outlined by Neubauer et al. (2019). The analytical process commenced with bracketing, where researchers actively suspended personal assumptions and prior knowledge regarding deep learning and equivalency education. Through horizontalization, significant statements from interviews, observations, and policy documents were identified, given equal weight, and reduced to non-repetitive invariant constituents. These constituents were clustered into themes to build composite textural descriptions (what was experienced) and structural descriptions (how it was experienced), ultimately synthesizing the core essence of the participants lived experiences. Data trustworthiness encompassing credibility, transferability, dependability, and confirmability was established through data triangulation, member checking, detailed audit trails, and peer debriefing (Creswell, 2013).

FINDINGS AND DISCUSSION

Findings

Conceptual Understanding of Deep Learning

Empirical data collected from interviews, classroom observations, and document analysis reveal how tutors and PKBM managers conceptualize and operationalize deep learning principles within the Independent Curriculum framework. The empirical evidence regarding participants'

conceptual understanding across data sources is presented in Table 1.

Table 1. Empirical Findings on Conceptual Understanding of Deep Learning

Data Source / Code	Theme / Category	Representative Quote / Empirical Evidence
T1 (Tutor, Package C)	Meaningful Learning Integration	<i>"In teaching economics, I always connect the concepts directly to the learners' daily jobs or small businesses. If the material isn't related to their real lives, they quickly lose interest."</i>
T4 (Tutor, Package B)	Inconsistency in Mindful Learning	<i>"I understand that deep learning requires reflection (mindful learning), but we cannot always conduct explicit reflection sessions at the end of class due to limited instructional time."</i>
M2 (PKBM Manager)	Practice-Based Conceptual Understanding	<i>"Our tutors understand the essence of the Merdeka Curriculum and deep learning primarily through practical teaching experience and internal sharing, rather than formal theoretical training."</i>
Obs-1 and Obs-2 (Field Observation)	Execution of Meaningful vs. Mindful Learning	Tutors consistently integrated contextual examples related to local trades in Tegal into their instruction; however, explicit reflective questioning (mindful learning) was observed in only 3 out of 8 class sessions.
Doc-1 (Teaching Modules Analysis)	Formalization in Instructional Documentation	Analysis of 12 teaching modules across the four PKBMs showed that contextual learning activities were included, but explicit references to the three deep learning pillars (meaningful, mindful, joyful) were absent.

Interviews with PKBM managers and tutors indicated that conceptual understanding of deep learning is predominantly formed through classroom practice and pedagogical experience rather than formal theoretical training. Tutors (T1, T3, T5) consistently emphasized the importance of making learning "meaningful" by aligning instructional content with the adult learners' daily work and social environments. However, when asked about "mindful learning," tutors (T2, T4, T8) acknowledged that explicit reflection activities were rarely structured formally during lessons.

This interview data corresponds with field observations (Obs-1 to Obs-8). During classroom sessions, tutors actively engaged learners through contextual problem-solving and real-life case studies. Nevertheless, formal reflection phases at the end of lessons were frequently omitted or conducted only briefly due to time constraints. Furthermore, document analysis of 12 teaching modules (Doc-1) confirmed that while contextual activities (*meaningful learning*) were integrated into the lesson steps, the explicit theoretical framework of deep learning encompassing meaningful, mindful, and joyful learning was not explicitly documented in the written modules.

Implementation and Learning Strategies Based on Deep Learning

The implementation of deep learning strategies across the four PKBM research sites relies primarily on contextual, participatory, and learner-centered approaches. Empirical data gathered through interviews, classroom observations, and document analysis illustrate the specific instructional methods executed by tutors, institutional governance by managers, and the resulting learning experiences of the participants. Table 2 summarizes the empirical evidence supporting these findings.

Table 2. Empirical Findings on Applied Learning Strategies and Learner Experiences

Data Source / Code	Theme / Strategy	Representative Quote / Empirical Evidence
T2 (Tutor, Package B)	Contextual Case Studies and Group Discussion	"I rarely use standard lectures. For instance, in social studies, we discuss local market inflation or informal business management. Learners analyze real cases in small groups, which makes them eager to share their experiences."
T3 (Tutor, Package C)	Diagnostic Assessment	"At the beginning of each topic, I conduct a brief diagnostic Q&A to map their initial understanding and working backgrounds. This helps me tailor the complexity of assignments."
L1 (Learner, Package C)	Enhanced Confidence and Meaningfulness	"I used to feel very shy to speak in front of people. But here, the tutor asks us to present group discussions based on our daily work. It makes me feel valued and more confident."
L4 (Learner, Package B)	Practical Application	"What we learn is directly applicable. For example, learning simple book-keeping helped me manage my small food stall expenses better."
Obs-3 and Obs-5 (Field Observation)	Classroom Participation and Digital Media	In 6 out of 8 observed sessions, tutors utilized small-group problem-solving, peer presentations, and hands-on practice. However, digital learning media was limited to WhatsApp group chats and smartphone PDFs due to a lack of classroom projectors.
Doc-2 and Doc-3 (Teaching Artifacts)	Instructional Planning	Analysis of 10 lesson plans confirmed that 85% incorporated group discussions, real-world case studies, and practical projects. Explicit written strategies for joyful learning (e.g., educational games) were present in only 2 modules.

Interviews with tutors (T2, T5, T6) revealed that instructional strategies are purposefully

designed around adult and non-formal learners' daily realities. Tutors consistently implemented small-group discussions, contextual case studies, and hands-on project assignments to stimulate student engagement. Furthermore, diagnostic assessments were routinely applied at the beginning of learning units by tutors (T3, T7) to adjust instruction according to the learners' heterogeneous initial abilities. From a management perspective, PKBM heads (M1, M3) provided policy flexibility allowing tutors to adapt learning schedules and select teaching methods freely, although formal supervisory classroom visits specifically monitoring deep learning remained irregular. The applied strategies directly influenced learners' classroom participation and self-perception. Learners (L1, L3, L5, L8) emphasized that participatory methods created an inclusive learning atmosphere, enabling previously reserved or underconfident individuals to express opinions publicly.

These interview findings were corroborated by classroom observations (Obs-1 to Obs-8). During observation sessions, learners actively engaged in group discussions, peer mentoring, and practical presentations. Tutors facilitated these sessions using local, low-cost materials and environmental contexts. However, the integration of interactive digital technologies remained low across observed classrooms. Finally, document analysis of lesson plans and teaching artifacts (Doc-2, Doc-3) confirmed the widespread inclusion of group-based activities and contextualized problem sets, though formal documentation of gamified or explicit *joyful learning* techniques remained limited.

Obstacles and Tutors' Efforts to Overcome Implementation Challenges

The empirical investigation revealed several contextual obstacles in implementing deep learning within PKBM environments, alongside specific adaptive efforts undertaken by tutors to overcome these challenges. Table 3 presents the empirical evidence supporting these findings across the various data sources.

Table 3. Empirical Findings on Implementation Challenges and Tutor Adaptation Efforts

Data Source / Code	Theme / Strategy	Representative Quote / Empirical Evidence
T7 (Tutor, Package C)	Learner Heterogeneity and Age Gap	"In one class, I have a 17-year-old dropout sitting next to a 42-year-old mother. Their literacy levels, learning speeds, and motivations are completely different, which makes standardized instruction impossible."
T8 (Tutor, Package B)	Time Constraints and Reflection	"Most learners work during the day and arrive tired for evening classes. Because our contact hours are very limited, we prioritize covering core concepts over lengthy

Data Source / Code	Theme / Strategy	Representative Quote / Empirical Evidence
M4 (PKBM Manager)	Institutional and Infrastructure Barriers	reflection sessions." "We lack interactive digital devices in classrooms, and our tutors have received minimal formal training specifically focused on deep learning syntax."
L6 (Learner, Package C)	Flexible Adaptation and Peer Support	"Since I work shifts at a factory, I often miss class. The tutor sends lesson summaries via WhatsApp and pairs me with a classmate who helps me catch up."
Obs-4 and Obs-7 (Field Observation)	Attendance Dynamics and Heterogeneous Groups	Attendance records and classroom observations showed a wide age range (16–45 years). Tutors managed attendance gaps by creating heterogeneous study groups and simplifying instructional language for older adult learners.
Doc-4 and Doc-5 (Institutional Records)	Student Profile and Communication Artifacts	Student registration profiles confirmed diverse backgrounds (housewives, factory workers, informal laborers). Documentation from WhatsApp learning groups verified the sharing of simplified summaries and flexible assignment submission schedules.

Interviews with tutors (T5, T7, T8) and managers (M2, M4) highlighted that implementation challenges stem primarily from structural and demographic factors rather than tutor resistance. Learner heterogeneity encompassing age differences (16 to 45 years), varied academic backgrounds, and competing employment demands directly affected classroom participation, learning pace, and initial skill levels. Additionally, limited contact hours and a lack of classroom digital infrastructure constrained the execution of explicit reflection sessions (*mindful learning*).

To address these limitations, tutors applied flexible instructional adaptations. Tutors (T1, T4, T7) conducted informal diagnostic assessments to organize heterogeneous study groups, pairing younger, digitally literate learners with older adult students to foster peer mentoring. To accommodate working students with irregular attendance, tutors utilized WhatsApp groups for asynchronous distribution of simplified lesson summaries and granted flexible assignment submission deadlines.

These interview accounts were corroborated by field observations (Obs-1 to Obs-8) and document analysis (Doc-4, Doc-5). Classroom observations confirmed that tutors frequently simplified complex terminology and utilized low-cost local environment materials to bridge

comprehension gaps. Document analysis of student demographic profiles confirmed the high heterogeneity of PKBM learners, while WhatsApp group logs verified the active use of simple technology to maintain instructional continuity.

Discussion

The research results show that PKBM tutors' and administrators' understanding of deep learning tends to be practical-intuitive, shaped primarily by classroom experience rather than formal theoretical mastery of its three core pillars: meaningful, mindful, and joyful learning. This phenomenon emphasizes that the primary obstacle to implementing deep learning is not pedagogical resistance, but rather a gap in formal literacy supported by the pedagogical framework of Busono et al. (2025), which places reflection and meaning making at the center of the learning process. Analyzed through the principles of adult learning and experiential learning (Loeng, 2020), this practical mastery occurs because tutors naturally prioritize real-world relevance to satisfy adult learners' immediate practical needs. Tutors continuously engage in on-the-spot reflection (reflection-in-action) to adapt lessons, allowing meaningful learning to flourish organically. However, because their competence is experientially acquired rather than theoretically trained, tutors struggle to formalize this intuitive practice into written, structured reflection (reflection-on-action), leaving the mindful learning pillar under-documented in teaching modules (Widyastuti et al., 2025).

While these findings show a convergent pattern with recent studies (Ainiyah et al., 2025; Harjun et al., 2026) confirming that educators easily internalize meaningful contextualization through practice but struggle to formalize reflective pedagogy, they contrast sharply with research conducted in formal education settings (Latifah et al., 2026; Rosidin et al., 2025). In formal schools, strict supervisory mechanisms often yield high administrative compliance and explicit document formalization, yet teachers frequently struggle with pedagogical flexibility. In contrast, the non-formal PKBM environment exhibits an inverted dynamic: tutors demonstrate exceptional instructional flexibility and contextual relevance driven by adult learning demands but display lower formal documentation of reflective practices due to the absence of structured, reflection-based professional development.

Empirically, this study observed that tutors' execution of diagnostic assessments alongside contextual, participatory strategies such as real-world case discussions and hands-on group projects significantly enhanced learners' active participation, self-confidence, and conceptual understanding, particularly empowering previously hesitant and underconfident adult learners. Synthesizing these

findings with the work of Alisalman (2022) and Rosiyati et al. (2025) confirms that initial ability mapping provides an essential foundation for designing targeted participatory methods that foster learner autonomy. The observed affective transformation wherein reserved learners gained the confidence to express opinions publicly reinforces established literature on discussion- and problem-based learning (Setiana & Purwoko, 2020; Tresnawati et al., 2017), as well as cooperative learning frameworks in adult education (Mentz & Zyl, 2018).

While these results align with prior research regarding the cognitive benefits of active learning, this study reveals a distinct contextual difference and unique scientific contribution: in formal school settings, problem-based learning is primarily geared toward standardized cognitive achievement (Setiana & Purwoko, 2020), whereas in the non-formal PKBM environment, its primary contribution lies in overcoming adult learners' psychological barriers such as low self-esteem, age anxiety, and employment fatigue by leveraging learner heterogeneity as a collaborative resource rather than an instructional obstacle.

Meanwhile, limited digital infrastructure forces PKBM tutors to adopt pragmatic instructional adaptations, such as utilizing low-cost local environmental resources and WhatsApp groups for flexible, asynchronous learning. Unlike formal school settings that typically benefit from standardized ICT infrastructure, dedicated computer labs, and full-time compulsory attendance, the non-formal education pathway in PKBM operates under severe resource constraints and relies on the voluntary participation of working adult learners facing competing employment and family demands. In this distinct non-formal context, explicitly incorporating *joyful learning* becomes vital not as an optional gimmick, but as a critical mechanism to maintain learner persistence and counteract attendance fatigue. Combining the conceptual framework of Istiqomah and Prihatnani (2019) with the empirical insights of Rosa et al. (2024) reveals that joy in learning is not merely a secondary emotional response, but a core driver of intrinsic motivation, engagement, and retention. Therefore, formalizing written joyful learning strategies in PKBM instructional materials is essential to sustaining empowering, adaptable learning experiences despite structural technological limitations.

Finally, structural challenges namely high heterogeneity in age (16–45 years), social backgrounds, and employment demands validate the principles of andragogy as synthesized by Loeng (2020), who stresses that adult learners possess diverse orientations and life experiences that resist standardized pedagogical approaches. Field adaptations by tutors, such as gradual mentoring,

flexible assignment timelines, and heterogeneous study groups, represent a concrete application of these principles, echoing Hayyi et al. (2023) regarding the importance of peer support systems in maintaining consistent learning participation amid occupational constraints. Crucially, this study reveals a novel pedagogical insight: heterogeneity in PKBM operates not merely as a structural barrier, but as a valuable asset for collaborative learning. By intentionally forming cross-age and multi-background study groups, tutors transform demographic diversity into a reciprocal learning resource where younger, digitally adept learners support older peers with technical tasks, while experienced adult learners contribute real-world insights to contextual discussions. This dynamic redefines learner heterogeneity from a logistical hurdle into a primary catalyst for intergenerational knowledge exchange and collective empowerment in non-formal education.

These findings have practical implications for the urgent need to strengthen the institutional capacity of PKBM (*Pusat Kegiatan Belajar Masyarakat*) through the provision of routine learning supervision, reflective training for tutors, and the formalization of mindful and joyful learning pillars into contextual teaching modules. However, this study is limited by its qualitative focus within a specific PKBM and reliance on perceptual data, which prevents it from quantitatively measuring the long-term impact of deep learning implementation on the cognitive achievement and economic well-being of learners in a comprehensive manner.

CONCLUSION

The implementation of the Merdeka Curriculum using a deep learning approach in the Equivalency Education Program at PKBM Tegal City successfully fosters a student-centered paradigm that enhances learners' critical thinking, self-confidence, and active participation. Tutors and managers demonstrate a solid conceptual understanding, successfully operationalizing *meaningful learning* through contextual and participatory strategies, including real-world case discussions, project-based learning, and initial diagnostic assessments. However, a notable implementation gap remains explicit reflection (*mindful learning*) and the formalization of *joyful learning* in written teaching modules remain inconsistent due to time constraints and a lack of reflection-based professional development. Primary implementation challenges stem from high learner heterogeneity in age (16–45 years) and social background, limited contact hours, and scarce digital infrastructure. Tutors effectively overcome these barriers through flexible, adaptive strategies, particularly tiered mentoring, heterogeneous study groups which transform

demographic diversity into a collaborative learning resource and simple communication technologies like WhatsApp for asynchronous learning. Ultimately, achieving sustainable deep learning implementation in non-formal education requires targeted tutor training on reflective pedagogy, continuous institutional supervision, and explicit integration of all deep learning pillars into instructional planning.

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