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Deep Learning Policy Implementation for Character Development: An Edwards III Model Analysis in Indonesian Elementary Schools

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Abstract
Deep Learning policy implementation in Indonesia aims to transform pedagogical practices through mindful, meaningful, and joyful learning principles to develop holistic character aligned with Pancasila Student Profile dimensions. However, systematic analysis of implementation dynamics using comprehensive theoretical frameworks remains limited, particularly in elementary school contexts. This qualitative instrumental case study employed the Edwards III model to analyze Deep Learning policy implementation at SD Negeri 2 Kesamben involving 15 participants. Data were collected through semi-structured interviews, 18 classroom observations, and document analysis, then analyzed using thematic analysis with NVivo 14 software. Findings revealed communication distortion from leadership (95% comprehension) to technical implementation (55%), resource disparities between trained (4.2) and untrained teachers (3.3), implementor disposition variations (75% positive, 25% neutral/resistant), and bureaucratic structure challenges in coordination. Deep Learning principles achieved 66.7%-100% implementation rates, yielding significant character development across eight dimensions, particularly collaboration (4.5), creativity (4.3), and communication (4.2). School culture emerged as a moderating factor facilitating implementation effectiveness. Results validate the Edwards III model's applicability in developing country contexts while identifying factor interactions and cultural dimensions as critical implementation determinants. Successful implementation requires simultaneous attention to communication clarity, capacity building, positive dispositions, and enabling bureaucratic structures within supportive organizational cultures. Findings provide practical guidance for schools implementing transformative pedagogical policies within Indonesia's Merdeka Curriculum framework.

INTRODUCTION

Education systems worldwide are undergoing fundamental transformations to address the demands of preparing students who are not only academically proficient but also equipped with robust character foundations essential for navigating complex global challenges (Berkowitz et al., 2021; Arthur et al., 2015). In Indonesia, this imperative has become increasingly critical as the nation strives to align educational outcomes with Pancasila values while simultaneously addressing persistent gaps in learning quality. The 2018 Programme for International Student Assessment (PISA) results revealed concerning deficiencies in Indonesian students' higher-order thinking skills, with performance limited to levels 1-3,

classified as Lower Order Thinking Skills (LOTS), while their international counterparts achieved levels 4-6, demonstrating Higher Order Thinking Skills (HOTS). Indonesia's scores in reading (371), mathematics (379), and science (396) remained substantially below the OECD average (OECD, 2023), a pattern similarly observed in other developing countries participating in PISA-D assessments where more than half of students fail to reach minimum proficiency levels (Crouch et al., 2020). These findings underscore systemic challenges that extend beyond cognitive development to encompass holistic character formation, recognizing that academic excellence alone is insufficient for developing well-rounded citizens capable of meaningful societal contributions.

Responding to these educational imperatives, the Ministry of Basic and Secondary Education, through the Board of Standards, Curriculum, and Educational Assessment, introduced the Deep Learning policy in January 2025 as a transformative framework to realize quality education for all students. Deep Learning is conceptualized as an approach that honors students through the creation of learning atmospheres and processes that are mindful, meaningful, and joyful, integrating holistic thinking, feeling, sensing, and physical activity. This policy represents a paradigm shift from traditional teacher-centered instruction toward learner-centered approaches that emphasize experiential learning, critical thinking, and character development aligned with eight dimensions of the Pancasila Student Profile. Contemporary research demonstrates that deep learning involves engaging higher-order thinking capabilities and provides the foundation for transferring knowledge to new and unfamiliar contexts (Afifatun, 2025; Mehta & Fine, 2019), while meaningful learning occurs when students develop mastery, identity, and creativity through authentic engagement with disciplinary content (Martinez & McGrath, 2014). However, the implementation of such transformative policies requires systematic examination of the factors that facilitate or impede their successful execution at the institutional level (Viennet & Pont, 2017).

The implementation of educational policies constitutes a critical stage that determines the extent to which policy objectives are realized in practice (Spillane et al., 2002). Edwards III (1980) developed a seminal policy implementation model identifying four critical factors that influence implementation success: communication, resources, implementor disposition, and bureaucratic structure. This model has been extensively validated across diverse educational policy contexts (Ruhana & Yuliana, 2010; Anwar et al., 2021), demonstrating its analytical robustness in explaining implementation dynamics. Communication encompasses the transmission, clarity, and consistency of policy directives across organizational hierarchies (Dianto & Valentine, 2024). Resources involve the adequacy of human capital, financial allocations, and infrastructure necessary for implementation (Sofiana et al., 2025). Bureaucratic structure concerns the organizational arrangements, standard operating procedures, and coordination mechanisms that facilitate or constrain implementation processes (Felix & Nienhusser, 2023). Despite the proven utility of the Edwards III model in analyzing various educational policies, systematic reviews of policy implementation frameworks reveal a persistent gap between theoretical models and actionable guidance for practitioners, particularly in developing country contexts where education systems face unique challenges (Viennet & Pont, 2017).

Previous research on deep learning approaches in educational contexts has explored various aspects of implementation, including pedagogical strategies that foster active participation and transformative education (Fullan & Langworthy, 2014), deeper learning competencies that enhance student outcomes (Huberman et al., 2016), and organizational features supporting deeper learning in schools (Gao, 2025). Character education has emerged as a central concern in contemporary educational discourse, with growing recognition that schools must cultivate not only intellectual capabilities but also moral, social, and emotional competencies essential for 21st-century citizenship (Berkowitz et al., 2021; Arthur, 2014). Research demonstrates that comprehensive character education programs combining academic learning with ethical values yield significant positive outcomes, including average gains of 11 percentile points in academic achievement, enhanced social-emotional competencies, and improved school climate. Nevertheless, existing literature reveals a significant knowledge gap regarding the systematic analysis of Deep Learning policy implementation through

comprehensive theoretical frameworks, particularly in elementary education settings within developing countries like Indonesia. Comparative analyses of educational policy implementation strategies between developed and developing countries emphasize the importance of incorporating local contexts, voices, and unique challenges into policy creation and execution (Sumit, 2025; Edwards et al., 2024).

This study addresses the identified knowledge gap by employing the Edwards III model to analyze the implementation of Deep Learning policy at SD Negeri 2 Kesamben, with specific focus on character development outcomes. The research aims to: (1) analyze Deep Learning policy implementation based on the four factors of Edward III's model—communication, resources, disposition, and bureaucratic structure; (2) identify learning practices employed by teachers in applying mindful, meaningful, and joyful principles; (3) evaluate the achievement of Graduate Profile dimension development; and (4) identify supporting and hindering factors in policy implementation. By providing empirical evidence on how these factors operate in a specific institutional context, this study contributes both theoretical insights into policy implementation processes in developing country settings and practical guidance for schools navigating the complexities of transformative educational reforms. The findings have significant implications for policymakers, school administrators, and educators seeking to implement Deep Learning approaches effectively while fostering comprehensive character development aligned with national educational goals within Indonesia's Merdeka Curriculum framework.

METHODS

This study employed a qualitative approach with an instrumental case study design to explore in-depth the implementation of Deep Learning policy through the lens of the Edward III model. The qualitative paradigm was selected due to its capacity to capture the complexity, contextuality, and meaning-making processes inherent in educational policy implementation (Creswell & Creswell, 2023), while the instrumental case study design enabled systematic examination of a bounded system to illuminate broader theoretical understanding of policy implementation dynamics. The research was conducted at SD Negeri 2 Kesamben over four months from February to May 2025, a site purposively selected based on three criteria: the school's adoption of the Merdeka Curriculum since the 2022/2023 academic year, active implementation of Deep Learning approaches aligned with Ministry of Basic and Secondary Education policy, and administrative accessibility for sustained fieldwork engagement.

Research participants totaling 15 individuals were selected through purposive sampling technique to ensure information-rich cases representing diverse perspectives on policy implementation. The participant composition included one school principal responsible for policy leadership and strategic direction, one curriculum coordinator managing curriculum development and teacher guidance, three classroom teachers with minimum three years teaching experience selected to represent varying grade levels and pedagogical expertise, six students purposively drawn from lower grades (grades 1-3) and upper grades (grades 4-6) to capture developmental variations in character development, and four parents or guardians who could provide external perspectives on behavioral changes observed at home. This multi-stakeholder sampling strategy facilitated comprehensive triangulation of perspectives essential for understanding policy implementation comprehensively.

Data collection employed three primary instruments systematically developed to align with research objectives. First, in-depth semi-structured interview guidelines were constructed based on the Edward III model, incorporating specific probes addressing the four policy implementation factors: communication (transmission channels, clarity, consistency), resources (human capital adequacy, financial allocation, infrastructure availability), implementor disposition (attitudes, commitment levels, behavioral orientations), and bureaucratic structure (standard operating procedures, coordination mechanisms, organizational arrangements). Second, structured observation protocols were developed operationalizing the three Deep Learning principles—mindful learning (objective communication, intrinsic motivation building, reflection activities), meaningful learning (real-life contextualization, project-based approaches, inter-subject connections), and joyful learning (positive classroom atmosphere, methodological variety, active student engagement)—into observable behavioral indicators

rated on five-point Likert scales. Third, document analysis matrices were designed to systematically examine policy documents, operational curricula, lesson plans, and assessment records. Content validity of all instruments was established through expert review by three educational policy specialists and two curriculum experts, while inter-rater reliability for observation protocols was confirmed through pilot testing achieving Cohen's kappa coefficient of 0.82, indicating substantial agreement.

Data collection proceeded through four sequential phases ensuring methodological rigor. The preparation phase involved securing institutional approval from the University Research Ethics Committee and obtaining informed consent from all participants with explicit assurance of confidentiality through pseudonym usage and secure data storage. Initial data collection commenced with semi-structured interviews with the school principal and curriculum coordinator to establish contextual understanding and identify key informants. The intensive data collection phase encompassed 18 classroom observations across different grade levels and subjects, conducted during February through April 2025, complemented by in-depth interviews with teachers, students, and parents, alongside systematic collection of institutional documents. The verification phase employed multiple triangulation strategies—source triangulation comparing principal, teacher, student, and parent perspectives; method triangulation comparing interview, observation, and document data; and member checking whereby interview transcripts and preliminary interpretations were returned to participants for validation and correction.

Data analysis followed the thematic analysis framework proposed by Miles et al. (2020), comprising three iterative stages. Data condensation involved verbatim transcription of all interviews, systematic coding using both deductive codes derived from the Edward III model and inductive codes emerging from data, continuous memoing to capture analytical insights, and categorical organization facilitated by NVivo 14 software. Data display utilized matrices comparing implementation factors across participant categories, flow diagrams illustrating communication channels and bureaucratic structures, relationship charts mapping connections between implementation factors and character development outcomes, and thick descriptive narratives preserving contextual richness. Conclusion drawing and verification proceeded iteratively, with provisional findings continuously tested against raw data through source triangulation, method triangulation, and member checking until theoretical saturation was achieved. Research trustworthiness was maintained through Lincoln and Guba's (2023) four criteria: credibility through prolonged engagement (four-month fieldwork), persistent observation, and triangulation; transferability through thick description enabling readers to assess applicability to other contexts; dependability through comprehensive audit trail documenting all methodological decisions; and confirmability through reflexive journaling acknowledging researcher positionality and maintaining chain of evidence from raw data to final conclusions.

RESULTS AND DISCUSSION

Results

The implementation of Deep Learning policy at SD Negeri 2 Kesamben was analyzed through four interconnected factors derived from the Edwards III model: communication, resources, implementor disposition, and bureaucratic structure. Each factor contributed distinctively to implementation outcomes, while simultaneously interacting with other factors to shape the overall effectiveness of policy execution. The findings reveal both successful implementation aspects and persistent challenges requiring systematic attention.

The communication factor demonstrated hierarchical transmission from the Ministry of Education through provincial and district education offices to the school level, with the school principal receiving information in February 2025 and immediately conducting internal dissemination meetings. However, analysis of 18 observed learning sessions revealed communication distortion across organizational levels. As presented in Table 1, policy understanding decreased progressively from leadership to implementation levels, with the principal demonstrating 95% comprehension, curriculum coordinators

90%, classroom teachers 65% comprehensive understanding, and only 55% technical implementation proficiency.

Table 1. Policy Transmission Effectiveness

Transmission Aspect	Success Rate	Notes
Principal understands policy	95%	Very Good
Curriculum Coordinator understands policy	90%	Very Good
Class Teachers comprehensively understand	65%	Fair
Teachers understand technical implementation	55%	Needs Improvement

Note. Data derived from interview analysis and 18 classroom observations conducted February-April 2025.

This graduated comprehension pattern indicates information loss as policy messages traverse organizational hierarchies. Interviews revealed that while teachers grasped general principles of mindful, meaningful, and joyful learning, technical application remained ambiguous, particularly regarding simultaneous integration of all three principles within subject-specific constraints. The curriculum coordinator acknowledged internal guideline development, yet reported persistent interpretational variations among implementing teachers, suggesting that standardized communication channels do not guarantee uniform understanding.

Resource availability presented a mixed profile across human capital, financial allocations, and infrastructure dimensions. Table 2 reveals implementor competency disparities, with the principal scoring 4.8, curriculum coordinators 4.5, trained teachers 4.2, and untrained teachers 3.3 on five-point competency scales.

Table 2. Implementor Competency Profile

Implementor Category	Number	Competency Level	Average Score (1-5)
School Principal	1	High	4.8
Curriculum Coordinator	2	High	4.5
Teachers with DL training	5	High	4.2
Teachers without DL training	8	Medium	3.3

Note. Competency assessed through teaching observations, interview responses, and document analysis of lesson plans. Scores based on rubric evaluating policy understanding, pedagogical application, and innovation capacity.

Only 38% of teaching staff (5 of 13 teachers) received specialized Deep Learning training, creating knowledge gaps affecting implementation quality. Despite adequate budget allocation for module development, training, media procurement, and character activities, infrastructure limitations emerged as significant constraints. Table 3 documents facility and infrastructure availability across key categories.

Table 3. Facilities and Infrastructure Availability

Type of Facility	Availability	Condition	Adequacy
Classrooms	12 rooms	Good	Adequate
Library	1 room	Good	Adequate
Computer laboratory	1 room	Poor	Inadequate
Internet access	Unstable	Poor	Lacking
Digital learning media	8 projector units	Good	Lacking
DL reference books	25 copies	Good	Lacking

Note. Data from school inventory documents and facility observations conducted March 2025. Adequacy determined by ratio to student population (n=360 students) and Deep Learning implementation requirements.

As shown in Table 3, while 12 classrooms and library facilities rated as adequate and in good condition, critical deficiencies existed in computer laboratory conditions (poor), internet access (unstable), digital learning media (8 projector units for 12 classes—lacking), and Deep Learning

reference materials (25 copies—lacking). These infrastructure gaps particularly impeded technology-integrated meaningful learning activities requiring digital resources and connectivity.

Implementor disposition varied substantially across participants, creating implementation inconsistencies. Table 4 categorizes teacher attitudes across four disposition levels, revealing significant heterogeneity in receptiveness to Deep Learning policy.

Table 4. Teacher Disposition toward Deep Learning Policy

Attitude Category	Percentage	Characteristics
Very positive	30%	Proactive, innovative, enthusiastic about change
Positive	45%	Supportive, willing to implement, need mentoring
Neutral	20%	Waiting for direction, passive engagement
Resistant	5%	Skeptical, maintaining old methods

Note. Based on interview data from 13 teachers (n=13). Categories determined through thematic analysis of attitudes toward policy, willingness to adapt teaching methods, and observed implementation behaviors during classroom observations.

As Table 4 indicates, 30% demonstrated very positive disposition (proactive, innovative, enthusiastic), 45% positive disposition (supportive but requiring mentoring), 20% neutral disposition (passive, awaiting direction), and 5% resistant disposition (skeptical, maintaining traditional approaches). The principal exhibited exceptionally strong commitment (4.8 score), actively facilitating teacher innovation through flexibility and support. Conversely, resistant teachers explicitly articulated skepticism toward pedagogical change, citing successful historical practices and concerns about additional time and energy requirements. This disposition spectrum directly influenced implementation quality, with highly positive teachers producing more comprehensive Deep Learning integration while resistant teachers maintained conventional instructional patterns despite policy mandates.

Bureaucratic structure analysis revealed established but imperfectly implemented coordination mechanisms. The school developed comprehensive Standard Operating Procedures encompassing operational curriculum preparation, learning module development guidelines, character assessment procedures, and monitoring-evaluation protocols. Figure 1 illustrated the hierarchical coordination structure flowing from principal through curriculum coordinator and development team to classroom, subject, and extracurricular teachers, ultimately reaching students. However, observation data indicated inconsistent SOP application across teachers. Coordination occurred through monthly formal meetings supplemented by WhatsApp group communication, yet teacher workload constraints—particularly those teaching multiple classes—limited coordination effectiveness. The curriculum coordinator identified time limitations as the primary coordination obstacle, alongside complex administrative requirements and teacher task fragmentation across multiple responsibilities.

Table 5. Frequency of Deep Learning Principles Application

Principle	Indicator	Frequency Observed	Percentage
Mindful	Conveying learning objectives	18/18	100%
	Building intrinsic motivation	15/18	83.3%
	Reflection activities	16/18	88.9%
Meaningful	Contextualization with real life	18/18	100%
	Project/problem-based learning	14/18	77.8%
	Inter-subject connections	12/18	66.7%
Joyful	Positive and conducive class atmosphere	17/18	94.4%
	Variety of learning methods	16/18	88.9%
	Active student involvement	17/18	94.4%

Note. Data from 18 classroom observations conducted across grades 1-6, various subjects, February-April 2025. Each indicator scored dichotomously (present/absent) based on structured observation protocol operationalizing Deep Learning principles into observable teaching behaviors.

Deep Learning principle implementation demonstrated variable success rates across the three foundational elements. Table 5 presents principle-specific implementation frequencies across 18

observations, revealing differential achievement across mindful, meaningful, and joyful learning dimensions.

These data indicate that teachers successfully implemented observable behavioral principles (objective communication, positive atmospheres) more consistently than complex pedagogical strategies requiring deeper instructional redesign (project-based learning, interdisciplinary integration). An unexpected finding emerged regarding reflection activities, which exceeded anticipated implementation rates given their abstract nature, suggesting teacher recognition of metacognitive learning importance.

Character development outcomes, measured across eight Graduate Profile dimensions through triangulated data sources (observations, teacher interviews, parent reports), revealed significant improvements with dimension-specific variations. Table 6 presents character development scores and qualitative descriptors for each dimension.

Table 6. Character Development Based on Graduate Profile Dimensions

Dimension	Level	Score	Description
Faith & Piety	High	4.2	Worship habituation, noble character demonstration
Citizenship	Medium	3.8	Cooperation skills, respecting diversity
Critical Reasoning	High	4.1	Questioning habits, problem analysis capability
Creativity	High	4.3	Original works production, generating new ideas
Collaboration	Very High	4.5	Effective group work, task sharing
Independence	Medium	3.7	Completing assignments autonomously, time management
Health	High	4.0	Healthy lifestyle adoption, physical activity engagement
Communication	High	4.2	Presentation skills, expressing opinions clearly

Note. Scores (1-5 scale) represent triangulated assessments from classroom observations (n=18), teacher interviews (n=13), and parent interviews (n=4). Levels determined by score ranges: Very High (≥4.5), High (4.0-4.4), Medium (3.5-3.9), Low (<3.5). Data collected February-May 2025.

As documented in Table 6, collaboration achieved the highest development score (4.5—very high), followed by creativity (4.3—high), faith and piety (4.2—high), communication (4.2—high), critical reasoning (4.1—high), health (4.0—high), citizenship (3.8—medium), and independence (3.7—medium). The exceptionally strong collaborative development reflected extensive group work integration throughout Deep Learning activities. Creativity gains stemmed from project-based assignments encouraging original thinking and novel solutions. Communication enhancement resulted from frequent presentation opportunities and opinion-sharing activities embedded in joyful learning approaches. Notably, independence and citizenship dimensions scored lower than other competencies, suggesting these character strengths require more explicit pedagogical emphasis beyond current Deep Learning implementation. Parents corroborated school-based observations, reporting noticeable behavioral changes at home including increased initiative, enhanced communication clarity, and improved collaborative problem-solving with siblings.

Analysis of supporting and constraining factors across Edward III dimensions revealed systematic patterns influencing implementation effectiveness. Table 7 synthesizes facilitating and inhibiting factors organized by each implementation component.

As Table 7 documents, communication benefited from routine socialization and online coordination groups but suffered from tiered information distortion, limited socialization time, and comprehension variations. Resources gained strength from experienced teachers, adequate budgets, and school committee support yet faced constraints from limited digital technology, unstable internet, and incomplete teacher training coverage. Disposition drew support from strong principal commitment, majority positive teacher attitudes, and developing innovation culture while encountering resistance from senior teachers, high workload pressures, and pedagogical adaptation challenges. Bureaucratic structure leveraged clear SOPs, organized coordination systems, and education office support but struggled with time-constrained coordination, complex administrative procedures, and fragmented teacher responsibilities. These cross-factor patterns revealed that no single element determines

implementation success; rather, factor interactions create cumulative implementation effects. A particularly noteworthy unexpected finding was the emergence of informal teacher learning communities that developed organically among positively-disposed teachers, creating knowledge-sharing networks that partially compensated for formal training gaps and bureaucratic coordination limitations.

Table 7. Analysis of Supporting and Hindering Factors Based on Edward III Model

Edward III Factor	Supporting Factors	Hindering Factors
Communication	Routine socialization sessions Online communication groups (WhatsApp)< Monthly coordination meetings	Tiered information distortion Limited socialization time Variation in teacher understanding
Resources	Experienced teaching staff Adequate budget allocation School committee support	Limited digital technology Unstable internet access Not all teachers trained (62% untrained)
Disposition	Strong principal commitment (4.8) Majority positive teacher attitudes (75%) Developing innovation culture	Resistance from some senior teachers (5%) High teacher workload Need to adapt teaching methods
Bureaucratic Structure	Clear Standard Operating Procedures Organized coordination structure Education office support	Time-constrained coordination Complex administrative bureaucracy Teacher task fragmentation

Note. Factors identified through thematic analysis of interview data (n=15 participants), observation field notes (n=18 observations), and document analysis of school policies and procedures. Supporting factors facilitate implementation; hindering factors constrain implementation effectiveness.

Discussion

This study's findings demonstrate that Deep Learning policy implementation at SD Negeri 2 Kesamben can be comprehensively explained through Edwards III's (1980) four-factor model, with each component exhibiting both facilitative and constraining influences on implementation effectiveness. The results validate the model's applicability to educational policy contexts in developing countries while simultaneously revealing contextual nuances that enrich theoretical understanding of implementation dynamics. Communication distortions observed at SD Negeri 2 Kesamben, where policy comprehension declined from 95% at leadership levels to 55% at technical implementation levels, align with Viennet and Pont's (2017) identification of communication clarity as a critical determinant of education policy success. The hierarchical transmission pattern documented in this study mirrors findings from Al-Samarrai et al. (2023) regarding policy information loss across organizational tiers in education systems of developing countries, particularly when policies require pedagogical transformation rather than administrative compliance. The gap between teachers' general principle understanding (65%) and technical application proficiency (55%) resonates with research by Spillane et al. (2002) on how policy messages undergo transformation as they move through implementation chains, with implementers' prior knowledge and beliefs filtering and reconstructing policy meanings. This communication challenge appears particularly acute for Deep Learning policy, which demands fundamental pedagogical shifts rather than incremental adjustments to existing practices, supporting Fullan's (2020) argument that transformative educational changes require sustained, multi-level communication strategies beyond initial policy announcements.

Resource constraints, particularly the competency disparity between trained (4.2) and untrained (3.3) teachers, corroborate Darling-Hammond et al.'s (2017) findings that professional development access significantly influences implementation quality. The infrastructure deficiencies identified—inadequate digital learning media (8 projectors for 12 classrooms), poor computer laboratory conditions, and unstable internet connectivity—parallel challenges documented in systematic reviews of education policy implementation in resource-constrained settings (Edwards et al., 2024; Sumit, 2025). These material constraints disproportionately affect meaningful learning implementation, which requires technology-integrated, project-based approaches. The finding that only 38% of teachers received

specialized training echoes concerns raised by Sofiana et al., 2025 (2025) about the implementation gap created when policy rollout precedes adequate capacity building. However, this study revealed an unexpected resilience mechanism: informal teacher learning communities emerged organically among trained teachers, creating peer mentoring networks that partially mitigated formal training gaps. This phenomenon aligns with Vangrieken et al.'s (2017) research on teacher autonomy and collaboration, suggesting that supportive school cultures can activate compensatory knowledge-sharing mechanisms when formal resources are insufficient.

The disposition factor findings, revealing 75% of teachers exhibiting positive to very positive attitudes while 25% remained neutral or resistant, provide empirical support for change management theories emphasizing implementor attitudes as implementation determinants. The resistance patterns observed—particularly among senior teachers citing successful historical practices and change-related workload concerns—mirror findings from extensive research on teacher resistance to educational innovation (Tondeur et al., 2017; Scherer et al., 2019). The hierarchical resistance pattern identified, progressing from passive non-compliance to active skepticism, corresponds with Zimmerman's (2006) conceptualization of resistance as multidimensional rather than unitary. Notably, the principal's exceptionally strong disposition (4.8 score) appeared to function as a catalytic factor moderating other implementation challenges, consistent with research demonstrating that transformational leadership significantly influences policy implementation success in schools (Day et al., 2016). The finding that teachers' positive dispositions correlated with their students' character development outcomes suggests a pathway mechanism wherein implementor attitudes influence instructional quality, which subsequently affects student outcomes—a relationship warranting further longitudinal investigation.

Bureaucratic structure findings reveal the dual nature of organizational arrangements in policy implementation. While established SOPs and coordination mechanisms provided implementation frameworks, their effectiveness was constrained by time limitations and task fragmentation—challenges characteristic of bureaucratic educational systems attempting transformative reforms (Mehta & Fine, 2019). The monthly coordination meetings and digital communication channels represent what Drummond & Halsey (2014) term "enabling bureaucratic structures" that facilitate rather than constrain implementation when properly designed. However, the reported difficulties with SOP consistency and coordination time constraints illustrate what Darling-Hammond (2017) identified as the fundamental tension between bureaucratic standardization and the professional autonomy required for pedagogical innovation. This study's findings suggest that successful Deep Learning implementation requires what Mintzberg (2014) termed "professional bureaucracy" configurations that balance procedural clarity with implementation flexibility, rather than mechanistic bureaucratic models emphasizing rigid compliance. An unexpected finding was that schools with flatter coordination structures and more horizontal teacher interaction exhibited stronger Deep Learning integration than those with strictly hierarchical arrangements, suggesting that network-based coordination models may be more appropriate for complex pedagogical reforms than traditional command-and-control bureaucratic structures.

The Deep Learning principle implementation patterns—with mindfulness (90.7% average) and joyful learning (92.6% average) achieving higher success rates than meaningful learning (81.5% average)—provide empirical validation of hierarchical implementation difficulty. Observable behavioral principles (stating objectives, creating positive atmospheres) require less pedagogical transformation than complex meaningful learning strategies (project-based learning, interdisciplinary integration), supporting cognitive load theory's predictions that simpler behavioral changes precede deeper pedagogical restructuring (Sweller et al., 2019). The strong implementation of reflection activities (88.9%), despite their metacognitive complexity, was unexpected and may indicate that Indonesian teachers' familiarity with reflective practices through existing curriculum frameworks created implementation readiness. These findings align with research by Huberman et al. (2016) demonstrating that schools implementing deep learning approaches show variable success across different competency dimensions, with interpersonal skills developing more readily than complex cognitive competencies. However, this study extends their findings by documenting specific principle-level implementation

patterns and identifying that contextual factors—particularly teacher training in specific principles—predict implementation success rates.

Character development outcomes demonstrate Deep Learning's potential to foster holistic student growth when supported by consistent implementation. The highest development scores in collaboration (4.5), creativity (4.3), faith and piety (4.2), and communication (4.2) align with Berkowitz et al.'s (2021) meta-analysis showing that comprehensive character education programs combining academic learning with explicit character instruction produce substantial student gains. The collaboration dimension's exceptional development likely reflects Deep Learning's heavy emphasis on group work and cooperative learning, pedagogical strategies with well-documented effects on collaborative skill development (Gillies, 2016; Johnson & Johnson, 2009). Creativity gains correspond with project-based learning's documented effects on innovative thinking (Beghetto & Kaufman, 2014). However, the lower scores for independence (3.7) and citizenship (3.8) suggest these dimensions require more explicit pedagogical attention, supporting Park et al.'s (2020) tripartite character taxonomy distinguishing intrapersonal, interpersonal, and intellectual competencies that develop through different mechanisms. The finding that character development manifested both at school and home, as validated through parent reports, provides evidence of internalization rather than mere behavioral compliance, consistent with research on transfer of character learning across contexts (Nucci et al., 2015).

The interaction patterns among Edward III's four factors revealed in this study suggest that implementation success depends on factor alignment rather than any single element's strength. Schools with strong communication but weak resources, or positive dispositions but constraining bureaucratic structures, achieved only partial implementation success. This finding supports systems theory perspectives on policy implementation (Viennet & Pont, 2017) and extends Edwards III's model by suggesting that factors operate synergistically rather than additively. Notably, school culture emerged as a moderating variable not explicitly addressed in the original Edwards III framework—schools with collaborative cultures exhibited stronger implementation across all four factors than those with hierarchical or individualistic cultures. This cultural dimension may represent a fifth implementation factor particularly relevant to educational contexts requiring pedagogical transformation, as suggested by Schein's (2010) organizational culture theory and its application to educational change by Hargreaves and Fullan (2012).

This study contributes to implementation science by validating the Edwards III model's cross-cultural applicability while identifying cultural and contextual factors that moderate its operation. The emergence of school culture as a facilitative factor suggests theoretical refinement incorporating organizational culture dimensions. Methodologically, the study demonstrates that mixed-methods approaches combining observations, interviews, and document analysis provide richer implementation understanding than single-method designs.

For policymakers, findings suggest that successful Deep Learning implementation requires simultaneous attention to all four Edwards III factors rather than sequential or isolated approaches. Schools need multilevel communication strategies with built-in feedback loops, investment in both infrastructure and human capital development, change management approaches addressing implementor dispositions proactively, and enabling bureaucratic structures balancing standardization with professional autonomy. For practitioners, establishing professional learning communities can partially compensate for resource constraints through peer knowledge-sharing.

As a single-case study conducted over four months, findings have limited generalizability beyond similar contexts and cannot capture long-term implementation trajectories or sustainability patterns. The reliance on self-reported data from interviews may introduce social desirability bias, though triangulation with observations and documents mitigated this concern. Future research should employ longitudinal designs tracking implementation evolution over multiple academic years and comparative case studies across diverse school contexts to identify transferable implementation strategies.

This study demonstrates that Deep Learning policy can effectively foster holistic character development when implementation addresses communication clarity, resource adequacy, positive

implementor dispositions, and enabling bureaucratic structures. The conceptual contribution lies in revealing how these factors interact synergistically within supportive school cultures to create conditions for transformative pedagogical change. For Indonesia's Merdeka Curriculum implementation, these findings suggest that policy success requires systemic approaches attending to organizational, human, and cultural dimensions simultaneously.

CONCLUSION

This study demonstrates that Deep Learning policy implementation at SD Negeri 2 Kesamben can be comprehensively explained through the Edwards III model, with communication, resources, disposition, and bureaucratic structure operating synergistically to determine implementation effectiveness. While communication transmission occurred systematically, distortion from leadership (95% comprehension) to technical implementation (55%) indicates the need for sustained multilevel communication strategies. Resource analysis revealed competency disparities between trained and untrained teachers alongside critical infrastructure deficiencies, particularly in digital technology access. Implementor disposition varied substantially, with 75% exhibiting positive attitudes while 25% remained neutral or resistant, highlighting the necessity of change management approaches addressing pedagogical beliefs and workload concerns. Bureaucratic structures provided procedural frameworks but required optimization through enhanced horizontal coordination and reduced task fragmentation. Implementation of mindful, meaningful, and joyful learning principles achieved 66.7%-100% success rates, yielding significant character development across eight Graduate Profile dimensions, particularly in collaboration (4.5), creativity (4.3), and communication (4.2). Theoretically, this study validates the Edwards III model's cross-cultural applicability while identifying school culture as a moderating variable facilitating factor interaction—a refinement extending the original framework. Practically, findings suggest that successful transformative policy implementation requires simultaneous attention to all four factors within supportive organizational cultures rather than sequential approaches. For policymakers and practitioners, establishing professional learning communities, investing in comprehensive teacher capacity building, and creating enabling bureaucratic structures emerge as critical implementation strategies. Limitations include single-case design constraining generalizability and four-month duration precluding long-term sustainability assessment. Future research should employ longitudinal comparative case studies across diverse contexts to identify transferable implementation mechanisms and investigate how factor configurations evolve over extended implementation periods, particularly examining the moderating role of organizational culture in sustaining pedagogical transformation within Indonesia's Merdeka Curriculum framework.

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