From Symbolic Compliance to Teacher Agency: Pedagogical Frictions under Indonesia's *Kurikulum Merdeka*

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Abstract

While Indonesia's Kurikulum Merdeka articulates an emancipatory vision of pedagogical decentralization, empirical realities indicate that uncalibrated autonomy often induces acute instructional paralysis. Following PRISMA 2020 guidelines, this systematic literature review synthesizes 18 peer-reviewed empirical field studies across primary, secondary, and faith-based schooling (madrasahs) to diagnose the structural and cognitive roots of teacher implementation frictions. Qualitative thematic synthesis reveals that classroom barriers coalesce around four systemic crisis points: conceptual design ambiguity, digital mediation strain on the Platform Merdeka Mengajar, differentiated formative assessment burdens, and entrenched compliance mindsets culminating in "symbolic compliance." Rather than reflecting individual deficits, these frictions stem from technocratic delivery models that bypass situated educator sensemaking. To resolve this impasse, this study operationalizes the Human-in-the-Loop (HITL) socio-technical framework as an emancipatory pedagogical paradigm, repositioning the educator as an indispensable reflective mediator within local classroom ecologies. Sustainable transformation requires institutional interoperability between civil-service audits and pedagogical platforms, restructuring school learning communities (Kombel) into psychologically safe clinical spaces, and integrating faith-based cultural values.

Keywords: *differentiated instruction; human-in-the-loop; Kurikulum Merdeka; pedagogical barriers; symbolic compliance; teacher agency.*

INTRODUCTION

Educational systems globally are undergoing a pronounced paradigm shift, moving away from transmission-based, content-heavy delivery toward competency-oriented, student-centered frameworks that demand contextual responsiveness (Gierhart, 2024). Within Southeast Asia, Indonesia has mirrored this global transition through *Kurikulum Merdeka* (the Emancipated Curriculum), an expansive structural reform initiated to address the imperatives of Education 4.0, Society 5.0, and the profound learning disruptions precipitated by the pandemic (Rofi'ah *et al.*, 2024). Conceptually, the reform articulates an emancipatory vision: it decouples pedagogical practice from rigid central prescriptions, decentralizes instructional design, and reframes educators as autonomous instructional leaders. Under this policy mandate, teachers are charged not merely with mastering decentralized curricular competencies, but with orchestrating differentiated instruction, authentic diagnostic assessments, project-based investigations (*Projek Penguatan Profil Pelajar Pancasila*), and

technology-mediated environments (Syafriani *et al.*, 2025). Ultimately, the policy assumes that granting institutional flexibility will catalyze teacher agency and sustain professional transformation across diverse educational echelons (Musa *et al.*, 2024).

However, the operationalization of *Kurikulum Merdeka* has revealed a pronounced dissonance between policy rhetoric and institutional practice. While official discourse celebrates institutional decentralization, empirical investigations show that classroom practitioners experience considerable cognitive and emotional friction as they navigate their newly designated autonomy. Rather than experiencing professional liberation, educators often face acute cognitive disorientation; as Zamjani *et al.* (2026) highlight, teachers—particularly in rural and economically constrained localities—struggle to translate autonomous guidelines into structured pedagogy without one-on-one professional scaffolding. Furthermore, possessing theoretical knowledge of curriculum architectures does not inherently ensure instructional competence. Susianna *et al.* (2026) observe that while teachers can articulate the curricular language of *Understanding by Design* (UbD), a substantial chasm persists in converting these constructivist tenets into coherent, student-centered classroom designs. This structural strain is compounded by institutional vulnerabilities; Rohmah *et al.* (2024) show that secondary institutions routinely fail to build the affective, infrastructural, and continuous evaluative support systems needed to cushion educators from transitional anxiety, leaving teachers emotionally overextended despite nationwide rollouts of centralized digital repositories.

Scholarly inquiries into Indonesian educational reforms have historically focused on baseline compliance, evaluating resource distribution, physical infrastructural inequities, and administrative readiness across basic education (Sucipto *et al.*, 2024). Complementary studies have examined localized institutional adaptations, suggesting that school-level innovations and tailored leadership styles are indispensable for curriculum execution (Harwisaputra *et al.*, 2024). Nonetheless, prevailing literature remains tethered to an administrative-versus-pedagogical dichotomy, frequently operating on the technocratic presumption that disseminating digital self-directed platforms like the *Platform Merdeka Mengajar* (PMM) or mandating intra-school working groups (*Komunitas Belajar* / *Kombel*) will organically resolve implementation bottlenecks (Hakim & Abidin, 2024; Bari *et al.*, 2027). This techno-rationalist assumption overlooks critical socio-technical and psychological realities. Global inquiries into learner-centered paradigm shifts consistently confirm that entrenched professional beliefs, occupational socialization, and the historical *habitus* of compliance constitute the most formidable impediments to educational renewal (Silva *et al.*, 2021). In transitional environments, these friction points manifest in complex sensemaking processes where educators perform "symbolic compliance"—adopting contemporary policy jargon while maintaining teacher-centered transmission modalities behind closed classroom doors (Pratiwi *et al.*, 2025). Moreover, existing scholarship lacks an integrated synthesis that captures the cross-sectoral tensions between general secular schooling and faith-based institutions (*Madrasahs*), where teachers must simultaneously harmonize national competency mandates with distinct theological imperatives (Amalia *et al.*, 2024).

Consequently, the core theoretical impasse in current educational literature stems not from a lack of empirical documentation of barriers, but from the absence of a grounded meta-framework that explains why structural and digital interventions fail to dismantle entrenched

epistemological barriers and how teacher agency can be sustained systematically. Mandating collaborative communities without addressing organizational hierarchies often reduces *Kombel* to superficial reporting mechanisms rather than transformative spaces for peer coaching and psychological safety (Roesminingsih & Windasari, 2025). To move beyond these analytical limits, this systematic literature review examines the empirical corpus of *Kurikulum Merdeka* implementation through a socio-technical lens. It introduces the Human-in-the-Loop (HITL) conceptual framework. Borrowed from socio-technical systems and adaptive governance, HITL is operationalized here not as computational terminology, but as an emancipatory pedagogical construct: it posits that in an era of automated, top-down digital delivery platforms, the human educator represents an indispensable, reflective, and contextualizing agent who cannot be bypassed by centralized algorithms or standardized administrative rubrics (Thaariq, 2026). By synthesizing recent empirical evidence through the PRISMA 2020 protocol, this study interrogates the structural, cognitive, and affective dimensions that govern pedagogical competence in diverse Indonesian learning environments. The primary contribution of this review is threefold: (1) it shifts the scholarly debate from descriptive accounts of teacher deficits toward a structural-psychological diagnosis of the theory-practice gap; (2) it bridges secular and faith-based educational contexts to map the systemic convergence of instructional friction points; and (3) it articulates a rigorous operational roadmap that re-establishes the teacher as an autonomous, contextual architect of learning, providing policymakers and school leaders with an actionable blueprint for sustainable educational transformation (Solehuddin *et al.*, 2026; Sellya *et al.*, 2026).

METHOD

Research Design

This study was operationalized as a Systematic Literature Review (SLR) designed in strict accordance with the updated PRISMA 2020 guidelines (Page *et al.*, 2021). Rather than offering a descriptive summary, this design applies a socio-technical evaluative lens to examine the friction between top-down reform mandates and localized classroom realities (Snyder, 2019). This systematic architecture provides a transparent, auditable, and replicable basis for synthesizing heterogeneous qualitative and mixed-methods evidence, establishing a grounded empirical foundation for analyzing teacher agency under *Kurikulum Merdeka* (Gough *et al.*, 2020; Thaariq, 2026).

Data Sources and Sampling Criteria

To eliminate database selection bias and ensure representative cross-sectoral coverage, the search protocol spanned major international indexes—specifically Scopus, Web of Science, and ERIC—alongside accredited national platforms including SINTA (tiers 1–2), DOAJ, and Google Scholar. The literature search deployed a Boolean string across publication titles, abstracts, and author keywords: ("*Kurikulum Merdeka*" OR "*Merdeka Belajar*" OR "Emancipated Curriculum") AND ("pedagogical barrier*" OR "instructional challenge*" OR "teacher agency" OR "teacher competence") AND ("differentiated instruction" OR "formative assessment" OR "educational reform"). Sampling followed clear eligibility criteria: peer-reviewed empirical articles published between 2021 and 2027 (including in-press and advanced online publications), aligned with the curriculum's national introduction, gradual expansion, and

institutionalization. Eligible articles were required to report primary qualitative, quantitative, or mixed-methods field data investigating classroom instruction, diagnostic assessments, or educator adaptations across primary, secondary, and Islamic schooling environments (*Madrasahs*). Conversely, conceptual commentaries, non-systematic reviews, and studies focusing solely on macro-political policy or physical infrastructure were omitted. To verify methodological trustworthiness, we screened each eligible study for data defensibility, conceptual coherence, and analytical rigor using the Mixed Methods Appraisal Tool (MMAT version 2018; Hong et al., 2018) before synthesis.

Data Collection Procedures

The identification, screening, and selection process followed the four sequential phases of the PRISMA workflow. Candidate records extracted from database queries were deduplicated in reference management software and subsequently screened by title and abstract to remove non-empirical works. To safeguard against selection bias and confirm screening consistency, two independent reviewers conducted dual screening on a randomized 25% subsample of full texts. Inter-coder agreement was quantified using Cohen's Kappa (kappa = 0.86), indicating near-perfect concordance; minor divergences were reconciled through consensus moderation with a third senior researcher (Belur *et al.*, 2021). The final analytical corpus was circumscribed through verified thematic saturation, confirmed when continuous coding of field interviews and classroom observations consistently generated redundant findings across pedagogical barrier dimensions without producing novel conceptual categories (Guest *et al.*, 2020).

Data Analysis

The synthesized empirical evidence was processed using Thomas and Harden's (2008) three-stage thematic synthesis framework. The process began with line-by-line open coding of primary empirical findings, teacher narratives, and field observations. These open codes were clustered into descriptive themes representing specific instructional frictions, such as curriculum flexibility gaps, digital navigation burdens, differentiated assessment demands, and customary teaching *habitus*. In the final stage, these descriptive clusters were inductively synthesized through the intersecting theoretical lenses of socio-technical systems and teacher agency. This inductive synthesis generated the Human-in-the-Loop (HITL) operational model, ensuring that the study's proposed intervention pathways are directly rooted in classroom evidence rather than normative policy rhetoric (Thomas & Harden, 2008; Thaariq, 2026).

Ethical Considerations

Because this systematic literature review analyzed publicly accessible, previously published scholarly research and involved no direct human subject experimentation, formal institutional review board clearance was not required. Scholarly integrity was maintained throughout by avoiding selective reporting, preserving the contextual fidelity of primary authors' findings, and adhering to strict international attribution standards (Booth *et al.*, 2021).

Results

The systematic literature search across primary international indexes (Scopus, Web of Science, ERIC) and accredited national repositories (SINTA Tiers 1–2, DOAJ, Google Scholar) yielded an initial pool of 540 candidate records. Following reference management import, 162 duplicate citations were removed. The remaining 378 unique records were subjected to dual-independent title and abstract screening against the pre-specified inclusion criteria. This preliminary screening excluded 312 records that represented non-empirical conceptual essays (n = 142), focused exclusively on macro-political governance or physical infrastructure (n = 98), or did not directly interrogate classroom pedagogical practices under Kurikulum Merdeka (n = 72). Inter-coder reliability during this screening stage demonstrated strong concordance (Cohen's kappa = 0.86), with discrepancies resolved through consensus adjudication. Of the 66 full-text reports sought for retrieval, 4 could not be retrieved due to broken institutional repository links or inaccessible archives, leaving 62 full-text articles for in-depth eligibility assessment and critical quality appraisal. Methodological trustworthiness was evaluated using the Mixed Methods Appraisal Tool (MMAT 2018). Forty-four reports were disqualified: 19 were non-systematic reviews or commentaries lacking primary empirical data, 14 lacked situated classroom-level observation or teacher field narratives, 7 fell below the established MMAT quality benchmark (< 60%), and 4 fell outside the target publication window or represented redundant datasets. Consequently, 18 high-quality empirical field investigations met all eligibility standards and were included in the final qualitative synthesis. The entire four-phase screening and attrition pathway is delineated in the PRISMA 2020 flow diagram (Figure 1).

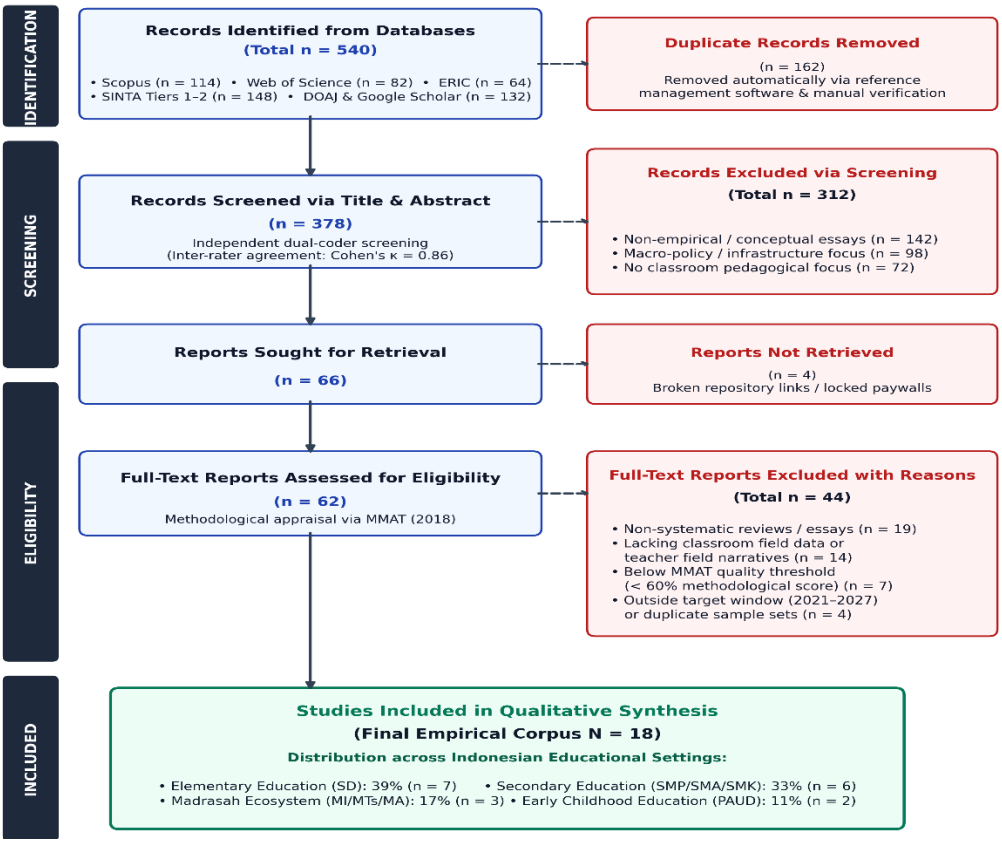


Figure 1

PRISMA 2020 Flow Diagram of the Systematic Identification, Screening, and Study Selection Process

Note. Adapted from Page et al. (2021), PRISMA 2020 Statement. MMAT = Mixed Methods Appraisal Tool (version 2018; Hong et al., 2018); WoS = Web of Science; ERIC = Education Resources Information Center; SINTA = Science and

Technology Index (Indonesia); DOAJ = Directory of Open Access Journals. Cohen's kappa (κ = 0.86) reflects dual-coder inter-rater concordance.

Methodological Characteristics and Contextual Distribution of the Empirical Corpus

The included studies reflect the multi-faceted methodological landscape required to evaluate complex curricular transitions. As detailed in Table 1, the synthesized corpus relies substantially on situated qualitative inquiries (phenomenology, multi-case evaluations, and classroom ethnographies), balanced by diagnostic surveys, mixed-methods field explorations, and quasi-experimental measurements of teacher competence. This qualitative and contextual weighting proves vital: evaluating epistemological disorientation, emotional exhaustion, and the micropolitics of pedagogical adaptation requires deep, field-level immersion rather than aggregate macro-level indicators.

Table 1

Methodological and Contextual Architecture of the Synthesized Empirical Corpus (N = 18)

Author(s) & Year	Research Design	Institutional Context	Geographic Context & Scale	Data Collection Protocol	Primary Barrier Focus
Mizwar et al. (2024)	Qualitative (Survey)	Junior & Senior High	Bireuen, Aceh (Rural; N = 42)	Questionnaires & site interviews	Digital Literacy; Time Poverty
Susilowati et al. (2025)	Qualitative (Case Study)	Elementary Schools (SD)	East Java (Suburban; N = 8)	Observations & deep interviews	Differentiated Learning; Kombel
Wulandari et al. (2025)	Qualitative (Case Study)	Elementary (SDN Sanding 2)	West Java (Rural-Periphery; N = 6)	Interviews & lesson plan audit	Conceptual UbD; Lesson Execution
Triwahyuni et al. (2025)	Qualitative (Case Study)	Elementary (SDN Bandung 1)	West Java (Urban; N = 12)	Interviews & digital log audits	Digital Resistance; PMM Disconnect
Pratiwi et al. (2025)	Qualitative (Phenomenology)	Early Childhood (PAUD)	Central Java & DIY (Rural; N = 14)	Phenomenological interviews	Symbolic Compliance; Identity
Zamjani et al. (2026)	Qualitative (Multi-Case)	Primary & Secondary (K-12)	Frontier/3T Sites (N = 24)	Site interviews & field notes	Autonomy Vacuum; 3T Isolation
Susianna et al. (2026)	Mixed Methods (Exploratory)	Junior High Science (SMP)	Jakarta Metropolitan (N = 65)	Diagnostic surveys & UbD audits	UbD Alignment; Constructivism
Hidayati et al. (2024)	Quantitative (Quasi-Exp.)	Elementary Schools (SD)	Central Java (Suburban; N = 54)	Pre-post test diagnostic inventories	Digital Fluency; PMM Recall
Rofi'ah et al. (2024)	Empirical SLR	Junior High Schools (SMP)	National Cross-Provincial Base	Thematic synthesis of field records	Transitional Cognitive Dissonance
Susanto & Marzuki (2021)	Descriptive Qualitative	Elementary Schools (SD)	East Java (Urban; N = 28)	Classroom audits & rubric checks	Profil Pelajar Pancasila Realities
Komariyah et al. (2025)	Qualitative (Case Study)	Islamic Junior High (MTs)	South Kalimantan (Rural; N = 10)	Teacher interviews & syllabus audits	Emancipated Design; Lecture Default
Sarnoto (2024)	Qualitative Descriptive	Elementary & Junior High	Jakarta & Banten (Metro; N = 18)	Focus groups & teaching journals	Differentiated Class Management
Saidah et al. (2025)	Action Research / Field	Islamic Senior High (MA)	Lampung (Suburban; N = 8)	Classroom action cycles & rubrics	Diagnostic Rubrics in Akidah Akhlak
Purnama et al. (2025)	Qualitative Case Study	Inclusive Elementary	East Nusa Tenggara (N = 9)	Classroom interaction audits	Inclusion Strains; Differentiation

Author(s) & Year	Research Design	Institutional Context	Geographic Context & Scale	Data Collection Protocol	Primary Barrier Focus
Widayati et al. (2027)	Mixed Methods (Explanatory)	Vocational High (SMK)	Yogyakarta & Solo (Urban; N = 82)	Workload surveys & interviews	Administrative Workload & Fatigue
Harwisaputra et al. (2024)	Qualitative (Case Study)	Senior High (SMAN 2)	Ponorogo, East Java (N = 15)	Interviews & field notes	Institutional Leadership; Adaptation
Amalia et al. (2024)	Qualitative Case Study	Madrasahs (MI, MTs)	Central Java (Semi-rural; N = 16)	In-depth interviews & audits	Faith-Curriculum Epistemic Nexus
Sellya et al. (2026)	Qualitative (Lived Exp.)	Early Childhood & Primary	Timor, NTT (Frontier 3T; N = 11)	Narrative inquiry & field journals	Marginal Agency; Sensemaking

Note. All 18 empirical studies were critically screened via the PRISMA 2020 framework and appraised using the Mixed Methods Appraisal Tool (MMAT 2018). Contextual distribution: Early Childhood (11%), Elementary Education (39%), Secondary/Vocational (33%), and Faith-based Madrasahs (17%).

Thematic Synthesis: The Four Convergent Crisis Points of Pedagogical Practice

Inductive line-by-line coding of the primary empirical datasets revealed that classroom barriers are neither idiosyncratic nor merely operational. Rather, instructional frictions coalesce around four deeply interconnected, systemic crisis points: (1) conceptual disconnects and flexibility paralysis; (2) digital platform resistance and navigation strain; (3) the cognitive and managerial load of differentiated instruction and formative rubrics; and (4) the stubborn residue of conventional mindsets mediated through symbolic compliance. Table 2 presents the cross-tabulation and thematic distribution of these empirical dimensions across the literature.

Table 2

Cross-Tabulation of Identified Pedagogical Barrier Domains, Empirical Manifestations, and Cross-Contextual Disparities

Pedagogical Crisis Domain	Primary Empirical Manifestations in Classrooms	Contributing Studies & Empirical Grounding	Cross-Contextual & Geographic Disparities
1. Conceptual Flexibility & Design Paralysis	• Superficial translation of Capaian Pembelajaran (CP) into operational ATP. • Confusion integrating the 6 core dimensions of Profil Pelajar Pancasila. • Reverting to traditional teacher lecturing despite constructivist lesson plan rhetoric.	Susanto & Marzuki (2021); Komariyah et al. (2025); Wulandari et al. (2025); Susianna et al. (2026); Rofi'ah et al. (2024); Amalia et al. (2024)	Urban teachers demonstrate high theoretical recall of UbD frameworks but fail in classroom execution; rural and madrasah teachers report acute ambiguity, relying on downloaded external templates.
2. Digital Platform Mediation Strain	• Operational fatigue and anxiety navigating Platform Merdeka Mengajar (PMM). • Instrumental viewing of digital platforms: completing self-paced modules solely for certificate points. • Disconnect between platform module consumption and classroom delivery.	Mizwar et al. (2024); Hidayati et al. (2024); Triwahyuni et al. (2025); Zamjani et al. (2026)	In 3T frontier regions, infrastructural deficits turn digital-first mandates into structural exclusion. In metropolitan areas, strain manifests as cognitive overload and platform fatigue.
3. Differentiated Assessment Load	• Acute fear of losing classroom control during multi-tiered student activities. • Inability to design, execute, and calibrate authentic initial diagnostic assessments. • Inability to construct holistic rubrics capturing both cognitive and character growth.	Sarnoto (2024); Saidah et al. (2025); Purnama et al. (2025); Susilowati et al. (2025); Harwisaputra et al. (2024)	Intensified in elementary and inclusive classrooms where high student-teacher ratios render individualized diagnostic tracking unsustainable without dedicated teaching aides.

Pedagogical Crisis Domain	Primary Empirical Manifestations in Classrooms	Contributing Studies & Empirical Grounding	Cross-Contextual & Geographic Disparities
4. Mindset Residue & Symbolic Compliance	• Severe cognitive dissonance: habitus conditioned by decades of administrative compliance struggles with granted autonomy. • Time poverty from dual reporting (national digital platforms vs. local paper files). • Emergence of 'symbolic compliance'—progressive talk masking conservative delivery.	Pratiwi et al. (2025); Mizwar et al. (2024); Widayati et al. (2027); Sellya et al. (2026)	Senior educators and rural teachers display higher propensity for symbolic compliance as a defensive psychological coping mechanism against continuous un-scaffolded reform shifts.

Note. Thematic clustering reveals cross-reinforcing friction points across general basic, secondary, and Islamic madrasah ecosystems.

1. Conceptual Flexibility and Design Paralysis

Empirical inquiry into lesson design reveals that decentralizing curricular authority has created widespread pedagogical paralysis rather than immediate emancipatory practice. While policy frameworks assume that eliminating rigid, centralized syllabi enables teachers to design localized learning modules, early empirical studies show that educators routinely struggle to interpret broad learning outcomes (*Capaian Pembelajaran*). In elementary education, Susanto and Marzuki (2021) and Wulandari *et al.* (2025) found that teachers view the integrated dimensions of *Profil Pelajar Pancasila* as distinct thematic burdens rather than cross-cutting, holistic dispositions. When tasked with structuring Project-Based Learning modules (*Projek Penguatan Profil Pelajar Pancasila* / P5), educators frequently defaulted to disconnected, craft-oriented consumer tasks (e.g., simple food processing or waste recycling) devoid of authentic inquiry or reflective questioning.

This conceptual friction persists even in well-resourced urban secondary schools. In their exploratory evaluation of junior high science teachers in Jakarta, Susianna *et al.* (2026) found that while 82% of participants demonstrated strong theoretical familiarity with *Understanding by Design* (UbD) principles, fewer than 28% could construct an aligned backward-design unit in which diagnostic assessment tasks directly mirrored essential understandings. Lesson plans analyzed in the field regularly displayed a disconnect between stated constructivist goals and planned classroom interactions, with teachers reverting to textbook-guided, direct exposition when executing complex content. In Islamic institutions (MTs/MA), Komariyah *et al.* (2025) and Amalia *et al.* (2024) uncovered an additional layer of conceptual friction: teachers faced institutional ambiguity when attempting to harmonize national secular competencies with mandated Islamic curricula, resulting in fragmented modules that treated religious values as decorative additions rather than foundational pedagogical orientations.

2. Digital Platform Mediation and Navigation Strain

The national shift toward technology-mediated professional development has fundamentally reshaped teacher workflows, yet empirical evidence highlights deep frictions in this digital infrastructure. Central to this reform is *Platform Merdeka Mengajar* (PMM), an asynchronous digital repository for training, module dissemination, and peer inspiration. However, the synthesis indicates that reliance on PMM has precipitated substantial operational hesitancy and psychological resistance.

Quantitative baseline data from Hidayati *et al.* (2024) showed that while structured digital engagement correlated positively with conceptual recall of curriculum rubrics, it had a negligible effect on practical classroom delivery. Teachers mastered the multiple-choice validation post-tests within PMM modules without acquiring the qualitative pedagogical sensitivity required to manage diverse learners. Furthermore, ethnographic field investigations reveal that platform usage is routinely distorted by institutional pressures: Triwahyuni *et al.* (2025) and Mizwar *et al.* (2024) documented that educators navigate PMM through an instrumentalist logic, rushing to download pre-existing instructional modules and acquire digital certificate badges to satisfy performance appraisals rather than engaging in deep reflective practice. In marginalized and rural regions, the digital divide transforms these pedagogical hurdles into acute structural barriers. Zamjani *et al.* (2026) documented that teachers in remote island and mountain schools face chronic bandwidth shortages, power outages, and inadequate hardware. Forcing these rural educators to rely on self-directed digital onboarding without in-person mentoring leads to deep feelings of professional abandonment and frustration, reinforcing a two-tiered system in which well-connected urban educators advance while rural practitioners fall further behind.

3. The Cognitive and Managerial Burden of Differentiated Instruction

The empirical corpus identifies differentiated instruction (pembelajaran berdiferensiasi) and ongoing formative assessment as the most cognitively and emotionally taxing components of the new curriculum. Under *Kurikulum Merdeka*, educators are expected to conduct initial cognitive and non-cognitive diagnostic evaluations to segment learners by readiness, interest, and learning profiles, then deliver tiered content, processes, and products.

Classroom observation data across multiple primary classrooms paint a clear picture of pedagogical strain. Sarnoto (2024) and Susilowati *et al.* (2025) found that the primary barrier to moving beyond uniform whole-class instruction is acute anxiety about losing classroom control. In classrooms of 30 to 40 pupils, designing multiple distinct learning trajectories simultaneously creates significant chaos, noise, and off-task behavior. Teachers lack the scaffolding needed to establish independent learning routines, causing them to interpret differentiated facilitation as pedagogical disorder. Furthermore, operationalizing assessment creates immense analytical friction. Saidah *et al.* (2025) observed that teachers struggle to formulate rubric criteria that capture subtle shifts in student character and soft-skill development; assessments routinely revert to pen-and-paper factual testing because tracking qualitative growth across multiple tiered groups demands unsustainable hours of documentation. In inclusive elementary schools, this burden reaches an unsustainable threshold: Purnama *et al.* (2025) documented that regular classroom teachers without special education backgrounds experience profound psychological helplessness when trying to balance national learning expectations with the differentiated needs of neurodivergent learners.

4. Mindset Residue, Time Poverty, and Symbolic Compliance

The final emergent crisis point concerns the teaching profession's historical habitus and the emotional toll of uncalibrated reform pacing. Decades of operating within rigid, centralized paradigms—most notably the 2013 Curriculum, which dictated precise

instructional steps and exhaustive administrative paperwork—have conditioned Indonesian teachers into a deeply entrenched culture of compliance. When *Kurikulum Merdeka* abruptly devolved pedagogical autonomy to the school level, it exposed a substantial vacuum in teacher self-efficacy.

Empirical inquiries by Mizwar *et al.* (2024) and Widayati *et al.* (2027) establish that structural autonomy has ironically exacerbated teacher workload. Educators are caught in a double bind: while central rhetoric promises administrative liberation, provincial inspectorates, local foundations, and accreditation boards continue demanding exhaustive administrative documentation, physical portfolio binders, and lesson-plan signatures. Teachers spend substantial hours reconciling conflicting compliance standards while preparing new modular learning media, leading to temporal exhaustion and psychological burnout. Under these high-stakes pressures, teachers develop behavioral coping mechanisms that Pratiwi *et al.* (2025) and Sellya *et al.* (2026) describe as "symbolic compliance." In their phenomenological study of rural early childhood and elementary practitioners, Pratiwi *et al.* (2025) observed that teachers masterfully adopt the lexicon of *Kurikulum Merdeka*—fluently citing terms like *Capaian Pembelajaran*, *Asesmen Diagnostik*, and *Merdeka Belajar* during formal supervisory visits—while maintaining traditional, teacher-centered, textbook-bound instruction as soon as supervisors depart. Rather than transforming underlying pedagogical beliefs, the reform often produces parallel structures: a compliant administrative facade masking unchanged classroom pedagogical realities.

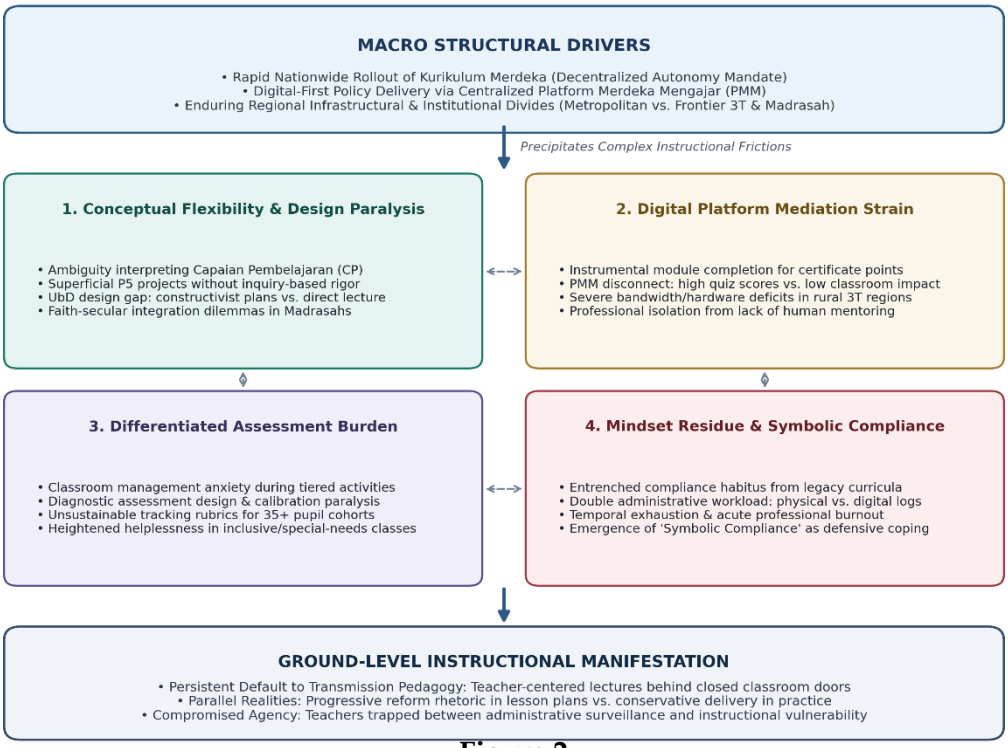


Figure 2

Thematic Architecture of Pedagogical Crisis Points under Kurikulum Merdeka

Note. Thematic network diagram modeling the interconnected structural drivers, pedagogical crisis points, and classroom manifestations identified across the synthesized empirical corpus.

DISCUSSION

Theoretical Reconceptualization: Grounding Human-in-the-Loop in Teacher Agency

The empirical findings of this review expose a profound paradox at the heart of *Kurikulum Merdeka*: the devolution of curricular autonomy, without structural scaffolding, often induces instructional paralysis rather than transformative pedagogical liberation. To interpret this systemic friction, educational scholarship must move beyond simplistic deficit narratives that frame teachers as inherently resistant or technically deficient. Instead, the implementation crisis must be conceptualized through socio-technical systems theory and the ecological model of teacher agency (Gierhart, 2024; Priestley *et al.*, 2015). Within this theoretical architecture, the concept of Human-in-the-Loop (HITL)—frequently mischaracterized as a narrow computational algorithm—is reclaimed and operationalized as an emancipatory pedagogical framework. In socio-technical educational systems, HITL asserts that digital platforms, standardized rubrics, and automated learning repositories cannot substitute for the contextual discernment, ethical judgment, and relational empathy of the human educator (Thaariq, 2026). Rather than reducing teachers to passive consumers of top-down digital directives on the *Platform Merdeka Mengajar* (PMM), an authentic HITL framework repositions the practitioner as an indispensable, active mediator who filters, adapts, and re-engineers centralized curricula to fit situated classroom ecologies. The multi-level mediation architecture of this framework—bridging macro-policy mandates, restructured professional learning circles, and localized classroom sensemaking—is delineated in Figure 2.

This theoretical recalibration directly confronts the techno-rationalist assumption that self-directed digital modules organically cultivate pedagogical competence. As Hidayati *et al.* (2024) and Triwahyuni *et al.* (2025) show, asynchronous digital dissemination may boost conceptual recall, but it systematically fails to alter practical classroom *habitus*. Digital interfaces lack the reciprocal feedback mechanisms, dialogic nuance, and psychological reassurance necessary to support educators through the acute vulnerability of instructional experimentation. When educational authorities deploy digital architectures as unilateral delivery conduits, they inadvertently bypass the "human loop," relegating teachers to bureaucratic data-entry agents striving for platform certification badges (Bari *et al.*, 2027; Hakim & Abidin, 2024). Re-establishing the teacher as the reflective center of the reform cycle requires institutional recognition that agency is not an individual attribute possessed by an educator, but an ecological phenomenon achieved through the dynamic interplay of individual capacity, structural resources, and cultural responsiveness (Biesta *et al.*, 2015; Musa *et al.*, 2024).

Deconstructing Pedagogical Paralysis: Habitus, Sensemaking, and Symbolic Compliance

A critical synthesis of the empirical evidence reveals that the primary obstacle to constructivist instruction lies within the deeply entrenched institutional *habitus* of the Indonesian teaching profession. Applying Bourdieu's sociological lens, the historical trajectory of national education—characterized by decades of authoritarian curriculum enforcement and exhaustive administrative scrutiny under the 2013 Curriculum—has conditioned educators into an ingrained *habitus* of compliance (Silva *et al.*, 2021). When *Kurikulum Merdeka* abruptly demanded that teachers abandon scripted syllabi for autonomous

backward design (*Understanding by Design*) and differentiated facilitation, it destabilized this professional *habitus*. As Susianna *et al.* (2026) and Wulandari *et al.* (2025) identified, educators experience severe cognitive dissonance: they are officially granted instructional autonomy, yet their cognitive schemas remain attuned to external verification, standardized testing benchmarks, and punitive supervisory audits.

Under the weight of contradictory structural signals, educators engage in what organizational theorists define as defensive sensemaking, culminating in "symbolic compliance" (Pratiwi *et al.*, 2025; Weick, 1995). Rather than genuine pedagogical transformation, teachers construct an elaborate facade of alignment: they master the nomenclature of *Capaian Pembelajaran*, assemble aesthetically formatted project-based teaching modules (*Modul Ajar P5*), and complete digital milestones on PMM, while classroom instruction behind closed doors remains stubbornly teacher-centered, textbook-dependent, and expository (Mizwar *et al.*, 2024; Sellya *et al.*, 2026). This bifurcation of professional practice is not deliberate subversion, but a rational psychological coping mechanism against temporal exhaustion. When teachers are subjected to dual administrative surveillance—compelled to maintain legacy physical compliance files while populating national digital portals—they experience severe time poverty (Widayati *et al.*, 2027; Rohmah *et al.*, 2024). Consequently, differentiated instruction is abandoned because managing multi-tiered learning trajectories and complex formative rubrics within overcrowded classrooms exceeds their remaining cognitive and emotional bandwidth (Sarnoto, 2024; Saidah *et al.*, 2025).

Structural and Cultural Adaptations: Transforming Kombel and Navigating Madrasah Realities

To dismantle this culture of symbolic compliance, policy mechanisms must reconstruct the social spaces wherein teacher learning occurs. While the Ministry of Education has formally mandated intra-school learning communities (*Komunitas Belajar* or *Kombel*) as decentralized reform engines, empirical findings show that these groups often replicate bureaucratic hierarchies rather than fostering authentic professional inquiry (Susilowati *et al.*, 2025). In conventional practice, *Kombel* sessions are routinely co-opted into administrative workshops focused on completing paperwork or answering collective PMM quizzes, divorced from substantive peer coaching or classroom observation (Roesminingsih & Windasari, 2025). Within the HITL paradigm, *Kombel* must be restructured into psychologically safe, reflective micro-ecosystems modeled on Japanese *Lesson Study* and iterative, design-based implementation research. In these reformed spaces, teachers collaboratively analyze anonymized student diagnostic assessments, co-construct differentiated learning trajectories, conduct non-evaluative peer observations, and iteratively refine instructional units based on immediate classroom evidence (Harwisaputra *et al.*, 2024; Solehuddin *et al.*, 2026).

Furthermore, the cross-sectoral evidence synthesized in this review underscores the need to contextualize curriculum policy within faith-based educational environments (*Madrasahs*). Accounting for a substantial proportion of Indonesia's basic and secondary student population, *madrasahs* operate under the dual administrative oversight of the Ministry of Religious Affairs (*Kemenag*) and national curriculum frameworks. As Amalia *et al.* (2024) and Komariyah *et al.* (2025) document, *madrasah* educators face distinct epistemological

tensions: they must meet national competency targets while integrating comprehensive Islamic values (*Akidah Akhlak*, *Fiqh*, and Quranic hermeneutics) into modular learning. When curriculum reform is delivered through secular, technocratic assumptions that ignore this dual institutional identity, *madrasah* teachers face fragmented expectations. A responsive HITL model bridges this institutional divide by treating theological values not as extrinsic curricular burdens, but as organic cultural resources for character formation, aligning the six dimensions of the *Profil Pelajar Pancasila* with universal Islamic ethical constructs (*Akhlakul Karimah*) through collaborative inter-institutional mentoring (Adiyono *et al.*, 2026; Saidah *et al.*, 2025).

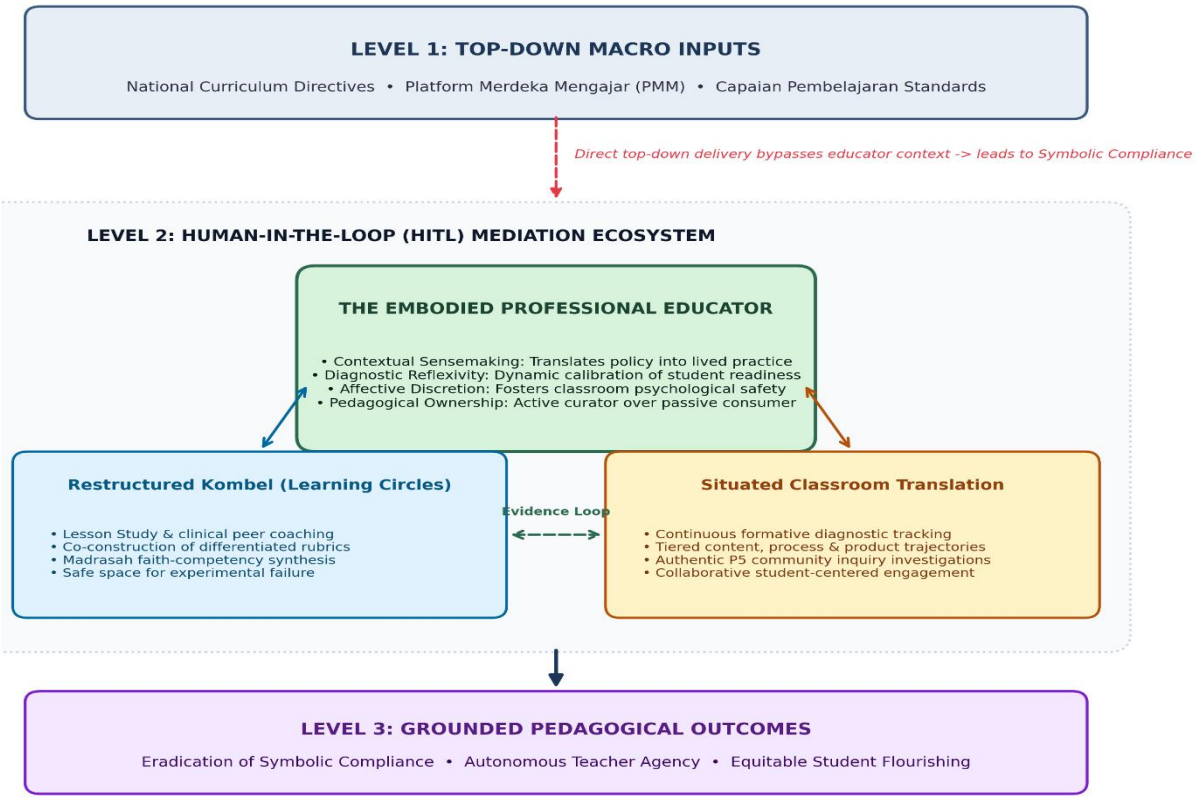


Figure 3

Operational Architecture of the Human-in-the-Loop (HITL) Socio-Technical Pedagogical Framework

Note. Operational architecture of the Human-in-the-Loop (HITL) framework, showing how teacher agency, reformed professional communities, and situated classroom evidence mediate national curriculum policy.

Table 3

Operational Matrix: Resolving Empirical Pedagogical Barriers Through the Human-in-the-Loop Framework

Barrier Domain	Conventional Technocratic Response	Human-in-the-Loop (HITL) Operational Intervention	Institutional Actor & Mechanism	Measurable Indicator
1. Conceptual Flexibility & Design Paralysis	Disseminating generic, downloadable lesson plan templates via PMM; one-shot webinars.	Longitudinal clinical mentoring guiding teachers through backward design (UbD) using local classroom evidence.	Cluster-level master teachers (Guru Penggerak), university teacher-education consortia (LPTK).	Shift from verbatim template copying to teacher-authored modular units tailored to local contexts.

Barrier Domain	Conventional Technocratic Response	Human-in-the-Loop (HITL) Operational Intervention	Institutional Actor & Mechanism	Measurable Indicator
2. Digital Mediation Strain	Enforcing mandatory platform logins, automated quiz completions, and badge tracking.	Decoupling PMM from administrative appraisals; integrating hybrid facilitators to contextualize digital media in Kombel circles.	Ministry of Education (Kemendikbudristek), provincial education boards (Dinas Pendidikan).	Reduction in digital platform fatigue; sustained engagement in collaborative problem-solving circles.
3. Differentiated Assessment Load	Expecting solo teachers to design multi-tiered rubrics for 35+ students without aides.	Co-designing modular diagnostic toolkits in Kombel; introducing collaborative team-teaching and peer-assisted learning.	School principals, instructional coaches, internal subject working groups (MGMP/KKG).	Sustained implementation of diagnostic evaluations that directly dictate differentiated instructional groupings.
4. Mindset Residue & Symbolic Compliance	Tightening supervisory audits, checklist inspections, and demanding dual documentation.	Instituting non-evaluative supervisory dialogues focused on reflection; providing administrative immunity for pedagogical trial.	School supervisors (Pengawas Sekolah), foundation directors, regional inspectors.	Elimination of decorative compliance documents; alignment between recorded lesson plans and observed classroom delivery.

Note. Operational matrix detailing institutional transition from top-down compliance checks toward reflective, peer-scaffolded teacher agency.

Policy and Practical Implications

The findings and operational frameworks articulated in this review carry urgent implications for the governance of educational reform in Indonesia and other Global South contexts undergoing rapid curricular transitions. First, policymakers must urgently address the structural contradictions embedded within teacher evaluation systems. It is self-defeating to demand pedagogical innovation, experimental risk-taking, and differentiated student support while simultaneously evaluating educators through rigid, high-stakes administrative compliance checklists (Zamjani *et al.*, 2026; Sucipto *et al.*, 2024). Educational ministries must streamline documentation requirements and establish seamless administrative interoperability between civil service reporting portals and instructional platforms to return precious time to classroom practitioners. Second, the professional development architecture must pivot from an online-first delivery model to a sustained hybrid mentoring ecosystem. Self-paced digital learning repositories should function exclusively as reference libraries rather than primary training engines. National resources must be reallocated to equip cluster-based instructional leaders (*Guru Penggerak*) with the pedagogical coaching competencies, interpersonal sensitivity, and clinical mentoring tools needed to scaffold peer teachers through the cognitive disorientation of curriculum planning (Susilowati *et al.*, 2025; Musa *et al.*, 2024). Finally, in rural and geographically isolated jurisdictions (3T), the state must guarantee foundational infrastructural parity—ensuring consistent electricity, functional hardware, and localized printed resource kits—to prevent digital-first curriculum mandates from deepening existing educational stratification (Zamjani *et al.*, 2026; Sellya *et al.*, 2026).

CONCLUSION

This systematic literature review synthesizes the empirical realities of *Kurikulum Merdeka*, showing that devolving curricular autonomy without structural and affective

scaffolding induces acute pedagogical paralysis rather than transformative professional liberation. By interrogating an empirical corpus of 18 field-level studies across basic, secondary, and faith-based schooling, this inquiry demonstrates that classroom barriers coalesce around four deeply interconnected crisis points: conceptual design ambiguity, digital mediation strain on the *Platform Merdeka Mengajar* (PMM), the cognitive load of differentiated formative assessment, and the persistence of legacy compliance mindsets manifesting as symbolic compliance. These findings challenge techno-rationalist assumptions that self-directed digital modules or mandated school learning communities (*Kombel*) can organically resolve implementation dilemmas. Instead, real-world educational reform is mediated by educators' deeply ingrained institutional *habitus*, who adopt reform nomenclature while maintaining teacher-centered transmission modalities behind closed classroom doors as a defensive response to administrative time poverty.

To resolve this systemic friction, this study reclaims and operationalizes the Human-in-the-Loop (HITL) socio-technical framework as an emancipatory pedagogical paradigm. Within this architecture, the human educator is re-established as an irreplaceable, reflective mediator who contextualizes centralized mandates within local classroom ecologies. Sustainable curricular transformation demands that policymakers realign contradictory accountability mechanisms by establishing administrative interoperability, decoupling digital platforms from punitive performance appraisals, and transforming *Kombel* from superficial compliance forums into psychologically safe spaces for collaborative lesson inquiry and clinical peer coaching. Furthermore, the synthesis underscores the imperative of cultural responsiveness in faith-based *madrasahs*, where teachers must be supported in harmonizing national secular competencies with Islamic theological orientations.

Limitations and Future Research Trajectories

Despite its contributions, this review has several methodological limitations. The synthesized evidence relies primarily on qualitative and localized case inquiries conducted during the initial implementation phases of *Kurikulum Merdeka*, which restricts immediate statistical generalizability across Indonesia’s profoundly heterogeneous archipelagic landscape. Furthermore, the current empirical corpus is heavily weighted toward teacher self-reports and document analysis, with relatively few longitudinal classroom ethnographies directly documenting student developmental outcomes under differentiated regimes. Future empirical scholarship should therefore deploy multi-site, mixed-methods designs and longitudinal classroom interaction analyses across contrasting socio-economic jurisdictions, particularly in frontier, outermost, and remote (3T) regions. In addition, future inquiries must rigorously evaluate the long-term viability of restructured *Kombel* models and investigate how emerging generative artificial intelligence tools can be ethically integrated within the HITL framework to alleviate diagnostic assessment burdens without displacing essential teacher agency.

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DECLARATIONS

Declaration Category	Statement Details
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Authors' Contributions	Marya Ulfa: Conceptualization, Methodology (PRISMA protocol), Investigation, Data curation, Writing – original draft. Agus Pahrudin: Formal analysis, Validation (MMAT 2018 appraisal), Theoretical framing (HITL framework), Writing – review & editing, Supervision. Sri Rahmi: Data curation (cross-tabulation matrix), Visualization (Figures 1 & 2 rendering), Validation, Writing – review & editing, Project administration. All authors read and approved the final manuscript.
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