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The algorithmic classroom divide: language, infrastructure, and unequal access to generative AI in urban and rural Indonesian schools

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ABSTRACT

Background: Generative AI is entering Indonesian schooling amid uneven infrastructure, multilingual classroom realities, and differentiated teacher readiness across urban, rural, and remote educational settings. **Objective:** This study aims to examine how infrastructure, language, and pedagogical governance shape unequal access to generative AI in Indonesian schools. **Method:** Using a qualitative documentary and corpus-assisted discourse design, this study analyzed 24 public and verifiable items from policy documents, statistical reports, academic literature, intergovernmental guidance, and contextual digital-access sources published between 2023 and 2026. **Results:** Findings show that infrastructural access is framed primarily through territorial inequality, with urban–rural and remote-school readiness dominating coded evidence. Findings also indicate that linguistic access is concentrated in formal Bahasa Indonesia policy discourse, while multilingual and translanguaging dimensions receive limited explicit attention. **Implication:** Findings further reveal that governance, safeguards, and child protection are more visible than teacher training, curriculum enactment, and classroom-level mediation. **Novelty:** This study introduces the algorithmic classroom divide as a conceptual lens for understanding generative AI inequality as a convergence of material access, linguistic usability, and pedagogically governed participation.

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1. INTRODUCTION

Indonesia's rapid movement toward AI-enabled schooling is occurring within a deeply uneven digital landscape. APJII reported 221,563,479 internet users in 2024, equivalent to 79.5% national penetration [1], yet this aggregate figure conceals persistent differences in connectivity, device availability, and school readiness across urban and rural communities. This asymmetry matters because Kemendikdasmen has positioned coding and artificial intelligence as part of school learning from the 2025/2026 academic year [2], making AI access no longer peripheral but increasingly embedded in national educational reform. For students in well-connected urban schools, generative AI may support writing, translation, feedback, and inquiry-based learning. For students in rural or remote schools, however, weak infrastructure, limited teacher support, and unstable access may turn the same technology into another layer of exclusion. The crucial issue, therefore, is not whether generative AI enters Indonesian classrooms, but which classrooms can use it meaningfully under unequal social, linguistic, and infrastructural conditions today nationwide.

Recent scholarship has established that generative AI can expand educational resources, personalize feedback, and support language learning, but it has also warned that such benefits are unevenly distributed. Studies on AI and inequality show that socioeconomic position, policy design, and institutional capacity mediate who gains from automation [3], [4], [5]. In education, reviews identify both pedagogical promise and risks of dependency, bias, misinformation, and uneven learning support [6], [7]. In language education, GenAI has been examined as a possible bridge for feedback and foreign-language practice, while also raising concerns about equity and linguistic reliability [8]. However, existing studies rarely integrate infrastructure, multilingual access, and teacher mediation within one Indonesian urban–rural frame. This leaves underexamined how AI inequality is produced simultaneously through material access, language hierarchy, and pedagogical governance in everyday classrooms empirically.

This study examines the algorithmic classroom divide as a multidimensional problem in Indonesian schooling. Rather than treating access as a simple matter of internet connection or device ownership, this study asks how infrastructure, language, and pedagogical readiness jointly shape unequal participation in generative AI-supported learning. Three questions guide the inquiry: how are urban and rural differences in AI readiness represented across policy, institutional, and scholarly discourse; how do Bahasa Indonesia, English, local languages, and translanguaging practices affect students' ability to interact with GenAI; and how do teacher training, digital citizenship, and school governance mediate safe and meaningful classroom use? These questions are grounded in Indonesian studies on offline AI for remote Papuan students, rural educator AI literacy, urban–rural readiness for AI and VR integration, and multilingual educational equity [9], [10], [11], [12], [13], across uneven institutional contexts nationally.

This study advances the argument that unequal access to generative AI should be conceptualized as an algorithmic classroom divide, not merely as a digital divide. The distinction is important because generative AI requires more than connectivity: students must be able to formulate prompts, evaluate outputs, negotiate language choices, recognize bias, and receive teacher mediation. Where these conditions are absent, AI may amplify existing inequalities by rewarding students who already possess stronger linguistic capital, digital confidence, and institutional support. Conversely, when offline systems, multilingual pedagogy, critical literacy, and teacher supervision are deliberately built into implementation, GenAI may become a resource for reducing rather than reproducing educational marginality [14], [15], [16], [17]. The implication is that AI policy in Indonesian schools must move from access provision to equitable, language-sensitive, and pedagogically governed participation across diverse educational ecologies and regions over time.

2. LITERATURE REVIEW

2.1. Generative AI in education

Generative AI in education is increasingly understood not as a neutral instructional tool, but as a socio-technical system whose benefits depend on prior distributions of infrastructure, literacy, and institutional power. Recent scholarship distinguishes between optimistic accounts of GenAI as a scalable resource for personalized feedback, learning assistance, and teacher support, and more critical accounts that foreground bias, dependency, misinformation, and unequal access [7], [6], [15]. At a broader level, GenAI may reorganize socioeconomic opportunity because automation benefits users who already possess stronger digital, linguistic, and institutional capital [3], [4], [5]. Thus, educational AI must be read through inequality, not innovation alone.

Studies of AI inequality commonly identify three interrelated dimensions: material access, capability access, and governance access. Material access refers to connectivity, devices, electricity, platforms, and school-level infrastructure. Capability access concerns whether teachers and students can formulate prompts, evaluate AI output, and convert AI interaction into learning. Governance access concerns policy, ethical safeguards, institutional supervision, and digital citizenship. In constrained environments, these dimensions do not develop evenly, especially where rural schools face infrastructural and training limitations [18], [19], [14]. Indonesian studies similarly show that offline GenAI, teacher literacy training, and urban–rural readiness remain decisive for equitable implementation [9], [11], [10].

2.2. Language access

Language access constitutes a second major dimension of this divide because GenAI interaction is mediated through prompts, feedback, translation, and textual interpretation. In language classrooms, GenAI has been examined as a tool for writing support, feedback generation, vocabulary practice, and conversational learning; however, systematic reviews also warn that linguistic benefits are uneven when students differ in proficiency, confidence, and access to dominant languages [8], [6]. In Indonesia, this issue is intensified by the coexistence of Bahasa Indonesia, English, local languages, and hybrid classroom repertoires. Therefore, access to GenAI cannot be reduced to device availability; it also depends on whether learners can make AI understand their linguistic world.

The linguistic dimension can be examined through several indicators: prompt literacy, multilingual reliability, translanguaging capacity, cultural alignment, and feedback intelligibility. Prompt literacy concerns students' ability to ask precise, critical, and contextually meaningful questions. Multilingual reliability concerns whether GenAI responds consistently across Bahasa Indonesia, English, and local linguistic practices. Translanguaging capacity refers to how learners move across languages when constructing meaning, especially in multilingual classrooms [13]. Cultural alignment concerns whether AI-generated content reflects local norms rather than generic global templates. Indonesian scholarship on language policy, English teaching identity, academic writing, digital literacy, and multimodal feedback shows that linguistic inequality is inseparable from educational equity [12], [20], [21], [22], [23].

2.3. Pedagogical mediation

Pedagogical mediation is a third central concept because GenAI does not enter classrooms as an autonomous curriculum; it becomes educational through teacher interpretation, institutional rules, and classroom norms. Recent studies emphasize that AI can support supervision, instructional planning, assessment feedback, and student engagement, but only when teachers understand both its possibilities and risks [17], [24], [25]. Indonesian scholarship on ChatGPT in classrooms and international schools highlights prospects for pedagogical support, yet also indicates the need for ethical guidance and context-sensitive implementation [26], [27]. Digital citizenship education further reframes AI use as a matter of responsibility, safety, and critical participation rather than technical adoption alone [16].

Pedagogical mediation can be specified through teacher AI literacy, curriculum integration, supervisory capacity, ethical regulation, and student agency. Teacher AI literacy includes knowing how to design tasks, evaluate AI output, prevent dependency, and guide responsible use. Curriculum integration concerns whether AI is embedded into learning objectives rather than added as an improvised tool. Supervisory capacity involves school leadership, assessment norms, and professional support [17]. Ethical regulation includes privacy, misinformation, academic integrity, and child protection [16], [7]. From this literature, this study positions the algorithmic classroom divide as a convergence of infrastructural inequality, linguistic hierarchy, and uneven pedagogical governance in Indonesian urban and rural schooling.

3. METHOD

The unit of analysis in this study is the publicly accessible document item and its coded excerpt concerning generative AI, schooling, language, infrastructure, and educational equity. The corpus consists of 24 verified items: policy documents and official webpages, statistical publications, academic articles, intergovernmental reports, and contextual digital-access materials. Each item was assigned a unique code, stored in metadata and text files, and coded according to its relevance to infrastructure, linguistic access, and pedagogical governance. This unit allows this study to compare national policy discourse, empirical scholarship, and contextual access data without claiming direct classroom outcomes beyond available documentary evidence.

This study uses a qualitative documentary and corpus-assisted discourse design. This design is appropriate because the research problem concerns how unequal AI access is represented, structured, and governed across public educational discourse, rather than measuring causal effects on student achievement. Corpus-assisted analysis supports systematic comparison across document types, while qualitative interpretation enables attention to policy language, infrastructural assumptions, and multilingual classroom implications. This design follows recent AI-in-education scholarship that treats generative AI as both a pedagogical resource and a socio-technical risk shaped by institutional capacity, digital inequality, and language access [3], [8], [7].

Information sources were organized into primary, secondary, and contextual layers. Primary sources included Indonesian government documents, official program pages, statistical publications, and public institutional releases related to coding, artificial intelligence, educational statistics, and internet access. Secondary sources included recent academic and intergovernmental literature on generative AI, language education, rural schooling, digital citizenship, and policy governance [9], [10], [6], [14], [5]. Contextual sources were used only to situate digital infrastructure and affordability. This layered structure prevents policy claims, scholarly interpretations, and access conditions from being treated as identical evidence.

Table 1. Dataset composition

Code	Data Type	Source	Location	Period	Number	Characteristics
ACD-PRI-001–007	Policy and official guidance	Kemendikdasmen, KodingKA, BPMP, Kemenko PMK, Komdigi, Kemenag	Indonesia, national	2025–2026	7	AI, coding, digital technology, child protection, school governance
ACD-PRI-008–011	Education and digital statistics	Pusdatin Kemendikdasmen, BPS	National and provincial	2024–2025	4	Education indicators, ICT access, urban–rural internet classification
ACD-PRI-012	Internet penetration survey	APJII	Indonesia, national	2024	1	Internet users, penetration, urban–rural contribution
ACD-SEC-014–017	GenAI and education literature	PNAS Nexus, IJAL, Interactive Learning Environments, Nature Human Behaviour	Global	2024–2025	4	AI inequality, language learning, human learning, pedagogical risk
ACD-SEC-018–020	Indonesian school AI studies	ICAITE, Jurnal Didaktik Matematika, RIGGS	Papua, urban/rural schools, Indonesia	2025	3	Offline GenAI, rural readiness, high-school AI use
ACD-SEC-021–023	Intergovernmental guidance	OECD, UNESCO	International	2023–2026	3	AI policy, governance, equitable infrastructure, education systems
ACD-CON-013, 024	Contextual digital-access material	DataReportal, IndonesiaBaik	Indonesia, national	2024–2025	2	Internet affordability, digital access, national technology context
Total	Mixed documentary corpus	Public and verifiable sources	Multi-level	2023–2026	24	Deduplicated corpus for qualitative coding

Data collection proceeded through thirteen steps: identifying official institutions and academic databases, defining keywords, setting a 2023–2026 period, delimiting Indonesia with urban–rural and remote-school relevance, applying inclusion and exclusion criteria, recording metadata, removing duplicates, extracting short excerpts, storing source links, assigning document codes, separating corpus layers, preparing an initial codebook, and creating coding columns. Search terms included “generative AI in Indonesian schools,” “Koding dan Kecerdasan Artifisial,” “rural education AI,” “AI literacy teachers,” “urban rural internet access Indonesia,” “multilingual classroom AI,” and “digital citizenship AI education.” Duplicates were removed through source-title-year matching and conceptual overlap checking.

Data analysis used three linked instruments. The Infrastructure Access Matrix coded connectivity, devices, ICT access, offline AI, and urban–rural readiness. Linguistic Access and Prompt Ecology Coding examined Bahasa Indonesia, English, local languages, translanguaging, prompt literacy, and feedback intelligibility. Pedagogical Governance and Risk Coding assessed teacher mediation, curriculum integration, digital citizenship, child protection, and policy safeguards. Coding was conducted at document-excerpt level and classified by evidence strength: high, medium, or low. The analytical flow moved from corpus construction to deduplication, coding, evidence review, and synthesis, producing an interpretation of the algorithmic classroom divide as infrastructure, language, and pedagogy combined.

4. RESULTS

4.1. Unequal AI readiness: connectivity, devices, and offline access

Public and scholarly discourse on generative AI in Indonesian schooling positions infrastructure as a decisive precondition for meaningful participation rather than as a neutral background variable. The strongest concentration appears in references to urban–rural and remote access, where policy language on inclusion intersects with statistical and academic evidence on uneven connectivity and school readiness. This pattern is significant because GenAI requires stable access not only at the moment of use, but also across teacher preparation, classroom experimentation, and student feedback cycles. Studies on AI inequality and educational transformation similarly warn that technological expansion can reproduce socioeconomic stratification when infrastructure is uneven [3], [4], [5]. Infrastructure therefore becomes the first visible layer of the algorithmic classroom divide.

The dominant pattern is territorial rather than merely technical. Urban–rural and remote-school access accounts for 58.8% of coded infrastructure evidence, making it the most visible category in the corpus. General infrastructure readiness follows at 23.5%, while connectivity and ICT access appear at 11.8%. Offline GenAI appears only once, at 5.9%, despite its direct relevance to constrained environments. This distribution shows that public and scholarly sources recognize uneven access, but give less attention to concrete low-connectivity pedagogical alternatives. Indonesian studies on remote Papuan students, rural educator AI literacy, and urban–rural STEM readiness reinforce this pattern by showing that access must be linked to school capacity, teacher preparation, and context-sensitive implementation [9], [10], [11].

Theoretically, these findings support a shift from the language of digital divide to algorithmic classroom divide. A digital divide framework captures connectivity and device inequality, but GenAI adds further requirements: prompt interaction, output verification, teacher mediation, and curriculum integration. When these requirements are unevenly distributed, students in better-resourced schools are more likely to convert AI access into educational advantage, while rural or constrained schools may encounter AI as policy expectation without equivalent support. This interpretation aligns with work on human learning, AI governance, and sustainable education, which cautions that GenAI becomes educationally valuable only when embedded in equitable systems of access and guidance [7], [14], [19]. Infrastructure is therefore not preliminary to AI equity; it is constitutive of it.

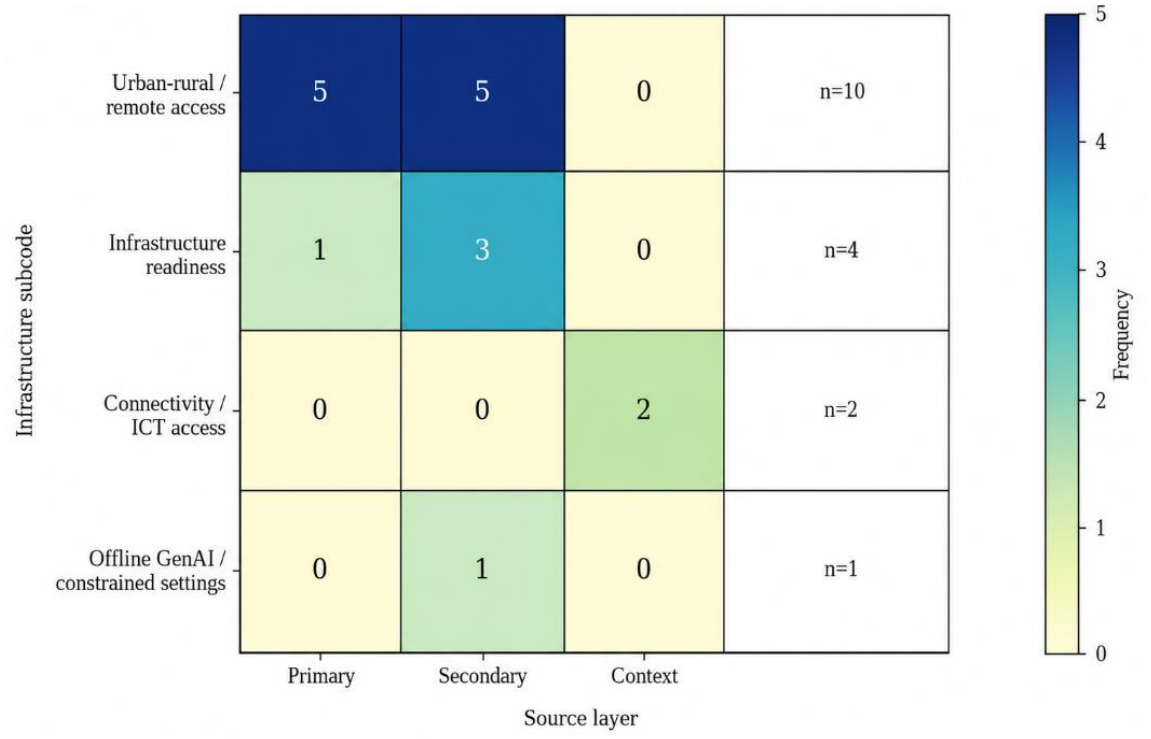

Figure 1. Infrastructure access matrix by source layer

Table 2. Infrastructure access matrix in coded corpus

Main Category	Subcategory	Indicator	Frequency	Percentage	Data Variation	Example / Short Evidence	Data Codes	Initial Interpretation
Material access gap	Urban–rural and remote school access	Explicit reference to urban, rural, remote, provincial, or geographically uneven AI/digital readiness	10	58.8%	Primary = 5; Secondary = 5; Context = 0	"semua anak, baik di perkotaan maupun daerah terpencil"; "Urban and Rural High Schools"; "penetrasi internet Indonesia menyentuh angka 79,5%"	ACD-PRI-001, ACD-PRI-002, ACD-PRI-010, ACD-PRI-011, ACD-PRI-012, ACD-SEC-016, ACD-SEC-017, ACD-SEC-019, ACD-SEC-020, ACD-SEC-023	AI readiness is framed most strongly through territorial inequality, especially when national AI policy is read beside connectivity and rural-school literature.
Institutional readiness gap	General infrastructure readiness	Reference to school capacity, system readiness, digital infrastructure, or conditions for AI implementation	4	23.5%	Primary = 1; Secondary = 3; Context = 0	"support an effective GenAI infrastructure for all"; "exacerbate and ameliorate"; "shape equity in English as a Foreign Language"	ACD-PRI-003, ACD-SEC-014, ACD-SEC-015, ACD-SEC-021	Infrastructure is not only technical but institutional, requiring policy alignment, school capacity, and equitable implementation frameworks.
Connectivity gap	Connectivity and ICT access	Reference to internet users, internet affordability, ICT access, or digital access conditions	2	11.8%	Primary = 0; Secondary = 0; Context = 2	"212 million individuals using the internet"; "Biaya Internet-an Orang Indonesia"	ACD-PRI-013, ACD-CON-024	Connectivity appears as enabling context, but contextual data alone cannot explain classroom-level readiness without policy and pedagogical mediation.
Constrained-environment response	Offline GenAI for constrained settings	Reference to offline or low-connectivity AI use in remote or resource-limited schools	1	5.9%	Primary = 0; Secondary = 1; Context = 0	"Offline Generative AI in Remote Indonesian Schools"	ACD-SEC-018	Offline GenAI emerges as a targeted equity response, but remains less frequently represented than general urban–rural access concerns.

4.2. Unequal linguistic access: prompt ecology, policy register, and multilingual classrooms

Public discourse on AI-supported schooling is shaped by a strong formal policy register. Most language-related excerpts are written in Bahasa Indonesia and frame generative AI through guidance, implementation, access, and governance. This pattern matters because policy language creates national coherence: it allows AI, coding, digital citizenship, and school readiness to be communicated across institutional levels. However, the same register can flatten classroom linguistic diversity when it does not explicitly address how students formulate prompts, interpret feedback, and negotiate meaning across Bahasa Indonesia, English, and local languages. This study therefore treats language not as a secondary issue after infrastructure, but as a condition of AI usability. Recent work on GenAI and language education similarly shows that equity depends on whether learners can transform AI interaction into meaningful linguistic participation [8], [6].

The dominant pattern is policy-language concentration. Bahasa Indonesia policy register accounts for 66.7% of language-access evidence, while general language-learning discourse accounts for 26.7%. Multilingual or translanguaging access appears in only 6.6% of coded excerpts. This distribution suggests that national AI discourse is more developed as formal implementation language than as an account of multilingual classroom practice. The imbalance is important because Indonesian schooling operates across Bahasa Indonesia, English, local languages, and informal student repertoires. Studies on language policy, translanguaging, English teacher identity, and digital literacy in Indonesia show that educational equity is shaped by language ideology and classroom linguistic practice, not only by curriculum content [12], [20], [13], [22].

Theoretically, these patterns extend the algorithmic classroom divide beyond connectivity and devices. GenAI requires students to ask questions, evaluate responses, revise prompts, and recognize when outputs misread local context. These actions are linguistic as much as technical. Students with stronger command of formal Bahasa Indonesia, academic English, or platform-oriented prompt conventions may gain more from AI than students whose knowledge is expressed through local languages, mixed codes, or oral classroom practices. This does not mean multilingualism is a barrier; rather, it becomes a resource only when AI pedagogy is designed to recognize translanguaging and culturally situated meaning-making. This interpretation aligns with research on AI equity, language classrooms, and human-centred AI governance, where access is defined by usable participation rather than mere availability [3], [7], [14].

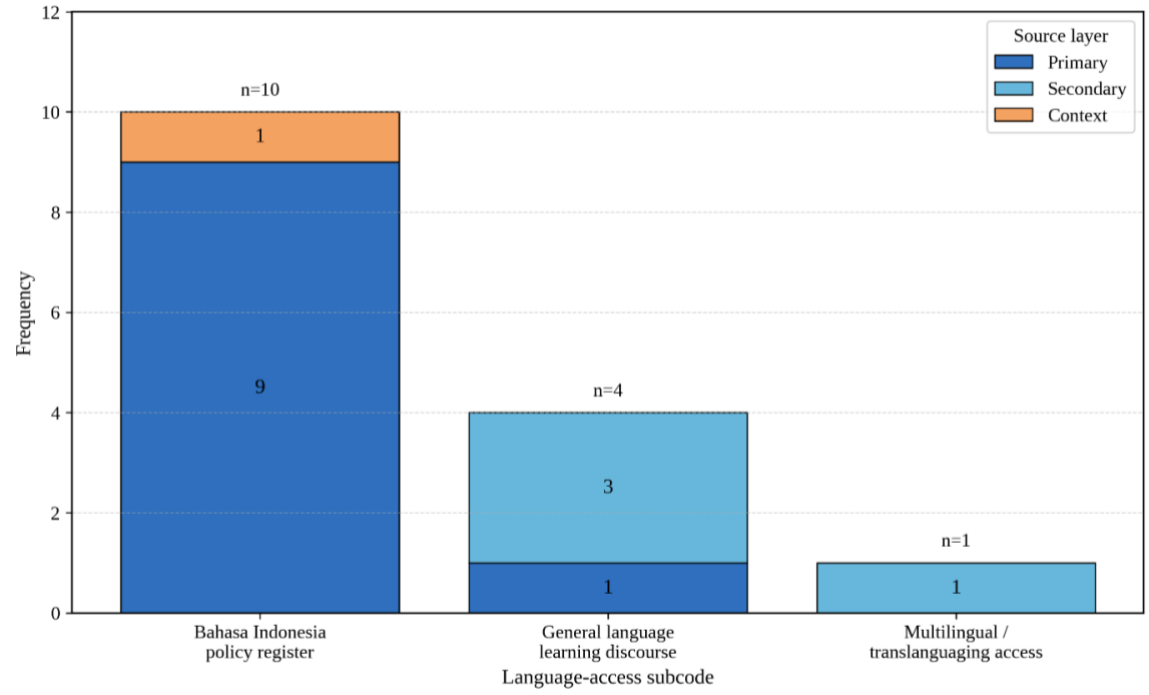

Figure 2. Language access and prompt ecology by source layer

Table 3. Linguistic access and prompt ecology in coded corpus

Main Category	Subcategory	Indicator	Frequency	Percentage	Data Variation	Example / Short Evidence	Data Codes	Initial Interpretation
Policy-language dominance	Bahasa Indonesia policy register	Excerpt uses official Indonesian policy language to frame AI, coding, access, guidance, or national implementation	10	66.7%	Primary = 9; Secondary = 0; Context = 1	"Menetapkan pedoman implementasi koding dan kecerdasan artifisial"; "Sasaran pengguna Semua"; "Pedoman Penggunaan AI di Pendidikan"	ACD-PRI-001, ACD-PRI-002, ACD-PRI-003, ACD-PRI-004, ACD-PRI-005, ACD-PRI-006, ACD-PRI-007, ACD-PRI-008, ACD-PRI-012, ACD-CON-024	AI access is linguistically anchored in formal Bahasa Indonesia, which supports national standardization but may obscure local classroom repertoires.
Language-learning mediation	General language learning discourse	Excerpt links GenAI, education, and language learning without specifying local-language or translanguaging conditions	4	26.7%	Primary = 1; Secondary = 3; Context = 0	"shape equity in English as a Foreign Language"; "language classroom"; "Urban and Rural High Schools"	ACD-PRI-009, ACD-SEC-015, ACD-SEC-016, ACD-SEC-019	GenAI is discussed as a language-learning resource, yet linguistic access is often treated broadly rather than connected to Indonesian multilingual realities.
Multilingual access	Multilingual or translanguaging access	Excerpt recognizes plural linguistic conditions, human-centred use, or flexible language access in AI-supported education	1	6.6%	Primary = 0; Secondary = 1; Context = 0	"human-centred vision"	ACD-SEC-023	Multilingual and translanguaging concerns are present but marginal, indicating limited explicit attention to language diversity as an AI equity issue.
Total	—	—	15	100%	Primary = 10; Secondary = 4; Context = 1	—	15 coded excerpts	

4.3. Access to governed use: teacher mediation, digital citizenship, and policy safeguards

AI-supported schooling is represented most strongly through governance, safeguards, and institutional responsibility. Policy governance and child protection account for 68.8% of coded pedagogical-governance evidence, making it the dominant category in this layer of analysis. This emphasis reflects a shift from technological adoption toward regulated use: AI is not merely introduced as a classroom tool, but as an object requiring guidance, coordination, ethical limits, and protection. Such emphasis is consistent with recent arguments that generative AI creates both learning opportunities and governance risks, particularly when misinformation, bias, academic integrity, and unequal access are not pedagogically managed [3], [7], [5]. Pedagogical access is therefore inseparable from institutional control.

The distribution also reveals an important imbalance. Teacher AI literacy and training appear in 18.8% of coded excerpts, while curriculum integration and general pedagogical mediation each appear in 6.2%. Objectively, this means that policy and protection are more visible than classroom enactment. Primary sources are especially concentrated in governance codes, whereas secondary sources provide broader pedagogical interpretations. This pattern suggests that Indonesian AI-in-education discourse has begun to formalize rules and safeguards, but it is less explicit about how teachers should translate AI policy into task design, feedback practice, multilingual interaction, and assessment routines. Studies on AI-assisted supervision, digital citizenship, high-school AI use, and classroom opportunities in Indonesia similarly emphasize that teacher mediation remains crucial for preventing dependency and supporting meaningful learning [17], [16], [25], [24].

Theoretically, these findings complete the logic of the algorithmic classroom divide. Infrastructure determines whether students can reach AI systems, language determines whether they can communicate with them, and governance determines whether AI use becomes educationally responsible. Without teacher mediation, GenAI may function as unsupervised automation rather than learning support. Without curriculum integration, AI may remain an optional add-on that benefits confident users more than vulnerable learners. Without digital citizenship, students may lack criteria for judging accuracy, bias, privacy, and appropriate use. This interpretation aligns with scholarship that frames GenAI as a socio-pedagogical system rather than a stand-alone technology [15], [6], [14]. This study therefore positions governed pedagogy as the condition that converts AI availability into equitable participation.

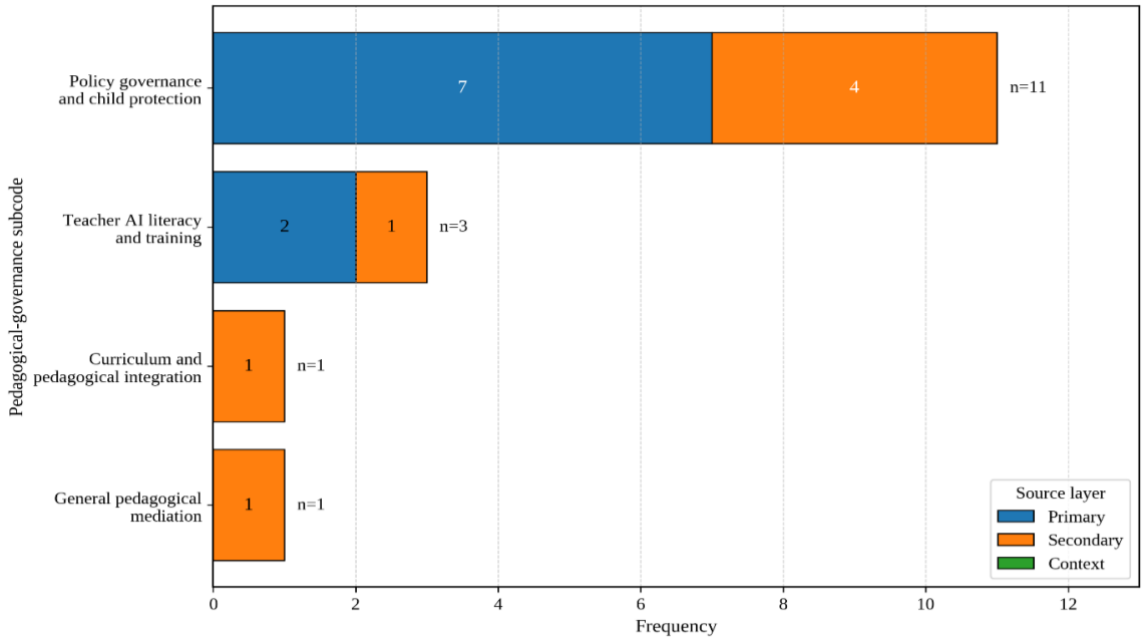

Figure 3. Pedagogical governance and risk coding by source layer

Table 4. Pedagogical governance and risk coding in coded corpus

Main Category	Subcategory	Indicator	Frequency	Percentage	Data Variation	Example / Short Evidence	Data Codes	Initial Interpretation
Governance and protection	Policy governance and child protection	Excerpt refers to formal AI guidance, cross-sectoral regulation, ethical use, protection, or national governance of AI in education	11	68.8%	Primary = 7; Secondary = 4; Context = 0	"Pedoman penggunaan AI di pendidikan"; "Sasaran pengguna Semua"; "human-centred vision"; "tackle persistent disparities"	ACD-PRI-001, ACD-PRI-003, ACD-PRI-004, ACD-PRI-005, ACD-PRI-006, ACD-PRI-007, ACD-PRI-008, ACD-SEC-014, ACD-SEC-021, ACD-SEC-022, ACD-SEC-023	Governance dominates pedagogical discourse, indicating that AI access is increasingly framed through rules, protection, and institutional responsibility.
Teacher capacity	Teacher AI literacy and training	Excerpt refers to teacher preparation, AI literacy, educator training, or capacity to mediate AI-supported learning	3	18.8%	Primary = 2; Secondary = 1; Context = 0	"semua anak, baik di perkotaan maupun daerah terpencil"; "equity digital infrastructure"	ACD-PRI-002, ACD-PRI-009, ACD-SEC-020	Teacher capacity is present but less visible than policy governance, suggesting a gap between institutional regulation and classroom-level enactment.
Curriculum enactment	Curriculum and pedagogical integration	Excerpt links AI use with curriculum, learning design, or systematic pedagogical integration	1	6.2%	Primary = 0; Secondary = 1; Context = 0	"cultivating AI literacy"	ACD-SEC-017	AI integration is acknowledged as pedagogical work, but explicit curriculum-level evidence remains limited in the coded corpus.
Classroom mediation	General pedagogical mediation	Excerpt refers broadly to AI-supported learning, feedback, or language education mediation without explicit governance or curriculum detail	1	6.2%	Primary = 0; Secondary = 1; Context = 0	"shape equity in English as a Foreign Language"	ACD-SEC-015	Pedagogical mediation appears as a concern, but it is less specified than policy and protection discourse.
Total	—	—	16	100%	Primary = 9; Secondary = 7; Context = 0	—	16 coded excerpts	

5. DISCUSSION

The first finding shows that pedagogical authority in AI-mediated language education is not disappearing; it is being redefined as accountable oversight. This matters because the strongest pattern in the corpus links teacher authority to ethical governance, human judgement, and AI literacy rather than to unrestricted classroom autonomy. Such a configuration functions productively when it positions teachers as professional validators of AI-generated lesson plans, feedback, assessment items, and language materials. However, it becomes dysfunctional when oversight is reduced to procedural checking after AI has already structured pedagogical options. This finding supports Adams, Pente, Lemermeyer, and Rockwell (2023), Akgun and Greenhow (2021), and Ninaus and Sailer (2022), who argue that responsible AI in education requires human accountability. It also complicates Fitria's (2023) concern about teacher replacement by showing that replacement is less immediate than redistribution. The implication is that teacher authority now depends on the capacity to govern automation pedagogically.

This redistribution of authority is produced by a deeper structural tension between efficiency-oriented automation and responsibility-oriented professionalism. AI systems are attractive because they can generate content, summarize information, draft feedback, and support planning rapidly; yet these functions also shift the temporal location of teacher judgement. Instead of designing every pedagogical element from the beginning, teachers may increasingly judge, repair, or authorize outputs generated elsewhere. Jeon and Lee (2023) describe this as a complementary relationship between teachers and large language models, while Bearman, Ryan, and Ajjawi (2022) warn that AI discourse in higher education often normalizes system-led decision-making. Turvey and Pachler (2025) similarly identify tension between human-mediated and algorithmically mediated pedagogy. Therefore, the issue is not whether AI assists teachers, but whether assistance narrows or expands the field of pedagogical choice. Authority is preserved only when teachers retain meaningful control over purposes, criteria, and contextual adaptation.

The second finding indicates that professional agency operates as an institutional and ethical condition, not simply as a personal disposition. This matters because the corpus frames teachers as responsible actors whose capacity to make AI-mediated decisions depends on policy, training, accountability structures, and professional learning. Functionally, such framing can protect teachers from being abandoned to individual experimentation with high-risk technologies. It recognizes that AI literacy, ethical awareness, and institutional guidance are necessary for responsible practice. Yet it can also become dysfunctional if institutions transfer accountability to teachers without providing time, resources, technical support, or decision-making authority. This finding aligns with Nagel, Guðmundsdóttir, and Afdal (2023), who connect professional agency to digital competence, and with Mouta, Torrecilla-Sánchez, and Pinto-Llorente (2024), who stress ethical professional learning for AIED. This study therefore suggests that agency is not merely exercised by teachers; it must also be structurally enabled.

The underlying structure behind this agency pattern is a governance gap between formal responsibility and practical preparedness. Teachers are increasingly expected to integrate AI into planning, assessment, communication, and learner support, but professional preparation often lags behind policy expectation. Ayanwale, Adelana, Molefi, Adeeko, and Ishola (2024) show that AI literacy among pre-service teachers is an emerging requirement, while Coşgun (2025) emphasizes AI literacy in assessment design. Kelley and Wenzel (2025) further argue that teacher education requires professional partnership inquiry, not isolated technical training. These studies support this finding, yet some optimistic AI adoption literature tends to treat access to tools as a sufficient condition for innovation. This study challenges that assumption. Agency cannot be inferred from availability. It emerges when teachers are authorized and prepared to question AI outputs, revise them, reject them, and justify their pedagogical decisions within accountable institutional environments.

The third finding shows that language-pedagogical alignment is the most fragile dimension of AI-mediated education discourse. Its implication is significant: AI may be pedagogically acceptable in general education discourse while remaining insufficiently sensitive to language-specific demands. Writing support, feedback, translation, multilingual mediation, differentiation, and curriculum implementation appear in the corpus, but pragmatic appropriateness, cultural meaning, inclusion, and learner identity receive weaker attention. Functionally, AI can assist language teachers by expanding feedback options, generating examples, supporting translation, and adapting classroom materials. Dysfunctionally, fluent AI output may conceal pragmatic mismatch, cultural simplification, inaccurate scaffolding, or inappropriate register. This finding supports Liang, Hwang, Chen, and Darmawansah (2021), Yang and Kyun (2022), Luo, Xia, and Lu (2025), and Tolstykh and Oshchepkova (2024), who document AI's expanding role in language learning. However, this study adds that expansion does not automatically equal language-pedagogical validity.

The underlying reason for this fragility lies in the difference between linguistic fluency and pedagogical fitness. Large language models can produce grammatically acceptable text, but language education requires more than correctness; it requires attention to learner proficiency, discourse purpose, cultural norms, translanguaging realities, and communicative risk. Labadze, Grigolia, and Machaidze (2023) show that AI chatbots can support education, while Wang (2023) illustrates AI use in English translation teaching. Yet translation and chatbot interaction can become pedagogically problematic when they detach language from context. In multilingual classrooms, especially in Indonesian and EFL settings, teachers must decide whether AI-generated language is level-appropriate, culturally intelligible, and aligned with curriculum goals. This explains why teacher authority and professional agency converge most strongly in language-pedagogical alignment. AI can mediate language learning, but teachers remain necessary as interpreters of meaning, context, and educational purpose.

6. CONCLUSION

This study concludes that AI-mediated language education does not simply replace teacher authority; it redistributes pedagogical authority through new forms of ethical oversight, professional judgement, and institutional accountability. The most important lesson is that teacher agency becomes visible not when teachers reject AI, but when they critically evaluate, revise, contextualize, or refuse AI-generated pedagogical output. Its strength lies in reframing AI adoption from a technical problem into a professional and methodological question about decision-making, responsibility, and language-pedagogical validity. By using corpus-assisted document analysis, this study contributes a sharper analytical lens for examining how authority, automation, and professional agency intersect in contemporary language education.

This study is limited by its reliance on public documents rather than direct classroom observation, teacher interviews, or learner-produced data. Consequently, its findings explain how AI-mediated teacher authority is represented in policy, guidance, and sector discourse, but not how teachers actually negotiate AI in situated classroom practice. Further research should therefore combine document analysis with ethnographic observation, teacher reflective journals, classroom interaction data, and comparative studies across multilingual educational contexts. Future studies may also examine how teachers evaluate AI-generated feedback, assessment rubrics, translation support, and writing assistance in real pedagogical episodes, particularly in EFL and Indonesian language education settings.

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AUTHOR CONTRIBUTIONS STATEMENT

Matsaini: conceptualization, methodology, formal analysis, investigation, data curation, writing – original draft, writing – review and editing.

CONFLICT OF INTEREST STATEMENT

Author states no conflict of interest.

AI USE DECLARATION

The author used artificial intelligence tools to assist with the generation of illustrative figures and with the formatting and layout of this manuscript. AI was not used to generate the substantive content, conceptualization, data, analysis, or conclusions of the research, all of which remain the sole responsibility of the author.

INFORMED CONSENT

Not applicable – this study did not involve direct human participants. Data consisted solely of publicly accessible documents concerning generative AI, schooling, language, and infrastructure in Indonesia.

ETHICAL APPROVAL

This research did not involve human or animal subjects; it analyzed publicly accessible policy documents, statistical reports, academic literature, and contextual digital-access sources, and therefore no institutional review board approval was required. Where research does involve human subjects, the author affirms that such research would be conducted in full compliance with all relevant national regulations and institutional policies, in accordance with the tenets of the Declaration of Helsinki, and would be approved by the author's institutional review board or equivalent committee.

DATA AVAILABILITY

The data (publicly accessible policy documents, statistical reports, and coding materials) analyzed in this study are available from the corresponding author upon reasonable request.

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