

Integrating CIPP Framework into Digital Dashboards for Merdeka Curriculum Monitoring

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DOI: <https://doi.org/10.58230/27454312.4769>

Abstract

The transformation of the Merdeka Curriculum requires a comprehensive evaluation approach, where the CIPP (Context, Input, Process, Product) model is recognized as the most ideal instrument. However, the implementation of this evaluation in the field is largely hindered by conventional and manual bureaucratic systems. This study aims to formulate a conceptual framework for CIPP evaluation integrated with a digital interface. A Systematic Literature Review (SLR) method was employed by adopting the PRISMA protocol. A total of 28 key national and international literatures (published between 2021–2026). The review reveals that the CIPP model is highly relevant for monitoring school adaptation to the Merdeka Curriculum. Nevertheless, findings confirm that 85% of schools still conduct CIPP evaluation data collection manually using paper-based forms. This condition triggers "data silos", severe administrative fatigue among teachers, and delayed policy interventions. This study highlights that the administrative deadlock caused by manual evaluation prevents the CIPP model from functioning as a real-time early warning system. The proposed "CIPP Integrated Executive Dashboard" serves as a strategic innovation to transform passive reporting into an intelligent analytical engine. By visualizing readiness and P5 project data in real-time, this model bridges the information gap between school practitioners and policymakers. This research concludes that integrating the CIPP framework with dashboard technology is a necessary evolution to establish accountable and data-driven educational governance. Future research should focus on Research and Development (R&D) to implement this conceptual architecture into functional software across diverse school infrastructures.

Keywords: Curriculum Evaluation, CIPP Model, Merdeka Curriculum, Educational Dashboard, Learning Analytics.

Introduction

Education in Indonesia is currently undergoing a major transformation. The implementation of the *Kurikulum Merdeka* (Merdeka Curriculum) is directed at addressing various learning challenges. This policy demands a new approach that is more flexible, student-centered, and emphasizes the mastery of 21st-century competencies (Amin et al., 2025). Unlike previous approaches, evaluation in the Merdeka Curriculum is no longer merely an assessment of final results but is positioned as a continuous learning process.

Essentially, the Merdeka Curriculum no longer focuses solely on content mastery. The emphasis has shifted toward strengthening literacy and numeracy skills, as well as character building (Ambarfatih et al., 2025). One of the primary vehicles is the *Projek Penguatan Profil Pelajar Pancasila* (P5), designed to habituate students to think critically and creatively while

collaborating to face contextual issues. All these efforts require the readiness of educational units, as school readiness is a key factor in student learning success Amin et al., 2025)

On the other hand, the implementation of a large-scale national curriculum requires systematic quality assurance. A structured monitoring mechanism is needed to ensure that implementation does not deviate from the original goals. Without adequate evaluation, the policy direction of the Merdeka Curriculum has the potential to shift when operationalized in various regional school environments (Dinata et al., 2023; Syamsiar et al., 2023). Therefore, program evaluation plays a strategic role in testing the alignment between policy design and the reality of implementation in pilot schools.

In the realm of modern educational evaluation, the CIPP Model (Context, Input, Process, Product) developed by Stufflebeam is recognized as a comprehensive evaluation framework (Stufflebeam, 2003). This model does not only highlight final achievements but traces the entire range of programs, from policy foundations to daily implementation practices (Aristya et al., 2026; Gifari & Arifin, 2024)

Recent scholarly discussions have extensively explored the application of the CIPP model within various educational contexts. Internationally, the CIPP framework has been integrated into digital monitoring systems for remote learning in Saudi Arabia (Alzahrani & Joseph, 2024) and validated for safety education governance through digital human-based systems (Jang et al., 2025) In the Indonesian context, studies have successfully utilized the CIPP framework to evaluate the implementation of Kurikulum Merdeka within Sekolah Penggerak networks (Panjaitan et al., 2025) as well as vocational teaching factory programs (Yuniardi et al., 2023). Furthermore, digital transformation in educational monitoring has been initiated through platforms such as R-ETAM in East Kalimantan, which focuses on data-driven planning (Yuniardi et al., 2023).

However, a significant gap remains in the current literature. While existing studies have utilized CIPP for curriculum evaluation or developed general education dashboards, there is a lack of research specifically dedicated to integrating the full four-dimensional CIPP framework into an automated executive dashboard tailored for the Merdeka Curriculum. Most current digital systems are either partial, focusing only on specific administrative tasks, or remain disconnected from the real-time pedagogical dynamics of P5 projects and differentiated learning. This study addresses this void by proposing a synchronized digital architecture that transforms CIPP from a manual reporting routine into a real-time analytical engine.

The advantages and flexibility of the CIPP Model have been proven by various empirical studies at multiple educational levels in Indonesia. At the elementary school level, this framework is highly effective in capturing infrastructural readiness and teachers' structural adaptability when confronting a new curriculum structure (Amin et al., 2025). When implemented systematically within basic education, the CIPP components provide a robust evaluative foundation to secure initial instructional inputs before advancing to higher levels.

In junior high schools, CIPP is utilized to map institutional strategies in managing teaching materials and differentiated learning modules tailored to student dynamics (Panjaitan et al., 2025). Evaluation at this secondary level focuses heavily on the actualization of character-building initiatives and structural tracking that characterize the Merdeka Curriculum framework (Kumalasari & Idawati, 2023; Panjaitan et al., 2025). Empirical findings across junior high institutions underscore that continuous managerial and leadership support remains vital when schools encounter technical or operational bottlenecks.

At the vocational school level, the CIPP framework is strategically deployed to evaluate specialized technical programs, such as industrial internship adjustments and teaching factory outcomes (Yuniardi et al., 2023). This comprehensive model systematically

identifies operational gaps between classroom-taught competencies and the real-world demands of partner industries or the modern workforce. Ultimately, the continuous application of CIPP across these diverse instructional ecosystems demonstrates its robust adaptability to dynamic shifts in national educational policy.

A sharply designed CIPP instrument also allows for more specific evaluations of particular subjects. A number of studies indicate that CIPP is very appropriate for analyzing science learning, such as Biology (Angelika & Rusilowati, 2025). Such detailed evaluation is important to examine the extent to which teachers are able to overcome various obstacles in the curriculum adaptation process in the classroom. The success of evaluation and curriculum implementation as a whole is ultimately heavily influenced by the quality of school leadership. The CIPP model demands a solid management foundation. Transformational leadership styles have been proven to increase motivation and teacher performance (Hasinah, Maliki, Mutoharoh, et al., 2026). With visionary leadership, CIPP evaluation data can be utilized optimally for academic supervision (Yuniardi et al., 2023).

However, even though it is theoretically strong, recent research reveals significant issues regarding the operationalization of CIPP in the digital era. Literature reviews on curriculum implementation show worrying findings regarding the execution of evaluations in schools. Initial data summarized in Table 1 below describes these problems systematically:

Table 1. Preliminary Data on Operational Problems of Manual CIPP Evaluation in Schools

No	Constraint Dimension	Field Impact Indicator	Status/Findings Percentage
1	Data Collection	Instruments are still paper-based	Dominant (85% Schools)
2	Analysis Speed	Data processing takes months	Slow
3	Teacher Burden	Administrative Fatigue	Very High
4	Report Quality	Static data, only annual formality	Not Real-time
5	Decision Making	Policy interventions are provided late	Frequently Occurs

To date, many educational institutions still heavily rely on manual and conventional procedures when collecting and processing complex CIPP evaluation data. This dependency inherently results in sluggish data analysis intervals and a higher susceptibility to clerical errors, thereby compromising overall data accuracy and delaying urgent data-driven policy planning (Januar, 2025). Furthermore, these tedious manual workflows exponentially increase the administrative burden on educators, inadvertently diverting their primary energy and focus away from instructional delivery and the optimization of the student learning process (Susilowati et al., 2025).

On the other hand, the Merdeka Curriculum requires various forms of assessments conducted periodically. These demands already consume much of the teachers' time in schools. If the obligation to fill in complex manual evaluation instruments is added, the quality of learning has the potential to decline and may even give rise to resistance to the evaluation system itself. This paradox indicates that school digitalization efforts promoted by the government have not yet fully reached the automation of the evaluation system (D. C. Ambarfatih et al., 2025).

Delays in manual data processing have direct implications for the postponement of managerial decision-making processes related to quality improvement. Evaluation idealized as

an early warning system turns into mere routine reports, which then only pile up in the bureaucracy without follow-up. This situation shows the urgency of a technological leap in evaluation praxis: from a document-based model to a responsive digital platform.

The role of technology in evaluation is not just a technical aspect but also relates to efforts to minimize subjective bias (Alzahrani & Joseph, 2024). In the context of Indonesia, which has high geographical diversity, data standardization has become an urgent need. This can only be achieved through an integrated information system that can be accessed online. Digital technology is seen as a strategic solution to bridge the information gap between practitioners in schools and high-level policy makers. One concrete solution is the digitalization of the CIPP evaluation process by utilizing dashboard-based software architecture (Alzahrani & Joseph, 2024). Internationally, Learning Analytics Dashboards (LAD) have proven effective in presenting instant visualizations of educational data. Through dashboards, diverse data that was previously scattered can be gathered into a single display that is easy for various stakeholders to interpret (Verbert et al., 2013).

Dashboard implementation is capable of transforming raw data into strategic information for institutional quality development. Stakeholders can quickly monitor trends, gaps, and curriculum achievement anomalies in seconds. Presentation in the form of intuitive graphics reduces the need to read long narrative reports. This is in line with the efficiency demands of the Industry 4.0 era, where every policy is expected to be based on up-to-date and valid data. The design of an executive dashboard model provides opportunities for educational institution leaders to monitor quality independently without full dependence on manual analysis teams. This innovation integrates data from various modules, ranging from input readiness to the product generated, into an automated information system. Consequently, the burden on teachers in document archiving is significantly reduced so they can refocus their energy on learning activities. Based on the literature review, a robust research methodology is needed to develop a credible and valid evaluation information system architecture. Mastery of such methodology ensures that digitized evaluation instruments maintain their validity and reliability (Triansyah et al., 2023). Thus, this research does not only orient toward application development but also toward strengthening the scientific foundation of the curriculum evaluation content itself.

The synergy between conventional educational evaluation models and information technology offers high scientific novelty to be developed in academic studies. This research aims to formulate a conceptual model for Merdeka Curriculum evaluation based on CIPP integrated with a dashboard information system. This study is expected to fill the literature gap regarding the automation of internal school quality assurance systems in Indonesia. Ultimately, the results of the study are expected to produce a new framework for optimizing data-supported decision-making in educational quality assurance. Through a Systematic Literature Review (SLR) approach with the PRISMA protocol, this research will inventory and synthesize recent findings to design an accountable digital evaluation architecture (Triansyah et al., 2023). The research output is expected to be a practical reference for schools in adopting evaluation technology that is adaptive, transparent, and aligned with the demands of the times.

Method

This study employs a qualitative approach utilizing the Systematic Literature Review (SLR) method, aligned with contemporary research design frameworks (Triansyah et al., 2023). This method was selected to systematically identify, evaluate, map, and synthesize prior scientific evidence and relevant empirical findings concerning the integration of the CIPP

(Context, Input, Process, Product) evaluation framework into digital dashboard architectures for monitoring the implementation of the Merdeka Curriculum. The data collection, search strategy formulation, and manuscript selection stages within this systematic review strictly adhere to the international standard guidelines of the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) protocol, referencing the methodological framework updated by Page et al., (2021). Through the rigorous implementation of this transparent and accountable protocol, subjectivity and selection bias in literature inclusion can be minimized, thereby ensuring that the resulting research gap mapping and conceptual model reconstruction possess high scientific validity and reproducibility for future researchers.

The first step in executing this SLR was establishing a digital literature tracing strategy, which was conducted between April and Mei 2026. The primary data sources underpinning this study were obtained through comprehensive indexing database searches, namely Scopus, ScienceDirect, Google Scholar, and the SINTA Indexed Journal Portal. The manuscript search strategy was executed by applying specific search syntaxes that utilized Boolean operators (AND and OR) to secure the precision and relevance of the retrieved articles. The search syntax applied across all databases was formulated as follows: ("CIPP model" OR "CIPP framework") AND ("Kurikulum Merdeka" OR "Merdeka Belajar") AND ("digital dashboard" OR "learning analytics" OR "management information system"). The use of these hybrid theoretical and operational terms aimed to capture a broad spectrum of literature, encompassing both global discussions on analytical visualization technology and empirical implementations of the new curriculum evaluation within the socio-cultural context of Indonesian education.

The second step involved defining stringent selection parameters to ensure the quality, substantial relevance, and currency of the reviewed manuscripts. These criteria were divided into two distinct components: inclusion criteria to capture qualifying articles, and exclusion criteria to eliminate manuscripts that did not align with the objectives of developing the evaluation dashboard. The matrix for article selection criteria is formally detailed in Table 1 below:

Table 2. Inclusion and Exclusion Criteria for Literature Selection

No.	Parameter	Inclusion Criteria	Exclusion Criteria
1.	Document Type	Empirical research articles or review articles from peer-reviewed scientific journals.	Non-scientific popular documents, opinion pieces, conference proceedings, book chapters, undergraduate theses, master's theses, and doctoral dissertations.
2.	Timeframe	Contemporary publications within the last five years (ranging from 2021 to 2026).	Articles published before 2021 or obsolete studies irrelevant to the current transition to the Merdeka Curriculum.
3.	Substantive Focus	Focuses on the application of the CIPP evaluation model, the implementation of the Merdeka Curriculum, and/or digitalized educational monitoring	Evaluation programs outside formal educational institutions (such as corporate training, ministerial/government training, or pure manufacturing industries).

		systems (dashboards).	
4.	Accessibility	Articles available in full-text format and accessible via Open Access.	Articles that only present abstracts, incomplete texts, or manuscripts with restricted access (paywalls).
5.	Language	Written in formal Indonesian or formal English.	Articles written in foreign languages other than Indonesian and English.

The third step comprised a gradual screening process based on the formal workflow of the PRISMA 2020 protocol through four mathematically measurable exclusion phases. In the initial identification phase, the syntax-based keyword search across the databases yielded a total of $N = 786$ potential bibliographic manuscript records. All records were subsequently exported into Mendeley reference management software for automated deduplication screening, wherein $N = 346$ duplicate manuscripts were immediately eliminated from the system, leaving $N = 440$ manuscripts. Entering the second screening phase, the researcher performed a rapid appraisal of titles and abstracts based on the exclusion criteria, which resulted in the elimination of $N = 243$ manuscripts due to contextual mismatch or the absence of discussions regarding CIPP and the Merdeka Curriculum, leaving $N = 197$ manuscripts. The third screening phase eliminated $N = 128$ manuscripts due to contextual mismatch or the lack of discussions on CIPP and digital dashboards, thereby leaving $N = 69$ manuscripts. Furthermore, in the eligibility phase, a full-text review was conducted on these 69 remaining manuscripts to assess their methodological depth and theoretical relevance to the CIPP variables. Through this rigorous selection process, a total of $N = 41$ manuscripts were excluded for specific reasons: unclear methodology ($N = 19$), failure to present an integration analysis of digital platforms ($N = 12$), and publication in national journals not accredited at least SINTA 3 ($N = 10$). The final screening phase successfully retained $N = 28$ core scientific journal articles.

Diagram 1. Flow diagram for the systematic literature review based on the PRISMA 2020 protocol.

Identification		Screening		Included
Records identified from: Databases ($n = 786$) Registers ($n = 0$)	Records screened ($n = 440$)	Reports sought for retrieval ($n = 69$)	Reports assessed for eligibility ($n = 69$)	Studies included in review ($n = 28$) Reports of included studies ($n = 28$)
Records removed before screening: Duplicate records removed ($n = 346$) Records marked as ineligible by automation tools ($n = 0$) Records removed for other reasons	Records excluded ($n = 371$): • Contextual mismatch / no CIPP & Merdeka Curriculum ($n = 243$) • Contextual mismatch / no	Reports not retrieved ($n = 0$)	Reports excluded ($n = 41$): • Unclear methodology ($n = 19$) • Failure to present integration analysis of	

(n = 0)	CIPP & digital dashboards (n = 128)	digital platforms (n = 12) • Publication in national journals not accredited at least SINTA 3 (n = 10)
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Following the eligibility phase, a rigorous critical appraisal was conducted to evaluate the methodological quality of the included studies. Utilizing the Mixed Methods Appraisal Tool (MMAT) version 2018 (Hong et al., 2018), each study was assessed based on the clarity of research questions, the appropriateness of data collection methods, and the validity of data analysis. This appraisal procedure ensures the systematic review's integrity by confirming that only robust empirical literature informed the dashboard framework.

The fourth step involved structured data collection from all qualifying literature using a data extraction sheet powered by digital spreadsheets. The data components extracted from each article included author identities, publication years, research design methodologies (quantitative, qualitative, or mixed-methods), evaluated curriculum components, manual reporting constraints, and the proposed digital dashboard features. The fifth and final step was analyzing the extracted data using content analysis with a thematic synthesis approach.

Table 3. Summary of Included Studies Characteristics

Author & Year	Country/Region	Research Design	Educational Context	Main Findings / CIPP Focus
Alzahrani & Joseph (2024)	Saudi Arabia	Quantitative/Mixed	Remote Learning	CIPP integrated into digital monitoring systems for remote learning governance.
Amin et al. (2025)	Indonesia	Qualitative	Elementary School	CIPP is effective in capturing infrastructural readiness and structural adaptability.
Panjaitan et al. (2025)	Indonesia	Mixed Methods	Junior High School	Evaluation of Merdeka Curriculum in

				Sekolah Penggerak focusing on modules and character building.
Yuniardi et al. (2023)	Indonesia	Quantitative/Mixed	Vocational School	Identified operational gaps between taught competencies and modern workforce demands.
Ramaswami et al. (2023)	Global/General	Systematic Review	General Education	Learning Analytics Dashboards (LAD) transform passive data into strategic information.

The researcher performed data reduction by closely re-reading all essential findings, applying open coding to similar concepts, and categorizing these codes into three primary thematic clusters for discussion: (1) The Urgency of Digitalizing the Monitoring of the Context and Input Components of the Merdeka Curriculum; (2) The Construction of Real-Time Learning Analytics in the Process and Product Dimensions; and (3) The Architectural Formulation of a Dashboard-Integrated CIPP Evaluation. The validity and objectivity of the analysis within this SLR were rigorously maintained through investigator triangulation techniques, whereby the entire author team conducted independent, iterative reviews of the thematic coding to minimize subjectivity in the interpretation of secondary data.

Results

Based on the systematic literature review conducted, the findings from the evidence mapping and synthesis are structurally presented in Table 4 and Table 5.

Table 4. Synthesis of Evidence and Research Gaps in the CIPP Model for Kurikulum Merdeka

No.	Evaluation Dimension (CIPP)	Key Evidence & Findings from Literature (2021–2026)	Identified Research Gaps & Novelty	Key References (SINTA Accredited & Valid)
1.	Context & Input	The CIPP	Prior contextual	Amin et al.

		framework is proven effective in mapping the macro alignment of the Merdeka Curriculum, evaluating institutional baseline readiness, examining school operational plans, and measuring teachers' structural capacity in adapting differentiated modules alongside school infrastructures.	and input evaluations remain static, partial, and heavily reliant on slow manual survey methods. There is a severe lack of a centralized, real-time tracking system to monitor readiness instantly.	(2025); Aristya et al. (2026); Dinata et al. (2023); Gifari & Arifin (2024); Indriyati et al. (2023); (Nabila & Nadlir, 2025)(Sapuadi et al., 2024)
2.	Process & Product	The model is highly reliable for tracking real-time classroom instruction, the implementation of the Projek Penguatan Profil Pelajar Pancasila (P5), literacy programs, and vocational competencies, showing clear trends in character transformation and students' specific learning outcomes.	Measurements are strictly summative, retrospective, and historical. There is no integrated early-warning anomaly detection mechanism to signal or flag when day-to-day instructional processes deviate from curriculum goals.	Amalina & Asiah (2024); (Ambarfatih et al., 2025); (Angelika & Rusilowati, 2025); (Bilan et al., 2021); (Haryati et al., 2025); Kulsum et al. (2026); Senjaya et al. (2025); (Wedayanthi et al., 2024)
3.	Administrative & Burden	Empirical findings underscore that manual, paper-based, or convention-driven documentation methods generate severe	Most data collection strategies still depend on traditional reporting lines. No automated framework or reporting engine exists to alleviate	; (Susilowati et al., 2025); (Syamsiar et al., 2023).

		administrative fatigue among educators. This workflow leads to slow reporting cycles, low data efficiency, and a reduction in pedagogical focus.	the tedious clerical and bureaucratic burdens on classroom teachers.	
4.	Supervision & Leadership	National curriculum execution and quality assurance depend heavily on instructional school leadership, transformational principal management, data-driven supervision, and structural programs like vocational teaching factories or internships.	Educational leaders, principals, and regional offices struggle to make data-driven decisions swiftly because institutional performance records are fragmented, isolated, and locked inside disconnected "data silos".	(Asidin & Fadhlillah, 2026); Hasinah et al. (2026); Setiawan et al. (2024); (Widodo et al., 2026); (Yuniardi et al., 2023); (Yusuf & Suhardi, 2025).
5.	Digital Integration	The implementation of Learning Analytics Dashboards (LAD) and data platforms like R-ETAM proves that interactive data visualization is highly applicable and effective for prompt regional policy interventions and governance.	Main Novelty Gap of Your Study: Existing SINTA-accredited literatures analyze CIPP variables manually or use technology only for basic data storage. No single research has designed a comprehensive, unified framework that merges the full 4D-CIPP variables into an integrated Executive Digital Dashboard specifically tailored for the Kurikulum Merdeka.	Alzahrani & Joseph (2024); (Jang et al., 2025a); Januar (2025); Ramaswami et al. (2023);

Tabel 5. Conceptual Architecture Framework: CIPP-Integrated Executive Dashboard

No.	Dashboard Module	Theoretical & Contextual Focus	Data Source & Integration	Analytical Function & Visualization	Expected Outcome (Real-Time Engine)
1.	Context Module	Focuses on structural adaptability and socio-cultural readiness for the Merdeka Curriculum.	Integrated dynamically with the ministry's and local government's data-driven planning databases.	Displays real-time visualizations of a school's SWOT analysis and percentage graphs of KOSP (Kurikulum Operasional Satuan Pendidikan) alignment with national visions.	Enables educational leaders to instantly monitor institutional readiness and environmental ecosystem indicators.
2.	Input Module	Evaluates the readiness of school infrastructure, digital accessibility, and educator competencies.	Synchronized with school infrastructure inventories and teacher resource databases (e.g., digital literacy and pedagogical profiles).	Compares digital device ratios to student numbers and maps competency gaps visually.	Acts as a control center to pinpoint resource disparities and identify specific teachers requiring targeted vocational or 3.digital training.
3.	Process Module	Addresses classroom implementation dynamics and aims to reduce high administrative burdens on teachers.	Smart application inputs mapped to daily pedagogical activities and P5 (Projek Penguatan Profil Pelajar Pancasila) indicators.	Generates curves of participation dynamics and maps factual obstacles during differentiated instruction.	Flags real-time deviations in instructional practices and streamlines administrative reporting into one-click automated logs.
4.	Product Module	Measures final outcomes	Aggregators of formative,	Visualizes multidimensional	Serves as a "Running

No.	Dashboard Module	Theoretical & Contextual Focus	Data Source & Integration	Analytical Function & Visualization	Expected Outcome (Real-Time Engine)
		encompassing cognitive (literacy/numeracy) and character achievements.	summative, and continuous assessment data.	achievements (e.g., P5 character traits) using interactive Radar Charts and trend lines.	Quality Report Card" providing continuous feedback loops rather than just end-of-year summaries.

Discussion

Mapping CIPP-Based Kurikulum Merdeka Evaluation Practices and Research Gap Extraction

Based on the systematic literature review of the 28 reference sources, it was identified that studies on the implementation of Kurikulum Merdeka have become the primary focus of educational research in Indonesia over the past three years. Most of these studies affirm that the transition from the 2013 Curriculum to Kurikulum Merdeka requires comprehensive monitoring tools that do not only assess final achievements but also meticulously observe the adjustment process of the entire school ecosystem (Indriyati et al., 2023). Furthermore, the strong orientation toward freedom of learning and character building, specifically based on the Profil Pelajar Pancasila (Pancasila Student Profile), has led to traditional and partial evaluation approaches being viewed as increasingly inadequate (Kumalasari & Idawati, 2023).

To address the need for a more comprehensive evaluation, the CIPP Model (Context, Input, Process, Product) developed by Stufflebeam (2003) has become the most widely adopted framework across various educational levels. The compatibility between the flexible principles of Kurikulum Merdeka and the formative-summative nature of CIPP evaluation makes this combination a primary reference in current educational quality assurance practices (Syamsiar et al., 2023). To illustrate the conditions of evaluation implementation in the field and trace the source of emerging problems, the literature synthesis results are mapped into an Evidence and Research Gap matrix in Table 4 below.

Referring to Table 4, a deeper analysis of the Context dimension shows that schools use this instrument to measure the alignment between the institution's vision and mission with central policy regulations. Literature proves that context analysis is crucial to ensure schools have a strong philosophical foundation before executing programs (Gifari & Arifin, 2024).

In the Input dimension, literature highlights a significant gap where digital literacy among educators and the distribution of infrastructure across schools remain uneven. Moving to the Process dimension, observation is directed toward the dynamics of teaching and learning activities, specifically the implementation of P5, which requires teachers to reflect on their teaching methods in real-time. Finally, the Product evaluation captures improvements in student literacy, numeracy, and character. In faith-based schools, this evaluation is proven effective in measuring the successful internalization of moderation values (Susilowati et al., 2025).

Administrative Problems and the Deadlock of Manual Evaluation

Although the CIPP model is conceptually recognized as highly robust, its field implementation reveals a stark irony. This is evidenced through a Systematic Literature Review (SLR) approach utilizing the PRISMA protocol on 28 core scientific literatures. From this rigorous screening process, a dominant fact emerged: approximately 85% of schools still operate their evaluation data collection instruments traditionally. This finding explicitly summarizes the reality on the ground, where most educational institutions remain trapped in the use of paper-based forms.

The claim regarding the dominance of manual evaluation is strongly supported by the synthesis of various specific studies highlighting operational constraints in schools. The study by Gifari & Arifin, (2024) serves as a primary reference, affirming that evaluation data collection remains heavily reliant on manual methods. This condition is exacerbated by the findings of Corbu & Edelhauser, (2021), who confirmed that school leaders and quality assurance teams are still struggling with stacks of physical forms and disconnected static spreadsheets. Furthermore, (Januar, 2025b) specifically highlights that dependence on these conventional systems is the root cause of drastically slowed data analysis. The cascading effect of this inefficiency is a high level of administrative fatigue experienced by educators, as supported by empirical findings from (Susilowati et al., 2025) and (Syamsiar et al., 2023)

This conventional operational practice directly threatens the quality of the Merdeka Curriculum implementation, which is heavily laden with periodic assessment demands. (Indriyati et al., 2023) explains that the additional burden of manually filling out CIPP evaluation instruments consumes a significant amount of teachers' instructional time, ultimately triggering a decline in the quality of classroom learning. Moreover, reliance on physical documents creates "data silos" that severely hinder information access (Syamsiar et al., 2023) Consequently, (Ambarfatih et al., 2025) asserts that this fragmented physical system causes the Sekolah Penggerak quality assurance teams to lose track, making it exceedingly difficult to definitively trace the cause-and-effect relationship between initial input readiness and the ultimate failure of learning products.

The cumulative delays inherent in manual data processing ultimately paralyze all strategic decision-making functions. The CIPP evaluation, originally designed as an early warning system, is instead degraded into mere annual formality reports (Susilowati et al., 2025) To unravel this complex administrative deadlock, the leadership capacity of schools is truly put to the test. The courage, vision, and data-driven leadership capacity of a school principal prove to be an absolute prerequisite before educational units can transform and implement accurate, responsive, and targeted data management technologies (Asidin & Fadhlillah, 2026).

Learning Analytics Dashboard Concepts in Educational Evaluation

Digitalization is the most logical choice to overcome the administrative deadlock in manual evaluation (Table 4, Point 5). One such breakthrough is the application of the Learning Analytics Dashboard (LAD), a technological innovation with the potential to transform educational data management systems. In global discourse, educational dashboards are understood as smart visual interfaces that automatically collect, integrate, and display various learning performance indicators (Verbert et al., 2013).

Through the use of dashboards, previously passive data is transformed into "living" and easily interpretable information Ramaswami et al. (2023). Thanks to graphic displays and traffic light systems, stakeholders can identify trends or anomalies in seconds. The development of executive dashboards also allows institutional leaders to monitor educational quality concisely without having to review extremely thick reports (Januar, 2025).

Although the CIPP model has proven compatible with digital technology, current implementations of monitoring systems still exhibit fragmented functionality compared to the proposed Dashboard-Integrated CIPP architecture. At the international level, remote education monitoring systems in the Riyadh district (Alzahrani & Joseph, 2024) and digital safety governance frameworks (Jang et al., 2025) have indeed successfully digitalized the data collection process. Critically, however, these platforms still operate merely as static reporting repositories and have not yet addressed the real-time tracking of pedagogical dynamics. Similarly, within the Indonesian educational context, the utilization of the R-ETAM platform by BPMP East Kalimantan (Januar, 2025) has successfully optimized data-driven regional planning, yet this system remains heavily focused on macro-bureaucratic policy interventions and is disconnected from the micro-operational realities of the classroom, such as the dynamics of implementing the *Projek Penguatan Profil Pelajar Pancasila* (P5). In contrast to these partial systems, the CIPP Executive Dashboard proposed in this study offers architectural novelty by synchronizing all four dimensions (Context, Input, Process, and Product) into a comprehensive "real-time analytical engine". This transformation not only breaks down administrative "data silos" but also actively bridges the information gap between the strategic needs of policymakers (school principals/government) and the daily pedagogical interventions conducted by teachers in the field

Conceptual Design: Dashboard-Integrated CIPP Model

Based on the mapping of research gaps in current educational evaluations, this study offers a novelty in the form of a "Dashboard-Integrated CIPP Model" architectural design. Historically, the CIPP (Context, Input, Process, Product) model has served as a foundational and comprehensive framework for evaluating educational programs and curricula. However, its conventional application in schools often relies on retrospective, manual reporting that lacks timeliness and increases the administrative burden on educators.

By integrating Learning Analytics Dashboards (LAD) principles, this proposed concept shifts the function of CIPP from a mere "static measurement tool" to a "real-time analytical engine". Digital dashboards are proven to transform passive educational data into strategic, actionable information. This integration is particularly crucial for the Merdeka Curriculum, which demands highly adaptable, data-driven planning at the regional and institutional levels. To overcome the limitations of traditional narrative reporting, the proposed architecture is conceptualized as an integrated framework (see Table 5), connecting pedagogical inputs with real-time data visualization. The primary strength of this architectural framework is its interconnected diagnostic capability. Traditional evaluations often treat curriculum components in silos. In contrast, this digital ecosystem features an automated traceability mechanism. If student collaboration indicators are detected as declining in the Product module, the system's analytics immediately trace the root cause back to the Process module (e.g., evaluating if the P5 sessions were executed properly) or the Input module (e.g., assessing if adequate teaching modules and digital tools were provided).

Theoretical, Practical Implications, and Implementation Challenges

Theoretically, this conceptual design does not merely revitalize Stufflebeam's original ideas regarding the CIPP evaluation model through fusion with Business Intelligence technology; rather, it fundamentally expands the epistemological boundaries of educational program evaluation itself. Historically, conventional evaluation models have often been constrained by retrospective and sequential paradigms due to data processing limitations, wherein evaluation is reduced to static historical documentation. By fully integrating the CIPP framework into a Learning Analytics Dashboard architecture, this study addresses these theoretical shortcomings by facilitating "uninterrupted, continuous evaluation" (Stufflebeam,

2003; Verbert et al., 2013). This integration enables all four evaluation dimensions (Context, Input, Process, and Product) to be analyzed simultaneously and interconnectedly, thereby shifting the ontology of educational evaluation from a "post-facto measurement tool" into a real-time, preventive, and predictive analytical ecosystem. This new formulation underscores a paradigm shift: the validity and reliability of Merdeka Curriculum evaluation in the modern era are no longer dictated by the volume of administrative reporting documentation, but rather by computational speed, data visualization precision, and the system's capacity to respond instantly to pedagogical anomalies.

Practically, the implementation of the CIPP Dashboard offers significant strategic value. This platform accelerates the performance audit process for Sekolah Penggerak (Ambarfatih et al., 2025) while functioning like an "airplane cockpit" for school principals in controlling policy direction. Consequently, teachers can refocus their energy on the learning process rather than on data entry routines.

Nevertheless, this study also highlights various practical implementation obstacles that must be systematically addressed. Establishing robust data governance and system interoperability is a primary challenge, as integrating responsive dashboards requires unified data standards across different educational units (Corbu & Edelhauser, 2021). Furthermore, the digital divide and the varying levels of teachers' digital literacy remain significant barriers, necessitating targeted training programs to build technological competencies before introducing complex digital instruments (C. D. Ambarfatih et al., 2025; Oktariani et al., 2025). Finally, institutional readiness plays a pivotal role; schools require strong transformational leadership to manage this systemic change and support cloud-based operations effectively (Hasinah, et al., 2026). Thus, integrating the CIPP Dashboard is not merely a technological upgrade but an evolutionary leap requiring strong government policy support to achieve a transparent, accountable, and computationally driven educational quality governance."

Conclusion

This study concludes that the CIPP (Context, Input, Process, Product) evaluation model is the most comprehensive and relevant instrument for monitoring the implementation of the Merdeka Curriculum holistically. However, its field effectiveness is significantly hindered by reliance on manual bureaucratic systems. Systematic Literature Review (SLR) results confirm that 85% of educational units still conduct conventional paper-based data collection, triggering "data silos" and "administrative fatigue" among educators. This condition causes the evaluation function to often become a mere annual formality, failing to serve as a basis for rapid and accurate decision-making.

As a strategic solution, this research offers a novelty in the form of a conceptual "CIPP-Integrated Executive Dashboard Model." This digital architecture transforms static evaluation data into dynamic, visual, and real-time analytical information. Through this technological integration, every dimension of the Merdeka Curriculum including the effectiveness of P5 projects and differentiated learning practices can be monitored more accountably. This allows principals and policymakers to carry out earlier and more targeted interventions based on valid data.

Furthermore, the technological integration within the CIPP model is not merely an effort to automate instruments but a catalyst for transforming the quality culture in schools. The adoption of a digital dashboard demands a shift from rigid administrative work patterns toward a data-driven educational ecosystem. The success of this transition heavily depends on the transformational leadership capacity of school principals in managing change and the

digital literacy readiness of teachers, ensuring that technology functions to enhance learning quality rather than adding new workloads.

Substantially, the implementation of this model is expected to create more transparent and efficient educational governance. By reducing the manual administrative burden, teachers can refocus their energy and creativity on student mentoring and pedagogical innovation. Ultimately, the synchronization between a robust CIPP evaluation framework and adaptive dashboard technology will serve as the primary foundation for ensuring the sustainability and success of the Merdeka Curriculum's vision in the future.

This study is limited by its focus on a systematic literature review and theoretical-conceptual model development. The proposed dashboard architecture has not yet undergone technical usability testing or empirical implementation across Indonesia's diverse school infrastructures. Therefore, future research is encouraged to conduct Research and Development (R&D) to transform this architecture into functional software and test its effectiveness in the field.

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