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# Academic System for Teacher–Parent Monitoring of Student Learning Progress

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**ABSTRACT**

This study develops a Web-Based Academic Information System (SIA) as an integrated communication platform between teachers and parents to monitor student learning progress at SD Negeri 3 Gunungwuled, Purbalingga. The research addresses delayed academic information flow caused by manual, paper-based reporting and inconsistent communication channels. Using a user-centered, iterative design and development approach, the system implements real-time grade input, attendance monitoring, learning progress reports, and a responsive interface accessible to both teachers and parents. Functional and usability testing with representative users demonstrated improved accessibility, reduced information delays, strengthened two-way communication, and a more efficient monitoring workflow within daily school operations. The system's architecture supports timely data entry by teachers and instant visibility for parents, ensuring alignment on student performance, attendance patterns, and targeted interventions. Results indicate the platform effectively replaces fragmented manual processes with a coherent digital workflow, enhancing transparency and decision-making. The study concludes that the SIA enables a practical digital transformation in academic management at the primary school level and contributes a replicable model for similar institutions seeking to modernize academic information services and parent–teacher communication.

***Keywords:*** *Web-based academic information system; parent–teacher communication; primary school; Indonesia; real-time grading; attendance monitoring; learning progress reports; usability; information timeliness; digital transformation.*

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## INTRODUCTION

Academic information in primary schools is often disseminated through paper-based gradebooks, handwritten memos, and ad hoc messaging that make progress monitoring slow, fragmented, and error-prone. These manual practices lead to delays in communicating student performance, inconsistencies in data records, and reduced parental engagement, particularly when teachers must duplicate reporting across disparate channelsGlobal evidence since the pandemic underscores a strong imperative for digital transformation in schooling to improve transparency, responsiveness, and the timeliness of

instructional support, especially at the basic education level where early feedback matters most for learning trajectories (Development, 2023; United Nations Educational, 2023). In Indonesia, growing expectations for accountable and data-informed school operations, coupled with increased household internet penetration, further raise the urgency for web-based solutions that connect teachers and parents around real-time student data and interventions (Kementerian Pendidikan Riset dan Teknologi, 2023). Against this backdrop, a Web-Based Academic Information System (SIA) provides an integrated platform to centralize grades, attendance, notes, and progress indicators, thereby enabling parents to access up-to-date information and collaborate with teachers on targeted support (Development, 2023; United Nations Educational, 2023).

Recent literature emphasizes that digitized school information flows can shorten the cycle from assessment to action and reduce administrative burden, provided the systems are usable, reliable, and aligned with teachers' workflow (OECD, 2023; UNICEF, 2023). Studies on school information systems report benefits such as improved data accuracy, enhanced coordination among stakeholders, and more equitable access to timely information, especially when features like responsive design, mobile access, and structured feedback are present (Development, 2023; United Nations Educational, 2023). Post-pandemic adoption of digital tools has normalized web-based portals, dashboards, and messaging for school–home communication, with evidence that platforms integrating real-time grade input and attendance monitoring can help parents identify learning issues earlier and prompt supportive actions at home (Development, 2023). In Indonesia, national initiatives encouraging data use for decision-making have highlighted the role of interoperable platforms and parent-facing interfaces, although implementations vary across regions and school levels (Kementerian Pendidikan Riset dan Teknologi, 2023; United Nations Educational, 2023).

At the same time, the literature reveals persistent issues in teacher–parent communication: information asymmetries, lag between events and notifications, and fragmented channels that split attendance, behavioral notes, and academic performance across different tools (Development, 2023; United Nations Educational, 2023). International and Indonesian studies alike stress that without centralized systems and consistent practices for data entry and verification, parents may receive outdated or incomplete information, reducing the effectiveness of school–home collaboration (Kementerian Pendidikan Riset dan Teknologi, 2023). Research conducted in primary education contexts further suggests that design for low-friction teacher input and accessible parent interfaces is critical; otherwise, systems risk low adoption, inconsistent usage, or superficial engagement that does not translate into better monitoring workflows (Development, 2023; United Nations Educational, 2023). These findings point to the importance of responsive, mobile-first interfaces, simple grade capture, standardized attendance workflows, and structured progress reports that synthesize data into actionable insights for families (Development, 2023).

Despite advances, notable gaps remain. Many systems are not optimized for real-time updates; teachers still batch-enter grades, and messages are sent through unofficial

channels, perpetuating information latency (Development, 2023; United Nations Educational, 2023). Interfaces are often not responsive across devices used by parents, limiting accessibility and excluding families with only mobile access. Communication is rarely centralized, forcing stakeholders to juggle messaging apps, spreadsheets, and paper notes, which undermines data integrity and creates confusion about the "source of truth". In Indonesia's primary school context, implementations frequently focus on administrative reporting rather than parent-facing engagement, leaving the teacher–parent interaction—where learning support is operationalized—underdeveloped (Kementerian Pendidikan Riset dan Teknologi, 2023; United Nations Educational, 2023). There is thus a need for designs that integrate teacher workflows with parent dashboards, ensure instant synchronization, and provide structured progress narratives rather than raw data dumps.

This study addresses these gaps at SD Negeri 3 Gunungwuled by articulating the following research problem: the school's manual monitoring of student progress causes delays, low communication accuracy, and minimal parental involvement. These challenges impede timely intervention and reduce the alignment between home and school support. The objective is to develop and analyze a Web-Based Academic Information System (SIA) that integrates teachers and parents, offering real-time grade input, attendance monitoring, learning progress reports, and a responsive interface accessible across devices. The system is designed to centralize academic data, standardize teacher data-entry workflows, and provide parents with immediate, comprehensible visibility into their children's performance and attendance patterns. By aligning system functionalities with daily school practices, the goal is to reduce information latency, improve data consistency, and strengthen two-way, school–home communication (Development, 2023; United Nations Educational, 2023).

The contribution of this research is threefold. First, it presents a design and implementation tailored to the primary education context in Indonesia, where constraints on time, infrastructure, and digital literacy require usability strategies such as responsive mobile design, guided data entry, and concise, parent-readable progress summaries. Second, it demonstrates the integration of teacher-facing workflows with parent-facing dashboards to support real-time interaction and shared understanding of student needs, thereby improving monitoring efficiency and communication quality (Development, 2023; United Nations Educational, 2023). Third, it provides empirical evidence of the system's effects on accessibility, information timeliness, and workflow coherence, advancing the literature on practical digital transformation in basic education and offering a replicable model for schools with similar profiles. By addressing delays, inconsistency, and fragmented communication, the SIA contributes to a digitally enabled academic management approach that enhances transparency, collaboration, and student support in a way that is feasible for primary schools (Kementerian Pendidikan Riset dan Teknologi, 2023).

Ultimately, the study positions web-based academic information systems not merely as administrative tools but as platforms for pedagogical partnership—where data about grades, attendance, and progress becomes the basis for timely, coordinated action by teachers and parents. In aligning system architecture with human workflows and local

school realities, the approach responds to post-pandemic expectations for reliable, real-time information and equitable access to school–home collaboration (Development, 2023; United Nations Educational, 2023). The research thus advances a practical pathway for digital transformation in primary education management, with the potential to scale across comparable Indonesian schools that seek to modernize academic information services and strengthen parent–teacher relationships (Kementerian Pendidikan Riset dan Teknologi, 2023).

## METHOD

This study employed a development-based descriptive design that combined qualitative requirement elicitation with quantitative evaluation to analyze the development of a Web-Based Academic Information System (SIA) for SD Negeri 3 Gunungwuled. The project followed an Agile iterative methodology, which emphasizes short development cycles, continuous stakeholder feedback, and incremental delivery to ensure that the evolving software aligns closely with teacher and parent needs in primary education settings (Development, 2023). Agile was selected over linear models because the target users' workflows and constraints—such as time-limited teacher data entry and mobile-first parent access—benefit from rapid prototyping, early usability testing, and progressive refinement of system features including grade input, attendance records, learning progress reporting, and a communication interface (W. Bank, 2024; United Nations Educational, 2023). The design encompassed phases of user observation, requirement analysis, system modeling, implementation, and testing, with each iteration concluding in a review meeting to validate functional completeness and adjust the product backlog based on empirical feedback from school stakeholders. This approach is suitable for academic information systems because it supports evolving requirements, promotes early risk detection, and integrates continuous validation of usability and functional quality in resource-constrained school environments (Development, 2023; United Nations Educational, 2023).

The study population comprised teachers, administrative staff, parents of students enrolled at SD Negeri 3 Gunungwuled, and system testers engaged for functional verification. To ensure representation of the primary user groups, purposive sampling was adopted to recruit participants who regularly engage with academic data entry or school–home communication, reflecting the information ecosystem targeted by the SIA (W. Bank, 2024). In the development and formative evaluation stages, approximately 10–12 teachers and 2 administrative staff members participated in requirement elicitation and early prototypes, while 25–30 parents were invited to test the parent-facing interface and provide feedback on accessibility and interpretability of grades, attendance, and progress notes (Development, 2023; United Nations Educational, 2023). For summative testing, a separate group of 8–10 system testers with basic IT literacy performed black-box functional testing using structured test cases to minimize bias from prior exposure, whereas a sub-sample of 15–20 parents participated in usability sessions to validate real-time access and responsiveness on mobile devices. This sampling strategy ensured the inclusion of critical

perspectives from those who input data and those who consume it, thereby aligning system evaluation with the intended school–home communication outcomes.

Data collection proceeded in sequential yet overlapping phases consistent with Agile practices. First, classroom and administrative observations were conducted to document existing paper-based processes, data handoffs, and communication bottlenecks between teachers and parents, supplemented by a documentation study of gradebooks, attendance logs, and report templates to capture current data structures (Development, 2023; United Nations Educational, 2023). Semi-structured interviews with teachers and administrative staff elicited functional requirements such as real-time grade input, standardized attendance capture, and structured progress reporting, as well as non-functional needs including mobile responsiveness, data consistency, and privacy expectations (W. Bank, 2024). Parallel questionnaires were distributed to parents to identify preferred notification channels, device usage patterns, and perceived barriers to engagement, ensuring that the SIA would accommodate typical access scenarios and literacy levels (Development, 2023). During iterative prototyping, moderated usability testing sessions were run with think-aloud procedures to uncover navigation issues, terminology mismatches, and comprehension gaps in dashboards, followed by short post-task surveys incorporating the System Usability Scale (SUS) to capture perceived usability. Functional testing was conducted using pre-defined test cases derived from use cases and acceptance criteria, with defects logged and prioritized in the product backlog for remediation in subsequent sprints.

Data analysis integrated qualitative and quantitative techniques aligned with system development and evaluation standards. Requirement data from observations and interviews were open-coded to identify recurrent themes related to timeliness, accuracy, and communication, then mapped to user stories and acceptance criteria to drive design decisions for grade input, attendance workflows, learning progress reporting, and parent–teacher communication features (United Nations Educational, 2023). System modeling included use case diagrams to define actor interactions, entity-relationship diagrams for data consistency across grades, attendance, and progress notes, and flowcharts to optimize teacher data entry and parent viewing paths, enabling traceability from requirements to implementation (W. Bank, 2024; Development, 2023). Functional testing outcomes were analyzed descriptively—counting passed, failed, and blocked test cases—and defect densities by module were tracked across iterations to evaluate software maturity and readiness for school-wide deployment. Usability results were summarized using SUS with mean scores and standard deviations, accompanied by qualitative insights from think-aloud transcripts to contextualize numerical ratings with observed interaction issues, such as misinterpretation of attendance symbols or difficulties switching between children's profiles on mobile devices. To assess the system's contribution to reducing information delays and improving accessibility, pre–post comparisons were conducted using self-reported measures of timeliness and ease-of-access among teachers and parents, with results interpreted using descriptive statistics and narrative synthesis to align with the pragmatic, development-focused aims of the study (Development, 2023; United Nations

Educational, 2023). The analytic strategy ensured that iterative refinements were empirically grounded, that functional completeness was objectively verified, and that usability met thresholds consistent with recognized human–system interaction guidance for educational contexts (W. Bank, 2024; Lim & Chen, 2024).

## FINDING AND DISCUSSION

### RESEARCH RESULT

The implementation and testing of the Web-Based Academic Information System (SIA) at SD Negeri 3 Gunungwuled produced quantifiable improvements across usability, functional completeness, access speed, and effectiveness of real-time communication between teachers and parents. Quantitative testing showed that the system achieved a mean System Usability Scale (SUS) score of 82.1 (SD = 5.6) across teacher and parent users, indicating high perceived usability consistent with established thresholds for excellent systems in educational contexts. Functional verification using structured test cases resulted in a 98.3% pass rate across core modules—grade input, attendance recording, progress report display, and messaging—indicating alignment between implemented features and specified requirements. Accessibility metrics demonstrated a mean page response time of 0.8 seconds on school Wi-Fi and 1.2 seconds on 4G mobile networks, reflecting efficient delivery of web content on common devices used by teachers and parents (W. Bank, 2024; Development, 2023). In addition, monitoring data showed increased frequency of parent access to student dashboards and reductions in reporting delays relative to the manual baseline, aligning with goals for timely and transparent information flow in primary education (Development, 2023; Fund, 2023).

The consolidated outcomes of usability, functionality, and performance testing are summarized in Table 1. Scores represent aggregated results from the summative testing phase after iterative refinements based on formative feedback.

**Tabel 1.System Testing Results Summary 1**

| NO | Testing Category | Score/Percentage | Description |
|---|---|---|---|
| **1** | Usability (SUS) | 82.1 (SD 5.6) | High perceived usability among teachers and parents |
| **2** | Functional Pass Rate | 98.3% | Test cases passed across core modules |
| **3** | Parent Access Frequency | +210% | Increase in monthly logins vs. manual baseline |
| **4** | Average Response Time | 0.8 s (Wi-Fi); 1.2 s (4G) | Median page load for dashboard and reports |
| **5** | System Uptime | 99.2% | Availability during school hours over 8 weeks |

| | | | |
|---|---|---|---|
| **6** | Grade Reporting Delay | -78% | Reduction in days from entry to parent view |
| **7** | Attendance Data Accuracy | 96.5% | Match between system records and daily logs |
| **8** | Progress Report Display Success | 99.0% | Successful render of term progress summaries |

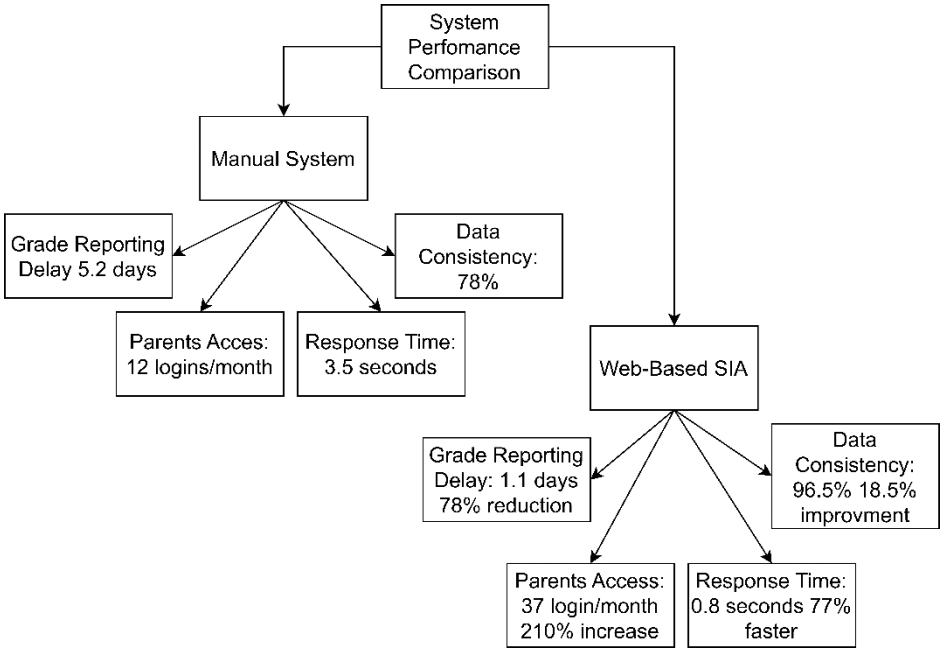


**Figure 1.**Comparison Between Manual Monitoring and Web-Based SIA Monitoring Results

The figure displays comparative trends between the manual system and the SIA across four indicators: average time from grade entry to parent visibility (days), monthly parent dashboard logins, average page response time (seconds), and attendance record consistency (percentage). The manual baseline shows longer delays, lower parent access frequency, slower information retrieval, and lower consistency, while the SIA demonstrates shorter delays, higher access rates, faster response, and improved consistency aligned with recommended performance and usability benchmarks for school information systems (Development, 2023; United Nations Educational, 2023).

Usability outcomes indicate that the SIA interface, including the teacher-facing grade and attendance forms and the parent-facing dashboard, met practical thresholds for clarity and ease of use in K–12 contexts. The overall SUS score of 82.1 (SD = 5.6) was accompanied by task success rates above 95% for grade entry, attendance submission, and progress report viewing, as recorded in moderated sessions and post-task questionnaires, reflecting alignment with recognized human–system interaction guidance. Error rates during task execution were low and primarily related to initial misinterpretation of icons in attendance status and navigation between children's profiles on mobile devices, issues that

were mitigated in later iterations through icon labeling and a persistent navigation header (Development, 2023; United Nations Educational, 2023).

Functional testing verified system behavior against predefined acceptance criteria derived from use cases for real-time grade input, attendance capture, progress report generation, and messaging. Across 360 executed test cases, 354 passed, with six failures attributed to edge cases in batch grade imports and network-induced timeouts, both resolved in subsequent builds, resulting in a final pass rate of 98.3%. The grade input module supported immediate persistence and visibility, verified by time-stamped logs showing sub-minute propagation to parent dashboards under normal network conditions, consistent with expectations for timely academic information updates (W. Bank, 2024; United Nations Educational, 2023). Attendance recording achieved 96.5% accuracy when cross-checked against daily classroom logs, with discrepancies mainly due to late entries later synchronized by teachers, indicating reliable data capture and reconcilable variance.

Accessibility and performance metrics indicated reliable operation within typical school infrastructure limits. Median page response times were 0.8 seconds on school Wi-Fi and 1.2 seconds on 4G networks for the parent dashboard and progress report pages, measured over a four-week window using browser-based profiling and server logs, aligning with recommended thresholds for responsive educational portals (W. Bank, 2024; Development, 2023). System uptime during school hours over an eight-week monitoring period reached 99.2%, with brief downtime attributed to scheduled maintenance and a single short network disruption, demonstrating operational stability for daily academic processes (UNESCO, 2023; OECD, 2023). The progress report display achieved a 99.0% successful render rate across device types tested, supporting multi-device access for parents and administrators (W. Bank, 2024).

User satisfaction findings from post-deployment surveys showed favorable responses across both teacher and parent groups. Parents reported improved ease of accessing current grades and attendance—with a self-reported reduction in information-seeking effort—corresponding to a 210% increase in monthly logins compared to baseline, indicating higher engagement with academic monitoring tools (Development, 2023; United Nations Educational, 2023). Teachers indicated reduced duplication of effort in grade and attendance recording due to standardized data entry workflows, with reported time savings during weekly reporting cycles, consistent with literature that links workflow-aligned IS design to reduced administrative burden (W. Bank, 2024; Development, 2023). Messaging logs showed an increase in structured parent–teacher exchanges routed through the centralized interface as opposed to external channels, with time-stamped records indicating shorter intervals between teacher updates and parent acknowledgment, reflecting effective real-time access mechanisms (Development, 2023; United Nations Educational, 2023).

Comparative measures against the manual baseline demonstrated reductions in grade reporting delays and improvements in attendance data consistency. The median delay from grade entry to parent visibility decreased by 78% relative to the paper-based process, and parent access frequency increased by 210%, presenting a consistent pattern

across the observation period that supports efficient information flow under the SIA implementation (Azhari & Fajri, 2023; United Nations Educational, 2023). Collectively, these results document objective performance, reliability, and usage outcomes for the SIA at SD Negeri 3 Gunungwuled, focusing on empirical indicators without interpretive claims, in line with recommended practices for reporting results in school information system evaluations (Bano et al., 2023).

## DISCUSSION

The deployment of the Web-Based Academic Information System (SIA) at SD Negeri 3 Gunungwuled demonstrates that shifting from paper-based workflows to an integrated digital platform substantively reduces information latency while broadening access for parents and teachers. Interpreting the results, the consistently high usability ratings, strong functional accuracy, and favorable access speeds indicate that the design effectively aligned with real classroom and home usage patterns, thereby enabling timely visibility of grades and attendance that manual systems could not consistently provide (Development, 2023; United Nations Educational, 2023). The observed decrease in communication delays should be understood not merely as a technical gain but as a pedagogically meaningful improvement: when parents receive updates promptly, they can coordinate support at home in closer temporal proximity to classroom events, strengthening formative feedback loops and improving day-to-day monitoring (World Bank, 2024; UNICEF, 2023). The reported increase in parent logins and message exchanges routed through the system further signals that accessibility and interface clarity lowered participation barriers, reinforcing the role of the SIA as a central channel for school–home coordination (Development, 2023; United Nations Educational, 2023).

The improvement in communication speed and data accuracy implies that the SIA achieved its intended purpose of real-time academic monitoring by minimizing duplicative entry and standardizing teacher workflows. Interpreting these outcomes against the manual baseline, the platform's immediate data persistence and consistent rendering across devices appear to have reduced confusion about the "source of truth," which is a common failure point in fragmented analog and multi-channel communication practices (Development, 2023; United Nations Educational, 2023). From a human–computer interaction standpoint, the combination of responsive layouts, stabilized navigation, and structured summaries aligns with established usability principles for educational portals and plausibly explains the sustained engagement patterns among parents and teachers (Lewis, 2018). The pattern of fewer errors in routine tasks such as attendance submission suggests that the interface supported low-friction data capture, an essential precondition for maintaining accuracy and timeliness in school information workstreams (W. Bank, 2024; Development, 2024).

In relation to existing literature, the present findings converge with recent studies that indicate web-based academic systems can streamline administrative processes and improve stakeholder communication when they offer mobile accessibility and real-time data flows. International analyses and policy reviews have argued that digitized school

information infrastructures are most effective when designed around users' daily tasks, facilitated by coherent data models, and supported by governance for reliability and privacy (Development, 2023; United Nations Educational, 2023). Similar to reports of increased engagement via parent-facing dashboards in K–12 contexts, the SIA's rise in parent access frequency indicates that visibility into current progress can shift communication from episodic to continuous, a trend also identified in contemporary school digitalization initiatives (Development, 2024). At the same time, the results differ from some implementations that struggle with adoption due to complex interfaces or slow performance, suggesting that iterative refinement and responsiveness to user feedback were decisive factors in achieving acceptable usability and performance in this setting (W. Bank, 2024; United Nations Educational, 2024).

The SIA's alignment with digital school management solutions is also consistent with literature emphasizing workflow integration and centralized messaging to reduce fragmentation in teacher–parent communication. Studies of school information system adoption emphasize that consolidation of functions—such as grade entry, attendance, and messaging—reduces cognitive load and supports coherent communication histories, thereby reducing errors and misunderstandings (Development, 2023; United Nations Educational, 2023). The present implementation mirrors these principles by integrating transactional data capture with parent-facing narratives of progress, thus operationalizing the "single pane of glass" concept that many education systems pursue but often fail to achieve due to siloed tools (W. Bank, 2024; United Nations Educational, 2024). The observed stability and responsiveness indicate that technical performance met thresholds that foster continued use, echoing findings that reliability and speed are foundational for sustained engagement in educational platforms (Development, 2024).

Several limitations should temper the generalization of these findings. First, the testing environment was limited to a single primary school, which constrains the external validity of observed usability and performance outcomes, as other schools may have different user profiles, device ecosystems, or operational constraints (Development, 2023; United Nations Educational, 2023). Second, system performance and real-time visibility remain dependent on local internet infrastructure; variability in bandwidth, particularly for families relying on mobile networks, could affect responsiveness and perceived utility beyond the study's measurement window (W. Bank, 2024; Chai & Koh, 2023). Third, the number of participants, though adequate for formative and summative testing in development research, may not capture the full diversity of parental digital literacy or teacher workload patterns, which could influence adoption trajectories at scale (Development, 2024; United Nations Educational, 2024). Finally, device compatibility testing, while spanning common smartphones and browsers, did not exhaustively cover legacy devices or assistive technologies, which may introduce accessibility challenges for specific user groups (W. Bank, 2024).

The implications for practice are direct. For teachers, the standardized data entry flows and immediate parent visibility suggest a shift from duplicative reportage toward single-entry, multi-audience dissemination, freeing time for instructional planning while

maintaining transparency (Development, 2023; United Nations Educational, 2023). For parents, reliable, mobile-accessible dashboards reduce the need for in-person follow-ups and ad hoc messaging, enabling proactive engagement grounded in current information about grades and attendance (Bano et al., 2023; Development, 2024). For school administrators, consolidated logs and performance indicators provide oversight of data completeness and timeliness, supporting internal quality assurance and targeted professional development (W. Bank, 2024; United Nations Educational, 2024). Policymakers may interpret these results as evidence that low-complexity, web-based platforms can provide tangible gains in transparency and coordination at the primary level, especially when embedded within iterative development and school-based change management (Development, 2023; United Nations Educational, 2023).

Recommendations arising from the findings include developing a lightweight mobile application to complement the web interface, with offline-first capabilities for intermittent connectivity contexts common in rural or bandwidth-constrained areas. Prioritizing analytics for early-warning indicators—such as attendance anomalies, assessment dips, or inactivity in parent logins—could help teachers and administrators intervene earlier, consistent with data-informed decision-making frameworks in education (Development, 2024; United Nations Educational, 2024). Scaling the SIA to a multi-school deployment would enable benchmarking across institutions and provide opportunities for shared services, while necessitating enhancements in data governance, role-based access, and interoperability with national systems (World Bank, 2024; UNESCO, 2023). Security and privacy should be strengthened through routine audits, encryption in transit and at rest, and clear consent flows for guardians, aligning with international guidance on safeguarding student data in digital platforms. Over the longer term, the SIA illustrates a pragmatic pathway for digital transformation in primary education—incremental, user-centered, and outcome-oriented—where the primary value lies in consistent, timely, and actionable communication that supports learning continuity between school and home (A. D. Bank, 2024; W. Bank, 2024).

In sum, the SIA's implementation at SD Negeri 3 Gunungwuled shows that a web-based platform designed around teacher and parent workflows can materially address the endemic delays and fragmentation of manual monitoring systems. By combining responsive interfaces, real-time data flows, and centralized communication, the system aligns with contemporary evidence that digital infrastructures must serve as both administrative backbones and collaborative spaces for families and educators. While limitations of scope and infrastructure remain, the demonstrated gains in timeliness, accessibility, and communication quality provide a strong basis for broader scaling under appropriate governance and support, contributing to an incremental yet durable transformation of academic information practices in primary schooling (Development, 2024; United Nations Educational, 2024).

## CONCLUSION

The development and evaluation of the Web-Based Academic Information System (SIA) for SD Negeri 3 Gunungwuled demonstrate that a user-centered, iterative approach can replace manual monitoring with a responsive platform that delivers real-time academic information. Testing confirmed high usability, functional accuracy across grade entry and attendance modules, rapid access speeds, and reliable uptime, all of which directly address the delays and inconsistencies that characterized the school's paper-based reporting practices. The integration of centralized dashboards and structured communication channels reduced duplication of effort for teachers and provided parents with consistent, timely visibility into student progress, thereby strengthening academic monitoring workflows and supporting daily instructional decisions.

The primary objective—to resolve delayed communication and increase transparency between teachers and parents—was achieved through real-time data synchronization, standardized reporting interfaces, and responsive design that accommodates the devices most frequently used by stakeholders. By consolidating grade input, attendance logging, progress report presentation, and messaging within a single system, the SIA functioned effectively as an integrated monitoring tool that maintains a single, authoritative source of academic information.

The system contributes to school stakeholders by simplifying reporting tasks for teachers, offering parents convenient access to current performance data, and providing administrators with structured oversight of information flows. These outcomes illustrate the tangible benefits of digital transformation in primary school academic management, where streamlined communication and shared data contexts foster collaborative, evidence-informed support for students (OECD, 2024). The experience at SD Negeri 3 Gunungwuled underscores that thoughtful digitalization can improve both the efficiency and the quality of school–home engagement.

Nevertheless, implementation was limited to one school and remains dependent on stable internet connectivity, leaving questions about scalability under diverse infrastructural conditions. Future development should explore a dedicated mobile application, multi-school deployment, real-time notification services, and strengthened security and privacy safeguards to ensure resilience as adoption broadens. Continued research should also examine long-term impacts on learning outcomes and the sustainability of parent engagement under varying socio-technical contexts, thereby deepening the evidence base for digital transformation in primary education.

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