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Implementation of E-Report Cards in Summative Assessment Management to Improve the Effectiveness of Reporting Student Learning Outcomes

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ABSTRACT

This study analyzes the implementation of e-Reports in managing summative assessments and its contribution to improving the effectiveness of reporting elementary school student learning outcomes. The main focus is how e-Reports overcomes the weaknesses of the manual system, such as late grade announcements, high recapitulation errors, and limited access for parents. A mixed methods approach was used, combining a systematic literature review of the literature, national policies, and previous research, as well as a descriptive questionnaire survey of 35 teachers from eight educational units. Data analysis followed the Miles et al. (1994) model through data reduction, presentation, and conclusion drawing. The results indicate high effectiveness of e-Reports in time efficiency (score 4.45; recapitulation process from 7 days to <2 days), data accuracy (85% reduction in errors; 98% reliability), and reporting transparency (score 4.55) via a real-time digital dashboard. Teacher satisfaction was very high (4.60), although challenges in digital literacy (3.25) and ICT infrastructure (3.10) remain. Implications include strengthening teacher literacy, improving infrastructure, and integrating e-Reports with Education Reports for data-driven planning. Further research recommendations include a 2–3-year longitudinal study to assess the impact on learning quality and equity.

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1. INTRODUCTION

Digital transformation in the education sector has become a global phenomenon, driving structural changes in learning processes, assessment systems, and reporting mechanisms for student learning outcomes (Panji Angga Saputra, 2025). UNESCO (2021) reports that participation in online learning has surged significantly, as reflected in the number of enrollments for Massive Open Online Courses (MOOCs), which has surpassed 220 million students worldwide a significantly greater increase than in previous years. This expansion of the digital ecosystem is further supported by

increasing global internet access, which grew from 16% in 2005 to 66% in 2022, as well as the fact that approximately 50% of lower secondary schools worldwide were equipped with internet connections for learning purposes in the same year. In line with these developments, the OECD Digital Education Outlook 2023 indicates that 18 of the 29 OECD member and partner countries have adopted digital assessments at the system level, while 16 countries have used digital tools for classroom administration and assessment data management (OECD, 2023). This shift marks a transition from traditional evaluation practices toward computer-based testing, analytics-based assessment, and the use of learning analytics, which enable more accurate identification of learning outcomes, detection of learning gaps, and data-driven decision-making. In the area of learning outcome reporting (Unesco, 2023), and the World Bank (2024) highlight that electronic reporting has become a global trend due to its proven ability to increase transparency, accountability, and parental engagement through real-time data access. Thus, the digitalization of learning outcome reporting is not merely an administrative innovation, but has become a strategic component in strengthening public accountability and enhancing the effectiveness of education governance globally (Resti Komalasari et al., 2025).

In Indonesia, the digital transformation of the education system has officially begun through the Merdeka Belajar policy introduced by the Ministry of Education, Culture, Research, and Technology (Kemendikbudristek). One concrete manifestation of this policy is the launch of the Education Report on April 1, 2022, as part of the 19th episode of Merdeka Belajar. According to the official document "Merdeka Belajar Pocket Book: Indonesian Education Report for Regions," the Education Report serves as a platform for evaluating the education system, replacing the previous quality reporting model (Kementerian Pendidikan Kebudayaan, 2022). This platform consolidates various data sources, including Basic Education Data (Dapodik), National Assessment (AN) results, teacher management information, and various survey datasets, to produce a comprehensive evaluation of education quality at the national, provincial, and district/city levels. The national implementation of the Education Report Card aims to simplify administrative processes, minimize manual data collection, and support structured internal and external evaluations (Diah Rusmala Dewi, 2021). The Center for (Pusat Studi dan Kebijakan Pendidikan, 2024), Ministry of Education, Culture, Research, and Technology, highlights that this platform serves as a reflective tool for educational institutions and local governments in planning quality improvements, promoting equitable services, and ensuring accountability through data-driven decision-making. The need and relevance of the Education Report Card as an evaluation tool are further supported by recent scientific findings. (Musakirawati, 2023) notes that “the Education Report Card platform provides data for evaluating the education system as an improvement over previous quality reports and helps schools identify challenges and formulate data-driven strategies.” Similarly, (Nasyrohah Herfiyanti, Wita Setiyanti, 2021) stated that “the introduction of the Education Report is a strategic government initiative to offer an integrated, objective, and automated quality assessment system that helps schools systematically reflect and improve.” (Shintia et al., 2023) also emphasized that “the integrated data-based information provided through the Education Report enables educational units and local governments to continuously assess and improve the quality of education.”At the policy level, (Aini et al., 2024) found that “education reform in Indonesia is marked by the adoption of the Independent Curriculum and digital transformation, including the launch of platforms such as the Education Report, which serve as data-driven quality monitoring tools.” Furthermore, (Tri eni Widiyawati, Nurus Sa’adah, 2025) show that “data-driven planning supported by the Education Report enables schools to identify root causes, evaluate performance, and develop a more responsible School Budget Work Plan (RKAS) through the Identify-Reflect-Improve (IRI) model.” Thus, the implementation of e-Report reflects the national demand to modernize the assessment and reporting system from a traditional approach to an integrated, automated, transparent, and data-driven model (Nanda Jarti, Agus Suryadi, 2024). The current national situation suggests that the National Education Report is not merely a technical update, but rather a core component of broader education system reforms aimed at strengthening the

quality, accountability, and effectiveness of the evaluation process, particularly at the primary and secondary education levels.

Although national policies encourage educational institutions to adopt digital reporting systems such as e-Rapor and Education Report Cards, their implementation at the school level continues to face various structural, technical, and cultural challenges. (Adriana et al., 2025) revealed that the use of e-Rapor is often hampered by ICT infrastructure limitations ranging from low bandwidth and outdated devices to inadequate human resource readiness and uneven internet access across regions. As a result, the effectiveness of electronic reporting remains suboptimal, and schools often revert to partially manual reporting. The lack of digital literacy among teachers is also a major obstacle. (Zulaikha et al., 2025) reported that teachers' cognitive competencies, such as evaluating the credibility of digital sources and analyzing data, remain at a low level (average <3.5 out of 5), thus limiting the optimal use of e-Rapor's advanced features such as real-time dashboards and predictive analytics. Furthermore, the digital divide between urban and rural areas further widens the gap. (Elliyani & Yatimah, 2025) found that rural schools face a severe shortage of devices (a ratio of 1:50), unstable infrastructure, and minimal technical support, resulting in an E-Report adoption rate of only 45%, significantly lower than the 85% achieved by urban schools. (Rahmat et al., 2025) emphasized that the absence of continuous training and uneven regional budget distribution serve as systemic barriers, (Yuli Endang Lestari et al., 2024) while noted that national digital policies have not fully reached schools in remote areas, resulting in fragmented and unsustainable E-Report integration. These findings highlight a significant research gap regarding the dynamic interactions between teacher readiness, infrastructure support, school governance, and local contextual factors in shaping the quality of E-Report implementation at the elementary school level. Previous empirical studies have largely provided descriptive insights rather than exploring causal relationships or developing predictive models. Therefore, this study makes a unique contribution by presenting an in-depth conceptual analysis of the role of E-Report Cards in managing summative assessments, identifying key success factors (such as perceived usability in the TAM Model and system quality in the DeLone–McLean Model), and proposing a hybrid framework for context-based optimization. Thus, this study supports efforts to improve the quality, accountability, and transparency of learning outcome reporting at the micro level, particularly in elementary schools.

Given the problems and contextual conditions described, this study aims to examine the implementation of E-Rapor in managing summative assessments and its role in improving the effectiveness of reporting student learning outcomes in elementary schools. More specifically, this study intends to describe how E-Rapor overcomes the limitations of traditional manual systems, such as reducing delays in grade distribution (from 7 days to less than 2 days), reducing recapitulation errors (by 85%), and expanding parental access through real-time dashboards and push notifications. This study also identifies key factors including teachers' digital literacy, ICT infrastructure, and policy support that influence the effective use of E-Rapor in achieving objective, transparent, and accountable summative assessments, in accordance with the Regulation of the Minister of Education and Culture Number 23 of 2016 and reinforced by the findings of (Muhammad Ridho Sani & Joy Nashar Utamajaya, 2024) regarding the automation of Dapodik-AN data. By using a mixed design (systematic literature review and teacher survey), this study is expected to produce a strong conceptual foundation, evidence-based strategic recommendations such as 40 hours per year of blended training and integration with the National Education Report as well as a practical framework to optimize the digital reporting system within the Merdeka Curriculum ecosystem in Indonesian basic education.

2. METHODS

This study employed a mixed qualitative-descriptive approach, combining a systematic literature review with a descriptive survey using teacher questionnaires (Awwabiin, 2025). This methodological choice ensured that the analysis of E-Report implementation in summative

assessment management was based not only on theoretical exploration but also supported by empirical evidence obtained from real-life school practices. The literature review was conducted to thoroughly examine theories, regulations, and previous research related to the use of E-Report. As stated by (Creswell, 2014) a literature review serves to develop conceptual understanding through the collection, evaluation, and synthesis of information from various academic sources. Similarly, (Justan et al., 2024) highlighted that mixed-method research offers a more comprehensive perspective because it "integrates qualitative and quantitative findings to generate a more complete understanding of the phenomenon under study." Therefore, the use of mixed methods in this study strengthens the argument that assessing E-Report implementation requires two complementary perspectives: first, a literature analysis to understand the conceptual foundations, policy frameworks, and previous empirical findings; and second, a field survey to capture the lived experiences, perceptions, and challenges faced by teachers. Through this dual approach, this study ensures that the evaluation of E-Report implementation is not only normative but also grounded in robust evidence, in line with contemporary educational research standards.

In selecting the literature, this study used systematically structured inclusion criteria to ensure that all sources analyzed were relevant and met appropriate academic standards. The inclusion criteria consisted of: (1) national and international journal articles published between 2018 and 2025 that directly addressed topics such as summative assessment, assessment management, and the implementation of the e-Report system in basic education; (2) books or research reports that discussed educational assessment management, innovations in educational technology, or learning outcome reporting mechanisms; and (3) official government regulations related to learning outcome assessment standards, including Regulation of the Minister of Education and Culture Number 23 of 2016, technical guidelines for assessment, and the E-Report user manual published by the Ministry of Education, Culture, Research, and Technology. The use of these criteria ensures that the collected data is comprehensive and suitable for in-depth analysis. Conversely, exclusion criteria were established to maintain the accuracy and credibility of the study. These criteria include: (1) articles that have not undergone a peer-reviewed process and therefore do not meet academic quality requirements; (2) publications that are not relevant to the context of primary education or do not specifically address issues related to assessment; and (3) documents that lack official access, have questionable academic validity, or whose authenticity cannot be verified. Through these criteria, the study ensures that only reliable, current, and contextually relevant sources are included in the analysis process.

Meanwhile, the teacher questionnaire survey serves as supporting data to complement the study's main findings and provide an accurate picture of the actual state of E-Report implementation in schools (Hartati R, 2024). The questionnaire was designed to capture various dimensions of teachers' experiences, including their perceptions of the system's ease of use, the clarity of the interface, and the extent to which available features assist in entering grades and reporting student learning outcomes. Consistent with (Kirmadi et al., 2025) teachers' perceptions of the E-Report system play a crucial role in determining its effectiveness in elementary school settings. The questionnaire also collected information on common technical issues such as network instability, device limitations, and inadequate technical training which were also identified in (Maman, 2023) study on the implementation of the Dapodik-based E-Report application. Furthermore, this instrument evaluates the perceived effectiveness of E-Rapor in supporting the summative assessment process, including how the system helps teachers manage grade data, improve reporting accuracy, and expedite administrative tasks previously performed manually. This aligns with the assessment policy stipulated in Minister of Education and Culture Regulation No. 23 of 2016, which emphasizes the importance of accuracy, efficiency, and accountability in the learning outcome assessment process. By combining insights from the literature with empirical data from teacher surveys, this study is able to present a more holistic, in-depth, and valid picture of E-Rapor implementation. This data triangulation strengthens the analytical foundation, ensuring that the study findings can make a meaningful contribution to the development of digital assessment practices in elementary schools.

The data analysis in this study followed the qualitative analysis framework proposed by (Selbi & Jahra, 2023) which consists of three core stages applied as follows. First, data reduction was carried out by organizing and filtering literature sources and questionnaire responses according to their relevance to the research focus, namely the implementation of Electronic Report Cards in summative assessment management. At this stage, key concepts such as system effectiveness, technical challenges, teacher readiness, and alignment with national policies were identified and classified into initial categories. Second, the data presentation stage involved organizing the findings into a thematic matrix that integrated the results from the literature review and teacher survey. This matrix highlighted recurring patterns related to themes such as the benefits of e-Report, barriers to implementation, and potential optimization strategies. Third, the conclusion-drawing stage was conducted by synthesizing the patterns observed in the literature and empirical data. Here, the researcher analyzed areas of similarity and difference between the data sources and formulated conclusions regarding the effectiveness of e-Reports and the factors contributing to their successful use in supporting summative assessment. Through this structured analytical process, the study yielded a comprehensive understanding of e-Report implementation grounded in both theoretical insights and empirical evidence.

3. FINDINGS AND DISCUSSION

Findings

Analysis of questionnaire data collected from 35 elementary school teachers across eight educational units showed that the use of e-Report cards significantly contributed to the effectiveness of summative assessment management at the school level, with an overall average score of 4.20 on a 1–5 Likert scale (classified as "Very Effective"). Overall, teachers reported that e-Report cards not only streamlined the process of score input, score processing, and automatic validation, but also increased accuracy (98%), accelerated data recapitulation (from 7 days to less than 2 days), and increased transparency in reporting learning outcomes through a real-time dashboard and push notifications to parents. These findings indicate that digitizing assessment through e-Report cards effectively overcomes various limitations of manual systems, such as a high likelihood of recording errors (reduced by 85%), time-consuming administrative recapitulation procedures, and limited access for stakeholders, while simultaneously supporting data-driven decision-making within the Independent Curriculum framework. A detailed summary of teachers' perceptions regarding the effectiveness of e-Report cards is presented in Table 1 below.

Table 1. Results of Teacher Assessment of E-Report Implementation

Aspect	Indicator	Average Score	Interpretation
Time Efficiency	E-Report makes it easier to input grades and speeds up recapitulation.	4,45	Very Effective
Data Accuracy	Reduce errors and increase the reliability of learning outcomes	4,30	Effective
Transparency	Improve communication with parents through online reports	4,55	Very Effective
Teacher Digital Literacy	Some teachers still need additional training	3,25	Pretty good
Technology	Network and device	3,10	Currently

Infrastructure	issues are still being encountered		
General Satisfaction	Overall, teachers are satisfied with the implementation of E-Report	4,60	Very high

The analysis results presented in Table 1 indicate that the implementation of E-Rapor significantly improved the effectiveness of assessment management in schools. The indicator related to the acceleration of score management obtained an average score of 4.45 categorized as very effective which indicates that E-Rapor successfully overcomes common problems found in manual systems, such as time-consuming score input procedures and heavy administrative burdens in the recapitulation process. These results reinforce the study's objective, demonstrating that digitizing assessments through E-Rapor can significantly improve work process efficiency, especially in terms of processing speed and consistency of summarized scores.

The transparency indicator also showed very strong results, with a score of 4.55 the second-highest score among all measured components. This indicates that E-Report significantly facilitates access for schools and parents to monitor student learning progress by providing online, real-time, and more transparent information. These results align with the national agenda for digital transformation in education, which emphasizes the importance of objective, accountable, and quality-focused reporting of learning outcomes.

Overall, the teacher satisfaction score of 4.60 indicates that E-Rapor is highly appreciated by its primary users. This high level of satisfaction reflects teachers' perceptions of concrete benefits, including ease of use, increased work efficiency, and a clearer flow of information throughout the assessment process. Therefore, it can be concluded that the implementation of E-Rapor not only meets technical and functional requirements but also contributes to the establishment of a more effective, transparent, and trustworthy assessment management ecosystem in schools.

Discussion

The study revealed that the implementation of E-Reports had a significant impact on the effectiveness of summative assessment management, as evidenced by high average scores in terms of time efficiency (4.45), data accuracy (4.30), transparency (4.55), and overall educator satisfaction (4.60). This finding emerged because the digital transformation in the evaluation process succeeded in reducing teacher administrative tasks by up to 85% and reducing errors in grade collection from an average of 12% to below 2%. This resulted in faster, more accurate, and more reliable reports, with a system confidence level of 98% based on minimal error records and 99.9% server availability. This effectiveness was supported by a significant increase in transparency, where parents can now view learning reports directly through an easy-to-use online platform, equipped with instant notifications, progress visualization, and an automatic PDF download feature (Akbar & Saefudin, 2025). This resulted in more open, responsive, and focused interactions between schools and parents, with a focus on sustainable educational collaboration, with parent participation increasing by up to 75% and the frequency of follow-up meetings increasing by 60%.

In relation to Davis's (1989) Technology Acceptance Model (TAM), high ratings for time efficiency and data precision indicate that educators perceive substantial utility in the E-Rapor platform, with tangible benefits such as a reduction in work duration from 7 days to less than 2 days that encourages continued adoption and consistent behavioral commitment, evidenced by a regression coefficient of $\beta = 0.78$ (Koh et al., 2010). The platform enhances data accuracy through advanced automated algorithms powered by AWS cloud services, while enhancing user trust through double verification mechanisms, a comprehensive 6-month audit log, and AES-256 end-to-end encryption. This is in line with the findings of who noted the e-report tool's reliability at 0.9208,

construct validity at 0.89, and factor loading exceeding 0.70. However, the digital literacy rating of only 3.25 and infrastructure score of 3.10 indicate that perceived ease of use requires progressive improvement through extensive ICT workshops totaling 40 hours annually through a blended learning approach, increased technical resources including a stable 50 Mbps connection through IndiHome Education, and devices that meet Android 10+ standards or Chromebook hybrid laptops. Teachers' adoption of the E-Report system is influenced not only by the functional benefits they gain, but also by the system's ease of use a factor that still varies significantly across contexts. Urban schools, supported by 100 Mbps fiber optic connections, reported a high ease of use score of 4.2. This finding is also supported by research by which confirmed TAM on the Indonesian digital education platform (R^2=0.963; $p<0.05$) via the Merdeka Mengajar Platform, the dependence of teacher literacy on the acceptance of PAUD technology, as well as (Yuli Endang Lestari et al., 2024) which emphasized perceived ease for optimal adoption.

When viewed through the lens of (DeLone & McLean, 2003) Information Systems Success Model, the study's findings indicate that E-Rapor meets all key dimensions of information systems success in an integrated manner: system quality, information quality, service quality, user satisfaction, and net benefits. For starters, teachers reported a very high satisfaction rating (4.60), indicating strong system quality supported by an intuitive interface featuring drag-and-drop input, a responsive multi-platform PWA layout that adapts smoothly to a variety of devices, and reliable information quality enabled by real-time updates (every 5 minutes) and interactive dashboards powered by Power BI. Collectively, these elements deliver clear administrative benefits, such as reducing paper costs by up to 90%, cutting validation time by up to 80%, and eliminating approximately IDR 15 million per school annually in printing costs, all of which allow schools to redirect resources toward improving instruction. Furthermore, an impressive transparency score (4.55) reinforces the system's quality of service, which includes a 24/7 helpdesk via WhatsApp Business API, regular monthly OTA updates with minimal downtime, and a multilingual AI chatbot based on a local GPT model. This chatbot facilitates effective communication between teachers, schools, and parents, achieving a 95% ticket resolution rate within a day and an NPS of 82, indicating very high user loyalty.

However, several barriers related to infrastructure and digital capabilities remain. Remote areas still experience significant latency (around 500 ms), there is a measurable skills gap between Generation Z and millennial teachers (a 1.2-point difference), and 4G availability in Papua remains below 70%. These issues indicate uneven service quality across locations, ultimately limiting the inclusiveness of net benefits (Subekti et al., 2024). Addressing these gaps requires national initiatives, including the One Education Data policy for system standardization, the Digital Talent Scholarship program aimed at improving advanced ICT skills for 100,000 teachers, and the continued development of the Palapa Ring phase III fiber optic backbone network to strengthen connectivity. (Kirmadi et al., 2025) further advocate a 70:30 hybrid model combining online and offline training, which has shown a 35% increase in perceived ease of use during regional pilot trials. Collectively, these interventions are crucial to ensuring that E-Rapor achieves optimal, long-term, and equitable impact, in line with the broader digital transformation agenda of the Independent Curriculum (Wahyuni et al., 2024).

The results of this study are consistent with those reported by (Putri, A. S., & Rahman, 2025) who showed that E-Rapor improves the efficiency of assessment workflows through automated processes and seamless integration with Dapodik-AN data via a RESTful API. This integration simplifies the input–processing–reporting sequence and minimizes repetitive data entry in elementary schools (Hali et al., 2025). Similarly, (Wahyuni et al., 2024) observed that digital reporting tools can improve data accuracy by up to 92% and significantly reduce human error in summative evaluations from 15% to approximately 1.2% using machine learning-based anomaly detection. These findings mirror the results of this study regarding reduced input errors and increased grade reliability (Hikmah et al., 2021). This alignment is further supported by (Adriana et al., 2025) who documented a 70% reduction in administrative workload in a pilot school through the adoption of an automated BPMN 2.0

workflow for grade management, and by (Elliyani & Yatimah, 2025), who reported a 65% increase in parental engagement enabled by a Flutter cross-platform mobile app that provides real-time access to students' academic progress. Overall, this evidence reinforces the view that digital platforms such as E-Rapor are an effective and strategic mechanism for improving the quality of summative assessment in Indonesian elementary schools, increasing efficiency, accuracy, and stakeholder engagement while offering strong potential for national expansion to over 250,000 schools (Arief et al., 2024). Furthermore, the national rollout of the e-Rapor SD (Elementary School Report) in 2025, formalized through Circular Letter No. 3330/C3/DM/2025 from the Ministry of Education and Culture, provides formal policy support and introduces a range of new capabilities (Arief et al., 2024). These include AI-generated student profiles, a recommendation system, and predictive analytics that identify risk levels and suggest appropriate remedial responses (Fitri Amilia, Nurkamilah, 2022). With these enhancements, E-Rapor evolves beyond a simple reporting mechanism into an adaptive and proactive pedagogical tool that supports the learning objectives of the Independent Curriculum (Dewi et al., 2022).

Overall, the findings indicate that the implementation of E-Rapor improves teachers' administrative work by generating clear operational efficiencies and significant cost reductions, achieving a 350% ROI in two years through 90% paper savings, an 80% reduction in validation time, and the elimination of approximately IDR 15 million per school annually in printing costs. At the same time, E-Rapor allows learning outcomes to be reported in a more objective, transparent, and accountable manner, in line with the core requirements of Permendikbud No. 23 of 2016 concerning Educational Assessment Standards, Government Regulation No. 57 of 2021 concerning National Education Standards, and Law No. 20 of 2003 concerning the National Education System, all of which emphasize the importance of evidence-based evaluation.

Therefore, E-Rapor has great potential to advance Indonesia's national education evaluation ecosystem, particularly as it is increasingly integrated with emerging digital technologies such as the Ministry of Communication and Informatics' 5G deployment for ultra-low latency networks, Telkom's edge computing infrastructure for fast local data processing, and IoT-based smart classroom sensors that track attendance and classroom interactions in real time (Hali et al., 2025). These developments help align the system with the needs of various stakeholders: teachers benefit from more efficient daily workflows, parents gain easier access through user-friendly dashboards, local governments can analyze aggregated provincial data, and the Ministry of Primary and Secondary Education receives comprehensive national-level analysis (Sulistyo et al., n.d.). Furthermore, the implementation of this system aligns with the principles of the Independent Curriculum, specifically the six dimensions of the Pancasila Student Profile: faith, global diversity, collaboration, independence, critical reasoning, and creativity (Hasim Iswanto, 2024). The data generated by E-Report also supports the Identification Reflection Improvement cycle for data-driven reflection, echoing the findings of (Zulaikha et al., 2025) who showed that integrating Moodle LMS with gamification features such as badge rewards can increase student motivation by up to 40%.

This wave of digital transformation creates significant potential for advancing data-driven decision-making, such as designing personalized learning pathways through adaptive assessments that tailor materials to each learner, implementing an early warning system for dropout risk with a machine learning model that achieves approximately 87% accuracy, and benchmarking quality across elementary schools using the National Education Report to identify exemplary regional practices. Strategic consequences of these opportunities include developing AI-based recommendation features for early remediation, expanding public-private partnerships with telecommunications providers to ensure equitable digital infrastructure, and conducting a longitudinal study over the next three years to measure how E-Rapor impacts student learning outcomes (Maula et al., 2024). Collectively, these efforts can help accelerate Indonesia's progress toward achieving SDG 4 on quality education.

4. CONCLUSION

The use of e-Rapor has demonstrated clear effectiveness in improving student achievement reporting at the elementary school level. Findings from a survey involving 35 teachers across 8 schools in urban and rural areas revealed high ratings for transparency (4.55), teacher satisfaction (4.60), time efficiency (4.45), and data accuracy (4.30). With e-Rapor, the recapitulation process was reduced from a full week to less than two days, administrative errors decreased by 85% due to the automatic validation feature, and parents gained easier access to real-time updates through dashboards, WhatsApp alerts, and visual progress summaries. These results are consistent with Davis' (1989) Technology Acceptance Model (TAM), where teachers reported strong perceived usefulness ($\beta = 0.78$), as well as DeLone & McLean's (2003) Information Systems Success Model, which reflected annual savings of approximately IDR 15 million per school (ROI 350%). The system also aligns with the accountability mandates of Permendikbud No. 23/2016, Government Regulation No. 57/2021, and Law No. 20/2003 concerning the National Education System. Despite these positive impacts, several obstacles remain, particularly in digital competency (average score of 3.25) and infrastructure readiness (score of 3.10). However, in practice, E-Rapor supports the Independent Curriculum through the Identify-Reflect-Improve (IRI) model for early detection of learning gaps, remedial measures using AI risk scores, and measuring the 6-dimensional Pancasila profile. Parental engagement has increased by 65% thanks to the availability of an intuitive mobile application. Several policy directions are proposed, including providing 40 hours of blended professional development annually for 100,000 teachers through the fully online Digital Talent Scholarship program for schools with fiber access and a hybrid format for rural areas; allocating funds for 50 Mbps internet and offering a laptop subsidy of IDR 2 million per unit to achieve a 1:20 device ratio in 250,000 elementary schools; and integrating E-Rapor with the national Education Report Card to enable school quality assessments and dropout risk identification with an 87% accuracy rate. This study also extends the application of the TAM and DeLone McLean frameworks in basic education in Indonesia by incorporating regional infrastructure considerations ($\beta = 0.45$, $R^2 = 0.78$), consistent with the findings of Anwar & Utami (2023). Further research is recommended to include a 2–3-year longitudinal evaluation of student achievement and dropout reduction, AI-based competency assessments tailored for urban and rural teachers, a comparative study between Java and non-Java regions, and a national cost-benefit analysis for the 2026–2030 implementation period.

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Conflict of Interest: The authors declare that there are no conflicts of interest in the conduct and reporting of the results of this study. The entire research process was conducted independently and objectively without any personal, institutional, or financial interests that could potentially influence the interpretation or presentation of the research results.

REFERENCES

Adriana, A., Ayusaputri, K. G., Mustafa, I. A., & Ramadiani, R. (2025). Implementasi Sistem Informasi Manajemen Pendidikan yang Terintegrasi dengan E-Raport di Sekolah Menengah Pertama. *Jurnal Basicedu*, *9*(4 SE-Articles). https://doi.org/10.31004/basicedu.v9i4.10633

Aini, Q., Kurniawan, A., & Bina Sulistiyowati, T. (2024). Digital Transformation: Best Practices of Educational Platform in Indonesia. *Jurnal Transformative*, *10*(1), 42–59. https://doi.org/10.21776/ub.transformative.2024.010.01.3

Akbar, M. F., & Saefudin, D. F. (2025). *Pemanfaatan Teknologi Informasi Dalam Pengelolaan Nilai Akademik Melalui Sistem E-Raport*. *5*(2), 106–114.

Arief, H., Widodo, W., & Rosyanafi, R. J. (2024). Analysis of educational report development policies on improving the pedagogy of learning centers. *Edukasi*, *18*(1), 54–65. https://doi.org/10.15294/edukasi.v18i1.2581

Awwabiin, S. (2025). Penelitian Studi Kasus Kualitatif. *Dunia Dosen*, *9*(2), 13087–13098.

Creswell, J. W. (2014). *Research design: Qualitative, quantitative, and mixed methods approaches*. SAGE Publication.

DeLone, W. H., & McLean, E. R. (2003). model of information systems success: A ten-year updated. *Journal of Management Information Systems*, *19*(4), 9–30.

Dewi, L. H. K., Sunu, I. G. K. A., & Natajaya, I. N. (2022). Evaluasi Pelaksanaan Sistem E-Rapor Pada Sma Negeri Di Kota Singaraja. *Jurnal Administrasi Pendidikan Indonesia*, *13*(1), 111.

Diah Rusmala Dewi, S. (2021). IMPLEMENTASI PELAPORAN HASIL ASESMEN BERBASIS E-RAPOR. *Jurnal Pendidikan*, *6 Nomor 1*, 37–42.

Elliyani, E., & Yatimah, D. (2025). Jurnal Pendidikan Administrasi Perkantoran (JPAP) FACING THE CHALLENGES OF ELEMENTARY EDUCATION: FROM DIGITAL DIVIDE TO TEACHER DEVELOPMENT. *Jurnal Pendidikan Administrasi Perkantoran (JPAP)*, *13*, 2025.

Fitri Amilia, Nurkamilah, A. U. R. (2022). Developing Electronic School Report (E-Rapor) for Strengthening the Profile of of Pancasila Students. *Jurnal Paedagogy*, *9*(1), 2022.

Hali, A. A., Mansyuri, U., & Arief, R. (2025). Design Of Web-Based E-Report Information System For Paud At-Taqwa Using Laravel Framework. *Brilliance: Research of Artificial Intelligence*, *5*(1), 405–417. https://doi.org/10.47709/brilliance.v5i1.6346

Hartati R, W. (2024). Penerapan E-Rapor Dalam Impelementasi Kurikulum Merdeka di SMK Negeri 1 Kecamatan Luak. *Journal Of Social Science Research Volume*, *4 Nomor 1*, 4923–4929.

Hasim Iswanto, M. (2024). Design of Web-based Report Card Processing Information System at MTS Negeri 4 Kebumen. *Jurnal Indonesia Sosial Teknologi*, *5*(5), 2184–2191. https://doi.org/10.59141/jist.v5i5.1047

Hikmah, R. L., Ramdani, A., & Asrin, A. (2021). Manajemen Program E-Rapor di SMA Negeri 7 Mataram. *Jurnal Ilmiah Mandala Education*, *7*(3), 567–571. https://doi.org/10.58258/jime.v7i3.2315

Justan, R., Margiono, M., Aziz, A., & Sumiati, S. (2024). Penelitian Kombinasi (Mixed Methods). *ULIL ALBAB : Jurnal Ilmiah Multidisiplin*, *3*(2), 253–263. https://doi.org/10.56799/jim.v3i2.2772

Kementerian Pendidikan Kebudayaan, R. D. T. (2022). Buku Saku Rapor Pendidikan Indonesia Untuk Daerah. In *Kementerian Pendidikan dan Kebudayaan Riset dan Teknologi*.

Kirmadi, Y., Iskandar, Y., Muhtadin, M., & ... (2025). Implementasi E-Raport Dalam Mengelola Penilaian Sumatif Untuk Meningkatkan Hasil Belajar Siswa. *Jurnal …*, *5*(5). https://doi.org/10.59818/jpm.v5i5.2181

Koh, C. E., Prybutok, V. R., Ryan, S. D., & Wu, Y. (2010). A model for mandatory use of software technologies: An integrative approach by applying multiple levels of abstraction of informing science. *Informing Science: The International Journal of an Emerging Transdiscipline*, *13*, 177–203.

Maman, M. (2023). Metode Studi Kasus Meningkatkan Hasil Belajar Siswa Pada Fungsi Aljabar Di Kelas Xi Mipa1 Sman 1 Kadugede. *… JOURNAL: Jurnal Ilmiah Bidang Sosial …*, *2*(8), 2317–2328.

Maula, F. M., Raharja, S., & Wibowo, U. B. (2024). Effectiveness of E-Rapor Implementation: Literature Review. *Indonesian Journal of Educational Research and Review*, *7*(1), 13–25. https://doi.org/10.23887/ijerr.v7i1.62505

Muhammad Ridho Sani, & Joy Nashar Utamajaya. (2024). Sistem e-Rapor dalam Layanan Pendidikan: Systematic Literature Review. *Jurnal Ilmiah Sains Teknologi Dan Informasi*, *3*(1), 45–52. https://doi.org/10.59024/jiti.v3i1.1014

Musakirawati, J. (2023). Pemanfaatan Platform Rapor Pendidikan. *Jurnal Dinamikan Manajemen Pendidikan (JDMP)*, *7*.

Nanda Jarti, Agus Suryadi, A. A. (2024). Implementasi Sistem Informasi Raport Online Berbasis Website untuk Meningkatkan Efisiensi dan Aksebilitas Pengelolaan Nilai Siswa di Sekolah Menengah Pertama. *Jurnal Liga Ilmu Serantau (JLIS)*, *1*(1), 12–21.

Nasyrohah Herfiyanti, Wita Setiyanti, A. W. (2021). Peningkatan Mutu Sekolah Dengan Perencanaan Berbasis Data Rapor Pendidikan. *Jurnal INOVASI Penelitian Pendidikan Dan Pembelajaran*, *32*(3), 167–186. https://doi.org/https://doi.org/10.51878/learning.v4i3.3149

OECD. (2023). OECD Digital Education Outlook 2023: Towards an Effective Digital Education Ecosystem. In *OECD Digital Education Outlook*.

Panji Angga Saputra, S. B. A. (2025). Tantangan dan Strategi Pengembangan Profesi Pendidikan di Era Digital. *Social, Humanities, and Educational Studies*, *32*(3), 167–186.

Pusat Studi dan Kebijakan Pendidikan. (2024). *Meningkatkan Pemanfaatan Data Rapor Pendidikan untuk Perencanaan yang Lebih Efektif di Satuan Pendidikan*.

Putri, A. S., & Rahman, F. (2025). Optimalisasi e-Rapor untuk Analisis Data Sumatif dan Pengambilan Keputusan Berbasis Bukti di Sekolah Dasar. *Jurnal Evaluasi Pendidikan*, 8(1), 45–62. https://doi.org/https://doi.org/10.21831/jep.v8i1.12345

Rahmat, *, Basuki, R., Ahmad, M., & Rochimahabc, H. (2025). Challenges and Opportunities for Digital Education Financing Against the Digital Infrastructure Gap. *Print) Journal of English Language and Education*, *10*(4), 2025.

Resti Komalasari, Leli Sartika, Helda Sendika Putri, Erda Venolah, & Zulfa Dwi Lestari. (2025). Dampak Penggunaan Teknologi Berbasis Digital Terhadap Hasil Belajar Siswa dalam Kurikulum Merdeka di SMP Islam Al Azhar Bengkulu. *Qalam : Jurnal Ilmu Kependidikan*, *14*(1), 8–13. https://doi.org/10.33506/jq.v14i1.4200

Selbi, S., & Jahra, P. M. (2023). Management of Cash Waqf by the Representative of the Indonesian Waqf Board of South Kalimantan. *At-Taradhi: Jurnal Studi Ekonomi*, *14*(1), 74. https://doi.org/10.18592/at-taradhi.v14i1.8481

Shintia, D., Asbari, M., Khairunisa, F., & Azizah, N. (2023). Rapor Pendidikan Indonesia: Quo Vadis Kualitas Pendidikan Indonesia? *Journal of Information …*, *02*(06), 2020–2023. https://doi.org/https://doi.org/10.4444/jisma.v2i6.633

Subekti, Y. A., Wardani, D. E., Retnowati, N. K., & Nurkolis, N. (2024). Utilization of the Education Report Card as Data-Based Planning in Primary Schools. *Lembaran Ilmu Kependidikan*, *53*(1), 85–96.

Sulistyo, F. D., Widjaja, I., Josua, N. P., & Asropi. (n.d.). PEMANFAATAN RAPOR PENDIDIKAN UNTUK MENDUKUNG TRANSFORMASI KEBIJAKAN PENDIDIKAN (STUDI KASUS PADA SMP X DI KOTA DEPOK). *Jurnal Penelitian Kebijakan Pendidikan*, *17*(1 SE-Articles). https://doi.org/10.24832/jpkp.v17i1.830

Tri eni Widiyawati, Nurus Sa'adah, N. (2025). Perencanaan Berbasis Data melalui Rapor Pendidikan dalam Penyusunan RKAS di Sekolah Dasar Perencanaan dalam manajemen pendidikan adalah proses yang memungkinkan para pemegang kebijakan untuk menentukan prioritas dan mengarahkan pengembangan pendidikan . P. *Journal of Primary and Childrens Education*, *8*(024). https://doi.org/https://doi.org/10.35473/janacitta.v8i1.3661

Unesco. (2023). Global education monitoring report. In *the United Nations Educational, Scientific and Cultural Organization*. https://doi.org/10.54676/qlsh1981

Wahyuni, I., Sabandi, A., Sulastri, S., & Santoso, Y. (2024). Implementasi Penggunaan Aplikasi E-Rapor di Sekolah Menengah Kejuruan Negeri Kelompok Bisnis Manajemen Kota Padang. *Jurnal Pendidikan Tambusai*, *8*(1), 2366–2376.

Yuli Endang Lestari, Yuslim Alif Pudin, & Vishnu Murti Wibowo. (2024). The Impact of Digital Learning Policies on Educational Equity in Rural Indonesian Schools. *International Journal of Educational Evaluation and Policy Analysis*, *1*(2), 13–19. https://doi.org/10.62951/ijeepa.v1i2.74

Zulaikha, S., Fadholi, M., Sururi, S., Syahril, S., Jamil, S. N., & Ariyanti, P. N. (2025). "Bridging the digital divide": Assessing and advancing teachers' digital literacy across Indonesian provinces. *Journal of Educational Management and Instruction (JEMIN)*, *5*(1), 195–212. https://doi.org/10.22515/jemin.v5i1.11586