Digital Transformation in Education: A Study on School Readiness for the Implementation of E-Reports in the Context of Datafication in West Sumatra for Quality Education (SDGs)

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Abstract: The phenomenon of datafication in schools has significantly transformed educational administration, introducing a new governance logic that shifts between centralized and decentralized regulatory models through interconnected systems. However, the adoption of datafication in education is influenced by socio-cultural factors, particularly when models shaped by Anglo-American practices are applied to countries like Indonesia, where cultural and social conditions differ. This research focuses on school readiness for implementing datafication, especially in learning evaluations through e-reporting (e-raport), and examines the disparities between urban and rural schools in this context. Using a qualitative methodology, this study explores the experiences of stakeholders involved in implementing e-raport systems. The research progresses through four stages: (a) initial investigation, involving field surveys and team discussions; (b) design, focusing on developing interview formats and questions; (c) construction, where data is collected, classified, and processed; and (d) evaluation and revision, incorporating triangulation for data validation. Findings reveal distinct differences in readiness for datafication between urban and rural schools. Urban schools demonstrate greater adaptability due to better infrastructure, access to training, and a more receptive technological culture. However, challenges such as age-related resistance among older teachers persist. In contrast, rural schools struggle with limited infrastructure and a less technology-oriented culture, further hindering their ability to adapt. This highlights the importance of addressing both infrastructural and socio-cultural readiness, particularly through targeted education and training programs, to ensure equitable implementation of datafication across diverse school contexts.

1 INTRODUCTION

Data integration through digital information systems has become an essential component in the educational landscape (Williamson, 2019). The process of digitalization has progressively extended across multiple domains within education, encompassing not only the activities of educators and students but also the entire pectrum of teaching, learning, and educational management processes. The data derived from these activities is subsequently utilized to inform evaluation processes and support decision-making by relevant stakeholders (PANGRAZIO et al., 2022). Datification, understood as the application of data to objectively assess the social behaviors of all components within a school, facilitates real-time monitoring, racking, and analysis, thereby contributing to the development of a more effective system of educational governance (B. Stewart et al., 2023). From a conceptual perspective, datification

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represents a more expansive form of digitalization, which entails the processing and application of data to enhance the understanding, modeling, and improvement of various facets of human existence (Haryono, 2023). This paradigm aims to fundamentally transform the way data is leveraged to underpin more effective educational decision-making. However, in the context of Indonesia, despite the implementation of digitalization, the adoption of datification within the educational system—particularly through electronic report cards—requires a level of readiness that surpasses mere technological competence.

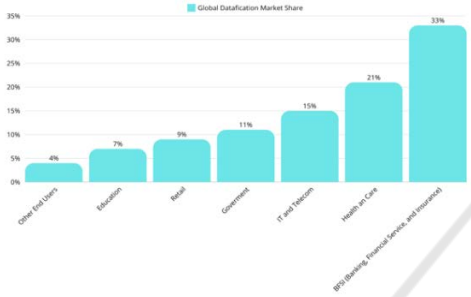

Figure 1: Bar chart of datafication usage by sector, BFSI, government, education, and others (source: scoop.market.us).

Datification in education also serves as a response to the demands of neoliberalism within modern educational systems, which emphasizes increased accountability and data-driven measurement within schools (Mertala, 2020). In the context of the corporatization and commercialization of education, the need for data-based measurement has become increasingly critical to ensure transparency and effectiveness (Fawns, Aitken, and Jones, 2021). This focus on data-driven governance aligns with **SDG 4 (Quality Education)**, which advocates for inclusive, equitable, and quality education, as well as the promotion of lifelong learning opportunities for all. On the other hand, the phenomenon of datification has had significant implications for the practice of educational administration within schools (Daliri-Ngametua, 2022). Datification in schools has transformed regulatory structures from those that were once centralized and hierarchical into more decentralized systems interconnected through networks (Takayama and Lingard, 2019). These changes, if implemented effectively, could contribute to improving educational management and ensuring that learning outcomes are more systematically measured and evaluated, thereby advancing the goal of quality education. However, despite its introduction by Western countries in 2013, the implementation of datification in Indonesia requires careful consideration of the country's distinct social and cultural dimensions. The influence of Anglo-American educational models within this approach must be adapted to better align with the local Indonesian context (Lewis, Holloway, and Lingard, 2022). Therefore, conducting research on the implementation of electronic report cards (e-raport) within the Indonesian educational context is crucial to understanding the preparedness of schools in addressing the challenges of implementing datification. This research is particularly significant for advancing SDG 4, as it addresses the need for better data-driven decision-making and evidence-based improvements in education.

Since 2019, Indonesia has implemented an electronic-based evaluation system, or e-report, to enhance the efficiency and effectiveness of the educational process (Agustini et al., 2020). The e-report system provides an easier way to monitor and evaluate students' learning progress digitally, in line with technological advancements in the digital era (Anastassia Amellia Kharis and Haqqi Anna Zili, 2022). However, despite its promise for progress in educational administration, there are numerous challenges that must be addressed, both from a technological perspective and in terms of the social and cultural readiness of its users, such as teachers and schools (Merdekawati and Rahayu, 2022). The success of e-report implementation depends not only on the technical capabilities of the system itself but also on an understanding of the social and cultural context within the educational environment (Febriyanto, Naufal, and Sulistiawati, 2020). The application of e-report within the 2013 Curriculum, which covers both primary and secondary education in Indonesia, presents significant challenges in understanding and implementing datafication. The e-report application often undergoes system updates, while internet access in some regions remains limited, and the lack of teacher competence, as well as suboptimal data integration, further complicate its implementation (Hamidi and Mahsun, 2020). Although digitalization in Indonesia is steadily progressing, the concept of datafication remains relatively new and under-researched, particularly in the context of Indonesian education. This study aims to fill this gap by analyzing the readiness of schools to implement e-reports in the era of datafication, comparing urban and rural schools, and providing insights into potential social and cultural tensions that may arise within the education bureaucracy (Manovich, 2017). This is based on previous

research, which has not sufficiently focused on aspects of readiness from the perspective of urban and rural school segmentation.

2 METHOD

This study adopts a qualitative research methodology, employing techniques such as observation, interviews, and document analysis. The qualitative approach enables the researcher to make comparisons across various stakeholders involved in the implementation of datafication in learning evaluation (E-Report) and to explore the reciprocal relationships between these factors. Furthermore, qualitative methods such as interviews and document analysis are deemed more appropriate for addressing the research questions, as they allow for a comprehensive narrative description of the findings (Pangandaheng et al., 2022). However, during data collection, a few obstacles were encountered. For example, during the interviews, not all teachers and staff were forthcoming or honest about the implementation of the e-report system. Additionally, when collecting documents, some schools were not open to providing the requested materials.

For data analysis, the study will utilize computer-assisted qualitative data analysis software (CAQDAS), specifically Nvivo (Pangandaheng et al., 2022). This choice aims to minimize potential biases that may arise during qualitative research (Haryono, 2023). Through this analysis, the study seeks to provide an in-depth comparison and uncover both linear and holistic relationships (Karman, 2019). The study case sites include government institutions and schools. Participants were selected using purposive sampling, as they represent the institutions and schools involved in the implementation of e-reporting systems. Semi-structured interviews were employed, guided by a set of specific questions or topics, commonly referred to as an interview guide (Karman, 2019). This semi-structured format allows for flexibility, enabling the researcher to probe additional open-ended questions on relevant topics as they arise during the interviews (Hamidi and Mahsu, 2020).
Additionally, document analysis was conducted to gather supplementary data, including official documents from various institutions involved in the implementation of datafication in learning evaluation (E-Report). These documents ranged from national policies issued by the Ministry of Education and Culture (Kemendikbud Ristek) to regional policies from district/city and provincial education departments.

3 RESULT AND DISCUSSION

3.1 the Introduction of Datafication in the Educational Context and the Implementation of E-Report in West Sumatera

In recent years, the digital landscape has experienced rapid development, accompanied by increasingly effective and efficient technologies. These advancements have significantly influenced daily human life, making it more structured and analyzable—a phenomenon known as datafication (Williamson, Bayne, and Shay, 2020). Datafication has become a critical concept in modern society, offering a wide range of applications across various fields. In the context of education, datafication presents substantial opportunities for managing and enhancing the quality of learning in schools. However, it also introduces challenges that need to be addressed (Daliri-Ngametua, 2022). As key pillars of educational modernization, datafication and algorithmization are driven by the pursuit of increased efficiency and effectiveness. Learning analytics systems play a crucial role in collecting, analyzing, and reporting student data, thereby supporting comprehension and optimization of the learning process (Supriadi, 2024).

Teachers, educational systems, and policymakers must view datafication as a fundamental aspect of educational modernization, contributing to the broader digital transformation of education (Anastassia Amellia Kharis and Haqqi Anna Zili, 2022). One specific example of datafication in practice is the implementation of the E-Report system, which digitizes the process of reporting students' learning outcomes. The E-Report, a digital-based assessment system, has been implemented across various educational levels in Indonesia to support the modernization of school administration (Agustini et al., 2020). Designed to replace traditional manual assessment methods, the system aims to enhance efficiency, accuracy, and transparency in reporting student performance (Febriyanto, Naufal, and Sulistiawati, 2020).

Despite its advantages, the implementation of the E-Report system in Indonesia faces complex challenges, including infrastructure readiness, the capacity of human resources, and stakeholder acceptance (Aprilianti et al., 2023). Research conducted in several schools in West Sumatra, with informants comprising school principals, teachers, and operators, indicates that the adoption of the E-

Report system has brought significant improvements to the management of student learning outcome reports.

The findings from two distinct research locations indicate that school principals expressed appreciation for the innovation offered by the e-report system, stating that the platform has enhanced the efficiency and security of student grade management compared to the previous manual methods. However, they also noted several technical challenges, such as limitations in internet connectivity, which often occur when many teachers access the system simultaneously, particularly as the deadline for grade submission approaches. This suggests that while the e-report system is functioning well, the supporting infrastructure, such as stable internet access, needs to be improved in order to optimize the implementation of the system.

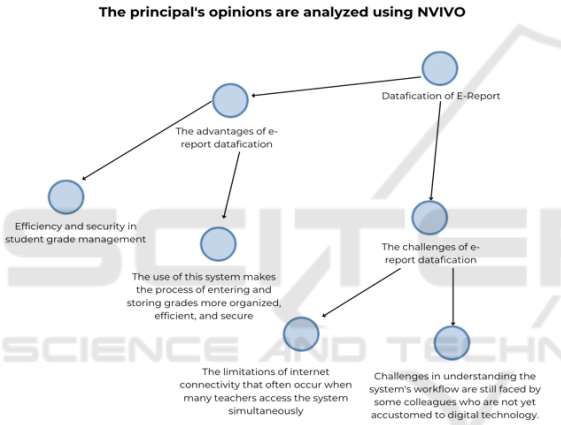

Figure 2: The principal's opinions are analyzed using NVIVO (Source: NVIVO Application).

Additionally, as a teacher, the feedback provided reflects a positive view of the e-report system's implementation. The teacher stated that the system has made the process of entering and storing grades more organized, efficient, and secure. However, some colleagues who are not yet familiar with digital technology still face challenges in understanding the system's workflow. With a deeper understanding of the system, the teacher believes that educators will be better able to manage student assessments in a more transparent and effective way. Therefore, more comprehensive training is needed to ensure that all teachers can use the e-report system smoothly and effectively.

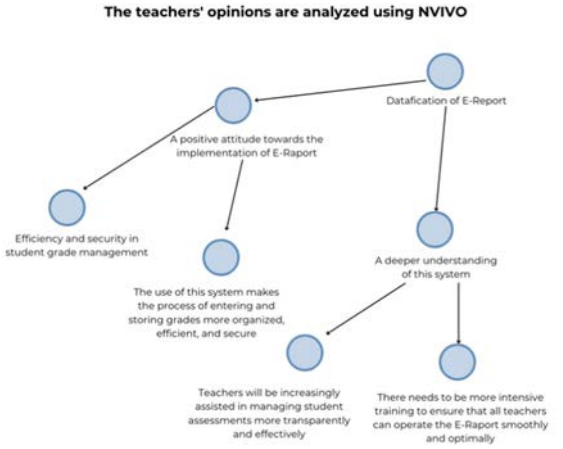

Figure 3: The teacher's opinions are analyzed using NVIVO (Source: NVIVO Application).

From the perspective of school administrators, the e-report system is considered a practical solution that replaces the previous manual, paper-based methods. The administrators also emphasized the importance of integrating the e-report system with national educational data, which allows student information to be directly utilized for various purposes without the need for redundant data entry. This practicality and efficiency provide significant advantages for the administration, as it helps reduce the potential for human error in data management. Furthermore, while the e-report system has streamlined administrative processes, administrators noted that certain areas still require improvement, particularly in terms of user experience and network optimization, to ensure a smoother grading process free from technical disruptions. Ongoing evaluation of the system is essential to adapt it to the evolving needs of its users, including teachers, school principals, and operators.

In conclusion, the implementation of the e-report system has positively impacted the educational environment by enhancing efficiency, transparency, and data management—key components of quality education. By streamlining administrative processes and improving the tracking of student performance, the system contributes to a more responsive and data-driven learning environment. However, challenges remain, such as the need for a deeper understanding of the system's workflow by teachers and improvements in infrastructure, particularly internet connectivity. Addressing these issues is essential to fully realize the potential of the e-report system in supporting quality education. To achieve optimal outcomes, comprehensive teacher training and continuous improvements to both the system and infrastructure are necessary. By doing so, the e-report

system can not only enhance administrative efficiency but also foster better learning outcomes, aligning with the broader goals of quality education as outlined in the Sustainable Development Goals (SDGs).

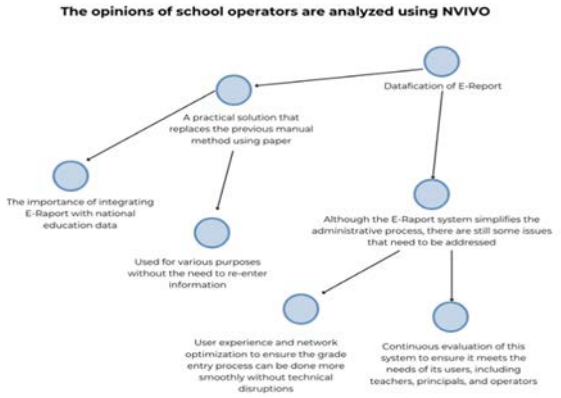

Figure 4: The opinions of school operators are analyzed using NVIVO (Source: NVIVO Application).

3.2 School Readiness in Implementing of E-Report

Datafication has become a crucial element in the digital era's educational transformation, supporting more effective, inclusive, and sustainable education. It encompasses various aspects of education, such as teaching processes, administration, and assessment, by structuring and integrating them into accessible, technology-driven information management platforms (Yuli Endra and Synta Aprilita, 2018). One key application of datafication in education is the implementation of the e-report system. E-report is a web-based software used to compile student competency reports at the institutional level, which includes complex data on attendance, academic performance, behavior, and student development, all integrated with the National Education Data (DAPODIK) on a single digital platform (Sastra et al., 2023).

The e-report website is designed to streamline the generation of competency reports and data collection, making it easier to determine student rankings as assessed by subject teachers (reference). While it offers significant benefits, the implementation of datafication in education also presents complex challenges, necessitating careful management by all involved stakeholders (Ydesen and Elfert, 2023). The success of datafication largely depends on school infrastructure readiness, including internet connectivity, hardware, and relevant software. This paper discusses school readiness in implementing e-reports, based on a case study across two different locations to provide a comprehensive comparison. The study examines factors such as differences in resources, human capital, and technological readiness in urban versus rural areas, which influence e-report implementation in schools. The comparison between these locations is crucial to understanding how these factors impact the application of e-reports in schools. The analysis of these differences aims to identify key factors necessary to enhance school readiness, with Padang city representing an urban location and Tapan district representing a rural location. The selection of these areas is intended to compare how datafication policies are implemented in different contexts (Monalisa, Imron, and Riyandi, 2021).

3.3 Availability of Facilities, Infrastructure, and Supporting Resources

Facilities and infrastructure are essential for the successful implementation of the e-report system in schools Radiating out rather than scaling up: Horizontalism and digital educational governance in Ghana (Gallagher, Evans, and Sarpong-Duah, 2024). This includes both hardware (computers, servers, and internet) and software (the e-report system itself), which form the foundation of datafication. Additionally, physical infrastructure, such as computer labs with stable internet access, plays a critical role in the system's successful application.Interviews with the school principal indicate a high level of readiness for datafication at the first location. According to the principal, both teachers and operators feel supported by the available technology and infrastructure, which allows for effective use of the e-report system. The principal emphasized that the e-report system greatly aids teachers in completing administrative tasks quickly and accurately, especially with supporting software like Microsoft Excel and Google Workspace (Google Sheets, Google Drive), which facilitate collaboration among teachers.

However, despite having complete facilities, such as computer labs and WIFI access, challenges remain. The principal highlighted coordination among teachers as one of the main obstacles in maximizing the use of available resources. Moreover, findings also show that teachers responded positively to the e-report system, noting that it simplifies the analysis of student progress and accelerates reporting to parents. However, some

teachers pointed out challenges such as meeting the deadlines for entering grades, especially when students have not completed their tasks or grade corrections by the system's deadline. Technical issues, such as slow system performance when multiple teachers access it simultaneously near the deadline, were also mentioned. Overall, both the principal and teachers agreed that while the e-report system has many positive impacts, improvements in network capacity and system optimization are still needed.

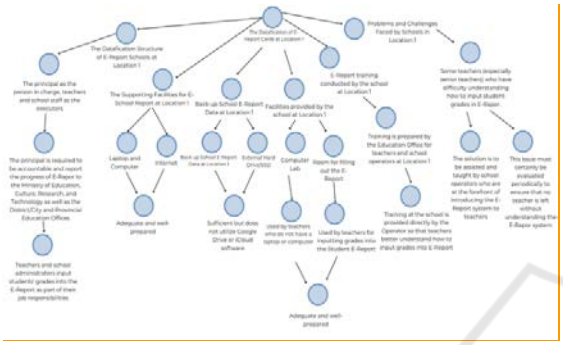

Figure 5: Datafication of E-Report in Location 1 (Urban Area) (Source: NVIVO Application).

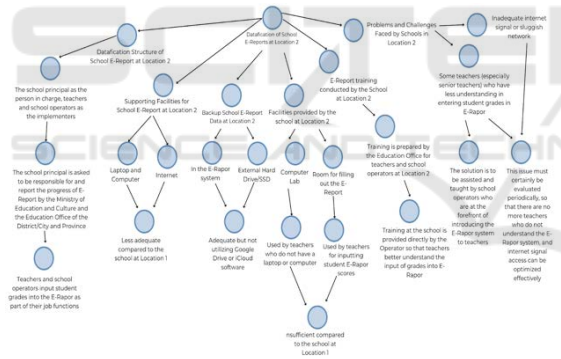

Figure 6: Datafication of E-Report in Location 2 (Rural Area) (Source: NVIVO Application**).**

The findings reveal a marked contrast in the implementation of the e-report system between Location 1, an urban area, and Location 2, a rural area. The school principal in Location 1 welcomed the introduction of the e-report system as an innovative advancement in education. However, the principal also outlined significant challenges faced in implementing the system in the rural context. One major obstacle identified was the availability of adequate equipment. Most teachers in Location 2 lack personal laptops and are dependent on a limited number of school-provided computers, which are insufficient to support all necessary activities, including the implementation of the e-report system. Some schools in Location 2, in fact, lack a computer laboratory entirely. From the perspective of the teaching staff, another significant challenge was the inconsistent and insufficient access to reliable internet connectivity. This lack of stable internet has caused delays in the data input and synchronization processes within the e-report system, which should ideally be efficient and effective. Despite these issues, the principal emphasized the school's commitment to adapting to the e-report system, and has initiated coordination with the relevant educational authorities to secure the necessary infrastructure and resources to support its effective implementation.

3.4 Human Resource Readiness

Teachers are the primary users of the e-report system, responsible for inputting grades, validating data, and ensuring alignment with curriculum standards. However, their technical skills in using digital tools vary, depending on factors like age, education, and experience with technology. Teachers familiar with software like Microsoft Excel or Learning Management Systems adapt more easily, while those less experienced, particularly older teachers, face challenges in navigating the system's interface and troubleshooting technical issues (Zhao et al., 2024).

To bridge this skills gap, specialized training focused on both the technical aspects and the conceptual benefits of the e-report system is essential. Successful e-report implementation depends on the competence and readiness of human resources (HR) (B. E. Stewart and Lyons, 2021). The principal, as a key decision-maker, is committed to providing comprehensive technical support, coordinating with the Education Office for training, monitoring, and evaluation, and ensuring that both teachers and operators acquire the necessary skills. A dedicated team has been formed to address technical issues, prioritizing HR support for improved e-report application.

From the teachers' perspective, technical training, guidance, and ongoing evaluation have been crucial in facilitating the system's adoption. One teacher noted that although the e-report system initially felt complex, the socialization efforts and support boosted their confidence in transitioning from manual to digital grading. This indicates strong technical readiness in location one. In contrast, location two faces challenges due to limited socialization and lack of understanding among HR. The principal noted the absence of staff with the expertise to lead e-report socialization and the limited

number of schools in the area, which hinders collaboration. As a result, teachers in location two rely heavily on the Education Office or external parties for training and support.

3.5 Organization Readiness

Internal school policies are crucial for guiding the integration of technology in education, including the implementation of e-reports. These policies should address infrastructure, staff training, and continuous system evaluation (Badawy and Alkaabi, 2023). Without clear policies, the implementation of e-reports risks becoming disorganized and ineffective. The policy on technology integration should align with the school's vision, explicitly committing to the use of technology for learning and assessment. The principal should mandate the use of e-reports for recording and reporting student outcomes. This policy must be supported by Standard Operating Procedures (SOPs) detailing system usage, including data input, grading, and reporting.

Policies must also allocate sufficient budgets for hardware, software, and staff training. Schools should ensure dedicated funds for these technical needs, such as purchasing computers or updating software.The e-report implementation process must be clearly defined, outlining roles and responsibilities, from teachers inputting grades to the principal overseeing the evaluation process. Access control procedures must ensure that only authorized personnel can modify data, and the system should include reporting mechanisms for technical issues. Ongoing evaluation is essential to monitor system implementation, assess adherence to procedures, and address technical problems. Evaluations can be conducted through surveys or data analysis to refine the system. Effective coordination among all stakeholders—teachers, principals, administrative staff, and the Education Office—is vital. Teachers, as primary users, must be involved in training and supported with technical assistance. The principal ensures efficient implementation, while administrative staff handle data accuracy and technical issues. The Education Office ensures the system complies with national policies and provides additional training or updates as necessary.

3.6 Parents and Students Readiness

The e-report system is a digital innovation that replaces paper-based student progress reports, offering a more efficient and transparent way to track academic performance. It allows teachers to provide detailed reports, enables parents to monitor their child's progress online, and encourages students to actively engage in tracking their academic growth. However, challenges remain, particularly regarding the readiness of parents and students to use the technology. Students' ability to understand and utilize the e-report system varies, especially for those with limited access to technology. Similarly, parents must be able to interpret the data effectively to support their child's learning.

To address these challenges, schools should provide training for both parents and students, ensuring they can access and understand the e-report system. Additionally, ensuring equitable access to the necessary technology is essential. With proper preparation, e-reports can enhance student development and strengthen collaboration between schools and parents.

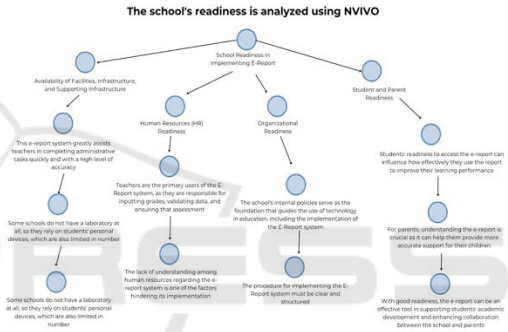

Figure 7: The schools readiness is analyzed using NVIVO (Source: NVIVO Application).

The results of this field study suggest that the implementation of the e-report system has generally received a positive response from various stakeholders, particularly schools across two different locations. However, despite this positive reception, the overall readiness of schools to implement the e-report system remains hindered by several challenges, even in urban areas. These challenges can be analyzed through four key dimensions: the availability of infrastructure and supporting facilities, human resource readiness, organizational preparedness, and parental readiness. The disparity in readiness between the two locations underscores that the successful implementation of the e-report system is contingent upon a variety of factors. This includes the necessity for coordinated collaboration among multiple parties, ranging from the relevant educational authorities to the parents—who, due to limited familiarity with the system, require comprehensive socialization and ongoing support efforts.

Furthermore, based on further discussions with various stakeholders, it became clear that the implementation of the e-report system would require some time to ensure a smooth and effective process. Stakeholders, including school principals, teachers, and administrators, highlighted that while the system holds great potential, a phased approach is necessary to address any challenges that may arise during its rollout. They emphasized the importance of continuous support, effective communication, and proper coordination among all parties involved to facilitate a seamless transition to digital reporting.

In addition to this, stakeholders recommended that schools in rural areas, in particular, should be provided with additional resources and opportunities for training. Teachers and staff in these areas would greatly benefit from specialized workshops and ongoing professional development, which would help them become more comfortable with the new system and enhance their technical skills. This targeted training would not only support the implementation of the e-report system but also contribute to long-term improvements in teaching practices and administrative efficiency. By engaging teachers and staff through such training programs, rural schools can better equip themselves to overcome existing challenges and ensure the success of the e-report system in the future."

This version expands on the stakeholder feedback, highlighting the need for a phased implementation, ongoing support, and specific recommendations for rural schools. It also provides a more comprehensive view of how these insights influence the findings and the recommendations for improvement.

Table 1: The disparities between urban and rural schools in implementing datafication based on few factors.

Key factors	Urban	Rural
School Readiness in Implementing of E-Report	**Better infrastructure**: Reliable internet, advanced hardware, and relevant software, More resources available for e-report system implementation, **Higher human capital:** Educators and staff more likely to be trained in digital tools and Higher technological readiness due to access to modern technology and platforms.	**Limited infrastructure**: Less reliable internet and outdated hardware, Fewer resources available for implementing e-reports, **Lower human capital:** Limited access to trained personnel and professional development and Lower technological readiness: Lack of access to modern technology and digital training.
Availability of Facilities, Infrastructure,and Supporting Resources	**Complete facilities**: Computer labs, stable WIFI access, and necessary hardware (computers, servers, internet) and **Technology support**: Effective use of the e-report system with available infrastructure and supporting software like Microsoft Excel and Google Workspace.	**Limited resources**: Many teachers in rural areas lack personal laptops and rely on a few school-provided computers, **Lack of computer labs**: Some schools do not have a computer lab, hindering the effective use of the e-report system and **Inconsistent internet access**: Unreliable internet connectivity causes delays in data input and synchronization.
Human Resource Readiness	Strong **technical readiness**: Teachers in Location 1 have received necessary training and support, making the system easier to use and Teachers felt confident transitioning from manual to digital grading due to good socialization efforts and	**Limited technical skills**: Teachers in rural areas may have less experience with digital tools, making the adoption of the e-report system more difficult, **Dependence on external support**: Teachers in rural areas rely more on the Education Office or

	ongoing support	external parties for training and support, as local staff lacks expertise to lead the system's socialization and **Limited socialization efforts**: There are fewer opportunities for teachers in rural areas to collaborate or receive proper training on the e-report system
Organization Readiness	**Clear policies**: Urban schools likely have more established policies and standard operating procedures (SOPs) for technology integration and Ongoing **evaluation** and coordination among stakeholders, including teachers, principals, and administrative staff, are common.	**Limited organizational support**: Rural schools may lack clearly defined policies and procedures to guide the integration of technology and **Coordination challenges**: The rural area faces difficulties in coordinating between stakeholders (teachers, principals, administrative staff, Education Office) due to limited resources.
Parents and Students Readiness	**Parental involvement**: Urban areas may have better access to technology and training, allowing parents to effectively monitor their child's progress and **Student readiness**: Students in urban areas may have easier access to technology and understand how to use the system.	**Limited access to technology**: Rural students and parents may have less access to the necessary technology and may struggle to use the e-report system effectively and **Need for training**: Parents and students require training and support to understand and use the e-report system effectively.

4 CONCLUSIONS

Datafication has become a critical concept in modern life, offering applications across various domains. In education, datafication presents significant opportunities to manage and enhance the quality of learning in schools, while also posing challenges that must be addressed. More specifically, educational datafication manifests in the form of the E-Raport system, which plays a central role in assessing student learning outcomes. However, the implementation of E-Raport in Indonesia faces complex challenges, particularly in terms of infrastructure readiness, human resource capabilities, and stakeholder acceptance. The success of E-Raport implementation hinges on the competence and preparedness of human resources (HR). School principals, as key decision-makers, are committed to providing comprehensive technical support by coordinating with the Department of Education for training, monitoring, and evaluation. They also ensure that teachers and operators acquire the necessary skills. The adoption of the E-Raport system has positively impacted the educational environment by enhancing efficiency, transparency, and data management—key components of quality education. Nevertheless, challenges remain, such as the need for a deeper understanding of system workflows among teachers and improvements in infrastructure, particularly internet connectivity. Addressing these issues is essential to realizing the full potential of the E-Raport system in supporting quality education.

Besides, to improve the implementation of the E-Raport system in Indonesia, key policy recommendations include prioritizing investments in reliable internet and digital infrastructure, particularly in rural areas. A nationwide training program for teachers should be developed to enhance both technical skills and data-driven teaching practices. Clear policies and Standard Operating Procedures (SOPs) should define stakeholder roles to ensure consistent system use across schools. Engaging teachers, parents, and students through awareness campaigns will foster support for the system.

Additionally, a monitoring and evaluation framework should be established to track progress and refine implementation, while ensuring data security and privacy compliance. These measures will help overcome challenges and maximize the E-Raport system's potential to improve education quality.

REFERENCES

Agustini, Ketut, I. Gede Mahendra Darmawiguna, I. Kadek Dwi Artayasa, and I. Nengah Eka Mertayasa. 2020. "Evaluation of the Teachers' Acceptance to E-Report Card Applications with the Hot-Fit Model Approach." *International Journal of Instruction* 13(3): 475–90. doi:10.29333/iji.2020.13333a.

Anastassia Amellia Kharis, Selly, and Arman Haqqi Anna Zili. 2022. "Learning Analytics Dan Educational Data Mining Pada Data Pendidikan." *Jurnal Riset Pembelajaran Matematika Sekolah* 6: 12–20.

Aprilianti, Baby Novega, Faysa Permata Rhahmadiahti, Bella Eka Setianingrum, Indah Agustin Pradana, Yayuk Wulandari, and Irvan Arif Kurniawan. 2023. "Penerapan Sistem Informasi E-Raport Pada Sekolah Di Kota Tangerang." *Jurnal Manajemen dan Ilmu Administrasi Publik (JMIAP)* 5(1): 48–55. doi:10.24036/jmiap.v5i1.586.

Badawy, Hesham R.I., and Ahmed M. Alkaabi. 2023. "From Datafication to School Improvement: The Promise and Perils of Data-Driven Decision Making." *Restructuring Leadership for School Improvement and Reform* (Dddm): 301–25. doi:10.4018/978-1-6684-7818-9.ch015.

Daliri-Ngametua, R. 2022. "The Datafication of Assessment and Learning: An Ethno-Case Study of Student, Teacher and School Practices in Queensland, Australia." (May). doi:10.14264/a18faed.

Fawns, Tim, Gillian Aitken, and Derek Jones. 2021. "Ecological Teaching Evaluation vs the Datafication of Quality: Understanding Education with, and Around, Data." *Postdigital Science and Education* 3(1): 65–82. doi:10.1007/s42438-020-00109-4.

Febriyanto, Erick, Romzi Syauqi Naufal, and Sulistiawati Sulistiawati. 2020. "Planning of the Web-Based E-Raport Assessment System." *Aptisi Transactions On Technopreneurship (ATT)* 2(1): 48–58. doi:10.34306/att.v2i1.27.

Gallagher, Michael, Pete Evans, and Joshua Sarpong-Duah. 2024. "Radiating out Rather than Scaling up: Horizontalism and Digital Educational Governance in Ghana." *International Journal of Educational Development* 111(November 2023): 103168. doi:10.1016/j.ijedudev.2024.103168.

Hamidi, and Mahsun. 2020. "Penerapan Kebijakan Rapor Elektronik Pada Kurikulum 2013 Menurut Peraturan Menteri Pendidikan Dan Kebudayaan Indonesia." *Al-Fikrah* 3(1): 10–22. https://jurnal.alhamidiyah.ac.id/index.php/al-fikrah/article/download/63/70/.

Haryono, Cosmas Gatot. 2023. 1 *DIGITAL PUBLIC RELATIONS: Pemanfaatan Big Data, SEO, CSR, Dan Komunikasi Krisis Dalam Kegiatan Public Relations Di Era Digital*. 1st ed. Jakarta: KENCANA.

Karman. 2019. "Implikasi Penggunaan Data Besar Terhadap Metode Penelitian Agenda-Setting Implication of Big Data Usage Towards Research Method of Agenda-Setting." *Jurnal Studi Komunikasi Dan Media* 23(1): 1–20.

Lewis, Steven, Jessica Holloway, and Bob Lingard. 2022. "Emergent Developments in the Datafication and Digitalization of Education." *Reimagining Globalization and Education* (March): 62–78. doi:10.4324/9781003207528-5.

Manovich, Lev. 2017. "Cultural Data: Possibilities and Limitations of the Digital Data Universe." *Museum and Archive on the Move Changing Cultural Institutions in the Digital Era*: 259–76. http://www.europeana.eu/portal/en.

Merdekawati, Agustiena, and Luci Kanti Rahayu. 2022. "Sistem Pengolahan Nilai Siswa Secara Online." *Jurnal Teknik Informatika Kaputama (JITK)* 6(2): 495–504.

Mertala, Pekka. 2020. "Data (Il)Literacy Education as a Hidden Curriculum of the Datafication of Education." *Journal of Media Literacy Education* 12(3): 30–42. doi:10.23860/JMLE-2020-12-3-4.

Monalisa, Monalisa, Imron Imron, and Albert Riyandi. 2021. "Analisa Kualitas Sistem Informasi E-Raport Pada Sekolah Smpn 5 Kota Tangerang Terhadap Kepuasan Pengguna Menggunakan Metode Webqual 4.0." *INFOTECH journal*: 10–21. doi:10.31949/infotech.v7i1.908.

Pangandaheng, Fony, Joubert Baren Maramis, David Paul Elia Saerang, Lucky Otto Herman Dotulong, and Djurwati Soepeno. 2022. "Transformasi Digital: Sebuah Tinjauan Literatur Pada Sektor Bisnis Dan Pemerintah." *Jurnal EMBA : Jurnal Riset Ekonomi, Manajemen, Bisnis dan Akuntansi* 10(2): 1106–15. doi:10.35794/emba.v10i2.41388.

PANGRAZIO, LUCI, AMY STORNAIUOLO, T. PHILIP NICHOLS, ANTERO GARCIA, and THOMAS M. PHILIP. 2022. "Datafication Meets Platformization: Materializing Data Processes in Teaching and Learning." *Harvard Educational Review* 92(2): 257–83. doi:10.17763/1943-5045-92.2.257.

Sastra, Ricki, Mery Arjohan, Dicky Hariyanto, Arfhan Prasetyo, and Numan Musyaffa. 2023. "Implementasi Penerapan Aplikasi E-Raport Menggunakan Metode RAD Pada SDN Rawa Badak Utara." *IMTechno: Journal of Industrial Management and Technology* 4(1): 42–46. doi:10.31294/imtechno.v4i1.1711.

Stewart, Bonnie E, and Erica Lyons. 2021. "When the Classroom Becomes Datafied: A Baseline for Building Data Ethics Policy and Data Literacies across Higher Education Quando La Classe Diventa Datificata: Una Base Di Partenza per La Costruzione Di Politiche Sull'etica Dei Dati e l'alfabetizzazione ." *Italian Journal of Educational Technology* 29(2): 54–68. doi:10.17471/2499-4324/1203.

Stewart, Bonnie, Erica Miklas, Samantha Szcyrek, and Thu Le. 2023. “Barriers and Beliefs: A Comparative Case Study of How University Educators Understand the Datafication of Higher Education Systems.” *International Journal of Educational Technology in Higher Education* 20(1): 1–20. doi:10.1186/s41239-023-00402-9.

Supriadi, Trys. 2024. “Inovasi Implementasi Sistem Informasi E-Raport Di SMK Negeri 5 Padang.” *Jurnal Pendidikan Tambusai* 8: 3275–81.

Takayama, Keita, and Bob Lingard. 2019. “Datafication of Schooling in Japan: An Epistemic Critique through the ‘Problem of Japanese Education.’” *Journal of Education Policy* 34(4): 449–69. doi:10.1080/02680939.2018.1518542.

Williamson, Ben. 2019. “Datafication of Education.” *Rethinking Pedagogy for a Digital Age* (December): 212–26. doi:10.4324/9781351252805-14.

Williamson, Ben, Sian Bayne, and Suellen Shay. 2020. “The Datafication of Teaching in Higher Education: Critical Issues and Perspectives.” *Teaching in Higher Education* 25(4): 351–65. doi:10.1080/13562517.2020.1748811.

Ydesen, Christian, and Maren Elfert. 2023. “SDG4 as a Global Governance Tool and the Quest for Recognizing Diversity – Implications Emerging from the Intersections between Inclusive Education and Assessment.” *International Journal of Educational Development* 103(November): 102932. doi:10.1016/j.ijedudev.2023.102932.

Yuli Endra, Robby, and Dwi Synta Aprilita. 2018. “E-REPORT BERBASIS WEB MENGGUNAKAN METODE MODEL VIEW CONTROLLER UNTUK MENGETAHUI PENINGKATAN PERKEMBANGAN PRESTASI ANAK DIDIK.” *Jurnal Sistem Informasi dan Telematika* 9(1).

Zhao, Xinyu, Rebecca Ng, Chris Zomer, Gavin Duffy, and Julian Sefton-Green. 2024. “Database as Method: Exposing ‘Data’ about Educational Technology through a Design Intervention.” *Computers and Education Open* 6(April): 100188. doi:10.1016/j.caeo.2024.100188.