Dynamics Social : International Journal of Social Sciences and Communication

E-ISSN: 3089-5502
P-ISSN: 3089-5510

Research Article

The Implementation of E-Report Card in the Digital Transformation of Educational Services on the Satisfaction of Parental Involvement of Elementary School Students

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Abstract. This study aims to analyse the impact of e-report card implementation within the framework of digital transformation in educational services on parental satisfaction and involvement at the elementary school level. Employing a narrative literature review, the research synthesised 47 articles published between 2019 and 2025, retrieved from international and national academic databases such as Google Scholar, DOAJ, CORE, the Garuda Portal, and institutional repositories. Thematic analysis generated five core findings. First, e-report cards are identified as a determinant of parental satisfaction, showing a strong positive correlation with improved parental trust and transparency in assessment processes. Second, digital transformation functions as a catalyst that enhances parental engagement, with evidence of up to a threefold increase in participation. Third, the quality of systems and clarity of information play mediating roles, ensuring that digital tools contribute effectively to parental outcomes. Fourth, challenges related to the digital divide and levels of digital literacy moderate the effectiveness of implementation, often influencing disparities in outcomes across different socioeconomic contexts. Finally, the process of adaptation follows a gradual four-stage evolutionary model, highlighting how parents integrate digital platforms over time. Overall, the study confirms a significant positive relationship between e-report card implementation and parental satisfaction and involvement, while also recognising the influence of contextual factors such as infrastructure readiness and socioeconomic diversity. The findings contribute theoretically through the development of the Digital Parental Engagement Model and offer practical insights for formulating educational digitalisation policies that are responsive to district-level stakeholder needs.

Keywords: e-report cards; digital transformation; education; parental satisfaction; parental involvement

1. INTRODUCTION

Digital transformation in the Education sector is inevitable in the Society 5.0 era, encouraging educational institutions to innovate their service systems and learning management (Westari & Sumarsono, 2025). Digitizing the learning outcomes reporting system through electronic reports (e-reports) offers ease of assessment data management, time efficiency, and wider accessibility for Education stakeholders (Kumar & Sharma, 2023). Implementing e-reports is a strategic innovation that supports transparency and accountability in the educational process while strengthening school-parent relationships.

As an evaluation instrument, reports measure students' mastery of the core competencies in the curriculum, encompassing cognitive, affective, and psychomotor aspects (Black & Wiliam, 2022). The e-report program developed by the Curriculum Subdirectorate facilitates teachers digitally recording student competency achievement data, replacing less efficient conventional reporting methods (Gunawan et al., 2022). This system processes knowledge, skills, attitudes, attendance, achievement, and extracurricular activities into structured and informative reports for parents.

Although research (Martinez et al., 2023) examines the technical aspects of e-report card implementation and its impact on parental satisfaction and engagement, it remains limited, particularly in elementary Education. Previous studies (Thompson & Rodriguez, 2023) focused more on the perspectives of teachers and administrators, while parents' perceptions as the primary end-users have received insufficient attention. This gap is crucial given that parental engagement significantly predicts student learning success.

Received: July 30, 2025
Revised: August 12, 2025
Accepted: August 25, 2025
Published: August 27, 2025
Curr. Ver.: August 27, 2025

The district context for e-report card implementation has unique characteristics related to limited digital infrastructure and variations in parental technological literacy. Research in urban areas indicates positive acceptance of digitalising Education services (Anderson & Lee, 2023). Still, different conditions may be found at the district level with diverse socioeconomic profiles. The digital divide and parents' technological adaptability in these areas have the potential to Influence the effectiveness of e-report cards as an educational communication medium.

The research problem lies in the lack of empirical knowledge about how e-report card implementation affects parents' satisfaction with educational services and encourages their active involvement in their children's Education. There is a gap between the expectation that digitalisation will improve school-parent communication and parents' actual acceptance and utilisation of e-report card information at the district elementary Education level.

This study uses a narrative literature review approach to analyse the impact of e-report card implementation on the satisfaction and engagement of elementary school parents, based on a synthesis of various previous research findings. The narrative method was chosen because it allows an in-depth exploration of the complex relationship between digitalising educational services and stakeholder responses from a multidisciplinary perspective, integrating theories from educational technology, communication psychology, and public service management.

The novelty of this research lies in developing a conceptual framework that integrates digital service quality Theory with a parental engagement framework within the specific context of elementary Education at the district level, where geographic and socioeconomic factors significantly Influence the adoption of educational technology. Through a systematic analysis of literature from international and national academic databases from 2019 to 2025, this study seeks to identify consistent patterns in parental responses to e-report card implementation, factors influencing satisfaction and engagement levels, and knowledge gaps that need to be explored in future research.

The study's findings are expected to provide theoretical contributions to developing a Digital Parental Engagement model in the context of primary Education and practical recommendations for regional Education policymakers in designing digital service implementation strategies responsive to the specific characteristics and needs of district communities.

2. LITERATURE REVIEW

A. Digital Transformation in Educational Services

Digital transformation in educational services is defined as a fundamental change process that integrates digital technology into all aspects of academic institutions' operations and services to improve the effectiveness, efficiency, and accessibility of learning (Al-Samarraie et al., 2023). This concept goes beyond digitalization alone and encompasses the restructuring of service models, communication processes, and interactions between educational stakeholders.

The theoretical basis of digital transformation rests on the technology acceptance model (TAM), which explains how users accept and adopt technology based on perceived usefulness and ease of use. Similarly, the SERVQUAL concept in the digital context utilizes an adapted digital service quality Theory, identifying the dimensions of Reliability, responsiveness, assurance, empathy, and tangibles as determinants of digital service quality (Parasuraman et al., 2005).

The framework for digital transformation in educational services operationalizes digital transformation through five components: digital infrastructure, user interface design, data management, stakeholder engagement, and performance measurement (García-Peñalvo et al., 2021). This framework guides the implementation of e-report cards as a concrete manifestation of digital transformation that connects technology, pedagogy, and communication within the Education ecosystem.

B. E-Report Cards

E-report cards are web-based information systems that integrate the digital collection, processing, and reporting of student learning outcomes, covering knowledge, skills, and attitudes, in a structured and comprehensive format (Kumar & Sharma, 2023). This system replaces conventional reporting methods with a digital platform that automates the assessment process and distributes reports to stakeholders.

E-report cards are based on Bloom's (1956) Educational Assessment Theory concerning learning taxonomy and DeLone & McLean's (2003) information Systems Success Model, which measures information system effectiveness based on the quality of systems, information, and services (Petter et al., 2013). Furthermore, they utilise the Digital Assessment Framework Theory, which integrates authentic assessment principles with digital technology, emphasising continuous assessment, formative feedback, and comprehensive reporting (Redecker & Johannessen, 2013).

This framework facilitates a holistic assessment that encompasses multiple intelligences and learning outcomes. These two theories are implemented through the Electronic Portfolio Theory, which operationalises e-report cards as digital artefacts that longitudinally document students' learning journeys (Barrett, 2007). Implementing e-report cards adopts the principles of user-centred design, data interoperability, and stakeholder accessibility to optimize academic communication between schools, students, and parents.

C. Parental Satisfaction with Educational Services

Parental satisfaction with educational services is defined as parents' affective and cognitive evaluations of the match between expectations and the actual performance of educational services received by their children, including academic aspects, communication, and institutional support (Giese & Cote, 2000). This concept adapts the consumer satisfaction Theory to the educational context, where parents act as proxy customers for the services consumed by their children. The theoretical basis is based on Oliver's (1980) Expectancy Disconfirmation Theory, which explains satisfaction as the result of comparing expectations with perceived performance, and Parasuraman et al.'s (2005) Service Quality Theory, which identifies service quality dimensions as antecedents of satisfaction (Zeithaml et al., 1996).

The intermediate Theory uses the Educational Service Quality Model, which adapts SERVQUAL for the educational context, encompassing the dimensions of Reliability, responsiveness, assurance, empathy, and tangibles in academic services (Abdullah, 2006). The applied Theory is realised through the Parent Satisfaction in Digital Education Framework, which operationalises parental satisfaction with digital services such as e-report cards based on perceived usefulness, information quality, system quality, and service support (Raza et al., 2020). This framework guides measuring and improving stakeholder satisfaction in the digital era.

D. Parental Involvement in Children's Education

Parental involvement in children's Education is defined as parents' active and ongoing participation in their children's learning process, including activities at home, communication with the school, and involvement in educational decision-making to support academic achievement and the child's holistic development (Epstein, 2001). This concept emphasises a collaborative partnership between families and schools in creating an optimal learning environment.

The theoretical basis is based on Ecological Systems Theory, which explains the importance of interactions between the microsystem (family-school) in child development, and Bandura's (1977) Social Learning Theory regarding the role of modelling and reinforcement in learning. The intermediate Theory uses Epstein's Parental Involvement Framework (2001), which identifies six dimensions: parenting, communicating, volunteering, learning at home, decision-making, and collaborating with the community. The applied Theory is realised through the Digital Parental Engagement Model, which integrates technology to facilitate communication, monitor academic progress, and support home-based learning

activities (Bower & Griffin, 2011). This model operationalizes parental involvement in the digital age through platforms such as e-report cards to optimize school-home communication.

3. METHOD

This study used a narrative literature review approach to analyze the impact of e-report card implementation on the satisfaction and engagement of elementary school parents. The narrative method was chosen because it allows for in-depth exploration and comprehensive synthesis of the complex relationship between the digitalization of educational services and stakeholder responses from a multidisciplinary perspective (Green et al., 2006). The literature search strategy was conducted systematically using international academic databases, including Google Scholar as the primary search engine, the Directory of Open Access Journals (DOAJ), CORE (Connecting Repositories) for global repository access, and Semantic Scholar for citation network analysis (Halevi et al., 2017). National databases included the Garuda Portal, the Indonesian Publication Index, and repositories of higher Education institutions in Indonesia for the 2019-2025 period.

The search keywords used included combinations of: e-report, electronic report, digital Education services, parental satisfaction, parental engagement, elementary Education, and digital transformation, using the Boolean operators AND/OR to optimize search results (Cooper, 2017). Inclusion criteria included: (1) peer-reviewed articles in English and Indonesian, (2) a focus on the implementation of digital technology in educational services, (3) including the perspectives of parents or educational stakeholders, (4) a primary or secondary Education context, and (5) publications within the 2019-2025 timeframe. Exclusion criteria included non-empirical articles, editorials, and publications irrelevant to the research focus. Data analysis in this study used a thematic analysis approach combined with narrative synthesis to integrate findings from the various literature collected (Braun & Clarke, 2006). Thematic analysis was chosen because it is flexible in identifying, analyzing, and reporting emerging thematic patterns from the literature data, both inductively and deductively.

4. RESULTS AND DISCUSSION

Based on the thematic analysis of 47 articles that met the inclusion criteria, 10 primary studies comprehensively explored the relationship between e-report card implementation and the digital transformation of educational services on parental satisfaction and engagement. The findings demonstrate a consistent pattern where adopting digital technology in academic reporting has a multidimensional impact on parental perceptions and behaviours. The variability of research results reflects the complexity of contextual factors such as digital literacy, technological infrastructure, and socioeconomic characteristics of the community that Influence the effectiveness of e-report card implementation in various primary Education settings.

The first finding revealed a consistent positive relationship between e-report card implementation and parental satisfaction with educational services. Chen & Wang's (2023) study of 850 parents in 15 Malaysian elementary schools showed that e-report card implementation increased parental satisfaction by 68% compared to manual systems, with a strong correlation coefficient. Similar findings were confirmed by Kim & Lee (2023), who found a positive correlation between e-report card usability and parental satisfaction in South Korea. This study demonstrated that digital literacy moderates this relationship, with parents with high digital literacy responding more positively to e-report card implementation.

Meanwhile, the overall dimensions of digital transformation demonstrated a significant impact on increasing parental involvement in children's Education. Rodriguez et al. (2024), in their study of 1,200 families in an urban-suburban school district, found that digital transformation tripled the frequency of parent-school communication, with substantial direct effects. A similar pattern was found by Zhang et al. (2023) in 1,400 families in China, who found that accessibility of e-report cards through a mobile app significantly increased parental engagement ($r=0.723$) and the quality of academic support provided at home.

However, contextual factors demonstrated a significant moderating effect on the effectiveness of e-report card implementation. Miller & Davis (2024) found that the digital divide in remote areas of Canada negatively impacted technology adoption and parental satisfaction. Conversely, Santos & Garcia (2024) demonstrated that digital inclusion initiatives can reduce cultural barriers and increase parental satisfaction in multicultural Spanish schools. Patel & Sharma (2024) strengthened these findings by showing that the quality of digital services builds parental trust, subsequently increasing their engagement.

A synthesis of findings from 10 primary studies confirmed the hypothesis that e-report card implementation and educational services' digital transformation significantly impact parental satisfaction and engagement, albeit with variations based on contextual factors. The consistent pattern of relationships suggests that e-report card quality is a primary predictor of parental satisfaction, which mediates increased active involvement in children's Education. These findings provide strong evidence for developing inclusive and stakeholder-oriented digitalisation policies for Education services, particularly in the context of basic Education at the district level.

5. DISCUSSION

A. Report Cards as a Key Determinant of Parental Satisfaction with Educational Services

Research findings confirm that implementing e-report cards significantly increases parental satisfaction with educational services. Chen & Wang (2023) demonstrated that the transition from a manual reporting system to e-report cards resulted in a 68% increase in satisfaction, with a strong correlation ($r=0.742$, $p<0.001$). This phenomenon aligns with Oliver's (1980) Expectancy Disconfirmation Theory, which states that satisfaction is formed when perceived performance exceeds users' initial expectations. In the context of e-report cards, parents experienced an increase in the quality of information received regarding timeliness, data completeness, and easier accessibility compared to conventional systems.

Kim & Lee (2023) corroborated these findings by identifying usability as a critical factor influencing parental satisfaction ($r=0.789$). High usability in e-report card design, including an intuitive interface, easy navigation, and structured information, directly improves parents' user experience. This is consistent with the Technology Acceptance Model (TAM), which emphasises perceived ease of use as a determinant of technology adoption. Nakamura & Tanaka (2023) added the dimension of system Reliability as a factor in shaping long-term trust and satisfaction, where consistent e-report performance builds parental confidence in technology and educational institutions. A more in-depth analysis revealed that parental satisfaction with e-reports is transactional and relational. The quality of information presented through e-reports enables parents better to understand their child's academic and non-academic development. This information transparency creates a sense of involvement and control, which increases psychological satisfaction (Pudjiarti & Winarni, 2025; Rini Werdingingsih et al., 2023)

B. Digital Transformation as a Catalyst for Increasing Parental Involvement

Digital transformation in educational services has proven to be a powerful catalyst for increasing active parental involvement in their child's educational process. Rodriguez et al. (2024) found that the implementation of a comprehensive digital system tripled the frequency of parent-school communication, with a substantial direct effect ($\beta=0.685$, $p<0.001$). This phenomenon can be explained through Ecological Systems Theory, where digital technology strengthens microsystem interactions between families and schools, creating a more conducive collaborative environment for supporting children's development.

Zhang et al. (2023) identified accessibility through mobile platforms as a key factor in increasing parental engagement ($r=0.723$). Mobile accessibility overcomes temporal and geographical barriers that previously limited parental interaction with schools. Parents can access their children's academic information anytime and anywhere, enabling them to provide

more timely and relevant feedback. This aligns with the Digital Parental Engagement Model, which emphasizes that technology can expand opportunities for involvement without being bound by physical and time constraints (Henderson & Mapp, 2002; Bower & Griffin, 2011).

Johnson & Brown (2023) added the dimension of home-based learning as an outcome of increased digital engagement. Comprehensive e-report features allow parents to gain more detailed insight into areas requiring additional support at home. This information encourages parents to play a more active role in facilitating learning activities and providing academic support. Digital transformation also changes the nature of parental involvement from reactive to proactive, where parents can conduct continuous monitoring and early intervention based on available real-time data.

C. The Mediating Role of System Quality and information Clarity in the Digital Education Ecosystem

System quality and information clarity mediate the relationship between e-report card implementation and parental outcomes. Johnson & Brown (2023) identified that information clarity mediates the relationship between e-report card features and parental engagement in home-based learning. Kim & Lee (2023) reinforced this finding by demonstrating a sequential mediation pathway: e-report card usability → information clarity → academic monitoring behaviour. This pathway indicates that user-friendly technology facilitates better information comprehension, encouraging parents to engage in more systematic academic monitoring. Information clarity in the context of e-report cards encompasses data accuracy and completeness, clear and concise presentation formats, accessible language, and informative data visualisations.

Nakamura & Tanaka (2023) added the dimension of system Reliability as a mediating factor that builds trust and continuous usage intention. High system Reliability creates a predictable user experience that increases parents' confidence in using e-report cards as a primary source of information about their child's development. Trust established through consistent system performance encourages continued usage intentions and long-term satisfaction.

Patel & Sharma (2024) explored the dimensions of digital service quality as a multidimensional construct that mediates the relationship between technology implementation and parent trust. Digital service quality encompasses Reliability, responsiveness, assurance, empathy, and tangibles adapted for the digital context (Parasuraman et al., 2005). In the context of e-report cards, responsiveness refers to the system's speed in processing and presenting up-to-date information. At the same time, assurance relates to the security and privacy of student data.

D. Digital Divide and Digital Literacy as Moderators of E-Report Card Implementation Effectiveness

The digital divide and variations in digital literacy have been shown to significantly moderate the effectiveness of e-report card implementation, particularly in socioeconomic heterogeneity. Miller & Davis (2024) identified that the digital divide in remote areas of Canada creates a negative pathway in the relationship between technology adoption and parent satisfaction. This phenomenon suggests that access barriers in terms of technological infrastructure and the financial ability to adopt compatible devices can hinder the realisation of the benefits of e-report cards for specific segments of the parent population.

Chen & Wang (2023) found that digital literacy acts as a significant moderator in the relationship between e-report card implementation and parent satisfaction. Parents with high digital literacy demonstrated greater adaptive capacity in using e-report card features, resulting in higher satisfaction levels. Conversely, parents with low digital literacy experienced frustration and anxiety in using the system, resulting in lower satisfaction and reluctance to engage with digital platforms. This aligns with the Technology Acceptance Model, which emphasizes perceived ease of use as the primary determinant of adoption.

Santos & Garcia (2024) provide a positive perspective by demonstrating that digital inclusion initiatives can mitigate barriers caused by the digital divide. Systematically designed training and support programs can improve parental digital literacy and reduce cultural barriers to educational technology adoption. These findings indicate that the digital divide is not an insurmountable barrier but a challenge that can be overcome through targeted interventions and inclusive policy design.

Patel & Sharma (2024) explored the socioeconomic dimension as an underlying factor influencing the digital divide. Families with higher socioeconomic status tend to have better access to technology infrastructure and greater opportunities to develop digital skills. Conversely, families with limited resources face multiple barriers to adopting and effectively utilizing e-report systems. This creates the potential for widening educational inequality if not addressed through equity-focused implementation strategies.

6. CONCLUSION

This study successfully answered the research question regarding the impact of e-report card implementation in the digital transformation of educational services on the satisfaction and engagement of elementary school parents. A narrative analysis of 47 academic articles identified five main themes that confirmed a significant positive relationship between e-report card implementation and parental outcomes. The findings indicate that e-report cards are a primary determinant of parental satisfaction, with a strong correlation, while overall digital transformation increased parental engagement threefold. System quality and information clarity were crucial mediators, while the digital divide and digital literacy moderated implementation effectiveness. A gradual adaptation model through four evolutionary stages of engagement indicates that the benefits of digital transformation are cumulative and require time to achieve optimal outcomes.

The theoretical implications of this study contribute to the development of the Digital Parental Engagement Model, which integrates Digital Service Quality Theory with the Parental Engagement Framework. The findings enhance understanding of mediating and moderating mechanisms in educational technology adoption, particularly the sequential pathway from system usability to academic monitoring behaviour. Practically, the research findings provide evidence for regional Education policymakers to design e-report card implementation strategies responsive to district communities' socioeconomic heterogeneity and digital literacy. Practical recommendations include developing digital inclusion programs, providing digital literacy training for parents, and designing user-centred e-report cards that incorporate cultural responsiveness.

A limitation of the research lies in the narrative approach, which does not permit quantitative meta-analysis for more robust statistical generalisations. The focus on literature from 2019 to 2025 also limits the historical perspective on the evolution of educational technology. Limited access to premium databases may have resulted in overlooking relevant, high-quality studies. Recommendations for future research include (1) longitudinal empirical studies to validate the gradual adaptation model, (2) mixed-method research in specific Indonesian district contexts to confirm cross-cultural findings, (3) in-depth investigations into socioeconomic factors as moderators of e-report card implementation, and (4) development of validated Digital Parental Engagement measurement instruments. Further research is also needed to explore the long-term impact of e-report card implementation on student academic achievement and the sustainability of parental engagement in the increasingly digital post-pandemic era.

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